

US EPA ARCHIVE DOCUMENT



User's Guide for the EPA Nonroad Emissions Model Draft NONROAD 2002

Appendixes

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Appendixes

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

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NOTICE

*This technical report does not necessarily represent final EPA decisions or positions.
It is intended to present technical analysis of issues using data that are currently available.*

*The purpose in the release of such reports is to facilitate the exchange of
technical information and to inform the public of technical developments which
may form the basis for a final EPA decision, position, or regulatory action.*

APPENDIX A

FIPS CODES

Refer to data file *fipslist.asc*, included with the NONROAD model,
for a complete list of FIPS codes.

State Name	FIPS	COUNTY
	00000	US Total
Alabama	01000	The State of Alabama
Alabama	01001	Autauga County
Alabama	01003	Baldwin County
Alabama	01005	Barbour County
Alabama	01007	Bibb County
Alabama	01009	Blount County
Alabama	01011	Bullock County
Alabama	01013	Butler County
Alabama	01015	Calhoun County
Alabama	01017	Chambers County
Alabama	01019	Cherokee County
Alabama	01021	Chilton County
Alabama	01023	Choctaw County
Alabama	01025	Clarke County
Alabama	01027	Clay County
Alabama	01029	Cleburne County
Alabama	01031	Coffee County
Alabama	01033	Colbert County
Alabama	01035	Conecuh County
Alabama	01037	Coosa County
Alabama	01039	Covington County
Alabama	01041	Crenshaw County
Alabama	01043	Cullman County
Alabama	01045	Dale County
Alabama	01047	Dallas County
Alabama	01049	De Kalb County
Alabama	01051	Elmore County
Alabama	01053	Escambia County
Alabama	01055	Etowah County
Alabama	01057	Fayette County
Alabama	01059	Franklin County
Alabama	01061	Geneva County
Alabama	01063	Greene County
Alabama	01065	Hale County
Alabama	01067	Henry County
Alabama	01069	Houston County
Alabama	01071	Jackson County
Alabama	01073	Jefferson County
Alabama	01075	Lamar County
Alabama	01077	Lauderdale County
Alabama	01079	Lawrence County
Alabama	01081	Lee County
Alabama	01083	Limestone County
Alabama	01085	Lowndes County
Alabama	01087	Macon County
Alabama	01089	Madison County
Alabama	01091	Marengo County
Alabama	01093	Marion County
Alabama	01095	Marshall County
Alabama	01097	Mobile County

State Name	FIPS	COUNTY
Alabama	01099	Monroe County
Alabama	01101	Montgomery County
Alabama	01103	Morgan County
Alabama	01105	Perry County
Alabama	01107	Pickens County
Alabama	01109	Pike County
Alabama	01111	Randolph County
Alabama	01113	Russell County
Alabama	01115	St Clair County
Alabama	01117	Shelby County
Alabama	01119	Sumter County
Alabama	01121	Talladega County
Alabama	01123	Tallapoosa County
Alabama	01125	Tuscaloosa County
Alabama	01127	Walker County
Alabama	01129	Washington County
Alabama	01131	Wilcox County
Alabama	01133	Winston County
Alaska	02000	The State of Alaska
Alaska	02013	Aleutians East Borough
Alaska	02016	Aleutians West Census Area
Alaska	02020	Anchorage Borough
Alaska	02050	Bethel Census Area
Alaska	02060	Bristol Bay Borough
Alaska	02068	Denali Borough
Alaska	02070	Dillingham Census Area
Alaska	02090	Fairbanks North Star Borough
Alaska	02100	Haines Borough
Alaska	02110	Juneau Borough
Alaska	02122	Kenai Peninsula Borough
Alaska	02130	Ketchikan Gateway Borough
Alaska	02150	Kodiak Island Borough
Alaska	02164	Lake and Peninsula Borough
Alaska	02170	Matanuska-Susitna Borough
Alaska	02180	Nome Census Area
Alaska	02185	North Slope Borough
Alaska	02188	Northwest Arctic Borough
Alaska	02201	PR of Wales-Out Ketchikan Census Area
Alaska	02220	Sitka Borough
Alaska	02232	Skagway-Yakutat-Angoon Census Area
Alaska	02240	Southeast Fairbanks Census Area
Alaska	02261	Valdez-Cordova Census Area

APPENDIX B

SOURCE CLASSIFICATION CODES (SCC) AND DEFINITIONS

SOURCE CLASSIFICATION CODE USE AND DEFINITIONS

This appendix provides a description of the Source Classification Codes (SCC) used in the NONROAD model. The NONROAD model uses SCCs to define the application and engine types. The model uses a hierarchy with the SCC in that a general SCC may define information for all more detailed SCC values. For example, input data using SCC code 2270000000 applies to all SCCs beginning with 2270xxxxxx unless input data are entered for a more detailed SCC; e.g., 2270001000 will overwrite the general information for that SCC or group of SCCs. Likewise, 2270001000 applies to all Recreational equipment (227001020, 227001030, 227001050, and 227001060) unless specific data are provided for those SCCs. Use of these hierarchical SCC's allows model input data to be simplified if information is the same for similar equipment types.

The codes used in the NONROAD model are listed in Tables B-1 through B-10. These tables provide additional explanation of each of these codes. The equipment descriptions are derived from the earlier NEVES (EPA, 1991) report on emissions from nonroad engines, with additional groups defined in EPA's NONROAD documentation report NR-006b (found at <http://www.epa.gov/otaq/nonrdmdl.htm>).

SCCs are defined by EPA, and States and other NONROAD users are discouraged from adding their own equipment types to avoid confusion between different State uses. To define additional SCCs in the NONROAD model, the core model must be recompiled with the additional SCCs included in the code using a Lahey FORTRAN compiler with a "Make" utility and the "Make" file included in the source code. It is HIGHLY recommended that States not alter the source code; if additional applications are required, then a cooperative effort should be pursued with EPA staff to add them to the model.

For a complete list of SCCs, please refer to the us.pop or activity.dat input files.

Table B-1. Recreational vehicles equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx001010	Off-road motorcycles	Two wheeled off-road motorcycles
22xx001020	Snowmobiles	Self-explanatory
22xx001030	ATVs	All terrain vehicles (ATV) are four or three wheeled off-road bikes combined with two wheeled off-road motorcycles
22xx001050	Golf Carts	Self-explanatory
22xx001060	Specialty Vehicles	Any number of off-road vehicles not otherwise classified including utility and personnel carriers, ice maintenance (aka Zamboni), snow groomers, and other various vehicles

