



DRAWDOWN GA

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Forestry Sector

Local GHG Emissions Tracker

Technical Documentation
Figures for Major Data Sources
and Emissions Calculations



Forestry sector emissions

Forestry data sources

- EPA State Inventory Tool (**SIT**) for statewide forestry flux
- National Land Cover Dataset (**NLCD**)
 - 30-meter raster coverage with
 - 19 land use categories, including
 - Deciduous, evergreen, and mixed forest, and woody wetlands
- NOAA 1990-2020 station-level **climatology** with growing degree days between 50 and 86 degrees F
- Oak Ridge National Laboratory estimates of county **forest flux** from 2010-2016

Forestry strategy

1. Use **NLCD** to sum forestry area by county from four classes
2. Interpolate between years and forecast by 10-year linear trend
3. Use **ORNL** data to calculate county flux per acre
4. Multiply flux per acre by county forest acres to calculate county flux
5. Calculate county percentage shares of statewide flux
6. Multiply **SIT** annual forestry flux times county shares to calculate county annual flux
7. Calculate each county's total **GDDs** and each month's percentage of the annual total
8. Multiply county GDD monthly shares times annual flux to calculate monthly flux

EPA State Inventory Tool for Georgia

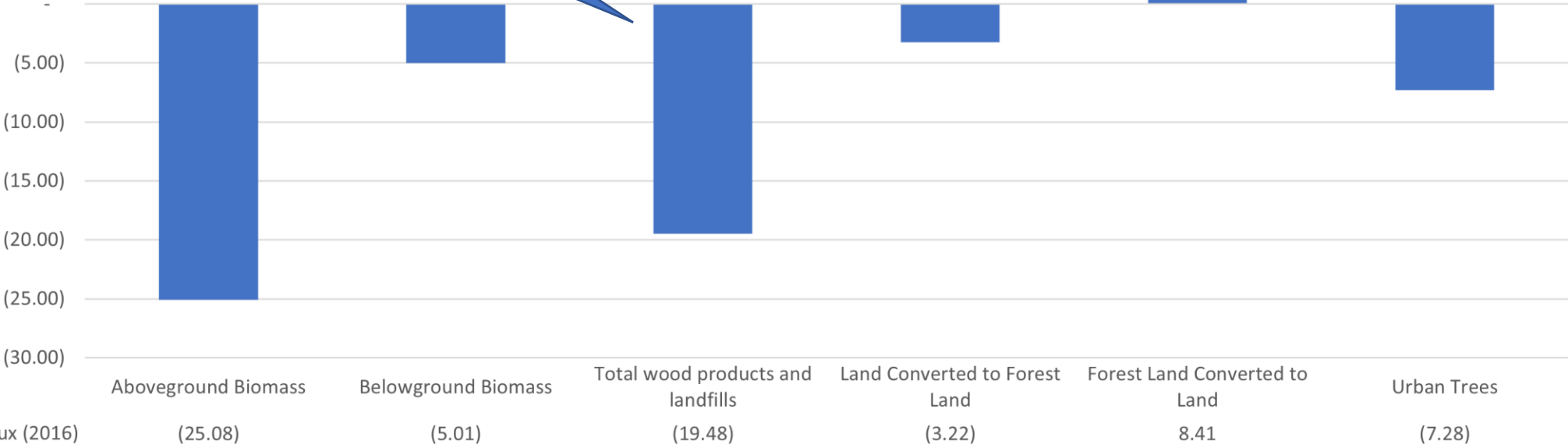
Forestry Emissions and Flux in MMTCO₂e

Emissions by Sector	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Energy	191.21	188.49	190.81	176.97	167.23	176.31	160.59	140.25	138.24	142.76	140.30	140.12	138.15	137.54	89%
CO ₂ from Fossil Fuel Combustion	186.77	184.32	186.86	173.34	163.85	172.97	157.47	137.36	135.39	139.91	137.60	137.42	135.57	134.96	87%
Stationary Combustion	0.88	0.88	0.89	0.81	0.77	0.85	0.78	0.66	0.71	0.77	0.66	0.67	0.61	0.62	0%
Mobile Combustion	2.11	1.86	1.62	1.38	1.18	1.05	0.90	0.79	0.70	0.64	0.60	0.59	0.53	0.52	0%
