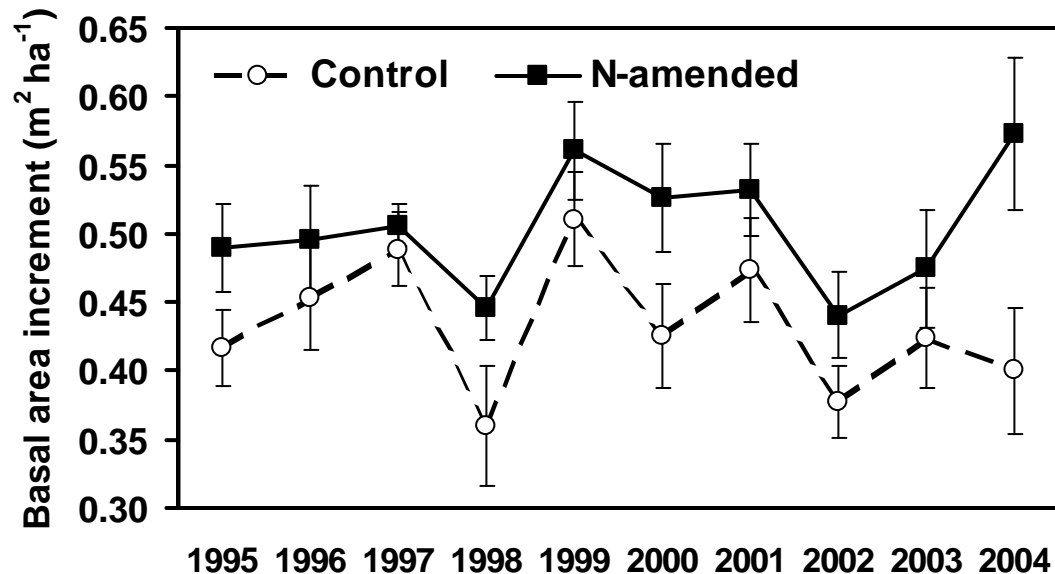


Michigan Gradient Study: Productivity data from 1988 through 2004.

Parameters listed below include [basal area](#) ($\text{m}^2 \text{ha}^{-1}$), annual [basal area increment](#) for living trees ($\text{m}^2 \text{ha}^{-1}$), [aboveground net primary productivity](#) (ANPP = litter mass plus woody biomass increment), and [woody biomass increment](#) for living trees. Stand level tree growth data were calculated from annual dbh measurement made for each tree after the end of the growing season and heights measured every five to six years. Heights for years in between measurement years are interpolated. Procedures for calculating biomass at the tree and stand level are described in Reed et al. (1994). Data also are available for tree mortality and the locations of all trees are known. Much of the data is the subject of manuscripts in review or in press. Please contact K.S. Pregitzer (kspregit@mtu.edu) for the status of these manuscripts, to enable proper citation of any data used.



Basal area increment for the control and simulated NO_3^- deposition treatment from 1995 through 2004.

Basal area (m² ha⁻¹)