Table B-2. Construction equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx002003	Pavers	Large and small (such as for curbs) primarily self-propelled pavers
22xx002006	Tampers/Rammers	Small 'handheld,' walk-behind, or single person sized equipment for compaction such as for sidewalk or other small area compaction
22xx002009	Plate Compactors	Similar to tamper/rammers with a larger vibrating plate instead of a ram
22xx002015	Rollers	Rollers include smooth and knobby (such as used in landfills and called "compactors" not to be confused with smaller Plate Compactors) self-propelled rollers
22xx002018	Scrapers	Special equipment type that is an off-highway tractor with a mid-frame bucket that lowers to scrape loose material (dirt) into the bucket to carry to another part of the job site to dump; sometimes converted to a water-wagon
22xx002021	Paving Equipment	Various equipment types used to smooth and distributing paving material including vibrators and finishers to support the work of the pavers
22xx002024	Surfacing Equipment	Other various equipment used to supplement paving activity including paving material mixers, surface profilers (road reclaiming chippers), and seal coating equipment not used to distribute paving material as with paving equipment
22xx002027	Signal Boards	Includes both highway boards and light plants used for nighttime lighting
22xx002030	Trenchers	Large and small trenchers typically using a rotating front mounted rotating 'blade' to pull material from trench and distribute it to the side.
22xx002033	Bore/Drill Rigs	Self-explanatory drills or boring rigs of all types that are skid mounted, trailer mounted, or self-propelled; not to be confused with highway trucks with drill attachments running off the highway engine, though truck mounted nonroad engines\equipment exist
22xx002036	Excavators	Single purpose wheeled or tracked excavators (backhoe) distinct of multipurpose tractor/backhoe/loaders
22xx002039	Concrete/ Industrial Saws	Handheld and large engine powered saws for stone cutting.
22xx002042	Cement & Mortar Mixers	Small mixers used for small batch mixing
22xx002045	Cranes	Self-propelled typically cable hoists; not to be confused with highway trucks with crane attachments running off the highway engine, though truck mounted nonroad engines\equipment exist

SCC	Equipment Type	Definition
22xx002048	Graders	Called road or motor graders often used to prepare a site, especially a road, for paving. A blade is mid-frame mounted with equipment having a long wheel base
22xx002051	Off-highway Trucks	Large off-highway dump trucks not certified for highway use
22xx002054	Crushing/Proc. Equipment	Various crushing and screening equipment for bulk material
22xx002057	Rough Terrain Forklifts	Rough terrain forklifts (RTF) can be confused with typical forklifts but have larger knobby off-road wheels and can be confused with rubber tire loaders but are specifically designed for handling palettes. RTFs include telescoping lift trucks called telescopic handlers often used in building construction.
22xx002060	Rubber Tire Loaders	Bucket loaders or front-end loaders with a front mounted bucket for scooping though other attachments can be used instead of a bucket
22xx002063	Rubber Tire Dozers	Similar to a rubber-tire loader with a vertically mounted blade instead of a bucket
22xx002066	Tractors/ Loaders/ Backhoes	Common and ubiquitous multipurpose equipment type that is most often referred to as a "backhoe" but include the combined functions of loading and a backhoe in one unit. Agricultural tractors with alternative attachments may used for similar purposes
22xx002069	Crawler Tractors	Tracked (not wheeled) loaders and dozers
22xx002072	Skid Steer Loaders	Smaller (able to be 'skid' mounted to transport to job site) loaders which may have alternative attachments than a bucket for loading
22xx002075	Off-Highway Tractors	Large tractors used to primarily drag large buckets or other equipment around a job or mine site, and agricultural tractors have been used for the same purpose
22xx002078	Dumpers/ Tenders	Small loaders and other trucks for confined space and light loads typically used for small building projects and are typically walk-behind equipment.
22xx002081	Other Construction Equipment	Miscellaneous category for equipment not categorized above; only example of this type supplied by PSR are tensioners which are large winches used in construction

Table B-3. Industrial equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx003010	Aerial Lifts	Various (telescoping, articulated, scissors, and other) lift equipment for personnel also called man lifts not to be confused with highway trucks with crane attachments running off the highway engine, though truck mounted nonroad engines\equipment exist to provide lifts for buckets
22xx003020	Forklifts	Small wheeled forklifts used for warehouses and other general purposes
22xx003030	Sweepers/ Scrubbers	Off-road primarily self-propelled sweeping and scrubbing vehicles
22xx003040	Other General Industrial Equipment	Miscellaneous category with examples such as sandblasters, large vacuum\spraying\other nonroad trucks, paint sprayers, general purpose spreaders, and winches.
22xx003050	Other Material Handling Equipment	Conveyers and other bulk material handling equipment
22xx003060	Refrigeration	Self contained engine compressors for refrigeration such as used on refrigeration trucks
22xx003070	Terminal Tractors	Single driver (typically no passenger seat) off-road trucks used primarily for moving highway trailers around paved areas such as at container ports and other intermodal facilities (rarely used for moving aircraft around airports); also called yard spotters, hostlers, and hustlers.

Table B-4. Lawn and garden equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx004010	Lawn mowers (Residential)	Walk behind mowers owned by residences
22xx004011	Lawn mowers (Commercial)	Walk behind mowers owned by commercial landscaping and horticultural services companies as well as facility\parks\other maintenance departments.
22xx004015	Rotary Tillers < 6 HP (Residential)	Smaller walk-behind rotary tillers for residential gardens
22xx004016	Rotary Tillers < 6 HP (Commercial)	Smaller walk-behind rotary tillers for residential gardens owned by facility\ parks\other maintenance departments or landscaping professionals
22xx004020	Chain Saws < 6 HP (Residential)	Self explanatory but smaller than those used for forestry
22xx004021	Chain Saws < 6 HP (Commercial)	Self explanatory but smaller and owned by facility\parks\other maintenance departments or landscaping professionals
22xx004025	Trimmers/Edgers/Brush Cutters (Residential)	Small handheld or nonhandheld power equipment for general purpose cutting including equipment types such as string trimmers (aka Weedwackers) as well as other engine powered types
22xx004026	Trimmers/Edgers/Brush Cutters (Commercial)	Same as above but owned by facility\parks\other maintenance departments or landscaping professionals
22xx004030	Leafblowers/Vacuums (Residential)	Self explanatory
22xx004031	Leafblowers/Vacuums (Commercial)	Self explanatory owned by facility\parks\other maintenance departments or landscaping professionals
22xx004035	Snowblowers (Residential)	Self explanatory
22xx004036	Snowblowers (Commercial)	Self explanatory owned by facility\parks\other maintenance departments or landscaping professionals
22xx004040	Rear Engine Riding Mowers (Residential)	As described and designed for residential lawn mowing
22xx004041	Rear Engine Riding Mowers (Commercial)	As described and designed for lighter duty mowing than front mowers owned by facility\parks\other maintenance departments or landscaping professionals
22xx004046	Front Mowers	Heavier duty and more versatile mowers than rear engine mowers with mower attached on the front of the vehicle
22xx004051	Shredders < 6 HP	Lighter-duty equipment (than chippers\stump grinders) with internal blades to reduce small diameter wood to small pieces
22xx004055	Lawn & Garden Tractors (Residential)	Small tractors used for mowing but able to perform tasks other than mowing and owned by residences

SCC	Equipment Type	Definition
22xx004056	Lawn & Garden Tractors (Commercial)	Small tractors used for mowing but able to perform tasks other than mowing and owned by facility\parks\other maintenance departments or landscaping professionals
22xx004066	Chippers/Stump Grinders	Internal or external bladed equipment to grind and chip various, but primarily woody biomass, materials. Heavier duty than shredders. May include road chippers, stone grinders, and other non-lawn and garden equipment types
22xx004071	Commercial Turf Equipment	Various turf equipment designed for professional use and include applications, such as aerators, dethatchers, sod cutters, hydro-seeders, turf utility vehicles, and specific golf course equipment including greens mowers and sand trap groomers
22xx004075	Other Lawn & Garden Equipment (Residential)	Any other lawn and garden maintenance equipment not otherwise classified and include such equipment types as augers, sickle-bar mowers, and wood splitters owned by residences
22xx004076	Other Lawn & Garden Equipment (Commercial)	Any other lawn and garden maintenance equipment not otherwise classified and include such equipment types as augers, sickle-bar mowers, and wood splitters owned by facility\parks\other maintenance departments or landscaping professionals