Coal Mining	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
Natural Gas and Oil Systems	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1%
Industrial Processes	4.66	4.98	5.20	5.65	5.92	6.20	6.38	6.51	6.59	6.88	7.00	6.96	7.03	7.13	5%
Agriculture	7.62	7.69	7.93	7.52	7.40	7.13	6.80	7.15	7.26	7.35	7.57	7.19	7.25	7.07	5%
Enteric Fermentation	2.15	2.11	2.10	2.02	1.97	1.92	1.87	1.90	1.86	1.90	1.89	1.99	1.99	1.92	1%
Manure Management	1.67	1.65	1.71	1.67	1.60	1.58	1.62	1.63	1.62	1.66	1.71	1.72	1.72	1.75	1%
Agricultural Soil Management	3.77	3.79	4.00	3.81	3.80	3.56	3.24	3.58	3.74	3.75	3.94	3.45	3.51	3.38	2%
Rice Cultivation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
Liming	0.03	0.12	0.10	-	-	0.03	0.05	-	-	-	-	-	-	-	0%
Urea	0.01	0.01	0.02	0.02	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0%
Burning of Agricultural Crop Waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%
LULUCF	(48.77)	(49.14)	(49.37)	(49.65)	(49.93)	(50.71)	(51.63)	(52.49)	(53.13)	(53.88)	(53.17)	(52.59)	(51.89)	(51.19)	-33%
Waste	5.92	5.26	5.26	5.32	5.73	5.05	4.72	3.82	3.90	4.11	3.79	3.83	3.84	2.68	2%
Municipal Solid Waste	4.91	4.22	4.20	4.25	4.65	3.98	3.65	2.74	2.81	3.00	2.67	2.70	2.69	1.52	1%
Wastewater	1.01	1.04	1.06	1.07	1.08	1.07	1.07	1.09	1.10	1.11	1.12	1.14	1.15	1.16	1%
Indirect CO₂ from Electricity Consumption*	89.93	91.95	94.02	88.30	81.42	87.56	79.49	70.98	69.78	71.67	68.36	66.08	61.29	61.80	40%
Gross Emissions	209.40	206.42	209.20	195.46	186.29	194.69	178.50	157.73	155.99	161.09	158.66	158.10	156.27	154.42	
Sinks	(48.77)	(49.14)	(49.37)	(49.65)	(49.93)	(50.71)	(51.63)	(52.49)	(53.13)	(53.88)	(53.17)	(52.59)	(51.89)	(51.19)	-33%
Net Emissions	160.63	157.27	159.83	145.81	136.36	143.98	126.87	105.24	102.86	107.21	105.49	105.51	104.38	103.23	

EPA SIT Land Use, Land Change, Forestry (LULCF) major categories in MMTCO₂e

Net LULCF Carbon Flux (2016)

