

# Nonroad Engine Population Estimates

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NR-006e

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

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# **Nonroad Engine Population Estimates**

## **Report No. NR-006e**

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### **Purpose**

The purpose of this memorandum is to document the source of the nonroad engine population values used in EPA's final NONROAD2008a emission inventory model. Engine populations are provided as default values in EPA's NONROAD emission inventory model categorized by equipment type, power level, and fuel type. This categorization allows the NONROAD model to determine the phase-in of new emission standards and other unique aspects of emissions or allocations by application, fuel type, or power level. Relative to the previous December 2005 version of this report, this version includes population estimates for high performance sterndrive and inboard (SD/I) recreational marine engines.

### **Introduction**

The default base year application populations are used as a starting point to estimate future and past year engine populations in the NONROAD emissions model. The base year is either 1996, 1998, 1999, or 2000, depending on the application. The base years are the most recent years for which population data are available. The NONROAD model tracks engines rather than equipment because present and planned nonroad emissions regulations focus on engines instead of equipment. EPA anticipates that future nonroad emission regulations would also focus on engines.

The engine populations were divided into many applications because of the variety of ways nonroad engines are used. This variety of applications allows for application-specific geographic and temporal allocations, activity, emission rates, and other input factors to characterize nonroad engine usage and emissions.

The engine populations were also divided into 5 fuel types: diesel (2 and 4-stroke combined), gasoline 2-stroke, gasoline 4-stroke, compressed natural gas (CNG) (2 and 4-stroke combined), and liquid petroleum gas (LPG) (2 and 4-stroke combined). The diesel, CNG, and LPG engine populations for 2 and 4-stroke engines were combined because these engines exhibit little difference in emission rates between 2 and 4-stroke engines, most likely because these engines use fuel injection to deliver the fuel to the combustion chamber. Gasoline 2 and 4-stroke engines were separated because of the availability of information indicating widely different

emission rates, especially for hydrocarbon emissions. Each combination of application and fuel has been assigned a unique “Source Classification Code” (SCC).

The engine populations by application and fuel were further divided into 19 power level categories to account for emission regulations and some technology differences associated with power level. The power level categories provided were 0-1 hp, 1-3 hp, 3-6 hp, 6-11 hp, 11-16 hp, 16-25 hp, 25-40 hp, 40-50 hp, 50-75 hp, 75-100 hp, 100-175 hp, 175-300 hp, 300-600 hp, 600-750 hp, 750-1000 hp, 1000-1200, 1200-1500 hp, 1500-2000 hp, 2000-3000 hp, and 3000+ hp. While this detailed disaggregation by application, fuel type, and power level allows users to make fine distinctions in understanding the effects of control strategies, it also might lead to very small engine populations for some states for some application and power segments.

Appendix A provides the default base year national populations used in final NONROAD2008a. A table containing descriptions of each SCC can be found in Appendix B.

### **Equipment Inventory Changes and Classifications**

Previous equipment population estimates in the Nonroad Engine and Vehicle Emission Study (NEVES) were provided by Power Systems Research (PSR), an independent marketing research firm. (1) NEVES used 1989 in-use year estimates from PSR. The PSR population estimates were determined from engine manufacturer sales surveys, experimentally determined engine life, and surveys of usage of these engines. The population estimates were verified by equipment owner surveys over the course of several years. A review and evaluation of the PSR methodology was later provided by Pechan, another independent contractor. (2) The NEVES work led to development of source category codes (SCCs) for given applications.

Appendix B describes both significant and minor changes between the SCCs in the NEVES report and the NONROAD model. New equipment classes and power range additions for some equipment types were included in the NONROAD model, altering the engine population estimates. LPG and CNG engines, which were not included in NEVES, were added to the NONROAD model. New SCCs were added to accommodate these new engines. There were other minor changes that did not affect engine populations but rather changed the description of the codes.

For many categories, final NONROAD2008a uses the 2003 version of the PSR estimates of national populations<sup>1</sup>, but, as described in the report on geographic allocation, the model uses other methods to allocate populations to the state and county level.(3) The exceptions to the use of PSR estimates are described in detail in later sections of this report.

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<sup>1</sup> Depending on the equipment application, the 2003 version of PSR includes population estimates for the years 1996, 1998, 1999, and 2000.

PSR developed engine population estimates for 2 and 4-stroke diesel, gasoline, liquid petroleum gas (LPG), and compressed natural gas (CNG) engines, categorized by application codes. These populations were further divided by power level for the NONROAD model to determine appropriate fleet turnover rates and appropriate engine emission standard phase-in strategies.

Appendix C describes how the PSR application codes correspond to the source categorization codes (SCCs). Each source category is uniquely identified with an SCC, which is a ten-digit number. The SCC number conventions are summarized in Table 1. The first two digits, 22, represent mobile sources. For most categories, the next two digits represent the engine or fuel type (60, 65, 67, 68, and 70, represent 2-stroke gasoline, 4-stroke gasoline, LPG, CNG, and diesel, respectively). The next three digits represent the segment type (for example, recreational or construction). The last three digits represent the specific kind of equipment (for example, golf carts or snowmobiles). If the last three digits are zero, it is implied that all equipment types in the segment are included.

In order to apply the emission standards for small spark-ignition (<25 hp other than snowmobiles, off-road motorcycles, and all-terrain vehicles) and recreational marine spark-ignition engines, the 2 and 4-stroke gasoline, LPG, and CNG engines were combined into one category (while still maintaining power level distinctions). The new emission standards intend to produce cleaner engines in part by reducing the number of 2-stroke in favor of 4-stroke engines. The reasons for combining these engines, and the associated problems, will be described in more detail later in this report.

### **Mobile and Stationary Nonroad Engines**

One challenge in preparing a mobile source inventory is that engines used for generators, pumps, compressors and certain other applications may be either mobile or stationary, and, thus, may be subject to different regulations. Therefore it was necessary to estimate the fraction of engines used as mobile and stationary emission sources. The NONROAD model estimates emissions from 'mobile' equipment. The legal definition of a mobile nonroad engine is an engine that moves from one place within a 12-month period. (4) In some cases the distinction may not be clear because engines that might appear stationary are in fact considered as mobile. For example, a palette-mounted engine is easily moved from one site to the next with a forklift or other type of lift truck over the course of several months. EPA used the only information available, which was derived from a report to the California Air Resources Board by Booz, Allen, and Hamilton (5) and given in Table 2, for fractions of engines used in mobile nonroad equipment for the few application classes in which some of the engines are used and regulated as stationary sources. Hydro power units, irrigation sets, generator sets, pumps, compressors, and welders were the applications which were determined to have some stationary engines. The fraction of mobile engines was applied to the equipment populations for the appropriate applications in order to avoid counting stationary sources in the nonroad mobile sources inventory. The model input populations, which are shown in Appendix A, have already been

reduced according to the percentages shown in Table 2 to represent only the portions of these applications considered to be mobile equipment.

Table 1. SCC Number Conventions (xx refers to '60' for 2-stroke gasoline, '65' for 4-stroke gasoline, '70' for diesel, '67' for LPG, and '68' for CNG)

SCC	Definition
22xx001000	Recreational vehicles
22xx002000	Construction equipment
22xx003000	Industrial equipment
22xx004000	Lawn and garden equipment
22xx005000	Agricultural equipment
22xx006000	Commercial equipment
22xx007000	Logging equipment
22xx008000	Airport service equipment
22xx009000	Underground mining equipment
22xx010000	Oil field equipment
2282005010	Gasoline 2-stroke outboard recreational marine equipment
2282005015	Gasoline 2-stroke personal watercraft
2282010005	Gasoline 4-stroke inboard/sterndrive recreational marine equipment
2282020005	Diesel inboard recreational marine equipment
2282020010	Diesel outboard recreational marine equipment
2285002015	Diesel railway maintenance equipment
2285004015	Gasoline 4-stroke railway maintenance equipment
2285006015	LPG railway maintenance equipment

Table 2. Fraction of Hydro Power Units (22xx005050), Irrigation Sets (22xx005060), Generator Sets (22xx006005), Pumps (22xx006010), Compressors (22xx006015 and 22xx006020), and Welders (22xx006025) Considered to be Mobile Sources

Power Range (Hp)	Percent Mobile Equipment
0 to 25	90
25 to 40	90
40 to 100	70
100 to 175	20
175 to 300	15
300 to 600	10
600+	0

**Small (<25 hp) Spark-Ignition Equipment**

Most small (<25 hp) spark-ignition engines fall under EPA regulations targeting mainly hydrocarbon emissions. (4,6,7) The regulations define new engine classes (I through V) based on use (handheld versus nonhandheld) and displacement, while the NONROAD model classifies engines by application and power level. For the purposes of inventory modeling, the five classes are defined by application and power level. Table 3 describes the definitions of engine class by application and power level that were used in the NONROAD model.

The 1998 PSR population estimates were used for small (<25 hp) SI equipment, except for the following applications: lawn mowers, trimmers/edgers/brush cutters, leafblowers/vacuums, and chain saws. The methodology for calculating the base year populations for these four applications is described below. (Recreational equipment will be discussed in a separate section.)

Table 3. Small SI Engine Classes (<25 hp) by Application and Power Level

SCC	Description	Power Range & Engine Cycle	Engine Class
22xx004020(1) 22xx007005	Chainsaws	0 to 1 hp (2 and 4-stroke)	III
		1 to 3 hp (2 and 4-stroke)	IV
		3 to 25 hp (2 and 4-stroke)	V
22xx002006 22xx002039 22xx004025(6) 22xx004030(1) 22xx004035(6) 22xx004071	Tampers and Rammers Concrete\Industrial Saws Trimmers\Edgers\Cutters Leaf blowers Snow blowers Commercial Turf	0 to 1 hp (2 and 4-stroke)	III
		1 to 3 hp (2 and 4-stroke)	IV
		3 to 6 hp (2-stroke)	V
		3 to 6 hp (4 stroke)	I
		6 to 25 hp (2 and 4-stroke)	II
22xx004015(6) 22xx005040 All Others	Tillers  All Others	0 to 1 hp (2 and 4-stroke)	III
		1 to 3 hp (2 and 4-stroke)	IV
		3 to 6 hp (2 and 4-stroke)	I
		6 to 25 hp (2 and 4-stroke)	II
22xx001050 22xx001060 22xx002015 22xx002024 22xx002030 22xx002033 22xx002042 22xx002072 22xx002078 22xx003050 22xx004010 (1) 22xx004040 (1) 22xx004045 (6) 22xx004050 (1) 22xx007010 22xx004055 (6) 22xx004065 (6) 22xx004075 (6) 22xx005030 22xx008005 228500x015	Golf Carts Specialty Carts Rollers Surfacing Equipment Trenchers Bore\Drill Rigs Cement\Motar Mixers Skid Steer Loaders Dumpers\Tenders Other Material Handling Lawnmower Rear Engine Riding Mower Front Mowers Shredders  Lawn & Garden Tractors Chippers and Stump Grinders Other Lawn & Garden Equipment Agricultural Mowers Aircraft Support Railway Maintenance	0 to 6 hp (2 and 4-stroke)	I
		6 to 25 hp (2 and 4-stroke)	II

22xx004065(6) indicates that both 22xx004065 and 22xx004066 SCC are considered, for instance.



As of 1998, engines less than 25 hp used in gasoline-fueled nonroad equipment (such as lawn and garden equipment) were required to meet the first set of Federal emission standards, known as Phase 1 standards. Using sales estimates submitted to EPA by manufacturers of small nonroad engines as part of their Phase 1 certification, EPA estimated the total number of engines sold in 1998 in four of the highest sales volume small engine applications: lawn mowers, trimmers/edgers/brush cutters, leafblowers/vacuums, and chain saws. For 1993 and earlier years, EPA used sales estimates that had been submitted for those years by manufacturers during the development of EPA's Phase 1 rulemaking. For the years 1994 to 1997, EPA linearly interpolated between the 1993 and 1998 sales estimates for each application. Using this year by year sales information and the expected scrappage of small nonroad equipment, EPA estimated the total 1996 calendar year population for the four applications noted above. In order to determine the power category specific populations, EPA relied on the fractions of engines in each engine class based on the certification sales estimates for all categories other than lawnmowers. For lawnmowers, nearly all of which were certified as Class I engines, EPA used the power category fractions in the PSR database. The resulting 1996 base year populations continue to be used in final NONROAD2008a. (8,9)

Two important issues regarding small (<25 hp) SI engines and equipment require further discussion: treating commercial and residential users separately, and accounting for the effects of new regulations.

Many of the small spark-ignited engines are used in lawn and garden equipment applications, and lawn and garden equipment is used both by commercial and residential users. The commercial users are grounds keepers for golf courses, nonresidential buildings, large apartment complexes, and some single-family homes. Commercial equipment therefore has significantly different usage than residential equipment in terms of hours per year as well as hours per weekday versus weekend day. To account for these differences in equipment usage, separate SCCs were defined to account for commercial and residential lawn and garden equipment. The 1998 PSR population estimates and the 1996 population estimates for the four lawn and garden applications described above were divided into residential and commercial fractions as shown in Table 4. For applications not shown in Table 4, 100% commercial use was assumed for the engines because these applications include such categories as construction, agricultural, commercial, and many other applications already considered commercial.

From information derived by California (10), the sales fraction combined with the average life (in years of average operation shown in another report, NR-005d) of the engines was used to calculate an in-use population fraction of residential and commercial equipment. The calculation uses the sales fraction multiplied by the average life for both residential and commercial equipment and the population fraction determined from the two populations as shown in the equation below.

$$\text{Commercial Population Fraction} = \frac{(\text{Commercial Sales Fraction} * \text{Commercial Average Life in Years})}{(\text{Commercial Sales Fraction} * \text{Commercial Average Life} + \text{Residential Sales Fraction} * \text{Residential Average Life})}$$

Table 4. Residential and Commercial Percentages of Small Spark-Ignition Engine Equipment

SCC	Application	Hp Categories	Residential % of Population	Commercial % of Population
22xx004010 22xx004011	Lawn mowers	All	96.3	3.7
22xx004025 22xx004026	Trimmers/edgers/cutters	0-1 hp	100	0
		1-3 hp	85.3	14.7
		>3 hp	0	100
22xx004020 22xx004021	Chainsaws	0-1 hp	100	0
		1-3 hp	97.0	3.0
		>3 hp	0	100
22xx004030 22xx004031	Leaf blowers/vacuums	0-1 hp	100	0
		1-3 hp	92.5	7.5
		>3 hp	0	100
22xx004015 22xx004016	Tillers <6 hp	All	85.7	14.3
22xx004035 22xx004036	Snowblowers	All	90.0	10.0
22xx004071	Commercial turf equipment	All	0.0	100.0
22xx004040 22xx004041	Rear engine rider	All	97.4	2.6
22xx004055 22xx004056	Lawn and garden tractors	All	97.4	2.6
22xx004075 22xx004076	Other lawn and garden equipment	All	45.7	54.3
22xx004045 22xx004046 22xx004050 22xx004051 22xx004065 22xx004066	Front Mowers Shredders <6 hp Chippers\Stump Grinders	All	0.0	100.0
All others	All other equipment			

The above methodology was applied for all applications in Table 4 with the exception of trimmers/edgers/cutters, chain saws, and leafblowers/vacuums. Based on discussions with manufacturers during the Phase 2 rulemaking process, we believe that the residential/commercial split for these three applications is strongly dependent on engine class. We now classify all these equipment powered by Class III two-stroke engines as residential. Equipment powered by Class IV two-stroke engines is now predominantly classified as residential. The Class IV split was estimated based on input from the three largest manufacturers of commercial equipment (i.e., ECHO, Stihl, and Husqvarna) and production estimates from all manufacturers of Class IV chainsaw engines. We now also classify the four-stroke engines over 6 hp as commercial equipment. (11)

The regulations to be proposed require reduced emission rates in future years, and, among other consequences, are estimated to reduce the number of two-stroke engines sold in favor of four-stroke engines. With the current NONROAD modeling methodology, it was not possible to keep the 2-stroke and 4-stroke spark-ignition engines in separate SCCs in the emissions model and account for the shift of 2-stroke to 4-stroke engines. Therefore, spark-ignition engines of less than 25 horsepower were lumped into one SCC category, eliminating the SCC distinction between 2 and 4-stroke gasoline, LPG, and CNG engines. The SCC description was changed to reflect the new engine classes described in Table 3. The distinction between 2 and 4-stroke gasoline, LPG, and CNG engines will be maintained for sales fraction and emission rates by using technology groups within the SCC.