Table B-5. Agricultural equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx005010	2-Wheel Tractors	Walk-behind 2-wheeled tractors for use in edible produce or other intensive farming
22xx005015	Agricultural Tractors	Large and small agricultural tractors, most prevalent farm equipment type
22xx005020	Combines	Self-propelled combined harvesting and cleaning equipment
22xx005025	Balers	Equipment that bales from loose or windrowed hay or other forage mowed crop
22xx005030	Agricultural Mowers	Equipment for mowing not intended for later baling or harvesting
22xx005035	Sprayers	Small (backpack) and large (self-propelled) powered equipment designed specifically for spraying
22xx005040	Tillers > 6 HP	Primarily small tillers similar to those used in lawn and garden

SCC	Equipment Type	Definition
		applications intended to be used in edible produce or other intensive farming
22xx005045	Swathers	Equipment designed to cut crops for later baling or harvesting including windrowers
22xx005050	Hydro Power Units	Power engines designed to specifically supply hydraulic power; might be misapplied as agricultural equipment
22xx005055	Other Agricultural Equipment	Other various cultivation equipment types and include harvesters or other special cultivating equipment
22xx005060	Irrigation Sets	Agricultural pumps and pivot wheel irrigation equipment to distribute water to fields or livestock.

Table B-6. Commercial equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx006005	Generator Set	Trailer or skid mounted self contained engine\electric generator designed to supply electrical power at a job site
22xx006010	Pumps	Trailer or skid mounted engine powered liquid pumps
22xx006015	Air Compressors	Trailer or skid mounted engine powered engine powered air compressors to generate high pressure air for pneumatic tools or other needs for pressurized air
22xx006020	Gas Compressors	Engine compressors for commercial gas, most likely to pressurize CNG from natural gas lines or boost pressure in those lines. May be similar to area or stationary source engine compressors.
22xx006025	Welders	Engine powered arc welding support equipment not unlike a generator
22xx006030	Pressure Washers	Engine powered pumps specifically for pressure washers

Table B-7. Logging equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx007005	Chain Saws > 6 hp	Larger thinning and harvesting chainsaws for commercial forestry
22xx007010	Shredders > 6 hp	Larger shredders to reduce slash to smaller pieces; it is distinguished from a chipper by not producing uniform size pieces.
22xx007015	Fellers/Bunchers/Skidders	Various harvesting equipment for forestry. Fellers typically appear to be excavators or loaders with grappling clamps and rotating saw attachments; a buncher typically loads whole logs for transport; a skidder is typically a low equipment type not unlike a loader with a chain winch to pull logs ('skid') to a location for a buncher or log loader.

Table B-8. GSE/underground mining/oil field equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
22xx008005	Airport Support Equipment	All types of airport support equipment; EPA may expand this to more and varied types of equipment but only one SCC exists to date
22xx009010	Other Underground Mining Equipment	Mining equipment similar to other construction and mining equipment but specially designed for low profile and confined space conditions
22xx010010	Other Oil Field Equipment	Various oil field equipment including fracturing rigs, large mechanical drilling engines, seismograph rigs, and trailer or skid-mounted oil field pumps

Table B-9. Recreational marine equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
2282005010	Gasoline Outboards	Standard outboard engines easily removed and replaced if needed
2282005015	Personal Watercraft	Engines used to provide power to jet-powered small boats and riding watercraft (aka JetSki)
2282010005	Gasoline Inboards	Primarily 4-stroke engines mounted as an integral part of the vessel
2282020005	Diesel Inboards	Diesel engines mounted as an integral part of the vessel
2282020010	Diesel Outboards	Rare, but nonzero diesel powered outboard engines.
2282020025	Diesel Sailboat Auxiliary	Not used because auxiliary integrally mounted propulsion power primarily for larger sailboats or outboard motors are included as inboards or outboards

Table B-10. Railway maintenance equipment types and descriptions. (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, 68 for CNG).

SCC	Equipment Type	Definition
2285002015	Diesel Railway Maintenance	Equipment types specifically design for repair, maintenance, and construction of rail lines including ballast handlers, rail/tie handlers, and rail straightening equipment
2285003015	2-stroke Railway Maintenance	
2285004015	4-stroke Railway Maintenance	
2285006015	LPG Railway Maintenance	

APPENDIX C

EXAMPLES OF STANDARD REPORTS

Reports for Travis County, Texas 1998 nonroad emissions are printed in the following order.

1. Emission Totals by County
2. Emission Totals by Equipment Type
3. Emission Totals by Horsepower
4. Emission Totals by HP and Source Classification
5. Emission Totals by SCC
6. Emission Totals by Source Classification
7. Population and Fuel Consumption by HP and Source Classification
8. Population and Fuel Consumption by SCC

Emission Totals by County and Pollutant

All Fuels

Tons/Season

LAWN AND GARDEN EQUIPMENT
 TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

County	Exhaust THC	Exhaust NOx	Exhaust CO	Exhaust PM10	Exhaust SOx	Exhaust CO2
Travis County	966.40	170.81	15,979.14	36.49	16.95	35,016.90
Totals:	966.40	170.81	15,979.14	36.49	16.95	35,016.90

Emission Totals by County and Pollutant

All Fuels

Tons/Season

LAWN AND GARDEN EQUIPMENT
 TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

County	Crankcase THC	Diurnal THC	Vapor Displacement THC	Spillage THC	Total THC
Travis County	15.45	12.16	13.28	78.81	1,086.09
Totals:	15.45	12.16	13.28	78.81	1,086.09

Emission Totals by Equipment Type and Pollutant

All Fuels

Tons/Season

Travis County

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Source Classification	Equipment Description	Exhaust TOG	Exhaust NOx	Exhaust CO	Exhaust PM10	Exhaust SOx	Exhaust CO2
LAWN AND GARDEN EQUIPMENT (COM)							
	Chain Saws < 6 HP	129.42	1.25	336.84	7.45	0.12	610.32
	Chippers/Stump Grinders	9.48	18.43	319.15	1.46	1.68	1,569.09
	Commercial Turf Equipment	154.21	58.81	6,047.79	3.30	5.05	12,012.40
	Front Mowers	12.66	38.84	189.20	5.20	5.79	3,138.60
	Lawn & Garden Tractors	43.36	17.41	1,902.65	1.09	1.46	3,898.66
	Lawn mowers	68.10	5.52	1,056.62	0.50	0.39	1,869.39
	Leafblowers/Vacuums	159.92	10.48	1,430.48	6.60	0.57	2,787.45
	Other Lawn & Garden Eqp.	11.51	0.79	175.62	0.16	0.08	352.18
	Rear Engine Riding Mowers	2.96	0.87	141.05	0.03	0.05	255.39
	Rotary Tillers < 6 HP	69.47	2.46	592.39	1.26	0.24	1,174.02
	Shredders < 6 HP	6.48	0.26	63.69	0.09	0.03	129.54
	Snowblowers	0.00	0.00	0.00	0.00	0.00	0.00
	Trimmers/Edgers/Brush Cutter	142.13	0.63	343.73	5.95	0.14	707.94
	Lawn and Garden Equipment (Com) Totals:	809.69	155.76	12,599.20	33.08	15.60	28,504.99
LAWN AND GARDEN EQUIPMENT (RES)							
	Chain Saws < 6 HP	17.11	0.05	40.55	0.60	0.01	71.45
	Lawn & Garden Tractors	52.30	10.70	2,223.77	0.40	0.86	4,149.49
	Lawn mowers	59.85	2.75	675.63	0.40	0.30	1,461.12