Total wood products and landfills:
-19.48 MMT

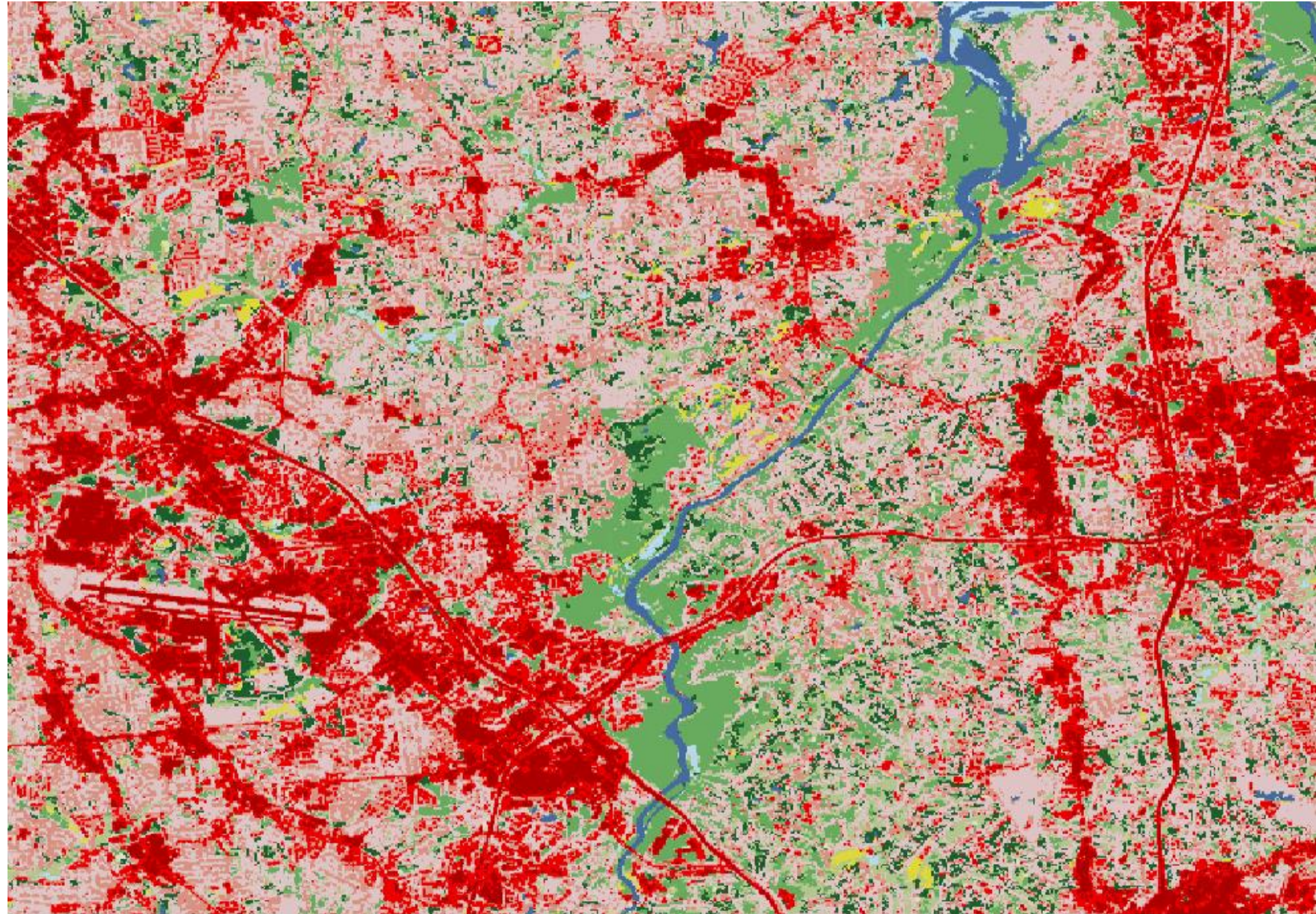


Georgia SIT harvested wood products in use and sequestered in land fills

- **US** 2018 total: **98.8** MMT
- **Georgia** SIT annual totals 1994-2018: **19.48** MMT
- If the Georgia SIT is correct,
- Georgia is sequestering **20%** of US total harvested wood products, with about **3%** of the US population, and **9%** of timber/logging employment
- Would it make sense to allocate 9% of the national value (based upon timber/logging employment) rather than 20%?