One problem with lumping 2-stroke and 4-stroke engines together is that the different engine types have different conversion factors for converting total hydrocarbons (THC) to other hydrocarbon types (TOG, NMHC, NMOG, and VOC). This problem was ameliorated somewhat by defining the population to be primarily 2-stroke or primarily 4-stroke fuel types. In the base year, engine classes of III, IV, and V were primarily 2-stroke gasoline engines, so they were assigned SCCs of 2260xxxxxx. Engine classes I and II are primarily 4-stroke gasoline, therefore they were assigned SCCs of 2265xxxxxx. This means that 2-stroke hydrocarbon conversion factors were used for engine classes III, IV, and V, and 4-stroke conversion factors were used for engine classes I and II.

### **Large Spark-Ignition Equipment**

The 1998 PSR population estimates were used for large SI equipment, with the exception of forklifts. We are using different population estimates for forklifts based on a recent market study. That study identified a 1996 population of 491,321 for Class 4 through 6 forklifts, which includes all forklifts powered by internal combustion engines. Approximately 80 percent of those were estimated to be fueled by propane, with the rest running on CNG, gasoline, or diesel fuel. Assuming diesel equipment makes up roughly half of these remaining forklifts leads to a total population of SI forklifts of 442,000. (12) Draft NONROAD2002a and later model versions therefore use this estimate for the 1996 base year SI forklift population. The 1998 PSR data was then used to subdivide the SI forklifts, such that propane accounts for about 85 percent, CNG about ten percent, and gasoline fueled equipment roughly five percent of the SI forklifts.

Analysis and assumptions regarding refueling methods was necessary in order to establish fuel type distributions in the absence of other data. Some applications of nonroad SI equipment face much different refueling situations. Lawn and garden equipment is usually not centrally fueled and therefore operates almost exclusively on gasoline, which is more readily available. Agriculture equipment is predominantly powered by diesel engines. Most of these operators likely have storage tanks for diesel fuel. For those who use spark-ignition engines in addition to, or instead of, the diesel models, we would expect them in many cases to be ready to invest in gasoline storage tanks as well, resulting in little or no use of LPG or natural gas for those applications. For construction, general industrial, and other equipment, there may be a mix of central and non-central fueling, and motive and portable equipment. We therefore believe that estimating an even mix of LPG and gasoline for these engines is most appropriate. The approximate distribution of fuel types for the individual applications used in the NONROAD model are listed in Table 5. It should be noted that the use of 100% LPG/CNG for large SI generators was based on recent sales and other market data. Due to the lack of such data for compressors and other large SI equipment, the 50% default value was used for these equipment types.

Table 5. Fuel Type Distribution for Various Large SI Applications

Application	Percent LPG/CNG	Application	Percent LPG/CNG
Forklift*	95	Bore/drill rig	50
Generator	100	Concrete/industrial saw	50
Commercial turf	0	Rough terrain forklift	50
Aerial lift	50	Other material handling	50
Pump	50	Ag. tractor	0
Welder	50	Paver	50
Baler	0	Roller	50
Air compressor	50	Other construction	50
Scrubber/sweeper	50	Crane	50
Chipper/grinder	50	Pressure washer	50
Swathers	0	Paving equipment	50
Leaf blower/vacuum	0	Aircraft support	50
Sprayers	0	Gas compressor	100
Specialty vehicle/cart	50	Front mowers	0
Oil field equipment	100	Other lawn & garden	0
Skid/steer loader	50	Tractor/loader/backhoe	50
Other agriculture	0	Hydraulic power unit	50
Irrigation set	50	Surfacing equipment	50
Trencher	50	Crushing/processing equip	50
Rubber-tired loader	50	Refrigeration/AC	100
Other general industrial	50	Railway maintenance	50
Terminal tractor	50	Recreational marine	0
* For forklifts the 95% is split roughly 85% LPG and 10% CNG.			

In a prior version of the model (draft NONROAD2004), populations in the 50-100 hp bin were entirely assigned to either the 50-75 hp bin or the 75-100 hp bin, depending on the average hp of the 50-100 hp bin. Since final NONROAD2005, these populations are distributed to the 50-75 hp and 75-100 hp bins based on the PSR population data, and new population-based average hp estimates are calculated for each bin. This change should have little effect on emissions.

### **Recreational Equipment**

Recreational equipment consists of snowmobiles, off-road motorcycles, all terrain vehicles (ATVs), golf carts, and specialty vehicle carts. The 1998 PSR population estimates were used for golf carts and non-diesel specialty vehicle carts.

The 1998 PSR population estimates were not used for snowmobiles, off-road motorcycles, ATVs, or diesel specialty vehicle carts. For snowmobiles, a study done by the Oak Ridge National Laboratory (ORNL) estimated the total snowmobile population for 1999 based on state registrations. They also developed a methodology for estimating the number of snowmobiles unregistered in each state, which works out to be approximately five percent of the total. Thus, they estimate a total snowmobile population of 1,567,000, which is used in final NONROAD2008a. (13) The International Snowmobile Manufacturers Association (ISMA) also estimated the total number of snowmobiles by summing the total number of registered snowmobiles in those states that require snowmobile registration. However, they did not estimate the number of unregistered snowmobiles. Therefore, we use the value presented by ORNL as the estimate of total snowmobiles. The distribution into hp categories was based on the hp category fractions in the PSR database.

For off-road motorcycles, the only source is the Motorcycle Industry Council (MIC). MIC projects a total population for 1998 of 1,196,000 off-road motorcycles nationwide (13), which is used in final NONROAD2008a. Based on sales information, 67 percent are 2-stroke engines and 33 percent are 4-stroke engines.

The population of ATVs used in final NONROAD2008a for the 1998 base year is 3,910,000. This estimate comes from a 1998 Consumer Products Safety Commission study. (14)

Populations of diesel specialty vehicle carts are estimated per the methodology presented below for compression-ignition equipment in general.

### **Compression-Ignition (CI) Equipment**

Versions of NONROAD prior to NONROAD2005 used PSR's population estimates directly. The PSR population estimates are derived using PSR's estimates of equipment sales, load factor, activity, median life, and a default scrappage curve used to estimate the percent of equipment in operation with age. Since final NONROAD2005, however, the model incorporates a number of significant changes that affect the CI equipment inventory, including load factor and median life estimates. In order to maintain consistency between the revised inputs for load factor and activity used in the model and the load factor and activity inputs used to derive base year population estimates, the 1998 PSR diesel populations were not used. Instead, the latest 2003 update of the PSR sales estimates through year 2000 (15) were used in conjunction with the latest input values for load factor, activity, median life and the default scrappage curve to calculate the 2000 base year populations for CI equipment. The 2000 populations are a sum of equipment in operation from model years 1950 through 2000, based on a backcast extrapolation of sales from 1973.

## **Recreational Marine Equipment**

The 2000 PSR population estimates were used for the base year of the recreational marine equipment category. Since final NONROAD2005, the power distribution of the population estimates for outboard and personal watercraft engines were reevaluated using the projected sales reported in the 1998-2004 model year certification data. This results in higher average rated power estimates for these categories compared to previous versions of the model. Similarly, for sterndrive/inboard engines, the available California certification data for 100-600 hp engines were used to update the power distribution for these engines, since the manufacturers certifying in California make up more than 90 percent of sterndrive/inboard sales. This also results in higher average rated power estimates compared to versions prior to final NONROAD2005.

Previous versions of NONROAD did not include high-performance SD/I marine engines. Manufacturers have more recently commented that approximately 1,500 high-performance engines are produced in the U.S. per year. These engines range from 500 to 1500 horsepower and are used in both racing and non-racing applications. Based on conversations with individual high-performance engine manufacturers, we estimate that about two thirds of these engines are sold for use in the U.S., with an average power of about 650 horsepower. These engines are designed to sacrifice service life for power, but with rebuilds, generally are used for 7-8 years (we use 8 years for our modeling). Based on these estimates and the growth rate in the model, we estimate a 1998 population of SD/I engines over 600 horsepower of 7500 units. (16)

The LPG and CNG recreational marine engine population values were estimated to be zero, which was confirmed with the PSR estimates. There were some diesel recreational marine engines not covered by the emissions regulations for spark-ignition marine engines and therefore not included in the recreational marine estimate just described.

Recreational marine spark-ignition engines fall under EPA regulations targeting mainly hydrocarbon emissions. (17,18) The regulations require reduced emission rates and, among other consequences, are estimated to reduce the number of 2-stroke engines sold in favor of 4-stroke engines. With the current NONROAD modeling methodology, it was not possible to keep the 2-stroke and 4-stroke spark-ignition engines in separate SCCs in the emissions model and account for the expected effects of the regulations. Therefore, spark-ignition engines are lumped into one SCC, which eliminates 2- and 4-stroke distinctions.

As with small gasoline engines, one problem with lumping 2-stroke and 4-stroke recreational marine engines into a single SCC is that the different engine types have different conversion factors for converting total hydrocarbons (THC) to other hydrocarbon types (TOG, NMHC, NMOG, and VOC). This problem is ameliorated somewhat by defining the population to be primarily 2-stroke or primarily 4-stroke fuel types. For outboard (SCC 2282005010) and personal water craft (SCC 2282005015), the primary engine type in the base year is 2-stroke; for inboard engines (SCC 2282010005), the primary engine type in the base year is 4-stroke. The

NONROAD model uses these primary engine types as the basis for the conversion factors for these SCCs.

As presented in Appendix A, three types of recreational marine equipment are differentiated: inboard, outboard, and personal water craft. The NEVES report documents three types of recreational applications; inboard, outboard, and sterndrive. Since sterndrive vessels use the same engines as inboard vessels, the EPA no longer considered the sterndrive category to be a unique application and eliminated it. Personal water craft, sometimes known by the brand name Jet Ski<sup>TM</sup>, were substituted into what was formerly the sterndrive category, and the SCC description was changed accordingly.

Sailboat auxiliary propulsion engines are also included in the outboard and inboard engine categories. The national estimates include these engines, so NONROAD does not use this category to avoid double counting. PSR estimates that these engines only represent a small percentage of recreational marine engines.

The population of diesel recreation marine engines provided in the default engine populations was derived from the PSR estimates and uses SCCs of 22820200xx. The 'xx' here denotes inboard as '05', outboard as '10', and sailboat auxiliary as '25.' The categories of '15' and '20' were not used because sterndrive is no longer a separate category, and the sailboat auxiliary diesel engines were of a design providing low horsepower similar to that of outboard engines rather than inboard engines. There is little distinction between inboard and outboard for sailboat activity, allocations, or any other parameter, so assigning these sailboat auxiliary engines to outboard rather than inboard is a moot issue.

### **Average Horsepower (Hp) Estimates**

As seen in Appendix A, the base year population estimates in NONROAD are provided by equipment type/hp category. In order to calculate an emissions inventory, the average hp corresponding to each equipment type/hp category is required. Final NONROAD2008a uses a sales-weighted average hp for each equipment type/hp category that was generated using information from PSR. For diesel equipment the average hp inputs come from the same 2003 PSR sales information for 1990-2000 that was used for the engine population calculations. For SI equipment the average hp inputs come from the same 1998 PSR Partslink database from which most of the SI equipment populations were obtained. The resulting average hp estimates are also provided in Appendix A.



## References

- (1) EPA, "Nonroad Engine and Vehicle Emission Study," EPA-21A-2001, November, 1991.
- (2) E.H. Pechan, "Evaluation of Power Systems Research (PSR) Nonroad Population Data Base," prepared for Office of Mobile Sources, U.S. Environmental Protection Agency, September 1997, EPA Contract No. 68-D3-0035, Work Assignment No. III-107, Pechan Report No. 97.09.003/1807.
- (3) Power Systems Research, "US Parts Link Edition 6.2," St. Paul, MN. 1998
- (4) EPA, "Determination of Significance for Nonroad Sources and Emission Standards for New Nonroad Compression-Ignition Engines At or Above 37 kW; Final Rule," 59 FR 31306, June, 17, 1994.
- (5) Booz, Allen and Hamilton Inc., "Off-Road Mobile Equipment Emission Inventory," January, 1992.
- (6) EPA, "Final Regulatory Impact Analysis, Phase 2: Emission Standards for New Nonroad Nonhandheld Spark-Ignition Engines At or Below 19 Kilowatts," EPA420-R-99-003, March 1999.
- (7) EPA, "Final Regulatory Impact Analysis, Phase 2 Final Rule: Emission Standards for New Nonroad Handheld Spark-Ignition Engines At or Below 19 Kilowatts," EPA420-R-00-004, March 2000.
- (8) Harvey, Craig A., "U.S. EPA NONROAD Model Technical Report Addenda for Tier 2 Rulemaking Version," EPA420-R-99-008, March 24, 1999.
- (9) EPA, "Revised NONROAD Populations for Chainsaws Above 3 Horsepower," Note from Phil Carlson to Craig Harvey, November 1, 2001.
- (10) California Air Resources Board, "Technical Support Document for California Exhaust Emission Standards and Test Procedures for 1994 and Subsequent Model-Year Utility and Lawn and Garden Equipment Engines," Attachment C to CARB Mailout # 92-06, El Monte, CA. January 1992.
- (11) EPA, "Request for Revisions to the NONROAD Model Affecting Small Spark-Ignition Nonroad Handheld Engines," Memorandum from Phil Carlson to Craig Harvey, December 10, 1999.
- (12) EPA, "Draft Regulatory Support Document: Control of Emissions from Unregulated Nonroad Engines," EPA420-D-01-004, September 2001.
- (13) EPA, "Emission Modeling for Recreational Vehicles," Memorandum from Linc Wehrly to Docket A-98-01, EPA420-F-00-051, November 13, 2000.
- (14) Consumer Products Safety Commission, April 1998, Part 1, "Report 1997 ATV Exposure Survey", Bethesda, MD.
- (15) Power Systems Research, OELink (Sales) Database, May 2003 updated version.
- (16) EPA, "Final Regulatory Impact Analysis, Final Rule: Control of Emissions from Marine SI and Small SI Engines, Vessels, and Equipment," EPA420-R-08-014, September 2008.
- (17) EPA, "Regulatory Impact Analysis: Control of Air Pollution Emission Standards for New Spark-Ignition Marine Engines," October, 1996.
- (18) EPA, "Control of Emissions From Nonroad Spark-Ignition Engines and Equipment; Final Rule," 73 FR 59034, October 8, 2008.