Emission Totals by Equipment Type and Pollutant

All Fuels

Tons/Season

Travis County

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Source Classification	Equipment Description	Crankcase TOG	Diurnal TOG	Vapor Displacement TOG	Spillage TOG	Total TOG
LAWN AND GARDEN EQUIPMENT (COM)						
	Chain Saws < 6 HP	0.00	0.03	0.43	14.65	144.53
	Chippers/Stump Grinders	1.27	0.12	0.26	0.11	11.25
	Commercial Turf Equipment	4.48	1.59	4.72	4.21	169.20
	Front Mowers	0.39	0.12	0.14	0.26	13.56
	Lawn & Garden Tractors	0.52	0.26	1.56	2.80	48.50
	Lawn mowers	0.20	0.19	0.89	10.32	79.68
	Leafblowers/Vacuums	1.63	0.23	1.40	9.30	172.47
	Other Lawn & Garden Eqp.	0.42	0.74	0.16	0.23	13.06
	Rear Engine Riding Mowers	0.03	0.04	0.11	0.21	3.36
	Rotary Tillers < 6 HP	1.41	0.05	0.59	9.18	80.70
	Shredders < 6 HP	0.19	0.03	0.06	0.96	7.72
	Snowblowers	0.00	0.00	0.00	0.00	0.00
	Trimmers/Edgers/Brush Cutter	0.01	0.11	0.49	11.35	154.10
	Lawn and Garden Equipment (Com) Totals:	10.55	3.52	10.81	63.57	898.14
LAWN AND GARDEN EQUIPMENT (RES)						
	Chain Saws < 6 HP	0.00	0.07	0.05	2.91	20.14
	Lawn & Garden Tractors	2.32	4.82	1.84	3.29	64.57
	Lawn mowers	2.62	1.96	0.70	8.16	73.30

Source Classification	Equipment Description	Exhaust TOG	Exhaust NOx	Exhaust CO	Exhaust PM10	Exhaust SOx	Exhaust CO2
	Leafblowers/Vacuums	21.45	0.09	56.62	0.73	0.02	101.40
	Other Lawn & Garden Eqp.	4.70	0.28	71.71	0.06	0.03	141.08
	Rear Engine Riding Mowers	3.67	0.81	165.58	0.03	0.06	306.79
	Rotary Tillers < 6 HP	6.93	0.25	64.37	0.08	0.03	140.02
	Snowblowers	0.00	0.00	0.00	0.00	0.00	0.00
	Trimmers/Edgers/Brush Cutter	33.03	0.11	81.73	1.12	0.03	140.57
Lawn and Garden Equipment (Res) Totals:		199.05	15.04	3,379.94	3.41	1.34	6,511.91
Grand Totals:		1,008.74	170.81	15,979.14	36.49	16.95	35,016.90

Source Classification	Equipment Description	Crankcase TOG	Diurnal TOG	Vapor Displacement TOG	Spillage TOG	Total TOG
	Leafblowers/Vacuums	0.02	0.77	0.07	0.47	22.79
	Other Lawn & Garden Eqp.	0.17	0.30	0.07	0.10	5.34
	Rear Engine Riding Mowers	0.16	0.67	0.14	0.26	4.89
	Rotary Tillers < 6 HP	0.25	0.16	0.07	1.07	8.48
	Snowblowers	0.00	0.00	0.00	0.00	0.00
	Trimmers/Edgers/Brush Cutter	0.01	0.42	0.10	2.40	35.96
Lawn and Garden Equipment (Res) Totals:		5.56	9.16	3.04	18.66	235.47
Grand Totals:		16.11	12.68	13.85	82.23	1,133.61

Emission Totals by Horsepower and Pollutant

All Fuels

Tons/Season

Travis County

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Horsepower	Exhaust NMHC	Crankcase NMHC	Diurnal NMHC	Vapor Displacement NMHC	Spillage NMHC	Total NMHC
0 < HP <= 1	8.57	0.00	0.20	0.02	0.48	9.28
1 < HP <= 3	303.86	0.12	1.38	1.00	20.92	327.29
3 < HP <= 6	380.58	4.57	2.66	3.27	38.66	429.74
6 < HP <= 11	31.86	0.45	1.20	1.17	4.71	39.39
11 < HP <= 16	86.03	1.93	3.57	3.18	5.24	99.95
16 < HP <= 25	78.69	1.14	1.87	2.81	2.74	87.25
25 < HP <= 40	12.30	3.28	0.14	0.38	0.21	16.31
40 < HP <= 50	0.51	0.01	0.00	0.00	0.00	0.52
50 < HP <= 100	5.74	1.07	0.04	0.12	0.35	7.32
100 < HP <= 175	3.69	1.10	0.02	0.13	0.67	5.60
175 < HP <= 300	0.39	0.01	0.00	0.00	0.00	0.40
300 < HP <= 600	0.64	0.01	0.00	0.00	0.00	0.65
600 < HP <= 750	0.24	0.00	0.00	0.00	0.00	0.24
750 < HP <= 1000	0.05	0.00	0.00	0.00	0.00	0.05
Totals:	913.13	13.72	11.07	12.09	73.98	1,023.99

Emission Totals by Horsepower, Source Classification, and Pollutant

All Fuels

Tons/Season

Travis County

LAWN AND GARDEN EQUIPMENT
 TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Source Classification	Horsepower	Exhaust NMHC	Crankcase NMHC	Diurnal NMHC	Vapor Displacement NMHC	Spillage NMHC	Total NMHC
LAWN AND GARDEN EQUIPMENT (COM)							
	0 < HP <= 1	1.01	0.00	0.02	0.00	0.04	1.08
	1 < HP <= 3	241.33	0.08	0.31	0.80	15.81	258.34
	3 < HP <= 6	321.62	2.00	0.75	2.58	30.69	357.63
	6 < HP <= 11	27.65	0.26	0.50	1.02	4.45	33.88
	11 < HP <= 16	54.48	0.53	0.49	2.07	3.17	60.73
	16 < HP <= 25	65.47	0.55	0.79	2.35	1.99	71.16
	25 < HP <= 40	12.30	3.28	0.14	0.38	0.21	16.31
	40 < HP <= 50	0.51	0.01	0.00	0.00	0.00	0.52
	50 < HP <= 100	5.74	1.07	0.04	0.12	0.35	7.32
	100 < HP <= 175	3.69	1.10	0.02	0.13	0.67	5.60
	175 < HP <= 300	0.39	0.01	0.00	0.00	0.00	0.40
	300 < HP <= 600	0.64	0.01	0.00	0.00	0.00	0.65
	600 < HP <= 750	0.24	0.00	0.00	0.00	0.00	0.24
	750 < HP <= 1000	0.05	0.00	0.00	0.00	0.00	0.05
Lawn and Garden Equipment (Com) Totals:		735.11	8.92	3.06	9.45	57.38	813.92
LAWN AND GARDEN EQUIPMENT (RES)							
	0 < HP <= 1	7.56	0.00	0.18	0.02	0.43	8.19
	1 < HP <= 3	62.53	0.04	1.07	0.20	5.11	68.96