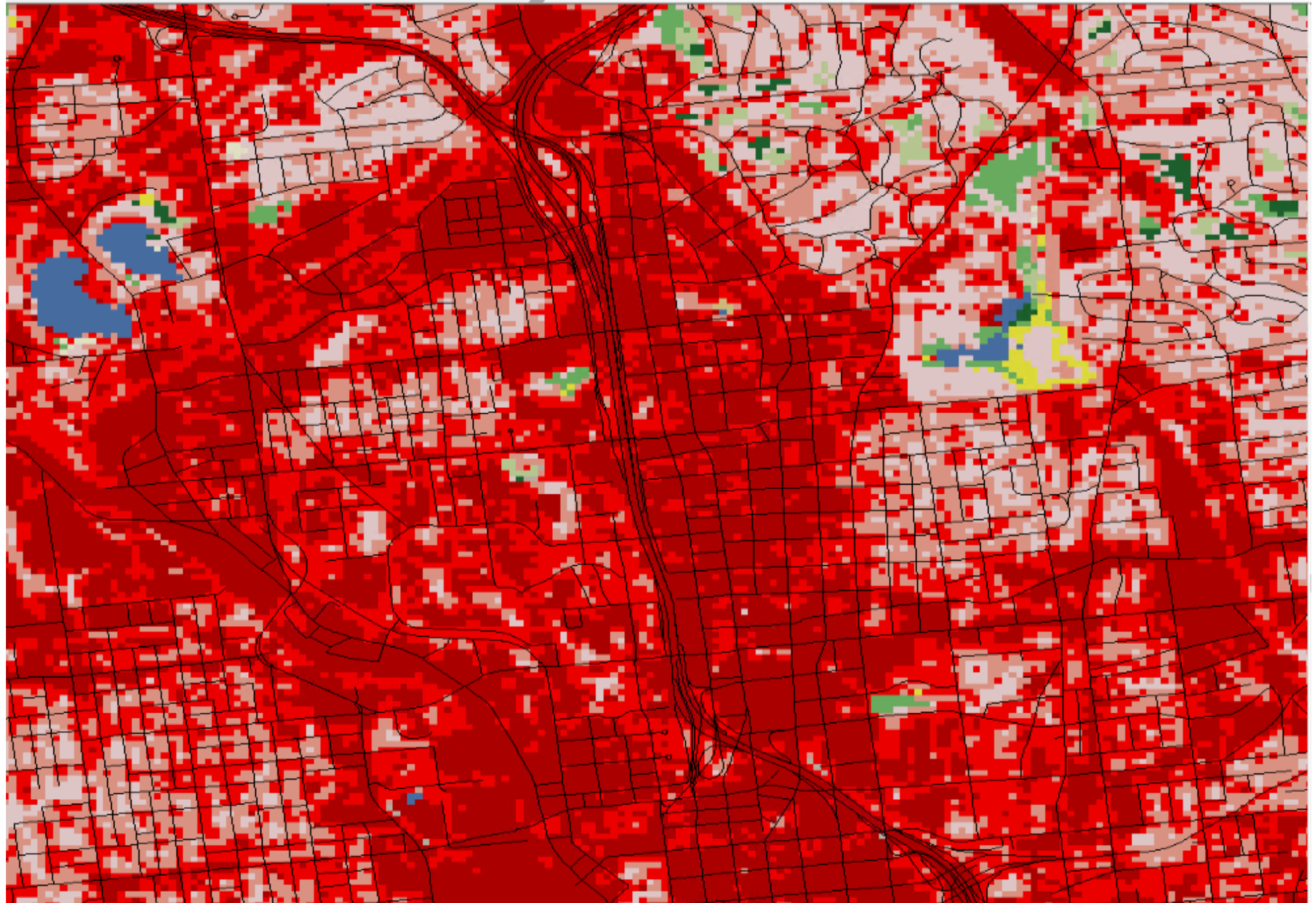
NLCD 2019

Northwest of
Atlanta, with
Dobbins AFB
to the lower
left and
Chattahoochee
NRA from
bottom center
to upper right