Appendix A

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1999	2260001020	2-Str Snowmobiles	1	3	2.5	6,297
1999	2260001020	2-Str Snowmobiles	3	6	4	3,715
1999	2260001020	2-Str Snowmobiles	11	16	15.66	3,989
1999	2260001020	2-Str Snowmobiles	16	25	20.26	317,887
1999	2260001020	2-Str Snowmobiles	25	40	32.86	320,869
1999	2260001020	2-Str Snowmobiles	40	50	45.68	144,018
1999	2260001020	2-Str Snowmobiles	50	75	58.48	507,374
1999	2260001020	2-Str Snowmobiles	75	100	85.78	208,526
1999	2260001020	2-Str Snowmobiles	100	175	112.4	54,325
1998	2260001010	2-Str Offroad Motorcycles	0	1	1	801,320
1998	2265001010	4-Str Offroad Motorcycles	0	1	1	394,680
1998	2260001030	2-Str All Terrain Vehicles	0	1	1	405,000
1998	2265001030	4-Str All Terrain Vehicles	0	1	1	3,505,000
1998	2265001050	4-Str Golf Carts	6	11	9.15	175,537
1998	2260001060	2-Str Specialty Vehicle Carts	6	11	8.046	326,568
1998	2260001060	2-Str Specialty Vehicle Carts	25	40	37	97
1998	2260001060	2-Str Specialty Vehicle Carts	50	75	55	55
1998	2265001060	4-Str Specialty Vehicle Carts	1	3	3	165
1998	2265001060	4-Str Specialty Vehicle Carts	3	6	4.424	6,706
1998	2265001060	4-Str Specialty Vehicle Carts	11	16	15.99	12,701
1998	2265001060	4-Str Specialty Vehicle Carts	16	25	19.62	100,050
1998	2265001060	4-Str Specialty Vehicle Carts	25	40	30.55	1,023
1998	2265001060	4-Str Specialty Vehicle Carts	40	50	46	25
1998	2265001060	4-Str Specialty Vehicle Carts	50	75	61.48	2,469
1998	2265001060	4-Str Specialty Vehicle Carts	75	100	86.5	20
1998	2265001060	4-Str Specialty Vehicle Carts	100	175	118.3	935
1998	2267001060	LPG - Specialty Vehicle Carts	25	40	30.55	1,023
1998	2267001060	LPG - Specialty Vehicle Carts	40	50	46	25
1998	2267001060	LPG - Specialty Vehicle Carts	50	75	61.48	2,469
1998	2267001060	LPG - Specialty Vehicle Carts	75	100	86.5	20
1998	2267001060	LPG - Specialty Vehicle Carts	100	175	118.3	935
1998	2265002003	4-Str Pavers	3	6	5.35	746
1998	2265002003	4-Str Pavers	6	11	9.328	5,198
1998	2265002003	4-Str Pavers	11	16	12.56	241
1998	2265002003	4-Str Pavers	16	25	20.85	1,883
1998	2265002003	4-Str Pavers	25	40	31.75	318
1998	2265002003	4-Str Pavers	50	75	62.41	351
1998	2267002003	LPG - Pavers	25	40	31.75	318
1998	2267002003	LPG - Pavers	50	75	62.41	351
1998	2260002006	2-Str Tampers/Rammers	3	6	3.75	155,522
1998	2265002006	4-Str Tampers/Rammers	6	11	7.518	340
1998	2260002009	2-Str Plate Compactors	1	3	1.649	14,614
1998	2265002009	4-Str Plate Compactors	3	6	4.409	74,153
1998	2265002009	4-Str Plate Compactors	6	11	8.225	22,828
1998	2265002009	4-Str Plate Compactors	11	16	12.67	4,046

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2265002015	4-Str Rollers	6	11	8.901	5,621
1998	2265002015	4-Str Rollers	11	16	14.82	1,004
1998	2265002015	4-Str Rollers	16	25	19.08	2,613
1998	2265002015	4-Str Rollers	25	40	36.82	309
1998	2265002015	4-Str Rollers	50	75	60.76	212
1998	2265002015	4-Str Rollers	75	100	83	146
1998	2267002015	LPG - Rollers	25	40	36.82	309
1998	2267002015	LPG - Rollers	50	75	60.76	212
1998	2267002015	LPG - Rollers	75	100	83	146
1998	2260002021	2-Str Paving Equipment	1	3	1.823	13,997
1998	2265002021	4-Str Paving Equipment	3	6	5.136	40,940
1998	2265002021	4-Str Paving Equipment	6	11	8.535	34,719
1998	2265002021	4-Str Paving Equipment	11	16	13.26	17,389
1998	2265002021	4-Str Paving Equipment	16	25	20	12,251
1998	2265002021	4-Str Paving Equipment	25	40	36.6	498
1998	2265002021	4-Str Paving Equipment	50	75	66	45
1998	2267002021	LPG - Paving Equipment	25	40	36.6	498
1998	2267002021	LPG - Paving Equipment	50	75	66	45
1998	2265002024	4-Str Surfacing Equipment	3	6	5.16	6,079
1998	2265002024	4-Str Surfacing Equipment	6	11	8.918	9,362
1998	2265002024	4-Str Surfacing Equipment	11	16	15.61	2,707
1998	2265002024	4-Str Surfacing Equipment	16	25	19.05	1,141
1998	2265002024	4-Str Surfacing Equipment	25	40	30.24	113
1998	2265002024	4-Str Surfacing Equipment	50	75	66	41
1998	2267002024	LPG - Surfacing Equipment	25	40	30.24	113
1998	2267002024	LPG - Surfacing Equipment	50	75	66	41
1998	2260002027	2-Str Signal Boards/Light Plants	1	3	2.2	38
1998	2265002027	4-Str Signal Boards/Light Plants	3	6	5.032	687
1998	2265002027	4-Str Signal Boards/Light Plants	6	11	8.25	684
1998	2265002027	4-Str Signal Boards/Light Plants	16	25	18	26
1998	2265002030	4-Str Trenchers	1	3	3	29
1998	2265002030	4-Str Trenchers	3	6	5.211	10,643
1998	2265002030	4-Str Trenchers	6	11	8.883	10,419
1998	2265002030	4-Str Trenchers	11	16	13.44	3,723
1998	2265002030	4-Str Trenchers	16	25	19.3	4,245
1998	2265002030	4-Str Trenchers	25	40	30	707
1998	2265002030	4-Str Trenchers	50	75	61.69	598
1998	2265002030	4-Str Trenchers	75	100	80	470
1998	2267002030	LPG - Trenchers	25	40	30	707
1998	2267002030	LPG - Trenchers	50	75	61.69	598
1998	2267002030	LPG - Trenchers	75	100	80	470
1998	2265002033	4-Str Bore/Drill Rigs	0	1	0.9	4,390
1998	2265002033	4-Str Bore/Drill Rigs	1	3	2.209	89,858
1998	2265002033	4-Str Bore/Drill Rigs	3	6	4.809	3,634
1998	2265002033	4-Str Bore/Drill Rigs	6	11	8.754	1,111
1998	2265002033	4-Str Bore/Drill Rigs	11	16	16	1,410
1998	2265002033	4-Str Bore/Drill Rigs	16	25	21.31	926
1998	2265002033	4-Str Bore/Drill Rigs	25	40	31.39	373

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2265002033	4-Str Bore/Drill Rigs	50	75	61.34	340
1998	2265002033	4-Str Bore/Drill Rigs	100	175	118.1	563
1998	2267002033	LPG - Bore/Drill Rigs	25	40	31.39	373
1998	2267002033	LPG - Bore/Drill Rigs	50	75	61.34	340
1998	2267002033	LPG - Bore/Drill Rigs	100	175	118.1	563
1998	2260002039	2-Str Concrete/Industrial Saws	1	3	1.897	11,491
1998	2260002039	2-Str Concrete/Industrial Saws	3	6	4.532	55,066
1998	2265002039	4-Str Concrete/Industrial Saws	6	11	8.535	28,313
1998	2265002039	4-Str Concrete/Industrial Saws	11	16	14.68	5,937
1998	2265002039	4-Str Concrete/Industrial Saws	16	25	19.41	2,610
1998	2265002039	4-Str Concrete/Industrial Saws	25	40	34.79	718
1998	2265002039	4-Str Concrete/Industrial Saws	50	75	65.78	391
1998	2267002039	LPG - Concrete/Industrial Saws	25	40	34.79	718
1998	2267002039	LPG - Concrete/Industrial Saws	50	75	65.78	391
1998	2265002042	4-Str Cement & Mortar Mixers	1	3	2.89	1,558
1998	2265002042	4-Str Cement & Mortar Mixers	3	6	5.22	87,327
1998	2265002042	4-Str Cement & Mortar Mixers	6	11	8.373	145,895
1998	2265002042	4-Str Cement & Mortar Mixers	11	16	13.52	4,950
1998	2265002042	4-Str Cement & Mortar Mixers	16	25	17.87	3,793
1998	2265002045	4-Str Cranes	6	11	8	148
1998	2265002045	4-Str Cranes	11	16	14.02	209
1998	2265002045	4-Str Cranes	16	25	18.16	74
1998	2265002045	4-Str Cranes	25	40	37	3
1998	2265002045	4-Str Cranes	50	75	69.04	520
1998	2265002045	4-Str Cranes	100	175	115.2	84
1998	2267002045	LPG - Cranes	25	40	37	3
1998	2267002045	LPG - Cranes	50	75	69.04	520
1998	2267002045	LPG - Cranes	100	175	115.2	84
1998	2260002054	2-Str Crushing/Proc. Equipment	1	3	1.8	1,405
1998	2265002054	4-Str Crushing/Proc. Equipment	3	6	4.321	1,975
1998	2265002054	4-Str Crushing/Proc. Equipment	6	11	8.93	3,603
1998	2265002054	4-Str Crushing/Proc. Equipment	11	16	16	924
1998	2265002054	4-Str Crushing/Proc. Equipment	50	75	62.53	115
1998	2267002054	LPG - Crushing/Proc. Equipment	50	75	62.53	115
1998	2265002057	4-Str Rough Terrain Forklift	16	25	23	33
1998	2265002057	4-Str Rough Terrain Forklift	25	40	29	112
1998	2265002057	4-Str Rough Terrain Forklift	40	50	46	1
1998	2265002057	4-Str Rough Terrain Forklift	50	75	65.9	738
1998	2265002057	4-Str Rough Terrain Forklift	75	100	80	5
1998	2265002057	4-Str Rough Terrain Forklift	100	175	113.3	87
1998	2267002057	LPG - Rough Terrain Forklift	25	40	29	112
1998	2267002057	LPG - Rough Terrain Forklift	40	50	46	1
1998	2267002057	LPG - Rough Terrain Forklift	50	75	65.9	738
1998	2267002057	LPG - Rough Terrain Forklift	75	100	80	5
1998	2267002057	LPG - Rough Terrain Forklift	100	175	113.3	87
1998	2265002060	4-Str Rubber Tire Loaders	25	40	37	32
1998	2265002060	4-Str Rubber Tire Loaders	50	75	70.4	1,474
1998	2265002060	4-Str Rubber Tire Loaders	100	175	113.0	49

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2267002060	LPG - Rubber Tire Loaders	25	40	37	32
1998	2267002060	LPG - Rubber Tire Loaders	50	75	70.4	1,474
1998	2267002060	LPG - Rubber Tire Loaders	100	175	113	49
1998	2265002066	4-Str Tractors/Loaders/Backhoes	6	11	10.8	362
1998	2265002066	4-Str Tractors/Loaders/Backhoes	16	25	19.08	7,534
1998	2265002066	4-Str Tractors/Loaders/Backhoes	25	40	30	28
1998	2265002066	4-Str Tractors/Loaders/Backhoes	50	75	61	132
1998	2265002066	4-Str Tractors/Loaders/Backhoes	75	100	80	16
1998	2267002066	LPG - Tractors/Loaders/Backhoes	25	40	30	28
1998	2267002066	LPG - Tractors/Loaders/Backhoes	50	75	61	132
1998	2267002066	LPG - Tractors/Loaders/Backhoes	75	100	80	16
1998	2265002072	4-Str Skid Steer Loaders	11	16	15.93	297
1998	2265002072	4-Str Skid Steer Loaders	16	25	18.41	5,986
1998	2265002072	4-Str Skid Steer Loaders	25	40	31.93	1,698
1998	2265002072	4-Str Skid Steer Loaders	50	75	54.44	938
1998	2265002072	4-Str Skid Steer Loaders	75	100	79	1,003
1998	2267002072	LPG - Skid Steer Loaders	25	40	31.93	1,698
1998	2267002072	LPG - Skid Steer Loaders	50	75	54.58	938
1998	2267002072	LPG - Skid Steer Loaders	75	100	79	1,003
1998	2265002078	4-Str Dumpers/Tenders	3	6	4.96	5,279
1998	2265002078	4-Str Dumpers/Tenders	6	11	8.52	17,418
1998	2265002078	4-Str Dumpers/Tenders	11	16	12.28	2,622
1998	2265002078	4-Str Dumpers/Tenders	16	25	18.74	3,202
1998	2265002078	4-Str Dumpers/Tenders	50	75	66	124
1998	2265002081	4-Str Other Construction Equipment	16	25	18	20
1998	2265002081	4-Str Other Construction Equipment	100	175	126	625
1998	2267002081	LPG - Other Construction Equipment	100	175	126	597
1998	2268002081	CNG - Other Construction Equipment	100	175	105	28
1998	2265003010	4-Str Aerial Lifts	6	11	8.075	2,188
1998	2265003010	4-Str Aerial Lifts	11	16	14.39	608
1998	2265003010	4-Str Aerial Lifts	16	25	21.13	14,037
1998	2265003010	4-Str Aerial Lifts	25	40	31.22	6,208
1998	2265003010	4-Str Aerial Lifts	50	75	59.86	12,931
1998	2265003010	4-Str Aerial Lifts	100	175	111.5	287
1998	2267003010	LPG - Aerial Lifts	25	40	31.22	6,208
1998	2267003010	LPG - Aerial Lifts	50	75	59.88	12,931
1998	2267003010	LPG - Aerial Lifts	100	175	111.5	287
1996	2265003020	4-Str Forklifts	25	40	36.12	1,645
1996	2265003020	4-Str Forklifts	40	50	45.16	5,876
1996	2265003020	4-Str Forklifts	50	75	62.77	9,466
1996	2265003020	4-Str Forklifts	75	100	89.03	691
1996	2265003020	4-Str Forklifts	100	175	144.7	4,399
1996	2265003020	4-Str Forklifts	175	300	215.8	22
1996	2267003020	LPG - Forklifts	25	40	33.44	31,264
1996	2267003020	LPG - Forklifts	40	50	45.43	68,337
1996	2267003020	LPG - Forklifts	50	75	58.18	179,857
1996	2267003020	LPG - Forklifts	75	100	79.83	13,136
1996	2267003020	LPG - Forklifts	100	175	131.5	83,590

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1996	2267003020	LPG - Forklifts	175	300	215.8	409
1996	2268003020	CNG - Forklifts	40	50	48	43,307
1998	2260003030	2-Str Sweepers/Scrubbers	1	3	1.276	3,298
1998	2265003030	4-Str Sweepers/Scrubbers	3	6	4.735	3,777
1998	2265003030	4-Str Sweepers/Scrubbers	6	11	9.855	5,779
1998	2265003030	4-Str Sweepers/Scrubbers	11	16	14.85	1,563
1998	2265003030	4-Str Sweepers/Scrubbers	16	25	18.23	3,348
1998	2265003030	4-Str Sweepers/Scrubbers	25	40	31.91	2,011
1998	2265003030	4-Str Sweepers/Scrubbers	40	50	46	2,273
1998	2265003030	4-Str Sweepers/Scrubbers	50	75	63.35	2,306
1998	2265003030	4-Str Sweepers/Scrubbers	75	100	90	23
1998	2265003030	4-Str Sweepers/Scrubbers	100	175	150.0	47
1998	2265003030	4-Str Sweepers/Scrubbers	300	600	411.0	3
1998	2267003030	LPG - Sweepers/Scrubbers	25	40	31	2,011
1998	2267003030	LPG - Sweepers/Scrubbers	40	50	47	2,273
1998	2267003030	LPG - Sweepers/Scrubbers	50	75	63.35	2,306
1998	2267003030	LPG - Sweepers/Scrubbers	75	100	90	23
1998	2267003030	LPG - Sweepers/Scrubbers	100	175	150	47
1998	2267003030	LPG - Sweepers/Scrubbers	300	600	411	3
1998	2268003030	CNG - Sweepers/Scrubbers	175	300	190	20
1998	2260003040	2-Str Other General Industrial Eqp	1	3	2.044	156
1998	2265003040	4-Str Other General Industrial Eqp	3	6	4.289	63,996
1998	2265003040	4-Str Other General Industrial Eqp	6	11	9.063	12,092
1998	2265003040	4-Str Other General Industrial Eqp	11	16	13.53	6,158
1998	2265003040	4-Str Other General Industrial Eqp	16	25	18.24	5,205
1998	2265003040	4-Str Other General Industrial Eqp	25	40	30.12	465
1998	2265003040	4-Str Other General Industrial Eqp	50	75	60.96	646
1998	2265003040	4-Str Other General Industrial Eqp	75	100	80	104
1998	2265003040	4-Str Other General Industrial Eqp	100	175	136	246
1998	2265003040	4-Str Other General Industrial Eqp	175	300	195	9
1998	2267003040	LPG - Other General Industrial Eqp	25	40	30.12	465
1998	2267003040	LPG - Other General Industrial Eqp	50	75	60.96	646
1998	2267003040	LPG - Other General Industrial Eqp	75	100	80	80
1998	2267003040	LPG - Other General Industrial Eqp	100	175	136	246
1998	2267003040	LPG - Other General Industrial Eqp	175	300	195	9
1998	2268003040	CNG - Other General Industrial Eqp	75	100	98.5	24
1998	2265003050	4-Str Other Material Handling Eqp	1	3	3	33
1998	2265003050	4-Str Other Material Handling Eqp	16	25	18.12	1,271
1998	2265003050	4-Str Other Material Handling Eqp	50	75	63.00	773
1998	2265003050	4-Str Other Material Handling Eqp	75	100	86.00	29
1998	2267003050	LPG - Other Material Handling Eqp	50	75	53.6	773
1998	2267003050	LPG - Other Material Handling Eqp	75	100	86.0	29
1998	2265003060	4-Str AC\Refrigeration	6	11	9.0	22
1998	2265003060	4-Str AC\Refrigeration	11	16	13.0	35
1998	2265003060	4-Str AC\Refrigeration	16	25	18.0	1,067
1998	2268003060	CNG - AC\Refrigeration	40	50	48	120
1998	2268003060	CNG - AC\Refrigeration	50	75	74	41
1998	2265003070	4-Str Terminal Tractors	25	40	35	11