Source Classification	Horsepower	Exhaust NMHC	Crankcase NMHC	Diurnal NMHC	Vapor Displacement NMHC	Spillage NMHC	Total NMHC
	3 < HP <= 6	58.96	2.57	1.91	0.69	7.97	72.11
	6 < HP <= 11	4.21	0.19	0.70	0.15	0.26	5.51
	11 < HP <= 16	31.55	1.40	3.08	1.11	2.08	39.22
	16 < HP <= 25	13.22	0.59	1.07	0.47	0.75	16.09
Lawn and Garden Equipment (Res) Totals:		178.03	4.80	8.01	2.64	16.60	210.07
Grand Totals:		913.13	13.72	11.07	12.09	73.98	1,023.99

Emission Totals by SCC and Pollutant**All Fuels****Tons/Season****Travis County**LAWN AND GARDEN EQUIPMENT
TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

SCC	Equipment Description	Engine Type	Exhaust PM10	Exhaust PM2.5
LAWN AND GARDEN EQUIPMENT (COM)				
2260004016*	Rotary Tillers < 6 HP	2 Stroke	0.59	0.54
2260004021*	Chain Saws < 6 HP	2 Stroke	7.45	6.85
2260004026*	Trimmers/Edgers/Brush Cutter	2 Stroke	5.94	5.47
2260004031*	Leafblowers/Vacuums	2 Stroke	6.34	5.83
2260004036	Snowblowers	2 Stroke	0.00	0.00
2260004071*	Commercial Turf Equipment	2 Stroke	0.00	0.00
2265004011*	Lawn mowers	4 Stroke	0.50	0.46
2265004016*	Rotary Tillers < 6 HP	4 Stroke	0.67	0.62
2265004026*	Trimmers/Edgers/Brush Cutter	4 Stroke	0.01	0.01
2265004031*	Leafblowers/Vacuums	4 Stroke	0.25	0.23
2265004036	Snowblowers	4 Stroke	0.00	0.00
2265004041*	Rear Engine Riding Mowers	4 Stroke	0.03	0.03
2265004046*	Front Mowers	4 Stroke	0.03	0.03
2265004051*	Shredders < 6 HP	4 Stroke	0.09	0.08
2265004056*	Lawn & Garden Tractors	4 Stroke	0.41	0.38
2265004066*	Chippers/Stump Grinders	4 Stroke	0.07	0.06
2265004071*	Commercial Turf Equipment	4 Stroke	1.39	1.27
2265004076*	Other Lawn & Garden Eqp.	4 Stroke	0.15	0.13
2267004066*	Chippers/Stump Grinders	LPG	0.02	0.02
2270004031	Leafblowers/Vacuums	Diesel	0.00	0.00
2270004036	Snowblowers	Diesel	0.00	0.00
2270004046	Front Mowers	Diesel	5.17	4.75
2270004056	Lawn & Garden Tractors	Diesel	0.68	0.63
2270004066	Chippers/Stump Grinders	Diesel	1.38	1.27
2270004071	Commercial Turf Equipment	Diesel	1.91	1.76
2270004076	Other Lawn & Garden Eqp.	Diesel	0.01	0.01
Lawn and Garden Equipment (Com) Totals:			33.08	30.44
LAWN AND GARDEN EQUIPMENT (RES)				
2260004015*	Rotary Tillers < 6 HP	2 Stroke	0.06	0.06
2260004020*	Chain Saws < 6 HP	2 Stroke	0.60	0.55
2260004025*	Trimmers/Edgers/Brush Cutter	2 Stroke	1.12	1.03
2260004030*	Leafblowers/Vacuums	2 Stroke	0.73	0.67

SCC	Equipment Description	Engine Type	Exhaust PM10	Exhaust PM2.5
2260004035	Snowblowers	2 Stroke	0.00	0.00
2265004010*	Lawn mowers	4 Stroke	0.40	0.37
2265004015*	Rotary Tillers < 6 HP	4 Stroke	0.02	0.01
2265004025*	Trimmers/Edgers/Brush Cutter	4 Stroke	0.00	0.00
2265004030*	Leafblowers/Vacuums	4 Stroke	0.00	0.00
2265004035	Snowblowers	4 Stroke	0.00	0.00
2265004040*	Rear Engine Riding Mowers	4 Stroke	0.03	0.03
2265004055*	Lawn & Garden Tractors	4 Stroke	0.40	0.36
2265004075*	Other Lawn & Garden Eqp.	4 Stroke	0.06	0.06
Lawn and Garden Equipment (Res) Totals:			3.41	3.14
Grand Totals:			36.49	33.57

* Under 25 horsepower spark-ignition engines are lumped into either 2- or 4-stroke.

Emission Totals by Source Classification and Pollutant

All Fuels

Tons/Season

Travis County

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Source Classification	Exhaust THC	Exhaust NOx	Exhaust CO	Exhaust PM10	Exhaust SOx	Exhaust CO2
Lawn and Garden Equipment (Com)	775.62	155.76	12,599.20	33.08	15.60	28,504.99
Lawn and Garden Equipment (Res)	190.78	15.04	3,379.94	3.41	1.34	6,511.91
Totals:	966.40	170.81	15,979.14	36.49	16.95	35,016.90

Emission Totals by Source Classification and Pollutant

All Fuels

Tons/Season

Travis County

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Source Classification	Crankcase THC	Diurnal THC	Vapor Displacement THC	Spillage THC	Total THC
Lawn and Garden Equipment (Com)	10.12	3.37	10.36	60.92	860.40
Lawn and Garden Equipment (Res)	5.33	8.78	2.91	17.88	225.69
Totals:	15.45	12.16	13.28	78.81	1,086.09

**Equipment Population and Fuel Consumption by HP and Source
Classification for Travis County**

LAWN AND GARDEN EQUIPMENT
TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Fuel Type	Source Classification	Horsepower	Equipment Population	Fuel Consumption (gallons/ Season)
Diesel				
Lawn and Garden Equipment (Com)				
		3 < HP <= 6	2	26
		6 < HP <= 11	0	17
		11 < HP <= 16	67	4,485
		16 < HP <= 25	1,692	153,236
		25 < HP <= 40	547	72,039
		40 < HP <= 50	72	14,758
		50 < HP <= 100	345	137,803
		100 < HP <= 175	33	25,299
		175 < HP <= 300	22	26,380
		300 < HP <= 600	21	30,925
		600 < HP <= 750	5	11,407
		750 < HP <= 1000	1	2,144
	<i>Diesel Lawn and Garden Equipment (Com) Totals:</i>		2,807	478,517
Diesel Totals:			2,807	478,517
Gasoline				
Lawn and Garden Equipment (Com)				
		0 < HP <= 1	206	929
		1 < HP <= 3	13,820	202,087
		3 < HP <= 6	19,408	698,642
		6 < HP <= 11	3,506	282,951
		11 < HP <= 16	2,937	570,657
		16 < HP <= 25	2,105	648,317
		25 < HP <= 40	284	104,050
		50 < HP <= 100	51	32,869
		100 < HP <= 175	32	35,509
	<i>Gasoline Lawn and Garden Equipment (Com) Totals:</i>		42,349	2,576,010
Lawn and Garden Equipment (Res)				
		0 < HP <= 1	11,302	5,373
		1 < HP <= 3	56,189	50,966