Site	Plot	Treatment	Parameter	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
A	1	C	Basal area	32.2	32.3	32.7	32.8	33.2	33.7	33.8	34.2	34.2	34.5	34.9	35.1	35.3	35.1	35.4	35.8	36.2	36.3
A	2	C	Basal area	31.5	31.6	31.9	31.9	32.1	32.6	33.0	33.2	33.5	33.8	34.3	34.4	33.8	33.5	33.8	34.3	34.3	34.1
A	3	C	Basal area	31.7	31.7	32.1	32.5	32.7	33.1	33.7	33.8	34.0	34.4	34.8	34.5	33.7	33.3	33.0	33.2	33.5	33.8
A	4	+N	Basal area								33.9	34.5	34.8	35.3	35.5	35.9	36.3	36.8	37.3	36.5	35.6
A	5	+N	Basal area								33.6	34.0	34.4	34.8	35.2	34.5	34.8	35.1	35.5	35.8	36.1
A	6	+N	Basal area								34.8	35.1	35.6	36.1	36.4	36.7	37.2	37.5	37.9	38.1	38.7
B	1	C	Basal area	28.1	28.4	28.6	29.1	29.1	29.2	29.4	28.8	29.0	29.5	29.8	30.1	30.7	31.2	31.7	31.8	32.2	32.7
B	2	C	Basal area	29.4	29.6	29.9	30.3	30.3	30.8	30.6	30.9	31.3	31.8	31.7	31.9	32.3	32.7	33.2	33.5	34.0	33.6
B	3	C	Basal area	30.7	30.9	31.2	31.3	31.5	31.9	32.2	32.5	32.8	33.3	32.5	32.1	32.7	33.2	32.8	33.2	33.4	33.6
B	4	+N	Basal area								39.0	39.4	40.0	40.3	40.7	41.5	42.4	42.8	43.4	43.9	44.3
B	5	+N	Basal area								24.4	24.6	24.9	25.1	25.3	25.8	26.4	26.3	26.6	26.2	26.6
B	6	+N	Basal area								28.3	28.5	28.5	28.8	29.0	29.5	29.6	30.0	30.3	29.6	29.6
C	1	C	Basal area	31.3	31.6	31.7	32.2	32.5	32.8	33.3	33.7	34.1	34.2	33.4	33.9	34.3	34.8	35.3	35.4	35.9	36.3
C	2	C	Basal area	26.7	27.1	27.3	27.8	28.2	28.6	28.9	29.4	29.7	30.1	29.8	30.1	30.6	30.1	30.4	30.1	30.5	30.9
C	3	C	Basal area	31.9	32.1	32.1	32.7	32.5	32.9	33.2	33.6	33.6	33.6	33.9	33.4	33.9	34.4	34.4	34.3	34.2	34.7
C	4	+N	Basal area								30.7	31.1	31.7	31.0	31.3	31.6	32.2	32.6	30.9	31.3	31.7
C	5	+N	Basal area								30.1	30.2	30.4	30.1	30.5	30.9	31.4	31.5	31.4	32.0	32.7
C	6	+N	Basal area								31.2	31.2	31.3	31.1	31.6	31.8	32.4	32.6	32.8	32.4	30.3
D	1	C	Basal area	31.4	31.8	31.8	32.5	32.3	32.8	33.2	33.6	33.8	33.9	33.2	32.3	32.7	32.9	33.4	33.7	34.1	34.5
D	2	C	Basal area	30.4	30.7	30.9	31.8	32.4	33.4	33.9	34.6	35.0	35.4	35.3	35.4	36.0	36.6	37.0	37.2	37.8	38.0
D	3	C	Basal area	27.6	27.7	27.9	28.5	28.8	29.5	30.0	30.7	30.8	31.1	31.6	31.8	32.4	31.9	32.5	32.8	33.4	33.6
D	4	+N	Basal area								39.0	39.3	39.6	38.9	37.3	37.8	37.7	38.2	38.8	38.2	39.1
D	5	+N	Basal area								36.1	35.6	36.0	35.6	36.0	36.2	36.1	36.7	36.8	37.4	38.2
D	6	+N	Basal area								33.4	33.6	33.8	34.3	34.7	34.9	35.4	35.8	36.2	37.1	37.7

Basal area increment ($\text{m}^2 \text{ha}^{-1}$) (calculated from the annual basal area growth of all trees living at the end of the year listed)