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2265003070	4-Str Terminal Tractors	50	75	58.19	411
1998	2265003070	4-Str Terminal Tractors	75	100	98.62	188
1998	2265003070	4-Str Terminal Tractors	100	175	114.2	739
1998	2265003070	4-Str Terminal Tractors	175	300	250	9
1998	2267003070	LPG - Terminal Tractors	25	40	35	11
1998	2267003070	LPG - Terminal Tractors	50	75	57	388
1998	2267003070	LPG - Terminal Tractors	75	100	97	147
1998	2267003070	LPG - Terminal Tractors	100	175	104	730
1998	2267003070	LPG - Terminal Tractors	175	300	190	0
1998	2268003070	CNG - Terminal Tractors	50	75	62	23
1998	2268003070	CNG - Terminal Tractors	75	100	94	41
1998	2268003070	CNG - Terminal Tractors	100	175	125	9
1998	2268003070	CNG - Terminal Tractors	175	300	250	9
1996	2265004010	4-Str Lawn mowers (res)	1	3	2.55	636,892
1996	2265004010	4-Str Lawn mowers (res)	3	6	4.1	31,652,672
1996	2265004010	4-Str Lawn mowers (res)	6	11	6.24	10,436
1996	2265004011	4-Str Lawn mowers (Com)	1	3	2.55	29,577
1996	2265004011	4-Str Lawn mowers (Com)	3	6	4.1	1,469,938
1996	2265004011	4-Str Lawn mowers (Com)	6	11	6.24	485
1998	2260004015	2-Str Rotary Tillers < 6 HP (res)	0	1	0.957	59,060
1998	2260004015	2-Str Rotary Tillers < 6 HP (res)	1	3	2.514	417,521
1998	2265004015	4-Str Rotary Tillers < 6 HP (res)	3	6	4.712	2,965,010
1998	2260004016	2-Str Rotary Tillers < 6 HP (com)	0	1	0.957	9,855
1998	2260004016	2-Str Rotary Tillers < 6 HP (com)	1	3	2.514	69,668
1998	2265004016	4-Str Rotary Tillers < 6 HP (com)	3	6	4.712	494,745
1996	2260004020	2-Str Chain Saws < 6 HP (res)	1	3	2.11	5,150,700
1996	2260004020	2-Str Chain Saws < 6 HP (res)	3	6	3.916	0
1996	2260004021	2-Str Chain Saws < 6 HP (com)	1	3	2.11	159,300
1996	2260004021	2-Str Chain Saws < 6 HP (com)	3	6	3.916	560,500
1996	2260004025	2-Str Trimmers/Edgers/Brush Cutter (res)	0	1	0.81	3,850,000
1996	2260004025	2-Str Trimmers/Edgers/Brush Cutter (res)	1	3	1.4	9,750,000
1996	2260004025	2-Str Trimmers/Edgers/Brush Cutter (res)	3	6	3.3	0
1996	2260004026	2-Str Trimmers/Edgers/Brush Cutter (com)	0	1	0.81	0
1996	2260004026	2-Str Trimmers/Edgers/Brush Cutter (com)	1	3	1.4	1,680,650
1996	2260004026	2-Str Trimmers/Edgers/Brush Cutter (com)	3	6	3.30	119,350
1996	2265004025	4-Str Trimmers/Edgers/Brush Cutter (res)	3	6	3.3	222,344
1996	2265004025	4-Str Trimmers/Edgers/Brush Cutter (res)	6	11	7.9	0
1996	2265004025	4-Str Trimmers/Edgers/Brush Cutter (res)	11	16	16	0
1996	2265004025	4-Str Trimmers/Edgers/Brush Cutter (res)	16	25	18.00	0
1996	2265004026	4-Str Trimmers/Edgers/Brush Cutter (com)	3	6	3.3	26,363
1996	2265004026	4-Str Trimmers/Edgers/Brush Cutter (com)	6	11	7.9	7,052
1996	2265004026	4-Str Trimmers/Edgers/Brush Cutter (com)	11	16	16	373
1996	2265004026	4-Str Trimmers/Edgers/Brush Cutter (com)	16	25	18	809
1996	2260004030	2-Str Leafblowers/Vacuums (res)	0	1	0.84	570,000
1996	2260004030	2-Str Leafblowers/Vacuums (res)	1	3	1.41	6,330,000
1996	2260004030	2-Str Leafblowers/Vacuums (res)	3	6	3.42	0
1996	2260004031	2-Str Leafblowers/Vacuums (com)	0	1	0.84	0
1996	2260004031	2-Str Leafblowers/Vacuums (com)	1	3	1.41	510,000

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1996	2260004031	2-Str Leafblowers/Vacuums (com)	3	6	3.42	190,000
1996	2265004030	4-Str Leafblowers/Vacuums (res)	3	6	3.4	358,692
1996	2265004030	4-Str Leafblowers/Vacuums (res)	6	11	8.3	0
1996	2265004030	4-Str Leafblowers/Vacuums (res)	11	16	14.23	0
1996	2265004030	4-Str Leafblowers/Vacuums (res)	16	25	20.96	0
1996	2265004031	4-Str Leafblowers/Vacuums (com)	3	6	3.4	29,083
1996	2265004031	4-Str Leafblowers/Vacuums (com)	6	11	8.3	284,431
1996	2265004031	4-Str Leafblowers/Vacuums (com)	11	16	14.2	8,959
1996	2265004031	4-Str Leafblowers/Vacuums (com)	16	25	21.0	9,747
1996	2265004031	4-Str Leafblowers/Vacuums (com)	25	40	31	742
1996	2265004031	4-Str Leafblowers/Vacuums (com)	50	75	61.21	5,061
1996	2265004031	4-Str Leafblowers/Vacuums (com)	100	175	120.8	5,020
1998	2260004035	2-Str Snowblowers (res)	1	3	2.921	966,993
1998	2260004035	2-Str Snowblowers (res)	3	6	4.686	1,480,768
1998	2265004035	4-Str Snowblowers (res)	6	11	8.699	2,498,136
1998	2265004035	4-Str Snowblowers (res)	11	16	12.59	116,759
1998	2260004036	2-Str Snowblowers (com)	1	3	2.921	107,444
1998	2260004036	2-Str Snowblowers (com)	3	6	4.686	164,530
1998	2265004036	4-Str Snowblowers (com)	6	11	8.699	277,571
1998	2265004036	4-Str Snowblowers (com)	11	16	12.59	12,973
1998	2265004040	4-Str Rear Engine Riding Mowers (res)	3	6	5.105	6,954
1998	2265004040	4-Str Rear Engine Riding Mowers (res)	6	11	9.153	1,006,160
1998	2265004040	4-Str Rear Engine Riding Mowers (res)	11	16	12.61	780,271
1998	2265004040	4-Str Rear Engine Riding Mowers (res)	16	25	18.26	3,691
1998	2265004041	4-Str Rear Engine Riding Mowers (com)	3	6	5.105	186
1998	2265004041	4-Str Rear Engine Riding Mowers (com)	6	11	9.153	26,858
1998	2265004041	4-Str Rear Engine Riding Mowers (com)	11	16	12.61	20,829
1998	2265004041	4-Str Rear Engine Riding Mowers (com)	16	25	18.26	99
1998	2265004046	4-Str Front Mowers (com)	6	11	8	27,794
1998	2265004046	4-Str Front Mowers (com)	11	16	13.47	94,937
1998	2265004046	4-Str Front Mowers (com)	16	25	17	41,976
1998	2265004046	4-Str Front Mowers (com)	25	40	32.27	630
1998	2265004051	4-Str Shredders < 6 HP (com)	1	3	2.986	101,841
1998	2265004051	4-Str Shredders < 6 HP (com)	3	6	4.835	199,316
1998	2265004055	4-Str Lawn & Garden Tractors (res)	3	6	5.002	24,846
1998	2265004055	4-Str Lawn & Garden Tractors (res)	6	11	9.735	778,998
1998	2265004055	4-Str Lawn & Garden Tractors (res)	11	16	13.61	8,655,718
1998	2265004055	4-Str Lawn & Garden Tractors (res)	16	25	18.41	2,821,097
1998	2265004056	4-Str Lawn & Garden Tractors (com)	3	6	5.002	663
1998	2265004056	4-Str Lawn & Garden Tractors (com)	6	11	9.735	20,795
1998	2265004056	4-Str Lawn & Garden Tractors (com)	11	16	13.61	231,056
1998	2265004056	4-Str Lawn & Garden Tractors (com)	16	25	18.41	75,306
1998	2265004066	4-Str Chippers/Stump Grinders (com)	3	6	3.5	34
1998	2265004066	4-Str Chippers/Stump Grinders (com)	6	11	9.791	1,678
1998	2265004066	4-Str Chippers/Stump Grinders (com)	11	16	15.32	6,916
1998	2265004066	4-Str Chippers/Stump Grinders (com)	16	25	20.05	13,034
1998	2265004066	4-Str Chippers/Stump Grinders (com)	25	40	35.1	984
1998	2265004066	4-Str Chippers/Stump Grinders (com)	50	75	60.77	4,199



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Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2265004066	4-Str Chippers/Stump Grinders (com)	75	100	80	39
1998	2265004066	4-Str Chippers/Stump Grinders (com)	100	175	119	1,005
1998	2267004066	LPG - Chippers/Stump Grinders (com)	25	40	35.1	984
1998	2267004066	LPG - Chippers/Stump Grinders (com)	50	75	60.77	4,199
1998	2267004066	LPG - Chippers/Stump Grinders (com)	75	100	80	39
1998	2267004066	LPG - Chippers/Stump Grinders (com)	100	175	119	1,005
1998	2260004071	2-Str Commercial Turf Equipment (com)	1	3	3	119
1998	2265004071	4-Str Commercial Turf Equipment (com)	3	6	5.217	343,058
1998	2265004071	4-Str Commercial Turf Equipment (com)	6	11	8.771	91,253
1998	2265004071	4-Str Commercial Turf Equipment (com)	11	16	13.99	203,640
1998	2265004071	4-Str Commercial Turf Equipment (com)	16	25	19.33	265,433
1998	2265004071	4-Str Commercial Turf Equipment (com)	25	40	27.24	52,592
1998	2265004071	4-Str Commercial Turf Equipment (com)	50	75	59.59	454
1998	2265004075	4-Str Other Lawn & Garden Eqp. (res)	0	1	0.914	25,378
1998	2265004075	4-Str Other Lawn & Garden Eqp. (res)	1	3	2.34	109,896
1998	2265004075	4-Str Other Lawn & Garden Eqp. (res)	3	6	4.867	280,075
1998	2265004075	4-Str Other Lawn & Garden Eqp. (res)	6	11	8.208	185,063
1998	2265004075	4-Str Other Lawn & Garden Eqp. (res)	11	16	15.54	2,710
1998	2265004075	4-Str Other Lawn & Garden Eqp. (res)	16	25	20.04	1,776
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	0	1	0.914	30,154
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	1	3	2.34	130,577
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	3	6	4.867	332,781
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	6	11	8.208	219,889
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	11	16	15.54	3,220
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	16	25	20.04	2,111
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	25	40	36.04	206
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	50	75	66.00	71
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	75	100	86.00	25
1998	2265004076	4-Str Other Lawn & Garden Eqp. (com)	100	175	113	83
1998	2265005010	4-Str 2-Wheel Tractors	6	11	8.197	2,595
1998	2265005010	4-Str 2-Wheel Tractors	11	16	14.19	2,239
1998	2265005015	4-Str Agricultural Tractors	16	25	20.4	1,075
1998	2265005015	4-Str Agricultural Tractors	25	40	30.5	111
1998	2265005015	4-Str Agricultural Tractors	75	100	82.13	1,286
1998	2265005015	4-Str Agricultural Tractors	100	175	125	145
1998	2265005020	4-Str Combines	50	75	60	1
1998	2265005020	4-Str Combines	75	100	90	9
1998	2265005020	4-Str Combines	100	175	141.2	20
1998	2265005025	4-Str Balers	25	40	34.57	13,265
1998	2265005025	4-Str Balers	50	75	65.28	4,246
1998	2265005025	4-Str Balers	100	175	113	482
1998	2265005030	4-Str Agricultural Mowers	3	6	6	88
1998	2265005030	4-Str Agricultural Mowers	6	11	9.206	6,148
1998	2265005030	4-Str Agricultural Mowers	11	16	16	90
1998	2265005030	4-Str Agricultural Mowers	16	25	18	1,880
1998	2260005035	2-Str Sprayers	0	1	0.88	22,521
1998	2260005035	2-Str Sprayers	1	3	2.567	20,997
1998	2265005035	4-Str Sprayers	3	6	4.37	81,764

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Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2265005035	4-Str Sprayers	6	11	8.204	29,819
1998	2265005035	4-Str Sprayers	11	16	14.85	10,243
1998	2265005035	4-Str Sprayers	16	25	20.51	17,354
1998	2265005035	4-Str Sprayers	25	40	33.28	4,227
1998	2265005035	4-Str Sprayers	50	75	62	1,586
1998	2265005035	4-Str Sprayers	75	100	89.87	1,661
1998	2265005035	4-Str Sprayers	100	175	130.3	1,630
1998	2265005040	4-Str Tillers > 6 HP	6	11	7.501	719,032
1998	2265005040	4-Str Tillers > 6 HP	11	16	14.76	1,796
1998	2265005045	4-Str Swathers	75	100	80	7,168
1998	2265005045	4-Str Swathers	100	175	121.9	4,061
1998	2265005055	4-Str Other Agricultural Equipment	3	6	4.84	1,544
1998	2265005055	4-Str Other Agricultural Equipment	6	11	9.14	7,506
1998	2265005055	4-Str Other Agricultural Equipment	11	16	14.11	4,462
1998	2265005055	4-Str Other Agricultural Equipment	16	25	18.64	3,953
1998	2265005055	4-Str Other Agricultural Equipment	25	40	32.23	314
1998	2265005055	4-Str Other Agricultural Equipment	50	75	62.38	508
1998	2265005055	4-Str Other Agricultural Equipment	75	100	88.04	81
1998	2265005055	4-Str Other Agricultural Equipment	100	175	167.4	2,977
1998	2265005055	4-Str Other Agricultural Equipment	175	300	230.1	1,244
1998	2267005055	LPG - Other Agricultural Equipment	100	175	154	80
1998	2268005055	CNG - Other Agricultural Equipment	100	175	148	134
1998	2265005060	4-Str Irrigation Sets	3	6	4.692	761
1998	2265005060	4-Str Irrigation Sets	6	11	8.918	209
1998	2265005060	4-Str Irrigation Sets	16	25	18	3
1998	2265005060	4-Str Irrigation Sets	50	75	59.7	477
1998	2265005060	4-Str Irrigation Sets	75	100	80.25	1,007
1998	2265005060	4-Str Irrigation Sets	100	175	120.5	467
1998	2265005060	4-Str Irrigation Sets	175	300	210.2	213
1998	2267005060	LPG - Irrigation Sets	100	175	113	12
1998	2268005060	CNG - Irrigation Sets	25	40	32	248
1998	2268005060	CNG - Irrigation Sets	50	75	72.78	1,314
1998	2268005060	CNG - Irrigation Sets	75	100	96.19	1,869
1998	2268005060	CNG - Irrigation Sets	100	175	138.9	184
1998	2268005060	CNG - Irrigation Sets	175	300	233.3	214
1998	2268005060	CNG - Irrigation Sets	300	600	384.4	44
1998	2260006005	2-Str Generator Sets	0	1	0.8	4,052
1998	2260006005	2-Str Generator Sets	1	3	1.663	100,577
1998	2265006005	4-Str Generator Sets	3	6	4.567	707,572
1998	2265006005	4-Str Generator Sets	6	11	8.816	1,699,093
1998	2265006005	4-Str Generator Sets	11	16	14.34	375,830
1998	2265006005	4-Str Generator Sets	16	25	20.72	537,782
1998	2265006005	4-Str Generator Sets	25	40	30.32	0
1998	2265006005	4-Str Generator Sets	40	50	45.99	0
1998	2265006005	4-Str Generator Sets	50	75	59.5	0
1998	2265006005	4-Str Generator Sets	75	100	81.28	0
1998	2265006005	4-Str Generator Sets	100	175	138.5	0
1998	2265006005	4-Str Generator Sets	175	300	212.6	0