Fuel Type	Source Classification	Horsepower	Equipment Population	Fuel Consumption (gallons/ Season)
		3 < HP <= 6	89,096	190,208
		6 < HP <= 11	4,969	41,127
		11 < HP <= 16	23,682	307,435
		16 < HP <= 25	7,092	128,421
	<i>Gasoline Lawn and Garden Equipment (Res) Totals:</i>		<i>192,330</i>	<i>723,531</i>
Gasoline Totals:			234,679	3,299,541
LPG				
	Lawn and Garden Equipment (Com)			
		25 < HP <= 40	5	2,585
		50 < HP <= 100	22	19,323
		100 < HP <= 175	5	9,007
	<i>LPG Lawn and Garden Equipment (Com) Totals:</i>		<i>32</i>	<i>30,915</i>
LPG Totals:			32	30,915
Grand Total:			237,518	

Equipment Population and Fuel Consumption by SCC for Travis County

LAWN AND GARDEN EQUIPMENT
TRAVIS COUNTY SUMMERTIME

Total for Summer Season, 1998

Date of Model Run: May 23 14:13:56: 2002

Today's Date: 7/15/2002

Fuel Type	SCC	Equipment Description	Engine Type	Equipment Population	Fuel Consumption (gallons/ Season)
Diesel					
Lawn and Garden Equipment (Com)					
	2270004031	Leafblowers/Vacuums	Diesel	1	7
	2270004036	Snowblowers	Diesel	0	0
	2270004046	Front Mowers	Diesel	2,223	252,476
	2270004056	Lawn & Garden Tractors	Diesel	317	31,982
	2270004066	Chippers/Stump Grinders	Diesel	87	68,061
	2270004071	Commercial Turf Equipment	Diesel	174	125,413
	2270004076	Other Lawn & Garden Eqp.	Diesel	4	578
	<i>Diesel Lawn and Garden Equipment (Com) Totals:</i>			2,807	478,517
Diesel Totals:				2,807	478,517
Gasoline					
Lawn and Garden Equipment (Com)					
	2260004016*	Rotary Tillers < 6 HP	2 Stroke	410	12,366
	2260004021*	Chain Saws < 6 HP	2 Stroke	3,709	102,199
	2260004026*	Trimmers/Edgers/Brush Cutter	2 Stroke	9,276	110,866
	2260004031*	Leafblowers/Vacuums	2 Stroke	3,607	106,993
	2260004036	Snowblowers	2 Stroke	0	0
	2260004071*	Commercial Turf Equipment	2 Stroke	1	51
	2265004011*	Lawn mowers	4 Stroke	7,730	211,116
	2265004016*	Rotary Tillers < 6 HP	4 Stroke	2,550	128,514
	2265004026*	Trimmers/Edgers/Brush Cutter	4 Stroke	178	5,201
	2265004031*	Leafblowers/Vacuums	4 Stroke	1,768	225,899
	2265004036	Snowblowers	4 Stroke	0	0
	2265004041*	Rear Engine Riding Mowers	4 Stroke	247	26,871
	2265004046*	Front Mowers	4 Stroke	852	32,255
	2265004051*	Shredders < 6 HP	4 Stroke	1,552	15,177
	2265004056*	Lawn & Garden Tractors	4 Stroke	1,689	372,816
	2265004066*	Chippers/Stump Grinders	4 Stroke	144	62,842
	2265004071*	Commercial Turf Equipment	4 Stroke	4,929	1,124,146
	2265004076*	Other Lawn & Garden Eqp.	4 Stroke	3,706	38,697
	<i>Gasoline Lawn and Garden Equipment (Com) Totals:</i>			42,349	2,576,010

Fuel Type	SCC	Equipment Description	Engine Type	Equipment Population	Fuel Consumption (gallons/ Season)
Lawn and Garden Equipment (Res)					
	2260004015*	Rotary Tillers < 6 HP	2 Stroke	1,196	1,325
	2260004020*	Chain Saws < 6 HP	2 Stroke	12,923	12,572
	2260004025*	Trimmers/Edgers/Brush Cutter	2 Stroke	34,122	23,653
	2260004030*	Leafblowers/Vacuums	2 Stroke	17,312	15,253
	2260004035	Snowblowers	2 Stroke	0	0
	2265004010*	Lawn mowers	4 Stroke	81,041	167,069
	2265004015*	Rotary Tillers < 6 HP	4 Stroke	7,439	15,056
	2265004025*	Trimmers/Edgers/Brush Cutter	4 Stroke	558	886
	2265004030*	Leafblowers/Vacuums	4 Stroke	900	1,710
	2265004035	Snowblowers	4 Stroke	0	0
	2265004040*	Rear Engine Riding Mowers	4 Stroke	4,509	32,315
	2265004055*	Lawn & Garden Tractors	4 Stroke	30,812	437,895
	2265004075*	Other Lawn & Garden Eqp.	4 Stroke	1,518	15,797
	<i>Gasoline Lawn and Garden Equipment (Res) Totals:</i>			<i>192,330</i>	<i>723,531</i>
Gasoline Totals:				234,679	3,299,541
LPG					
Lawn and Garden Equipment (Com)					
	2267004066*	Chippers/Stump Grinders	LPG	32	30,915
	<i>LPG Lawn and Garden Equipment (Com) Totals:</i>			<i>32</i>	<i>30,915</i>
LPG Totals:				32	30,915
Grand Total:				237,518	

* Under 25 horsepower spark-ignition engines are lumped into either 2- or 4-stroke.

APPENDIX D

EXAMPLES OF MODEL COMPARISON REPORTS

Comparison reports for Travis County, Texas 1998 and 2010 nonroad emissions are printed in the following order. Note that only the first two pages are printed for the longer reports.