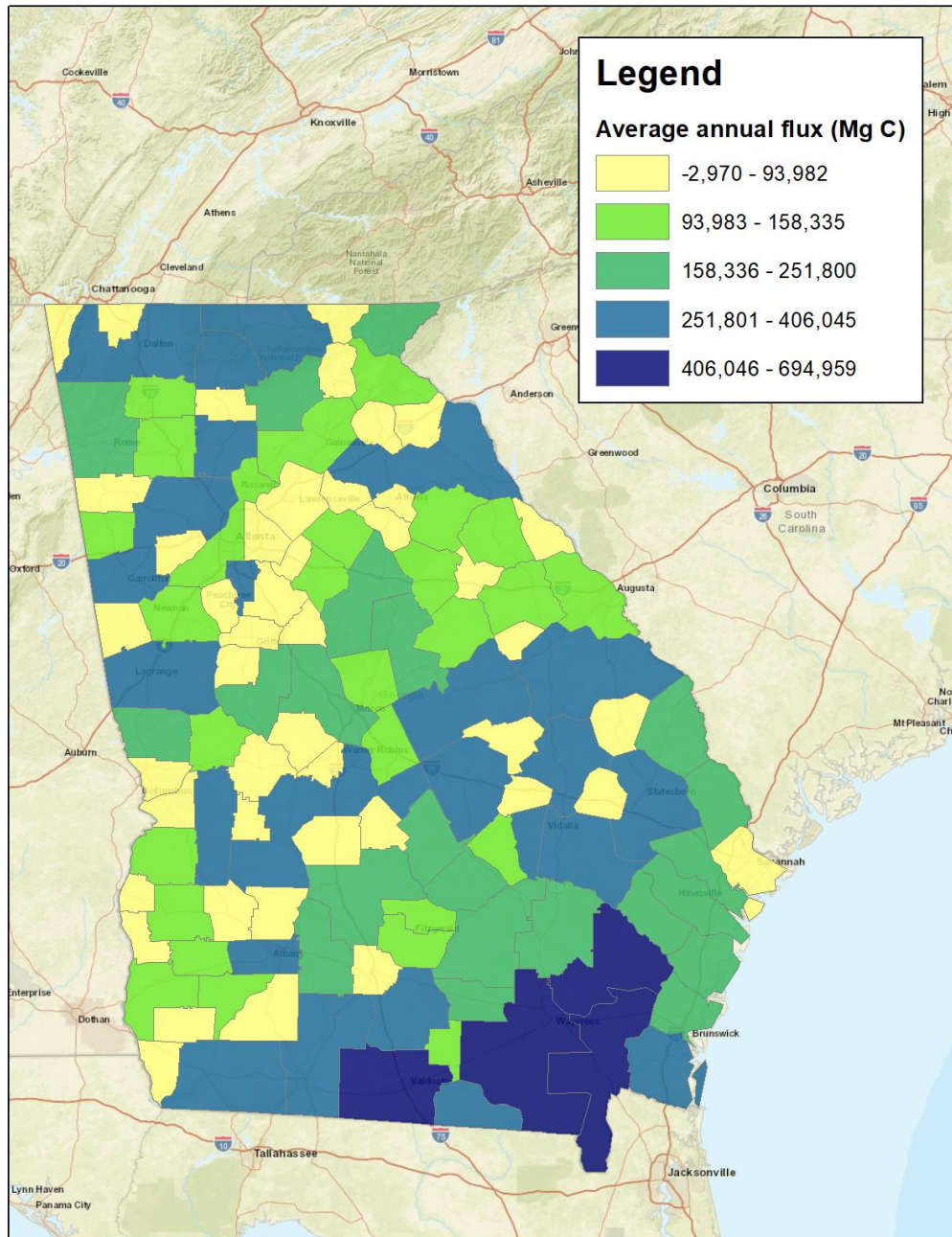
NLCD 2019

Midtown
Atlanta with
Georgia Tech
to the center
left and
Piedmont
Park to the
upper right