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2267006005	LPG - Generator Sets	25	40	30.32	49,803
1998	2267006005	LPG - Generator Sets	40	50	45.99	374
1998	2267006005	LPG - Generator Sets	50	75	62.91	23,229
1998	2267006005	LPG - Generator Sets	75	100	81.28	20,659
1998	2267006005	LPG - Generator Sets	100	175	138.8	7,750
1998	2267006005	LPG - Generator Sets	175	300	239.6	179
1998	2267006005	LPG - Generator Sets	300	600	372	30
1998	2268006005	CNG - Generator Sets	25	40	31.73	471
1998	2268006005	CNG - Generator Sets	40	50	47.67	797
1998	2268006005	CNG - Generator Sets	50	75	60.44	15,915
1998	2268006005	CNG - Generator Sets	75	100	95.41	5,356
1998	2268006005	CNG - Generator Sets	100	175	147.8	1,849
1998	2268006005	CNG - Generator Sets	175	300	239.8	756
1998	2268006005	CNG - Generator Sets	300	600	392.6	382
1998	2260006010	2-Str Pumps	0	1	0.991	127,359
1998	2260006010	2-Str Pumps	1	3	1.998	230,103
1998	2260006010	2-Str Pumps	25	40	38	140
1998	2260006010	2-Str Pumps	50	75	55	29
1998	2265006010	4-Str Pumps	3	6	4.631	329,762
1998	2265006010	4-Str Pumps	6	11	8.337	206,833
1998	2265006010	4-Str Pumps	11	16	14.81	20,034
1998	2265006010	4-Str Pumps	16	25	18.35	11,674
1998	2265006010	4-Str Pumps	25	40	31.95	10,150
1998	2265006010	4-Str Pumps	40	50	46	94
1998	2265006010	4-Str Pumps	50	75	60.6	4,723
1998	2265006010	4-Str Pumps	75	100	81.25	314
1998	2265006010	4-Str Pumps	100	175	115.3	728
1998	2267006010	LPG - Pumps	25	40	31.95	9,817
1998	2267006010	LPG - Pumps	40	50	46	94
1998	2267006010	LPG - Pumps	50	75	57	4,719
1998	2267006010	LPG - Pumps	75	100	81.25	314
1998	2267006010	LPG - Pumps	100	175	115.3	682
1998	2268006010	CNG - Pumps	25	40	32	333
1998	2268006010	CNG - Pumps	50	75	52	4
1998	2268006010	CNG - Pumps	100	175	175	46
1998	2268006010	CNG - Pumps	175	300	246	53
1998	2268006010	CNG - Pumps	300	600	423.3	55
1998	2260006015	2-Str Air Compressors	1	3	2.209	59
1998	2265006015	4-Str Air Compressors	3	6	5.188	52,263
1998	2265006015	4-Str Air Compressors	6	11	9.925	48,785
1998	2265006015	4-Str Air Compressors	11	16	13.63	5,984
1998	2265006015	4-Str Air Compressors	16	25	18.67	6,485
1998	2265006015	4-Str Air Compressors	25	40	31.67	950
1998	2265006015	4-Str Air Compressors	50	75	60.73	5,253
1998	2265006015	4-Str Air Compressors	75	100	81.69	1,118
1998	2265006015	4-Str Air Compressors	100	175	131.9	524
1998	2267006015	LPG - Air Compressors	25	40	31.67	950
1998	2267006015	LPG - Air Compressors	50	75	60.73	5,102

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2267006015	LPG - Air Compressors	75	100	81.69	1,118
1998	2267006015	LPG - Air Compressors	100	175	131.9	280
1998	2268006015	CNG - Air Compressors	50	75	52	151
1998	2268006015	CNG - Air Compressors	100	175	148	244
1998	2268006020	CNG - Gas Compressors	25	40	27.5	155
1998	2268006020	CNG - Gas Compressors	40	50	45.24	92
1998	2268006020	CNG - Gas Compressors	50	75	69	25
1998	2268006020	CNG - Gas Compressors	75	100	91.2	271
1998	2268006020	CNG - Gas Compressors	100	175	145.9	45
1998	2268006020	CNG - Gas Compressors	175	300	242.1	117
1998	2268006020	CNG - Gas Compressors	300	600	401.9	38
1998	2265006025	4-Str Welders	3	6	5.974	6,910
1998	2265006025	4-Str Welders	6	11	9.326	26,796
1998	2265006025	4-Str Welders	11	16	15.71	98,775
1998	2265006025	4-Str Welders	16	25	18.20	32,951
1998	2265006025	4-Str Welders	50	75	63.63	7,778
1998	2265006025	4-Str Welders	75	100	80.00	691
1998	2265006025	4-Str Welders	100	175	130.0	156
1998	2267006025	LPG - Welders	50	75	63.63	7,778
1998	2267006025	LPG - Welders	75	100	80.00	691
1998	2267006025	LPG - Welders	100	175	130	156
1998	2265006030	4-Str Pressure Washers	1	3	3.00	164
1998	2265006030	4-Str Pressure Washers	3	6	4.827	872,534
1998	2265006030	4-Str Pressure Washers	6	11	9.104	539,616
1998	2265006030	4-Str Pressure Washers	11	16	14.13	160,083
1998	2265006030	4-Str Pressure Washers	16	25	18.8	30,104
1998	2265006030	4-Str Pressure Washers	25	40	36.55	510
1998	2265006030	4-Str Pressure Washers	50	75	66	39
1998	2265006030	4-Str Pressure Washers	75	100	86	1
1998	2267006030	LPG - Pressure Washers	25	40	36.55	510
1998	2267006030	LPG - Pressure Washers	50	75	66	39
1998	2267006030	LPG - Pressure Washers	75	100	86	1
1998	2260006035	2-Str Hydro Power Units	1	3	1.709	1,273
1998	2265006035	4-Str Hydro Power Units	3	6	4.834	6,056
1998	2265006035	4-Str Hydro Power Units	6	11	9.855	5,486
1998	2265006035	4-Str Hydro Power Units	11	16	13.1	4,322
1998	2265006035	4-Str Hydro Power Units	16	25	18.35	4,424
1998	2265006035	4-Str Hydro Power Units	25	40	33.91	67
1998	2265006035	4-Str Hydro Power Units	40	50	46	28
1998	2265006035	4-Str Hydro Power Units	50	75	66.79	66
1998	2265006035	4-Str Hydro Power Units	100	175	113	1
1998	2267006035	LPG - Hydro Power Units	25	40	33.91	67
1998	2267006035	LPG - Hydro Power Units	40	50	46	28
1998	2267006035	LPG - Hydro Power Units	50	75	66.79	66
1998	2267006035	LPG - Hydro Power Units	100	175	154	1
1998	2268006035	CNG - Hydro Power Units	100	175	148	1
1996	2260007005	2-Str Chain Saws > 6 HP	6	11	6.81	29,500
1998	2265007010	4-Str Shredders > 6 HP	6	11	8.117	187,298

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
1998	2265007010	4-Str Shredders > 6 HP	11	16	12.62	10,359
1998	2265007010	4-Str Shredders > 6 HP	16	25	20.56	3,357
1998	2265007015	4-Str Forest Eqp - Feller/Bunch/Skidder	3	6	5.50	326
1998	2265007015	4-Str Forest Eqp - Feller/Bunch/Skidder	6	11	9.00	134
1998	2265008005	4-Str Airport Support Equipment	3	6	4.861	897
1998	2265008005	4-Str Airport Support Equipment	6	11	8.171	102
1998	2265008005	4-Str Airport Support Equipment	11	16	16.00	363
1998	2265008005	4-Str Airport Support Equipment	16	25	18.36	19
1998	2265008005	4-Str Airport Support Equipment	25	40	37.0	21
1998	2265008005	4-Str Airport Support Equipment	40	50	46.0	7
1998	2265008005	4-Str Airport Support Equipment	50	75	59.0	23
1998	2265008005	4-Str Airport Support Equipment	75	100	86.16	97
1998	2265008005	4-Str Airport Support Equipment	100	175	113.0	287
1998	2267008005	LPG - Airport Support Equipment	25	40	37.0	21
1998	2267008005	LPG - Airport Support Equipment	40	50	46.0	7
1998	2267008005	LPG - Airport Support Equipment	50	75	59.0	23
1998	2267008005	LPG - Airport Support Equipment	75	100	86.16	97
1998	2267008005	LPG - Airport Support Equipment	100	175	113.0	287
1998	2265010010	4-Str Other Oil Field Equipment	6	11	9.568	4,015
1998	2265010010	4-Str Other Oil Field Equipment	11	16	12.68	7,361
1998	2265010010	4-Str Other Oil Field Equipment	16	25	20.31	4,889
1998	2265010010	4-Str Other Oil Field Equipment	25	40	37	0
1998	2268010010	CNG - Other Oil Field Equipment	25	40	32.59	4,792
1998	2268010010	CNG - Other Oil Field Equipment	40	50	43.74	656
1998	2268010010	CNG - Other Oil Field Equipment	50	75	57.77	2,033
1998	2268010010	CNG - Other Oil Field Equipment	75	100	81.7	74
1998	2268010010	CNG - Other Oil Field Equipment	100	175	131.1	201
1998	2268010010	CNG - Other Oil Field Equipment	600	750	725	14
2000	2270001060	Dsl - Specialty Vehicle Carts	11	16	15	464
2000	2270001060	Dsl - Specialty Vehicle Carts	16	25	21.27	16,886
2000	2270001060	Dsl - Specialty Vehicle Carts	25	40	28.44	11,675
2000	2270001060	Dsl - Specialty Vehicle Carts	40	50	46.5	39
2000	2270001060	Dsl - Specialty Vehicle Carts	50	75	62.54	248
2000	2270001060	Dsl - Specialty Vehicle Carts	75	100	88.43	246
2000	2270001060	Dsl - Specialty Vehicle Carts	100	175	144.7	2,068
2000	2270001060	Dsl - Specialty Vehicle Carts	175	300	252.4	1,820
2000	2270001060	Dsl - Specialty Vehicle Carts	300	600	373.8	804
2000	2270001060	Dsl - Specialty Vehicle Carts	1000	1200	1200	30
2000	2270002003	Dsl - Pavers	16	25	21.9	102
2000	2270002003	Dsl - Pavers	25	40	32.8	2,499
2000	2270002003	Dsl - Pavers	40	50	45.34	232
2000	2270002003	Dsl - Pavers	50	75	62.96	4,743
2000	2270002003	Dsl - Pavers	75	100	86.65	2,953
2000	2270002003	Dsl - Pavers	100	175	134.6	6,469
2000	2270002003	Dsl - Pavers	175	300	221.1	4,542
2000	2270002003	Dsl - Pavers	300	600	386.9	585
2000	2270002006	Dsl - Tampers/Rammers	3	6	4.2	2,446
2000	2270002009	Dsl - Plate Compactors	3	6	4.937	12,246

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270002009	Dsl - Plate Compactors	6	11	8.554	5,471
2000	2270002009	Dsl - Plate Compactors	11	16	14.22	3,328
2000	2270002009	Dsl - Plate Compactors	16	25	20.35	307
2000	2270002015	Dsl - Rollers	3	6	5.438	1,319
2000	2270002015	Dsl - Rollers	6	11	8.695	2,475
2000	2270002015	Dsl - Rollers	11	16	13.55	2,963
2000	2270002015	Dsl - Rollers	16	25	19.68	5,318
2000	2270002015	Dsl - Rollers	25	40	32.52	7,585
2000	2270002015	Dsl - Rollers	40	50	45.81	7,030
2000	2270002015	Dsl - Rollers	50	75	60.74	7,118
2000	2270002015	Dsl - Rollers	75	100	84.76	19,481
2000	2270002015	Dsl - Rollers	100	175	132.2	18,063
2000	2270002015	Dsl - Rollers	175	300	217	6,167
2000	2270002015	Dsl - Rollers	300	600	420.5	1,829
2000	2270002018	Dsl - Scrapers	50	75	66	5
2000	2270002018	Dsl - Scrapers	100	175	160.8	491
2000	2270002018	Dsl - Scrapers	175	300	246.9	5,648
2000	2270002018	Dsl - Scrapers	300	600	422.5	7,313
2000	2270002018	Dsl - Scrapers	600	750	687.6	3,393
2000	2270002018	Dsl - Scrapers	750	1000	760	4
2000	2270002021	Dsl - Paving Equipment	3	6	4.62	1,056
2000	2270002021	Dsl - Paving Equipment	6	11	7.3	1,184
2000	2270002021	Dsl - Paving Equipment	11	16	14.7	91
2000	2270002021	Dsl - Paving Equipment	16	25	19.72	610
2000	2270002021	Dsl - Paving Equipment	25	40	33.82	812
2000	2270002021	Dsl - Paving Equipment	40	50	41	0
2000	2270002021	Dsl - Paving Equipment	50	75	61.05	797
2000	2270002021	Dsl - Paving Equipment	75	100	83.23	940
2000	2270002021	Dsl - Paving Equipment	100	175	131.3	1,715
2000	2270002021	Dsl - Paving Equipment	175	300	230.2	532
2000	2270002021	Dsl - Paving Equipment	300	600	460	24
2000	2270002024	Dsl - Surfacing Equipment	6	11	6.7	19
2000	2270002024	Dsl - Surfacing Equipment	11	16	13.3	61
2000	2270002024	Dsl - Surfacing Equipment	16	25	21.66	912
2000	2270002024	Dsl - Surfacing Equipment	25	40	31.69	764
2000	2270002024	Dsl - Surfacing Equipment	40	50	44.9	264
2000	2270002024	Dsl - Surfacing Equipment	50	75	54.93	14
2000	2270002024	Dsl - Surfacing Equipment	75	100	80.9	724
2000	2270002024	Dsl - Surfacing Equipment	100	175	126.5	222
2000	2270002024	Dsl - Surfacing Equipment	175	300	233	10
2000	2270002024	Dsl - Surfacing Equipment	300	600	492.6	222
2000	2270002024	Dsl - Surfacing Equipment	600	750	713.5	98
2000	2270002024	Dsl - Surfacing Equipment	750	1000	897	20
2000	2270002024	Dsl - Surfacing Equipment	1000	1200	1050	2
2000	2270002024	Dsl - Surfacing Equipment	1200	2000	1544	15
2000	2270002027	Dsl - Signal Boards/Light Plants	3	6	5.4	1,982
2000	2270002027	Dsl - Signal Boards/Light Plants	6	11	7.775	4,666
2000	2270002027	Dsl - Signal Boards/Light Plants	11	16	13.73	2,492