1. Compare Two Model Runs by HP and Source Classification
2. Compare Two Model Runs by Pop and Fuel (first two pages)
3. Compare Two Model Runs by SCC (first two pages)
4. Compare Two Model Runs by Source Classification

Comparison of Exhaust THC Emissions in Tons/Season by Horsepower and Source Classification

Model Run 1 : travis98

Total for Summer Season, 1998

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 1: May 23 14:13:56: 2002

Model Run 2 : travis10

Total for Summer Season, 2010

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 2: May 23 14:24:08: 2002

Today's Date: 7/15/2002

Horsepower Range	Model Run 1	Model Run 2	Run 2 - Run 1	% Difference
LAWN AND GARDEN EQUIPMENT (COM)				
0 < HP <= 1	1.04	0.23	-0.81	-77.94
1 < HP <= 3	243.86	63.07	-180.78	-74.14
3 < HP <= 6	341.04	169.78	-171.26	-50.22
6 < HP <= 11	30.72	22.67	-8.05	-26.20
11 < HP <= 16	60.52	44.68	-15.83	-26.16
16 < HP <= 25	72.27	55.20	-17.06	-23.61
25 < HP <= 40	13.49	15.01	1.52	11.28
40 < HP <= 50	0.52	0.21	-0.31	-59.97
50 < HP <= 100	6.57	7.29	0.71	10.85
100 < HP <= 175	4.27	5.38	1.11	26.11
175 < HP <= 300	0.40	0.32	-0.08	-20.29
300 < HP <= 600	0.65	0.69	0.04	6.22
600 < HP <= 750	0.24	0.26	0.02	6.77
750 < HP <= 1000	0.05	0.06	0.01	16.57
Lawn and Garden Equipment (Com) Totals:	775.62	384.85	-390.77	-50.38

Model Run 1 Core Model Ver 2.1d, Mar 2002

Model Run 2 Core Model Ver 2.1d, Mar 2002

Horsepower Range	Model Run 1	Model Run 2	Run 2 - Run 1	% Difference
LAWN AND GARDEN EQUIPMENT (RES)				
0 < HP <= 1	7.63	1.50	-6.13	-80.29
1 < HP <= 3	63.22	14.80	-48.41	-76.58
3 < HP <= 6	65.52	36.53	-28.99	-44.24
6 < HP <= 11	4.68	3.08	-1.60	-34.13
11 < HP <= 16	35.06	22.24	-12.81	-36.55
16 < HP <= 25	14.68	9.30	-5.39	-36.67
Lawn and Garden Equipment (Res) Totals:	190.78	87.46	-103.32	-54.16
Grand Totals:	966.40	472.31	-494.09	-51.13

Comparison of Equipment Population and Fuel Consumption by SCC

Model Run 1 : travis98

Total for Summer Season, 1998

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 1: May 23 14:13:56: 2002

Model Run 2 : travis10

Total for Summer Season, 2010

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 2: May 23 14:24:08: 2002

Today's Date: 7/15/2002

Fuel Type	SCC	Equipment Description	Engine Type	Equipment Population Run 1	Equipment Population Run 2	Fuel Consumption (gallons/Season) Run 1	Fuel Consumption (gallons/Season) Run 2
Diesel							
Lawn and Garden Equipment (Com)							
	2270004071	Commercial Turf Equipment	Diesel	174.08	301.41	125,413.34	217,138.49
	2270004066	Chippers/Stump Grinders	Diesel	86.65	150.03	68,060.79	117,839.29
	2270004046	Front Mowers	Diesel	2,223.39	3,849.55	252,476.16	437,132.91
	2270004056	Lawn & Garden Tractors	Diesel	317.34	549.43	31,981.63	55,372.44
	2270004031	Leafblowers/Vacuums	Diesel	1.20	2.07	7.22	12.51
	2270004076	Other Lawn & Garden Eqp.	Diesel	4.08	7.07	577.96	1,000.67
	2270004036	Snowblowers	Diesel	0.00	0.00	0.00	0.00
	<i>Diesel Lawn and Garden Equipment (Com) Totals:</i>					478,517.09	828,496.31
Diesel Totals:						478,517.09	828,496.31
Gasoline							
Lawn and Garden Equipment (Com)							
	2260004021*	Chain Saws < 6 HP	2 Stroke	3,709.48	4,885.63	102,199.38	94,058.96
	2260004071*	Commercial Turf Equipment	2 Stroke	0.63	0.81	51.06	44.99
	2265004071*	Commercial Turf Equipment	4 Stroke	4,928.92	6,268.45	1,124,146.27	1,295,141.37

Fuel Type	SCC	Equipment Description	Engine Type	Equipment Population Run 1	Equipment Population Run 2	Fuel Consumption (gallons/Season) Run 1	Fuel Consumption (gallons/Season) Run 2
	2265004066*	Chippers/Stump Grinders	4 Stroke	143.67	182.72	62,841.91	73,230.08
	2265004046*	Front Mowers	4 Stroke	852.05	1,083.61	32,255.08	34,140.71
	2260004031*	Leafblowers/Vacuums	2 Stroke	3,607.48	4,751.29	106,993.34	97,943.59
	2265004056*	Lawn & Garden Tractors	4 Stroke	1,689.39	2,148.51	372,816.49	400,839.66
	2265004031*	Leafblowers/Vacuums	4 Stroke	1,767.95	2,328.50	225,899.46	261,129.71
	2265004011*	Lawn mowers	4 Stroke	7,730.25	10,181.24	211,116.25	238,549.80
	2265004076*	Other Lawn & Garden Eqp.	4 Stroke	3,706.03	4,713.22	38,696.53	39,325.72
	2260004016*	Rotary Tillers < 6 HP	2 Stroke	409.76	521.13	12,365.72	10,416.02
	2265004041*	Rear Engine Riding Mowers	4 Stroke	247.22	314.41	26,871.06	29,486.35
	2265004016*	Rotary Tillers < 6 HP	4 Stroke	2,549.67	3,242.60	128,513.96	127,470.84
	2260004036	Snowblowers	2 Stroke	0.00	0.00	0.00	0.00
	2265004036	Snowblowers	4 Stroke	0.00	0.00	0.00	0.00
	2265004051*	Shredders < 6 HP	4 Stroke	1,552.05	1,973.85	15,176.99	14,865.39
	2260004026*	Trimmers/Edgers/Brush Cutter	2 Stroke	9,276.24	12,217.41	110,865.69	101,702.55
	2265004026*	Trimmers/Edgers/Brush Cutter	4 Stroke	178.24	234.75	5,201.05	5,786.77
<i>Gasoline Lawn and Garden Equipment (Com) Totals:</i>						<i>2,576,010.24</i>	<i>2,824,132.48</i>
Lawn and Garden Equipment (Res)							
	2260004020*	Chain Saws < 6 HP	2 Stroke	12,923.12	17,020.59	12,572.20	10,978.01
	2260004030*	Leafblowers/Vacuums	2 Stroke	17,312.11	22,801.18	15,253.19	13,314.97
	2265004010*	Lawn mowers	4 Stroke	81,040.75	106,735.97	167,068.62	162,588.28
	2265004030*	Leafblowers/Vacuums	4 Stroke	899.96	1,185.31	1,709.92	1,675.46
	2265004055*	Lawn & Garden Tractors	4 Stroke	30,812.21	39,186.05	437,895.12	457,796.20
	2265004075*	Other Lawn & Garden Eqp.	4 Stroke	1,517.69	1,930.15	15,796.54	16,038.42
	2260004015*	Rotary Tillers < 6 HP	2 Stroke	1,195.73	1,520.69	1,325.45	1,107.61
	2265004015*	Rotary Tillers < 6 HP	4 Stroke	7,439.21	9,460.97	15,055.83	13,804.77
	2265004040*	Rear Engine Riding Mowers	4 Stroke	4,508.83	5,734.20	32,314.90	34,146.70

Fuel Type	SCC	Equipment Description	Engine Type	Equipment Population Run 1	Equipment Population Run 2	Fuel Consumption (gallons/Season) Run 1	Fuel Consumption (gallons/Season) Run 2
	2260004035	Snowblowers	2 Stroke	0.00	0.00	0.00	0.00
	2265004035	Snowblowers	4 Stroke	0.00	0.00	0.00	0.00
	2260004025*	Trimmers/Edgers/Brush Cutter	2 Stroke	34,122.43	44,941.47	23,652.75	20,669.09
	2265004025*	Trimmers/Edgers/Brush Cutter	4 Stroke	557.85	734.72	886.27	877.56
<i>Gasoline Lawn and Garden Equipment (Res) Totals:</i>						723,530.78	732,997.08
Gasoline Totals:						3,299,541.02	3,557,129.56
LPG							
Lawn and Garden Equipment (Com)							
	2267004066*	Chippers/Stump Grinders	LPG	32.10	40.91	30,914.72	39,397.05
<i>LPG Lawn and Garden Equipment (Com) Totals:</i>						30,914.72	39,397.05
LPG Totals:						30,914.72	39,397.05
Totals:						3,808,972.83	4,425,022.91

* Under 25 horsepower spark-ignition engines are lumped into either 2- or 4-stroke.