Site	Plot	Treatment	Parameter	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
A	1	C	BA increment	0.20	0.39	0.30	0.44	0.52	0.58	0.51	0.27	0.30	0.54	0.34	0.36	0.28	0.35	0.40	0.39	0.17
A	2	C	BA increment	0.25	0.24	0.46	0.20	0.47	0.48	0.29	0.32	0.36	0.57	0.07	0.32	0.17	0.28	0.56	0.14	0.15
A	3	C	BA increment	0.23	0.46	0.39	0.23	0.37	0.55	0.26	0.32	0.39	0.60	0.10	0.32	0.24	0.25	0.34	0.32	0.25
A	4	+N	BA increment							0.52	0.53	0.32	0.53	0.45	0.37	0.41	0.54	0.50	0.18	0.51
A	5	+N	BA increment							0.46	0.42	0.42	0.42	0.45	0.39	0.31	0.44	0.39	0.44	0.23
A	6	+N	BA increment							0.46	0.41	0.57	0.54	0.41	0.51	0.42	0.36	0.64	0.29	0.52
B	1	C	BA increment	0.27	0.27	0.43	0.37	0.43	0.52	0.38	0.34	0.68	0.48	0.31	0.63	0.50	0.50	0.23	0.37	0.53
B	2	C	BA increment	0.23	0.33	0.33	0.23	0.47	0.52	0.29	0.47	0.65	0.40	0.39	0.62	0.53	0.54	0.33	0.47	0.33
B	3	C	BA increment	0.24	0.24	0.33	0.39	0.46	0.52	0.35	0.42	0.64	0.31	0.45	0.62	0.46	0.47	0.33	0.44	0.36
B	4	+N	BA increment							0.65	0.68	0.77	0.57	0.59	0.79	0.84	0.81	0.57	0.61	0.53
B	5	+N	BA increment							0.54	0.56	0.61	0.49	0.46	0.67	0.63	0.52	0.33	0.50	0.42
B	6	+N	BA increment							0.43	0.47	0.52	0.44	0.32	0.55	0.55	0.41	0.30	0.31	0.34
C	1	C	BA increment	0.46	0.14	0.70	0.45	0.55	0.48	0.42	0.47	0.41	0.51	0.51	0.55	0.47	0.50	0.47	0.49	0.37
C	2	C	BA increment	0.54	0.20	0.50	0.36	0.57	0.35	0.53	0.44	0.51	0.39	0.47	0.58	0.53	0.55	0.46	0.43	0.52
C	3	C	BA increment	0.34	0.04	0.58	0.31	0.41	0.36	0.43	0.38	0.34	0.41	0.41	0.51	0.45	0.43	0.34	0.41	0.59
C	4	+N	BA increment							1.00	0.54	0.58	0.55	0.46	0.68	0.60	0.65	0.53	0.61	0.79
C	5	+N	BA increment							0.76	0.28	0.38	0.46	0.43	0.52	0.50	0.49	0.45	0.54	0.71
C	6	+N	BA increment							0.91	0.38	0.58	0.57	0.59	0.59	0.62	0.53	0.44	0.46	0.88
D	1	C	BA increment	0.41	0.02	0.73	0.29	0.51	0.59	0.36	0.45	0.42	0.50	0.29	0.46	0.39	0.49	0.28	0.41	0.39
D	2	C	BA increment	0.31	0.21	1.01	0.61	0.88	0.78	0.67	0.59	0.39	0.61	0.57	0.61	0.61	0.69	0.40	0.63	0.60
D	3	C	BA increment	0.26	0.21	0.57	0.40	0.70	0.74	0.65	0.54	0.36	0.55	0.41	0.56	0.49	0.64	0.37	0.58	0.55
D	4	+N	BA increment							0.91	0.60	0.43	0.47	0.41	0.48	0.44	0.51	0.32	0.56	0.57
D	5	+N	BA increment							0.84	0.56	0.45	0.55	0.40	0.67	0.53	0.60	0.48	0.68	0.75
D	6	+N	BA increment							0.68	0.46	0.32	0.48	0.37	0.49	0.46	0.53	0.34	0.52	0.61

Aboveground Net Primary Productivity (ANPP, g m⁻²) (sum of woody biomass increment and litterfall)