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270002027	Dsl - Signal Boards/Light Plants	16	25	22.18	39,467
2000	2270002027	Dsl - Signal Boards/Light Plants	25	40	30.32	12,108
2000	2270002027	Dsl - Signal Boards/Light Plants	40	50	42.2	21
2000	2270002027	Dsl - Signal Boards/Light Plants	50	75	59.28	865
2000	2270002027	Dsl - Signal Boards/Light Plants	75	100	89	502
2000	2270002027	Dsl - Signal Boards/Light Plants	100	175	157.5	399
2000	2270002027	Dsl - Signal Boards/Light Plants	175	300	216	98
2000	2270002030	Dsl - Trenchers	3	6	5	0
2000	2270002030	Dsl - Trenchers	6	11	9.6	6
2000	2270002030	Dsl - Trenchers	11	16	15.5	72
2000	2270002030	Dsl - Trenchers	16	25	21.6	100
2000	2270002030	Dsl - Trenchers	25	40	34.1	5,457
2000	2270002030	Dsl - Trenchers	40	50	45.05	13,605
2000	2270002030	Dsl - Trenchers	50	75	61.02	22,633
2000	2270002030	Dsl - Trenchers	75	100	86.75	9,142
2000	2270002030	Dsl - Trenchers	100	175	134.3	2,840
2000	2270002030	Dsl - Trenchers	175	300	250.5	1,897
2000	2270002030	Dsl - Trenchers	300	600	414.6	964
2000	2270002030	Dsl - Trenchers	600	750	741.7	84
2000	2270002030	Dsl - Trenchers	1200	2000	1500	10
2000	2270002033	Dsl - Bore/Drill Rigs	6	11	8	57
2000	2270002033	Dsl - Bore/Drill Rigs	11	16	14.5	88
2000	2270002033	Dsl - Bore/Drill Rigs	16	25	23.48	197
2000	2270002033	Dsl - Bore/Drill Rigs	25	40	31.48	3,362
2000	2270002033	Dsl - Bore/Drill Rigs	40	50	44.93	3,420
2000	2270002033	Dsl - Bore/Drill Rigs	50	75	61.85	5,542
2000	2270002033	Dsl - Bore/Drill Rigs	75	100	85.12	5,637
2000	2270002033	Dsl - Bore/Drill Rigs	100	175	131.8	8,286
2000	2270002033	Dsl - Bore/Drill Rigs	175	300	239.2	7,203
2000	2270002033	Dsl - Bore/Drill Rigs	300	600	447.1	4,151
2000	2270002033	Dsl - Bore/Drill Rigs	600	750	690.5	971
2000	2270002033	Dsl - Bore/Drill Rigs	750	1000	869	531
2000	2270002033	Dsl - Bore/Drill Rigs	1000	1200	1050	11
2000	2270002033	Dsl - Bore/Drill Rigs	1200	2000	1500	19
2000	2270002036	Dsl - Excavators	3	6	6	66
2000	2270002036	Dsl - Excavators	6	11	7.967	364
2000	2270002036	Dsl - Excavators	11	16	13.14	749
2000	2270002036	Dsl - Excavators	16	25	21.54	3,339
2000	2270002036	Dsl - Excavators	25	40	33.05	6,917
2000	2270002036	Dsl - Excavators	40	50	45.77	3,688
2000	2270002036	Dsl - Excavators	50	75	61.3	2,861
2000	2270002036	Dsl - Excavators	75	100	91.67	12,912
2000	2270002036	Dsl - Excavators	100	175	137.6	48,245
2000	2270002036	Dsl - Excavators	175	300	233.3	35,271
2000	2270002036	Dsl - Excavators	300	600	410.6	9,344
2000	2270002036	Dsl - Excavators	600	750	719.4	297
2000	2270002036	Dsl - Excavators	750	1000	884	344
2000	2270002036	Dsl - Excavators	1000	1200	1200	11

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270002036	Dsl - Excavators	1200	2000	1768	131
2000	2270002036	Dsl - Excavators	2000	3000	2350	5
2000	2270002039	Dsl - Concrete/Industrial Saws	6	11	10	304
2000	2270002039	Dsl - Concrete/Industrial Saws	16	25	20.12	519
2000	2270002039	Dsl - Concrete/Industrial Saws	25	40	32.94	2,977
2000	2270002039	Dsl - Concrete/Industrial Saws	40	50	43.2	107
2000	2270002039	Dsl - Concrete/Industrial Saws	50	75	57.85	955
2000	2270002039	Dsl - Concrete/Industrial Saws	75	100	81.47	1,374
2000	2270002039	Dsl - Concrete/Industrial Saws	100	175	120.9	168
2000	2270002039	Dsl - Concrete/Industrial Saws	175	300	241.5	4
2000	2270002042	Dsl - Cement & Mortar Mixers	3	6	5.983	6,051
2000	2270002042	Dsl - Cement & Mortar Mixers	6	11	8.082	3,607
2000	2270002042	Dsl - Cement & Mortar Mixers	11	16	13.08	670
2000	2270002042	Dsl - Cement & Mortar Mixers	16	25	21.08	610
2000	2270002042	Dsl - Cement & Mortar Mixers	25	40	32.78	444
2000	2270002042	Dsl - Cement & Mortar Mixers	40	50	45.5	0
2000	2270002042	Dsl - Cement & Mortar Mixers	50	75	59.56	761
2000	2270002042	Dsl - Cement & Mortar Mixers	75	100	83.46	1,272
2000	2270002042	Dsl - Cement & Mortar Mixers	100	175	128.9	403
2000	2270002042	Dsl - Cement & Mortar Mixers	175	300	253.1	143
2000	2270002042	Dsl - Cement & Mortar Mixers	300	600	402.3	180
2000	2270002042	Dsl - Cement & Mortar Mixers	600	750	704.7	36
2000	2270002045	Dsl - Cranes	16	25	23	0
2000	2270002045	Dsl - Cranes	25	40	39.4	551
2000	2270002045	Dsl - Cranes	40	50	41.7	8
2000	2270002045	Dsl - Cranes	50	75	64	293
2000	2270002045	Dsl - Cranes	75	100	88.14	2,839
2000	2270002045	Dsl - Cranes	100	175	145.2	10,690
2000	2270002045	Dsl - Cranes	175	300	237.7	10,934
2000	2270002045	Dsl - Cranes	300	600	412	6,734
2000	2270002045	Dsl - Cranes	600	750	669	290
2000	2270002045	Dsl - Cranes	750	1000	882.8	82
2000	2270002045	Dsl - Cranes	1000	1200	1071	3
2000	2270002048	Dsl - Graders	25	40	35	0
2000	2270002048	Dsl - Graders	40	50	48.3	16
2000	2270002048	Dsl - Graders	50	75	59.54	126
2000	2270002048	Dsl - Graders	75	100	84.21	972
2000	2270002048	Dsl - Graders	100	175	140.8	9,932
2000	2270002048	Dsl - Graders	175	300	231.2	16,634
2000	2270002048	Dsl - Graders	300	600	341.8	1,902
2000	2270002048	Dsl - Graders	600	750	750	115
2000	2270002051	Dsl - Off-highway Trucks	100	175	160.5	26
2000	2270002051	Dsl - Off-highway Trucks	175	300	244.3	2,497
2000	2270002051	Dsl - Off-highway Trucks	300	600	419.9	5,299
2000	2270002051	Dsl - Off-highway Trucks	600	750	688.1	3,000
2000	2270002051	Dsl - Off-highway Trucks	750	1000	868	1,457
2000	2270002051	Dsl - Off-highway Trucks	1000	1200	1153	461
2000	2270002051	Dsl - Off-highway Trucks	1200	2000	1787	2,333



Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270002051	Dsl - Off-highway Trucks	2000	3000	2424	568
2000	2270002054	Dsl - Crushing/Proc. Equipment	16	25	20.42	65
2000	2270002054	Dsl - Crushing/Proc. Equipment	25	40	32.1	89
2000	2270002054	Dsl - Crushing/Proc. Equipment	40	50	45.6	336
2000	2270002054	Dsl - Crushing/Proc. Equipment	50	75	60.74	3,830
2000	2270002054	Dsl - Crushing/Proc. Equipment	75	100	88.98	926
2000	2270002054	Dsl - Crushing/Proc. Equipment	100	175	132.3	1,451
2000	2270002054	Dsl - Crushing/Proc. Equipment	175	300	241.3	547
2000	2270002054	Dsl - Crushing/Proc. Equipment	300	600	423.2	1,424
2000	2270002054	Dsl - Crushing/Proc. Equipment	600	750	666.3	108
2000	2270002054	Dsl - Crushing/Proc. Equipment	750	1000	920	8
2000	2270002057	Dsl - Rough Terrain Forklifts	11	16	13.5	15
2000	2270002057	Dsl - Rough Terrain Forklifts	16	25	22.45	195
2000	2270002057	Dsl - Rough Terrain Forklifts	25	40	33.36	4,563
2000	2270002057	Dsl - Rough Terrain Forklifts	40	50	45.06	5,079
2000	2270002057	Dsl - Rough Terrain Forklifts	50	75	61.42	10,068
2000	2270002057	Dsl - Rough Terrain Forklifts	75	100	85.6	57,611
2000	2270002057	Dsl - Rough Terrain Forklifts	100	175	126	29,594
2000	2270002057	Dsl - Rough Terrain Forklifts	175	300	229.1	1,534
2000	2270002057	Dsl - Rough Terrain Forklifts	300	600	346.1	2,019
2000	2270002060	Dsl - Rubber Tire Loaders	6	11	8.336	0
2000	2270002060	Dsl - Rubber Tire Loaders	11	16	15.4	0
2000	2270002060	Dsl - Rubber Tire Loaders	16	25	22.83	45
2000	2270002060	Dsl - Rubber Tire Loaders	25	40	34.38	2,308
2000	2270002060	Dsl - Rubber Tire Loaders	40	50	45.44	2,650
2000	2270002060	Dsl - Rubber Tire Loaders	50	75	61.7	3,748
2000	2270002060	Dsl - Rubber Tire Loaders	75	100	85.48	16,113
2000	2270002060	Dsl - Rubber Tire Loaders	100	175	136.3	40,747
2000	2270002060	Dsl - Rubber Tire Loaders	175	300	230	38,900
2000	2270002060	Dsl - Rubber Tire Loaders	300	600	419.4	28,540
2000	2270002060	Dsl - Rubber Tire Loaders	600	750	692.2	2,157
2000	2270002060	Dsl - Rubber Tire Loaders	750	1000	866.3	1,051
2000	2270002060	Dsl - Rubber Tire Loaders	1000	1200	1082	219
2000	2270002060	Dsl - Rubber Tire Loaders	1200	2000	1867	1,287
2000	2270002060	Dsl - Rubber Tire Loaders	2000	3000	2243	46
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	11	16	15.5	5
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	16	25	22.78	2,346
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	25	40	32.49	4,689
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	40	50	46.23	2,505
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	50	75	62.46	46,795
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	75	100	87.17	165,326
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	100	175	120.7	110,004
2000	2270002066	Dsl - Tractors/Loaders/Backhoes	175	300	200	599
2000	2270002069	Dsl - Crawler Tractor/Dozers	25	40	25.75	0
2000	2270002069	Dsl - Crawler Tractor/Dozers	40	50	42.5	0
2000	2270002069	Dsl - Crawler Tractor/Dozers	50	75	57.98	485
2000	2270002069	Dsl - Crawler Tractor/Dozers	75	100	87.86	13,961
2000	2270002069	Dsl - Crawler Tractor/Dozers	100	175	136.1	31,552

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270002069	Dsl - Crawler Tractor/Dozers	175	300	235.5	27,323
2000	2270002069	Dsl - Crawler Tractor/Dozers	300	600	425.3	13,835
2000	2270002069	Dsl - Crawler Tractor/Dozers	600	750	707	5,458
2000	2270002069	Dsl - Crawler Tractor/Dozers	750	1000	923	1,129
2000	2270002069	Dsl - Crawler Tractor/Dozers	1000	1200	1065	1,964
2000	2270002069	Dsl - Crawler Tractor/Dozers	1200	2000	1473	9
2000	2270002072	Dsl - Skid Steer Loaders	6	11	9.5	125
2000	2270002072	Dsl - Skid Steer Loaders	11	16	15.47	20,644
2000	2270002072	Dsl - Skid Steer Loaders	16	25	20.3	45,772
2000	2270002072	Dsl - Skid Steer Loaders	25	40	34.97	89,565
2000	2270002072	Dsl - Skid Steer Loaders	40	50	44.94	35,417
2000	2270002072	Dsl - Skid Steer Loaders	50	75	57.67	194,482
2000	2270002072	Dsl - Skid Steer Loaders	75	100	84.35	127,851
2000	2270002072	Dsl - Skid Steer Loaders	100	175	115.3	3,220
2000	2270002075	Dsl - Off-Highway Tractors	100	175	144.5	1
2000	2270002075	Dsl - Off-Highway Tractors	175	300	290	435
2000	2270002075	Dsl - Off-Highway Tractors	300	600	410.3	743
2000	2270002075	Dsl - Off-Highway Tractors	600	750	676	1,777
2000	2270002075	Dsl - Off-Highway Tractors	750	1000	907.8	582
2000	2270002075	Dsl - Off-Highway Tractors	1000	1200	1139	56
2000	2270002075	Dsl - Off-Highway Tractors	1200	2000	1516	460
2000	2270002075	Dsl - Off-Highway Tractors	2000	3000	2283	11
2000	2270002078	Dsl - Dumpers/Tenders	6	11	10	876
2000	2270002078	Dsl - Dumpers/Tenders	11	16	14.31	838
2000	2270002078	Dsl - Dumpers/Tenders	16	25	23.75	599
2000	2270002078	Dsl - Dumpers/Tenders	25	40	32.15	694
2000	2270002078	Dsl - Dumpers/Tenders	40	50	48.5	152
2000	2270002078	Dsl - Dumpers/Tenders	50	75	57.8	72
2000	2270002078	Dsl - Dumpers/Tenders	75	100	85.4	473
2000	2270002078	Dsl - Dumpers/Tenders	100	175	109.7	171
2000	2270002081	Dsl - Other Construction Equipment	6	11	7.9	28
2000	2270002081	Dsl - Other Construction Equipment	11	16	15	12
2000	2270002081	Dsl - Other Construction Equipment	16	25	21.1	127
2000	2270002081	Dsl - Other Construction Equipment	25	40	34.14	364
2000	2270002081	Dsl - Other Construction Equipment	40	50	44.43	33
2000	2270002081	Dsl - Other Construction Equipment	50	75	59.85	354
2000	2270002081	Dsl - Other Construction Equipment	75	100	84.28	349
2000	2270002081	Dsl - Other Construction Equipment	100	175	137.7	2,424
2000	2270002081	Dsl - Other Construction Equipment	175	300	233.7	2,164
2000	2270002081	Dsl - Other Construction Equipment	300	600	442.6	5,226
2000	2270002081	Dsl - Other Construction Equipment	600	750	710.2	953
2000	2270002081	Dsl - Other Construction Equipment	750	1000	827.5	4
2000	2270002081	Dsl - Other Construction Equipment	1000	1200	1200	63
2000	2270003010	Dsl - Aerial Lifts	6	11	8	123
2000	2270003010	Dsl - Aerial Lifts	11	16	13.18	813
2000	2270003010	Dsl - Aerial Lifts	16	25	21.63	11,404
2000	2270003010	Dsl - Aerial Lifts	25	40	33.05	14,165
2000	2270003010	Dsl - Aerial Lifts	40	50	45.46	3,350