Comparison of Exhaust PM10 Emissions in Tons/Season by SCC

Model Run 1 : travis98

Total for Summer Season, 1998

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 1: May 23 14:13:56: 2002

Model Run 2 : travis10

Total for Summer Season, 2010

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 2: May 23 14:24:08: 2002

Today's Date: 7/15/2002

SCC	Equipment Description	Engine Type	Model Run 1	Model Run 2	Run 2 - Run 1	% Difference
LAWN AND GARDEN EQUIPMENT (COM)						
2260004016*	Rotary Tillers < 6 HP	2 Stroke	0.59	0.62	0.04	6.08
2260004021*	Chain Saws < 6 HP	2 Stroke	7.45	9.55	2.10	28.20
2260004026*	Trimmers/Edgers/Brush Cutter	2 Stroke	5.94	6.59	0.65	11.01
2260004031*	Leafblowers/Vacuums	2 Stroke	6.34	7.50	1.16	18.31
2260004036	Snowblowers	2 Stroke	0.00	0.00	0.00	NA
2260004071*	Commercial Turf Equipment	2 Stroke	0.00	0.00	0.00	2.47
2265004011*	Lawn mowers	4 Stroke	0.50	0.30	-0.19	-39.17
2265004016*	Rotary Tillers < 6 HP	4 Stroke	0.67	0.18	-0.49	-72.92
2265004026*	Trimmers/Edgers/Brush Cutter	4 Stroke	0.01	0.01	0.00	-22.36
2265004031*	Leafblowers/Vacuums	4 Stroke	0.25	0.26	0.00	0.99
2265004036	Snowblowers	4 Stroke	0.00	0.00	0.00	NA
2265004041*	Rear Engine Riding Mowers	4 Stroke	0.03	0.03	0.00	1.97
2265004046*	Front Mowers	4 Stroke	0.03	0.03	0.00	0.13
2265004051*	Shredders < 6 HP	4 Stroke	0.09	0.02	-0.06	-74.18
2265004056*	Lawn & Garden Tractors	4 Stroke	0.41	0.40	-0.01	-1.52
2265004066*	Chippers/Stump Grinders	4 Stroke	0.07	0.07	0.00	3.97
2265004071*	Commercial Turf Equipment	4 Stroke	1.39	1.34	-0.05	-3.26
2265004076*	Other Lawn & Garden Eqp.	4 Stroke	0.15	0.05	-0.10	-65.03

Model Run 1 Core Model Ver 2.1d, Mar 2002

Model Run 2 Core Model Ver 2.1d, Mar 2002

SCC	Equipment Description	Engine Type	Model Run 1	Model Run 2	Run 2 - Run 1	% Difference
2267004066*	Chippers/Stump Grinders	LPG	0.02	0.02	0.00	27.44
2270004031	Leafblowers/Vacuums	Diesel	0.00	0.00	0.00	53.20
2270004036	Snowblowers	Diesel	0.00	0.00	0.00	NA
2270004046	Front Mowers	Diesel	5.17	4.37	-0.79	-15.38
2270004056	Lawn & Garden Tractors	Diesel	0.68	0.47	-0.21	-31.45
2270004066	Chippers/Stump Grinders	Diesel	1.38	1.45	0.07	5.42
2270004071	Commercial Turf Equipment	Diesel	1.91	1.69	-0.22	-11.36
2270004076	Other Lawn & Garden Eqp.	Diesel	0.01	0.01	0.00	5.45
Lawn and Garden Equipment (Com) Totals:			33.08	34.99	1.91	5.78
LAWN AND GARDEN EQUIPMENT (RES)						
2260004015*	Rotary Tillers < 6 HP	2 Stroke	0.06	0.07	0.00	7.46
2260004020*	Chain Saws < 6 HP	2 Stroke	0.60	0.65	0.05	8.53
2260004025*	Trimmers/Edgers/Brush Cutter	2 Stroke	1.12	1.27	0.15	13.84
2260004030*	Leafblowers/Vacuums	2 Stroke	0.73	0.80	0.07	9.78
2260004035	Snowblowers	2 Stroke	0.00	0.00	0.00	NA
2265004010*	Lawn mowers	4 Stroke	0.40	0.26	-0.14	-34.82
2265004015*	Rotary Tillers < 6 HP	4 Stroke	0.02	0.02	0.01	48.19
2265004025*	Trimmers/Edgers/Brush Cutter	4 Stroke	0.00	0.00	0.00	12.89
2265004030*	Leafblowers/Vacuums	4 Stroke	0.00	0.00	0.00	11.07
2265004035	Snowblowers	4 Stroke	0.00	0.00	0.00	NA
2265004040*	Rear Engine Riding Mowers	4 Stroke	0.03	0.03	0.00	16.08
2265004055*	Lawn & Garden Tractors	4 Stroke	0.40	0.45	0.06	14.13
2265004075*	Other Lawn & Garden Eqp.	4 Stroke	0.06	0.02	-0.04	-65.10
Lawn and Garden Equipment (Res) Totals:			3.41	3.58	0.17	5.06

Model Run 1 Core Model Ver 2.1d, Mar 2002

Model Run 2 Core Model Ver 2.1d, Mar 2002

SCC	Equipment Description	Engine Type	Model Run 1	Model Run 2	Run 2 - Run 1	% Difference
Grand Totals:			36.49	38.58	2.09	5.72

* Under 25 horsepower spark-ignition engines are lumped into either 2- or 4-stroke.

Comparison of Exhaust NOx Emissions in Tons/Season by Source Classification

Model Run 1 : travis98

Total for Summer Season, 1998

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 1: May 23 14:13:56: 2002

Model Run 2 : travis10

Total for Summer Season, 2010

LAWN AND GARDEN EQUIPMENT

TRAVIS COUNTY SUMMERTIME

Date of Model Run 2: May 23 14:24:08: 2002

Today's Date: 7/15/2002

Source Classification	Model Run 1	Model Run 2	Run 2 - Run 1	% Difference
Lawn and Garden Equipment (Com)	155.76	163.08	7.32	4.70
Lawn and Garden Equipment (Res)	15.04	17.16	2.12	14.11
Grand Totals:	170.81	180.25	9.44	5.53