Site	Plot	Treatment	Parameter	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
A	1	C	ANPP								746	805	960	783	826	781	846	922	961	613
A	2	C	ANPP								879	892	1057	606	808	742	899	1101	726	720
A	3	C	ANPP								922	889	1106	666	815	779	786	861	870	749
A	4	F	ANPP								928	926	1074	1015	930	1039	1135	1151	814	1084
A	5	F	ANPP								792	922	907	985	798	835	943	929	1040	772
A	6	F	ANPP								722	1027	996	933	986	923	893	1130	871	1055
B	1	C	ANPP								820	1243	873	841	1111	1020	921	638	854	959
B	2	C	ANPP								951	1305	883	967	1205	1117	1117	824	1059	860
B	3	C	ANPP								961	1279	790	1012	1169	1005	970	804	1013	858
B	4	F	ANPP								1226	1442	1086	1277	1450	1516	1433	1187	1281	1184
B	5	F	ANPP								1084	1249	960	1029	1251	1228	1049	824	1129	967
B	6	F	ANPP								827	1046	810	820	1105	1121	877	730	764	775
C	1	C	ANPP								950	979	990	1033	1130	1074	1119	1019	1053	897
C	2	C	ANPP								931	1054	890	1001	1224	1196	1204	1071	1098	1114
C	3	C	ANPP								1033	1082	1085	1120	1234	1221	1158	1011	1080	1280
C	4	F	ANPP								1090	1139	1062	1025	1303	1224	1266	1088	1253	1388
C	5	F	ANPP								923	1071	1089	1114	1247	1248	1270	1119	1260	1445
C	6	F	ANPP								945	1187	1085	1250	1275	1393	1258	1125	1076	1465
D	1	C	ANPP								875	909	954	837	1098	976	1071	841	962	967
D	2	C	ANPP								1199	1099	1242	1281	1227	1414	1513	1199	1434	1713
D	3	C	ANPP								1105	981	1078	1034	1252	1146	1245	954	1200	1148
D	4	F	ANPP								1281	1255	1216	1168	1270	1289	1336	1061	1289	1372
D	5	F	ANPP								1252	1230	1188	1196	1598	1359	1432	1201	1405	1574
D	6	F	ANPP								1083	1078	1123	1081	1342	1219	1331	1074	1276	1402

Aboveground woody biomass increment (g m⁻²) (calculated as described in Reed et al. 1994)

Site	Plot	Treatment	Parameter	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
A	1	C	Wood increment								396	417	624	438	496	419	495	554	547	328
A	2	C	Wood increment								495	527	721	286	483	354	464	734	325	353
A	3	C	Wood increment								483	543	734	266	467	428	437	509	504	445
A	4	F	Wood increment								548	516	711	648	579	623	757	716	435	739
A	5	F	Wood increment								441	562	571	609	502	483	599	567	626	429
A	6	F	Wood increment								421	694	676	581	666	597	555	805	503	719
B	1	C	Wood increment								437	750	563	419	711	603	605	349	490	650
B	2	C	Wood increment								605	781	547	550	786	702	720	508	660	527
B	3	C	Wood increment								555	765	454	584	741	586	605	467	590	504
B	4	F	Wood increment								857	948	762	794	999	1059	1023	789	847	772
B	5	F	Wood increment								675	734	624	599	814	783	678	494	682	604
B	6	F	Wood increment								519	578	497	393	620	621	481	373	391	429
C	1	C	Wood increment								564	498	603	619	660	582	613	589	611	496
C	2	C	Wood increment								545	615	498	538	725	709	723	649	621	720
C	3	C	Wood increment								644	598	677	695	765	698	677	598	668	875
C	4	F	Wood increment								673	710	693	557	836	776	827	712	796	985
C	5	F	Wood increment								480	580	681	664	756	745	747	711	813	1018
C	6	F	Wood increment								590	780	781	791	833	870	789	702	735	1151
D	1	C	Wood increment								502	487	557	370	596	534	625	442	565	559
D	2	C	Wood increment								773	587	803	779	675	912	1000	728	972	1195
D	3	C	Wood increment								672	528	696	588	734	680	815	584	789	760
D	4	F	Wood increment								920	760	818	723	805	780	862	661	895	925
D	5	F	Wood increment								803	710	811	678	959	818	898	785	1005	1094
D	6	F	Wood increment								708	579	741	639	768	740	835	641	847	944

Reed, D.D., K.S. Pregitzer, H.O. Liechty, A.J. Burton, and G.D. Mroz. 1994. Productivity and growth efficiency in sugar maple forests. *For. Ecol. and Manage.* 70:319-327.