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270003010	Dsl - Aerial Lifts	50	75	60.46	23,806
2000	2270003010	Dsl - Aerial Lifts	75	100	83.86	8,461
2000	2270003010	Dsl - Aerial Lifts	100	175	113	103
2000	2270003020	Dsl - Forklifts	11	16	15	16
2000	2270003020	Dsl - Forklifts	16	25	25	4
2000	2270003020	Dsl - Forklifts	25	40	34.68	41
2000	2270003020	Dsl - Forklifts	40	50	47.02	485
2000	2270003020	Dsl - Forklifts	50	75	61.74	17,974
2000	2270003020	Dsl - Forklifts	75	100	85.48	18,108
2000	2270003020	Dsl - Forklifts	100	175	135.6	6,503
2000	2270003020	Dsl - Forklifts	175	300	220.3	1,058
2000	2270003020	Dsl - Forklifts	300	600	353.9	1,351
2000	2270003030	Dsl - Sweepers/Scrubbers	3	6	5	302
2000	2270003030	Dsl - Sweepers/Scrubbers	6	11	11	14
2000	2270003030	Dsl - Sweepers/Scrubbers	11	16	13.65	1
2000	2270003030	Dsl - Sweepers/Scrubbers	16	25	21.69	1,845
2000	2270003030	Dsl - Sweepers/Scrubbers	25	40	34.83	4,436
2000	2270003030	Dsl - Sweepers/Scrubbers	40	50	43.64	2,993
2000	2270003030	Dsl - Sweepers/Scrubbers	50	75	60.81	2,898
2000	2270003030	Dsl - Sweepers/Scrubbers	75	100	81.86	10,672
2000	2270003030	Dsl - Sweepers/Scrubbers	100	175	134.3	11,984
2000	2270003030	Dsl - Sweepers/Scrubbers	175	300	216.7	3,222
2000	2270003030	Dsl - Sweepers/Scrubbers	300	600	363.8	55
2000	2270003040	Dsl - Other General Industrial Eqp	3	6	4.367	2,108
2000	2270003040	Dsl - Other General Industrial Eqp	6	11	9.58	398
2000	2270003040	Dsl - Other General Industrial Eqp	11	16	13.72	257
2000	2270003040	Dsl - Other General Industrial Eqp	16	25	22.62	447
2000	2270003040	Dsl - Other General Industrial Eqp	25	40	32.48	1,414
2000	2270003040	Dsl - Other General Industrial Eqp	40	50	44.31	515
2000	2270003040	Dsl - Other General Industrial Eqp	50	75	61.31	3,989
2000	2270003040	Dsl - Other General Industrial Eqp	75	100	86.11	12,419
2000	2270003040	Dsl - Other General Industrial Eqp	100	175	130.4	17,667
2000	2270003040	Dsl - Other General Industrial Eqp	175	300	234.2	5,512
2000	2270003040	Dsl - Other General Industrial Eqp	300	600	389.4	564
2000	2270003040	Dsl - Other General Industrial Eqp	600	750	650	93
2000	2270003040	Dsl - Other General Industrial Eqp	1200	2000	1350	0
2000	2270003050	Dsl - Other Material Handling Eqp	6	11	8.5	0
2000	2270003050	Dsl - Other Material Handling Eqp	16	25	19	0
2000	2270003050	Dsl - Other Material Handling Eqp	25	40	37.2	336
2000	2270003050	Dsl - Other Material Handling Eqp	50	75	64.73	1,691
2000	2270003050	Dsl - Other Material Handling Eqp	75	100	86.43	510
2000	2270003050	Dsl - Other Material Handling Eqp	100	175	128.9	2,345
2000	2270003050	Dsl - Other Material Handling Eqp	175	300	245.2	892
2000	2270003050	Dsl - Other Material Handling Eqp	300	600	428.3	123
2000	2270003050	Dsl - Other Material Handling Eqp	1000	1200	1071	2
2000	2270003060	Dsl - AC\Refrigeration	6	11	9.6	6,320
2000	2270003060	Dsl - AC\Refrigeration	11	16	13.24	19,428
2000	2270003060	Dsl - AC\Refrigeration	16	25	19.45	18,216

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270003060	Dsl - AC\Refrigeration	25	40	31.83	4,671
2000	2270003060	Dsl - AC\Refrigeration	40	50	44.9	34,240
2000	2270003060	Dsl - AC\Refrigeration	50	75	57	131,695
2000	2270003060	Dsl - AC\Refrigeration	75	100	76	0
2000	2270003070	Dsl - Terminal Tractors	6	11	8.3	0
2000	2270003070	Dsl - Terminal Tractors	11	16	11.7	0
2000	2270003070	Dsl - Terminal Tractors	16	25	21.2	11
2000	2270003070	Dsl - Terminal Tractors	25	40	38.5	4
2000	2270003070	Dsl - Terminal Tractors	40	50	41	0
2000	2270003070	Dsl - Terminal Tractors	50	75	62.82	2,275
2000	2270003070	Dsl - Terminal Tractors	75	100	84.18	3,947
2000	2270003070	Dsl - Terminal Tractors	100	175	141.1	6,340
2000	2270003070	Dsl - Terminal Tractors	175	300	221.4	10,556
2000	2270003070	Dsl - Terminal Tractors	300	600	419	322
2000	2270003070	Dsl - Terminal Tractors	600	750	655	0
2000	2270004031	Dsl - Leafblowers/Vacuums (com)	3	6	5.667	277
2000	2270004031	Dsl - Leafblowers/Vacuums (com)	25	40	28	67
2000	2270004031	Dsl - Leafblowers/Vacuums (com)	40	50	49	0
2000	2270004031	Dsl - Leafblowers/Vacuums (com)	50	75	61	0
2000	2270004031	Dsl - Leafblowers/Vacuums (com)	75	100	95	0
2000	2270004031	Dsl - Leafblowers/Vacuums (com)	100	175	118.5	0
2000	2270004036	Dsl - Snowblowers (com)	100	175	165	22
2000	2270004036	Dsl - Snowblowers (com)	175	300	251.8	189
2000	2270004036	Dsl - Snowblowers (com)	300	600	384.4	235
2000	2270004046	Dsl - Commercial Mowers (com)	3	6	5	280
2000	2270004046	Dsl - Commercial Mowers (com)	6	11	7.35	0
2000	2270004046	Dsl - Commercial Mowers (com)	11	16	14.12	7,869
2000	2270004046	Dsl - Commercial Mowers (com)	16	25	20.87	109,208
2000	2270004046	Dsl - Commercial Mowers (com)	25	40	31.28	52,933
2000	2270004046	Dsl - Commercial Mowers (com)	40	50	44.66	11,824
2000	2270004046	Dsl - Commercial Mowers (com)	50	75	55.08	19,417
2000	2270004046	Dsl - Commercial Mowers (com)	75	100	82.63	4,151
2000	2270004056	Dsl - Lawn & Garden Tractors (com)	6	11	10.5	32
2000	2270004056	Dsl - Lawn & Garden Tractors (com)	11	16	14.62	1,921
2000	2270004056	Dsl - Lawn & Garden Tractors (com)	16	25	20.03	47,948
2000	2270004056	Dsl - Lawn & Garden Tractors (com)	25	40	26.33	832
2000	2270004056	Dsl - Lawn & Garden Tractors (com)	40	50	44.5	480
2000	2270004056	Dsl - Lawn & Garden Tractors (com)	75	100	80	731
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	16	25	25	11
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	25	40	37.2	178
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	40	50	47.12	1,891
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	50	75	61.07	7,053
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	75	100	84.47	31,166
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	100	175	121.3	9,868
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	175	300	241.7	5,958
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	300	600	434.4	5,053
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	600	750	702.9	1,144
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	750	1000	947.8	187

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270004066	Dsl - Chippers/Stump Grinders (com)	1000	1200	1095	23
2000	2270004071	Dsl - Commercial Turf Equipment (com)	6	11	7.75	0
2000	2270004071	Dsl - Commercial Turf Equipment (com)	11	16	13.56	1,121
2000	2270004071	Dsl - Commercial Turf Equipment (com)	16	25	21.15	1,458
2000	2270004071	Dsl - Commercial Turf Equipment (com)	25	40	34.57	2,687
2000	2270004071	Dsl - Commercial Turf Equipment (com)	40	50	45.47	1,306
2000	2270004071	Dsl - Commercial Turf Equipment (com)	50	75	62.87	24
2000	2270004071	Dsl - Commercial Turf Equipment (com)	75	100	83.82	1,374
2000	2270004071	Dsl - Commercial Turf Equipment (com)	100	175	113	1,149
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	11	16	15	32
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	16	25	22.9	277
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	25	40	32	1
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	40	50	47	6
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	50	75	51	231
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	75	100	80	62
2000	2270004076	Dsl - Other Lawn & Garden Eqp. (com)	100	175	131	11
2000	2270005010	Dsl - 2-Wheel Tractors	3	6	6	86
2000	2270005010	Dsl - 2-Wheel Tractors	6	11	8.333	349
2000	2270005015	Dsl - Agricultural Tractors	11	16	16	8
2000	2270005015	Dsl - Agricultural Tractors	16	25	20.97	79,153
2000	2270005015	Dsl - Agricultural Tractors	25	40	32.48	212,890
2000	2270005015	Dsl - Agricultural Tractors	40	50	46.39	121,645
2000	2270005015	Dsl - Agricultural Tractors	50	75	62.18	192,612
2000	2270005015	Dsl - Agricultural Tractors	75	100	86.14	169,760
2000	2270005015	Dsl - Agricultural Tractors	100	175	133.6	282,860
2000	2270005015	Dsl - Agricultural Tractors	175	300	236.5	243,857
2000	2270005015	Dsl - Agricultural Tractors	300	600	415.2	126,182
2000	2270005015	Dsl - Agricultural Tractors	600	750	635	13
2000	2270005020	Dsl - Combines	75	100	91	13,300
2000	2270005020	Dsl - Combines	100	175	141.8	121,999
2000	2270005020	Dsl - Combines	175	300	231.5	145,476
2000	2270005020	Dsl - Combines	300	600	345.8	7,515
2000	2270005025	Dsl - Balers	40	50	50	146
2000	2270005025	Dsl - Balers	50	75	61.8	3,172
2000	2270005025	Dsl - Balers	75	100	85.83	1,169
2000	2270005025	Dsl - Balers	100	175	140	993
2000	2270005025	Dsl - Balers	175	300	177	49
2000	2270005030	Dsl - Agricultural Mowers	75	100	76	300
2000	2270005035	Dsl - Sprayers	16	25	22.6	1,586
2000	2270005035	Dsl - Sprayers	25	40	32.06	721
2000	2270005035	Dsl - Sprayers	40	50	47.97	451
2000	2270005035	Dsl - Sprayers	50	75	63.66	1,212
2000	2270005035	Dsl - Sprayers	75	100	86.24	7,429
2000	2270005035	Dsl - Sprayers	100	175	128.4	14,340
2000	2270005035	Dsl - Sprayers	175	300	226.6	15,583
2000	2270005035	Dsl - Sprayers	300	600	358.5	4,222
2000	2270005040	Dsl - Tillers > 6 HP	3	6	6	31
2000	2270005040	Dsl - Tillers > 6 HP	175	300	245	3

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270005040	Dsl - Tillers > 6 HP	300	600	424.5	12
2000	2270005045	Dsl - Swathers	50	75	70	8,980
2000	2270005045	Dsl - Swathers	75	100	85	42,439
2000	2270005045	Dsl - Swathers	100	175	131.3	8,383
2000	2270005045	Dsl - Swathers	175	300	200	375
2000	2270005055	Dsl - Other Agricultural Equipment	6	11	10.5	24
2000	2270005055	Dsl - Other Agricultural Equipment	11	16	14.38	279
2000	2270005055	Dsl - Other Agricultural Equipment	16	25	20.87	1,013
2000	2270005055	Dsl - Other Agricultural Equipment	25	40	32.08	536
2000	2270005055	Dsl - Other Agricultural Equipment	40	50	45.02	326
2000	2270005055	Dsl - Other Agricultural Equipment	50	75	62.64	2,537
2000	2270005055	Dsl - Other Agricultural Equipment	75	100	84.95	3,171
2000	2270005055	Dsl - Other Agricultural Equipment	100	175	135.5	7,901
2000	2270005055	Dsl - Other Agricultural Equipment	175	300	230.4	7,993
2000	2270005055	Dsl - Other Agricultural Equipment	300	600	375.1	3,349
2000	2270005055	Dsl - Other Agricultural Equipment	750	1000	965	2
2000	2270005060	Dsl - Irrigation Sets	6	11	8	0
2000	2270005060	Dsl - Irrigation Sets	11	16	15.6	4
2000	2270005060	Dsl - Irrigation Sets	16	25	21.88	638
2000	2270005060	Dsl - Irrigation Sets	25	40	33	1,457
2000	2270005060	Dsl - Irrigation Sets	40	50	45.08	578
2000	2270005060	Dsl - Irrigation Sets	50	75	60.24	2,267
2000	2270005060	Dsl - Irrigation Sets	75	100	85.87	10,702
2000	2270005060	Dsl - Irrigation Sets	100	175	136.3	5,615
2000	2270005060	Dsl - Irrigation Sets	175	300	224.5	1,597
2000	2270005060	Dsl - Irrigation Sets	300	600	390	114
2000	2270005060	Dsl - Irrigation Sets	600	750	704.7	0
2000	2270006005	Dsl - Generator Sets	3	6	5.35	60,349
2000	2270006005	Dsl - Generator Sets	6	11	8.418	60,257
2000	2270006005	Dsl - Generator Sets	11	16	13.56	46,445
2000	2270006005	Dsl - Generator Sets	16	25	21.29	73,131
2000	2270006005	Dsl - Generator Sets	25	40	33.44	121,047
2000	2270006005	Dsl - Generator Sets	40	50	45.19	16,533
2000	2270006005	Dsl - Generator Sets	50	75	59.96	61,002
2000	2270006005	Dsl - Generator Sets	75	100	86.42	74,241
2000	2270006005	Dsl - Generator Sets	100	175	135.7	25,340
2000	2270006005	Dsl - Generator Sets	175	300	238	14,089
2000	2270006005	Dsl - Generator Sets	300	600	419.3	7,317
2000	2270006005	Dsl - Generator Sets	600	750	682.1	0
2000	2270006005	Dsl - Generator Sets	750	1000	887.1	0
2000	2270006005	Dsl - Generator Sets	1000	1200	1112	0
2000	2270006005	Dsl - Generator Sets	1200	2000	1655	0
2000	2270006005	Dsl - Generator Sets	2000	3000	2401	0
2000	2270006010	Dsl - Pumps	1	3	3	27
2000	2270006010	Dsl - Pumps	3	6	5.225	10,390
2000	2270006010	Dsl - Pumps	6	11	8.464	24,977
2000	2270006010	Dsl - Pumps	11	16	13.73	6,266
2000	2270006010	Dsl - Pumps	16	25	21.72	4,984

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270006010	Dsl - Pumps	25	40	34.32	8,669
2000	2270006010	Dsl - Pumps	40	50	44.78	2,457
2000	2270006010	Dsl - Pumps	50	75	62.38	16,632
2000	2270006010	Dsl - Pumps	75	100	86.31	18,512
2000	2270006010	Dsl - Pumps	100	175	132.4	8,163
2000	2270006010	Dsl - Pumps	175	300	243.2	2,045
2000	2270006010	Dsl - Pumps	300	600	397.6	1,036
2000	2270006010	Dsl - Pumps	600	750	687.2	0
2000	2270006010	Dsl - Pumps	750	1000	860	0
2000	2270006010	Dsl - Pumps	1000	1200	1200	0
2000	2270006010	Dsl - Pumps	1200	2000	1633	0
2000	2270006010	Dsl - Pumps	2000	3000	2373	0
2000	2270006015	Dsl - Air Compressors	3	6	5.567	354
2000	2270006015	Dsl - Air Compressors	6	11	9.47	864
2000	2270006015	Dsl - Air Compressors	11	16	13.34	117
2000	2270006015	Dsl - Air Compressors	16	25	22.68	179
2000	2270006015	Dsl - Air Compressors	25	40	33.5	6,636
2000	2270006015	Dsl - Air Compressors	40	50	44.26	4,593
2000	2270006015	Dsl - Air Compressors	50	75	60.76	29,440
2000	2270006015	Dsl - Air Compressors	75	100	83.86	38,346
2000	2270006015	Dsl - Air Compressors	100	175	129.2	4,397
2000	2270006015	Dsl - Air Compressors	175	300	243.3	3,947
2000	2270006015	Dsl - Air Compressors	300	600	427.4	1,128
2000	2270006015	Dsl - Air Compressors	600	750	700	0
2000	2270006020	Dsl - Gas Compressors	25	40	38	0
2000	2270006020	Dsl - Gas Compressors	40	50	40.1	0
2000	2270006020	Dsl - Gas Compressors	50	75	54.65	0
2000	2270006020	Dsl - Gas Compressors	75	100	90	1
2000	2270006020	Dsl - Gas Compressors	300	600	400.3	0
2000	2270006025	Dsl - Welders	6	11	8.843	3,836
2000	2270006025	Dsl - Welders	11	16	14.68	21,254
2000	2270006025	Dsl - Welders	16	25	21.29	30,940
2000	2270006025	Dsl - Welders	25	40	32.98	19,188
2000	2270006025	Dsl - Welders	40	50	46.24	53,190
2000	2270006025	Dsl - Welders	50	75	64.27	38,634
2000	2270006025	Dsl - Welders	75	100	84.6	16,963
2000	2270006025	Dsl - Welders	100	175	151.8	883
2000	2270006025	Dsl - Welders	300	600	380	20
2000	2270006025	Dsl - Welders	750	1000	800	0
2000	2270006030	Dsl - Pressure Washers	3	6	5.18	671
2000	2270006030	Dsl - Pressure Washers	6	11	9.041	5,716
2000	2270006030	Dsl - Pressure Washers	11	16	13.97	6,562
2000	2270006030	Dsl - Pressure Washers	16	25	20.42	8,194
2000	2270006030	Dsl - Pressure Washers	25	40	31.23	7,831
2000	2270006030	Dsl - Pressure Washers	40	50	45.31	981
2000	2270006030	Dsl - Pressure Washers	50	75	61.34	3,294
2000	2270006030	Dsl - Pressure Washers	75	100	88.53	921
2000	2270006030	Dsl - Pressure Washers	100	175	128.3	3,060