NLCD Forest Totals by County

COUNTY	Acres	Deciduous	Evergreen	Mixed	Woody	Non-	All Forest	Deciduous	Evergreen	Mixed	Woody	Non-	All Forest	Deciduous	Evergreen	Mixed	Woody	Non-	All Forest	Square Miles	
		Forest	Forest	Forest	Wetlands	wetland		Forest	Forest	Forest	Wetlands	wetland		Forest	Forest	Forest	Wetlands	wetland			Forest
		2000	2000	2000	2000	2000	2000	2011	2011	2011	2011	2011	2011	2016	2016	2016	2016	2016	2016	2016	
Appling	328,027	1,686	94,684	3,933	94,916	100,304	195,220	1,403	91,944	3,562	89,603	96,908	186,511	1,084	85,222	3,119	91,312	89,425	180,738	512.54	
Atkinson	220,550	1,302	72,091	2,357	67,065	75,750	142,816	1,173	74,499	1,830	65,340	77,502	142,842	967	71,801	1,539	66,463	74,306	140,769	344.61	
Bacon	182,977	611	53,620	1,031	50,737	55,261	105,998	509	46,773	876	48,993	48,157	97,150	407	42,121	790	49,214	43,317	92,532	285.90	
Baker	223,242	5,649	51,744	9,840	35,972	67,232	103,204	5,119	52,177	9,773	35,885	67,069	102,953	4,989	52,555	9,793	35,470	67,338	102,808	348.82	
Baldwin	171,703	38,024	40,594	19,023	11,706	97,641	109,346	37,137	42,508	20,200	11,762	99,845	111,607	35,474	43,918	20,526	11,535	99,918	111,453	268.29	
Banks	149,684	72,180	6,904	11,797	4,426	90,881	95,306	67,682	7,279	12,993	4,301	87,954	92,255	68,275	7,331	13,615	4,434	89,220	93,654	233.88	
Barrow	104,266	30,118	8,464	8,215	3,129	46,797	49,926	26,753	7,738	8,652	3,038	43,143	46,181	27,217	7,851	8,922	3,060	43,989	47,050	162.91	
Bartow	300,837	85,168	54,212	27,728	841	167,108	167,949	76,639	51,624	27,583	768	155,846	156,614	76,835	53,442	28,472	756	158,749	159,505	470.06	
Ben Hill	162,501	2,343	57,668	3,702	32,614	63,713	96,326	2,270	61,862	3,597	32,665	67,730	100,395	1,951	56,321	3,322	32,503	61,593	94,096	253.91	
Berrien	293,055	1,796	83,649	4,099	81,176	89,544	170,720	1,725	85,836	3,934	81,001	91,494	172,495	1,659	82,373	3,669	80,945	87,701	168,646	457.90	
Bibb	163,448	21,764	17,080	23,063	23,280	61,906	85,187	18,274	16,065	22,601	23,171	56,940	80,110	18,428	17,128	23,019	23,512	58,575	82,087	255.39	
Bleckley	140,238	6,283	31,192	10,387	23,439	47,863	71,303	5,259	30,068	9,421	23,191	44,747	67,938	4,971	30,840	9,477	23,449	45,289	68,737	219.12	
Brantley	286,511	122	105,503	273	111,557	105,898	217,454	189	84,285	127	109,293	84,600	193,893	222	72,684	83	111,863	72,988	184,851	447.67	
Brooks	318,554	3,534	80,412	14,501	76,565	98,446	175,011	3,197	81,683	13,549	77,226	98,429	175,655	2,933	79,508	13,219	77,358	95,660	173,018	497.74	
Bryan	291,266	540	112,638	2,431	95,289	115,609	210,898	491	110,326	2,011	95,327	112,829	208,155	469	105,024	1,612	95,856	107,105	202,961	455.10	
Bulloch	441,196	2,427	75,402	5,676	147,359	83,504	230,864	2,406	81,330	5,091	145,979	88,827	234,806	2,157	77,574	4,628	146,529	84,358	230,887	689.37	
Burke	534,000	34,811	103,084	6,587	146,332	144,482	290,814	36,446	100,322	6,070	145,435	142,838	288,273	39,009	92,067	5,714	145,233	136,790	282,023	834.37	
Butts	120,326	34,483	32,155	7,940	4,706	74,578	79,284	33,449	31,364	8,774	4,412	73,587	77,999	34,191	31,625	8,943	4,518	74,759	79,277	188.01	
Calhoun	181,777	5,789	26,281	9,440	51,569	41,511	93,079	5,226	28,226	9,328	51,737	42,780	94,516	5,009	27,771	9,291	51,554	42,070	93,624	284.03	
Camden	501,016	2,598	142,536	254	122,720	145,389	268,109	3,037	139,720	191	122,311	142,948	265,259	3,173	134,097	160	122,830	137,430	260,259	782.84	
Candler	159,389	945	34,240	2,695	45,029	37,881	82,910	956	34,646	2,640	44,771	38,242	83,013	861	33,356	2,546	44,571	36,763	81,334	249.05	



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CMS: Forest Carbon Stocks, Emissions, and Net Flux for the Conterminous US: 2005-2010

Get Data

Documentation Revision Date: 2016-05-31

Data Set Version: V1

Summary

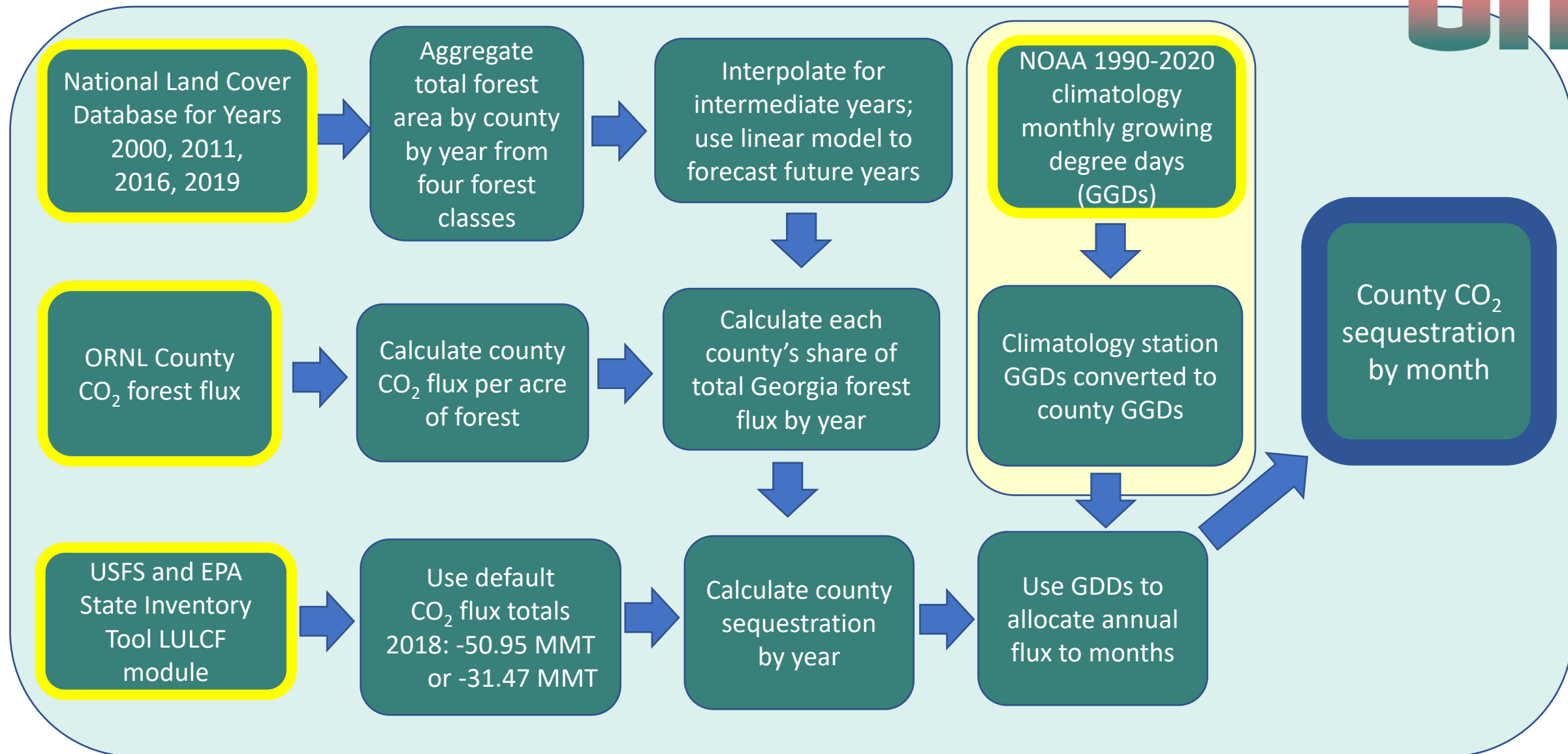
This data set provides maps of estimated carbon in forests of the 48 continental states of the US for the years 2005-2010. Carbon (termed committed carbon) stocks were estimated for forest aboveground biomass, belowground biomass, standing dead stems, and litter for the year 2005. Carbon emissions were estimated from land use conversion to agriculture, insect damage, logging, wind, and weather events in the forests for the years 2006 - 2010. Committed net carbon flux was estimated as the sum of carbon emissions and sequestration. The maps are provided at 100-m spatial resolution in GeoTIFF format. Average annual carbon estimates, by US county, for (1) emissions for the multiple disturbance sources, (2) sequestration, and (3) the committed net carbon flux are provided in an ESRI shapefile.

Data sources included forest carbon stock maps, tree cover change data, Forest Inventory and Analysis Database (FIA) plot data, biomass derived from Geoscience Laser Altimeter System (GLAS) data, and auxiliary spatial data sets collected by various US agencies on types of forest disturbances. The data were integrated into a synthesis framework to attribute changes in forest carbon stocks to specific disturbances in the forests and to estimate the spatial distribution of carbon emissions and removals across US forest lands.

Committed net carbon flux was estimated as the sum of gross committed carbon emissions and carbon sequestration. This committed net carbon flux includes future emissions from decomposing plant matter killed during disturbances occurring between 2006 and 2010 and does not include the same type of flux resulting from disturbances occurring before 2006.

Hagen, S., N. Harris, S.S. Saatchi, T. Pearson, C.W. Woodall, S. Ganguly, G.M. Domke, B.H. Braswell, B.F. Walters, J.C. Jenkins, S. Brown, W.A. Salas, A. Fore, Y. Yu, R.R. Nemani, C. Ipsan, and K.R. Brown. 2016. CMS: Forest Carbon Stocks, Emissions, and Net Flux for the Conterminous US: 2005-2010. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1313>

Forestry calculations



2018 Monthly Forest Uptake in Metric Tons of CO₂