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270006030	Dsl - Pressure Washers	175	300	226.2	2,476
2000	2270006030	Dsl - Pressure Washers	300	600	415.5	379
2000	2270006030	Dsl - Pressure Washers	600	750	688.9	177
2000	2270006035	Dsl - Hydro Power Units	3	6	5.1	90
2000	2270006035	Dsl - Hydro Power Units	6	11	8.575	201
2000	2270006035	Dsl - Hydro Power Units	11	16	13.97	63
2000	2270006035	Dsl - Hydro Power Units	16	25	20.54	589
2000	2270006035	Dsl - Hydro Power Units	25	40	33.26	854
2000	2270006035	Dsl - Hydro Power Units	40	50	42.73	269
2000	2270006035	Dsl - Hydro Power Units	50	75	58.03	1,309
2000	2270006035	Dsl - Hydro Power Units	75	100	83.95	1,512
2000	2270006035	Dsl - Hydro Power Units	100	175	137.7	408
2000	2270006035	Dsl - Hydro Power Units	175	300	226.8	53
2000	2270006035	Dsl - Hydro Power Units	300	600	439	13
2000	2270006035	Dsl - Hydro Power Units	600	750	700	0
2000	2270007010	Dsl - Shredders > 6 HP	40	50		0
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	25	40	35.47	12
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	40	50	44.93	17
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	50	75	65.09	24
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	75	100	88.96	1,192
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	100	175	137	8,269
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	175	300	225.2	11,850
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	300	600	421.3	1,024
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	600	750	689.3	419
2000	2270007015	Dsl - Forest Eqp - Feller/Bunch/Skidder	1000	1200	1050	11
2000	2270008005	Dsl - Airport Support Equipment	6	11	7.65	1,124
2000	2270008005	Dsl - Airport Support Equipment	11	16	15.5	3
2000	2270008005	Dsl - Airport Support Equipment	16	25	25	14
2000	2270008005	Dsl - Airport Support Equipment	25	40	32.46	41
2000	2270008005	Dsl - Airport Support Equipment	40	50	42.82	57
2000	2270008005	Dsl - Airport Support Equipment	50	75	61.23	1,176
2000	2270008005	Dsl - Airport Support Equipment	75	100	85.4	2,142
2000	2270008005	Dsl - Airport Support Equipment	100	175	135.6	6,327
2000	2270008005	Dsl - Airport Support Equipment	175	300	228.8	2,124
2000	2270008005	Dsl - Airport Support Equipment	300	600	443.4	2,481
2000	2270008005	Dsl - Airport Support Equipment	600	750	667	263
2000	2270008005	Dsl - Airport Support Equipment	1000	1200	1071	16
2000	2270009010	Dsl - Other Underground Mining Equip	16	25	22.76	10
2000	2270009010	Dsl - Other Underground Mining Equip	25	40	31.89	252
2000	2270009010	Dsl - Other Underground Mining Equip	40	50	44.42	497
2000	2270009010	Dsl - Other Underground Mining Equip	50	75	60	1,285
2000	2270009010	Dsl - Other Underground Mining Equip	75	100	92.49	2,271
2000	2270009010	Dsl - Other Underground Mining Equip	100	175	145	2,419
2000	2270009010	Dsl - Other Underground Mining Equip	175	300	251.1	758
2000	2270009010	Dsl - Other Underground Mining Equip	300	600	339.6	376
2000	2270010010	Dsl - Other Oil Field Equipment	6	11	9	0
2000	2270010010	Dsl - Other Oil Field Equipment	16	25	20.1	0
2000	2270010010	Dsl - Other Oil Field Equipment	25	40	36.79	232



Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2270010010	Dsl - Other Oil Field Equipment	40	50	44.36	113
2000	2270010010	Dsl - Other Oil Field Equipment	50	75	62.68	1,055
2000	2270010010	Dsl - Other Oil Field Equipment	75	100	87.93	155
2000	2270010010	Dsl - Other Oil Field Equipment	100	175	136.7	2,195
2000	2270010010	Dsl - Other Oil Field Equipment	175	300	255.3	1,117
2000	2270010010	Dsl - Other Oil Field Equipment	300	600	401.9	1,617
2000	2270010010	Dsl - Other Oil Field Equipment	600	750	681.7	1,024
2000	2270010010	Dsl - Other Oil Field Equipment	750	1000	887.3	425
2000	2270010010	Dsl - Other Oil Field Equipment	1000	1200	1110	189
2000	2270010010	Dsl - Other Oil Field Equipment	1200	2000	1492	231
2000	2270010010	Dsl - Other Oil Field Equipment	2000	3000	2268	6
1998	2282005010	2-Str Outboard	1	3	2.41	177,107
1998	2282005010	2-Str Outboard	3	6	5.34	660,643
1998	2282005010	2-Str Outboard	6	11	8.76	995,028
1998	2282005010	2-Str Outboard	11	16	14.99	221,228
1998	2282005010	2-Str Outboard	16	25	21.54	435,716
1998	2282005010	2-Str Outboard	25	40	36.00	841,662
1998	2282005010	2-Str Outboard	40	50	49.34	647,452
1998	2282005010	2-Str Outboard	50	75	63.50	1,082,796
1998	2282005010	2-Str Outboard	75	100	85.00	735,549
1998	2282005010	2-Str Outboard	100	175	139.4	1,645,496
1998	2282005010	2-Str Outboard	175	300	217.9	1,477,105
1998	2282005015	2-Str Personal Water Craft	1	3		704
1998	2282005015	2-Str Personal Water Craft	3	6		680
1998	2282005015	2-Str Personal Water Craft	6	11		6,488
1998	2282005015	2-Str Personal Water Craft	16	25	18.41	12
1998	2282005015	2-Str Personal Water Craft	25	40	36.75	6,889
1998	2282005015	2-Str Personal Water Craft	40	50	43.95	2,777
1998	2282005015	2-Str Personal Water Craft	50	75	73.10	61,559
1998	2282005015	2-Str Personal Water Craft	75	100	88.90	227,683
1998	2282005015	2-Str Personal Water Craft	100	175	116.3	843,496
1998	2282005015	2-Str Personal Water Craft	175	300		55,495
1998	2282010005	4-Str Inboard/Sterndrive	3	6	5.00	774
1998	2282010005	4-Str Inboard/Sterndrive	6	11	10.00	554
1998	2282010005	4-Str Inboard/Sterndrive	11	16	15.00	328
1998	2282010005	4-Str Inboard/Sterndrive	25	40	30.47	1,415
1998	2282010005	4-Str Inboard/Sterndrive	50	75	59.55	12,439
1998	2282010005	4-Str Inboard/Sterndrive	75	100		0
1998	2282010005	4-Str Inboard/Sterndrive	100	175	149.7	298,229
1998	2282010005	4-Str Inboard/Sterndrive	175	300	211.1	1,106,937
1998	2282010005	4-Str Inboard/Sterndrive	300	600	380.8	444,547
1998	2282010005	4-Str Inboard/Sterndrive	600	750	630.0	7,500
2000	2282020005	Dsl - Inboard	6	11	9.736	9,126
2000	2282020005	Dsl - Inboard	11	16	14.92	4,478
2000	2282020005	Dsl - Inboard	16	25	21.41	9,908
2000	2282020005	Dsl - Inboard	25	40	31.2	5,421
2000	2282020005	Dsl - Inboard	40	50	42.4	1,002
2000	2282020005	Dsl - Inboard	50	75	56.19	8,784

Base Year U.S. Population Estimates in Final NONROAD2008a\*

Year	SCC	Equipment Description	HPmin	HPmax	HPavg	Population
2000	2282020005	Dsl - Inboard	75	100	94.22	7,397
2000	2282020005	Dsl - Inboard	100	175	144.9	60,632
2000	2282020005	Dsl - Inboard	175	300	223.1	99,703
2000	2282020005	Dsl - Inboard	300	600	387.1	73,546
2000	2282020005	Dsl - Inboard	600	750	677	2,902
2000	2282020005	Dsl - Inboard	750	1000	876.5	5,502
2000	2282020005	Dsl - Inboard	1000	1200	1154	448
2000	2282020005	Dsl - Inboard	1200	2000	1369	1,573
2000	2282020005	Dsl - Inboard	2000	3000	2294	964
2000	2282020010	Dsl - Outboard	25	40	32.25	9,819
2000	2285002015	Dsl - Railway Maintenance	3	6	4.2	13
2000	2285002015	Dsl - Railway Maintenance	6	11	8.32	71
2000	2285002015	Dsl - Railway Maintenance	11	16	14.13	78
2000	2285002015	Dsl - Railway Maintenance	16	25	17.5	110
2000	2285002015	Dsl - Railway Maintenance	25	40	33.34	408
2000	2285002015	Dsl - Railway Maintenance	40	50	44.12	641
2000	2285002015	Dsl - Railway Maintenance	50	75	59.61	1,169
2000	2285002015	Dsl - Railway Maintenance	75	100	87.84	1,088
2000	2285002015	Dsl - Railway Maintenance	100	175	134	4,595
2000	2285002015	Dsl - Railway Maintenance	175	300	234	1,693
2000	2285002015	Dsl - Railway Maintenance	300	600	453.2	286
2000	2285002015	Dsl - Railway Maintenance	600	750	689.2	72
2000	2285002015	Dsl - Railway Maintenance	750	1000	850	17
2000	2285002015	Dsl - Railway Maintenance	1000	1200	1200	26
2000	2285002015	Dsl - Railway Maintenance	1200	2000	1633	9
1998	2285004015	4-Str Railway Maintenance	1	3	3.00	70
1998	2285004015	4-Str Railway Maintenance	3	6	3.52	2,238
1998	2285004015	4-Str Railway Maintenance	6	11	6.59	9,202
1998	2285004015	4-Str Railway Maintenance	11	16	12.07	165
1998	2285004015	4-Str Railway Maintenance	16	25	18.19	421
1998	2285004015	4-Str Railway Maintenance	25	40	33.15	131
1998	2285004015	4-Str Railway Maintenance	100	175	113.0	1
1998	2285006015	LPG - Railway Maintenance	25	40	33.15	131
1998	2285006015	LPG - Railway Maintenance	100	175	113.0	1

\* Inputs for ATV's and offroad motorcycles are set to allow calculations based on g/mile emission factors instead of g/bhp-hr. Thus the hp values shown here do not represent the actual in-use hp of these engines.

## Appendix B

### Engine Source Classification Code (SCC) Changes in NONROAD from NEVES

SCC	SCC Description in NONROAD	Changes from NEVES
22xx003060*	Industrial Equipment AC\Refrigeration	New Category
22xx005060	Farm Equipment Irrigation Sets	New Category
22xx009010	Other Underground Mining Equipment	New Category
22xx010010	Other Oil Field Equipment	New Category
2285002015	Diesel Railway Maintenance	New Category
2285003015	2-Stroke Gasoline Railway Maintenance	New Category
2285004015	4-Stroke Gasoline Railway Maintenance	New Category
2285006015	LPG Railway Maintenance	New Category
2285008015	CNG Railway Maintenance	New Category
22xx006005	Light Commercial Generator Sets	Engines Greater than 50 hp are included
22xx006010	Light Commercial Pumps	Engines Greater than 50 hp are included
22xx006015	Light Commercial Air Compressors	Engines Greater than 50 hp are included
22xx006020	Light Commercial Gas Compressors	Engines Greater than 50 hp are included
22xx006025	Light Commercial Welders	Engines Greater than 50 hp are included
22xx002012	Construction Equipment Concrete Pavers	Unused; population included in 22xx002003
22xx002003	Construction Equipment, Pavers	New Description (Asphalt + Concrete) Pavers
22xx007020	Logging Equipment Fellers/Bunchers	Unused; population included in 22xx007015
22xx008005	Airport Service Equipment	Changed SCC to 22xx003070 because terminal tractors are not Airport Service Equipment
22xx007015	Logging Equipment Forest Equipment	New Description (Skidders + Fellers\Bunchers)
22xx004010	Lawn & Garden Equipment Lawn mowers (Residential)	New Description
22xx004011	Lawn & Garden Equipment Lawn mowers (Commercial)	New SCC
22xx004015	Lawn & Garden Equipment Rotary Tillers < 6 HP (Residential)	New Power Level, Description

<b>SCC</b>	<b>SCC Description in NONROAD</b>	<b>Changes from NEVES</b>
22xx004016	Lawn & Garden Equipment Rotary Tillers < 6 HP (Commercial)	New SCC
22xx004020	Lawn & Garden Equipment Chain Saws < 6 HP (Residential)	New Power Level, Description
22xx004021	Lawn & Garden Equipment Chain Saws < 6 HP (Commercial)	New SCC
22xx004025	Lawn & Garden Equipment Trimmers/Edgers/Brush Cutters (Residential)	New Description
22xx004026	Lawn & Garden Equipment Trimmers/Edgers/Brush Cutters (Commercial)	New SCC
22xx004030	Lawn & Garden Equipment Leafblowers/Vacuums (Residential)	New Description
22xx004031	Lawn & Garden Equipment Leafblowers/Vacuums (Commercial)	New SCC
22xx004035	Lawn & Garden Equipment Snowblowers (Residential)	New Description
22xx004036	Lawn & Garden Equipment Snowblowers (Commercial)	New SCC
22xx004040	Lawn & Garden Equipment Rear Engine Riding Mowers (Residential)	New Description
22xx004041	Lawn & Garden Equipment Rear Engine Riding Mowers (Commercial)	New SCC
22xx004045	Lawn & Garden Equipment Front Mowers (Residential)	New Description
22xx004046	Lawn & Garden Equipment Front Mowers (Commercial)	New SCC
22xx004050	Lawn & Garden Equipment Shredders < 6 HP (Residential)	New Power Level, Description
22xx004051	Lawn & Garden Equipment Shredders < 6 HP (Commercial)	New SCC
22xx004055	Lawn & Garden Equipment Lawn & Garden Tractors (Residential)	New Description
22xx004056	Lawn & Garden Equipment Lawn & Garden Tractors (Commercial)	New SCC
22xx004060	Lawn & Garden Equipment Wood Splitters (Residential)	New Description
22xx004061	Lawn & Garden Equipment Wood Splitters (Commercial)	New SCC
22xx004065	Lawn & Garden Equipment Chippers/Stump Grinders (Residential)	New Description
22xx004066	Lawn & Garden Equipment Chippers/Stump Grinders (Commercial)	New SCC
22xx004070	Lawn & Garden Equipment Commercial Turf Equipment (Residential)	Unused; no 'residential' commercial turf equipment
22xx004071	Lawn & Garden Equipment Commercial Turf	New SCC

SCC	SCC Description in NONROAD	Changes from NEVES
	Equipment (Commercial)	
22xx004075	Lawn & Garden Equipment Other Lawn & Garden Equipment (Residential)	New Description
22xx004076	Lawn & Garden Equipment Other Lawn & Garden Equipment (Commercial)	New SCC
22xx002069	Construction Equipment Crawler Dozer	New Description (Changed from Tractor to Dozer)
22xx004015	Lawn & Garden Equipment Rotary Tillers < 6 HP	New Power Level
22xx007005	Logging Equipment Chain Saws > 6 HP	New Power Level
22xx007010	Logging Equipment Shredders > 6 HP	New Power Level
2282005010	Recreational Pleasure Craft, Gasoline 2-Stroke Outboards	Includes 2 and 4-stroke engines
2282005015	Recreational Pleasure Craft, Gasoline 2-stroke Personal Water Craft	New Description (Changed from Sterndrive to Personal Water Craft) Primarily 2-stroke
2282010005	Recreational Pleasure Craft, Gasoline 4-Stroke Inboards	Includes 2 and 4-stroke engines
2282010015	Recreational Pleasure Craft, Gasoline 4-Stroke Sterndrive	Unused
2282010010	Recreational Pleasure Craft, Gasoline 4-Stroke Outboard	Unused (included in 2282005010 as a technical type)
2282005020	Recreational Pleasure Craft, Gasoline 2-Stroke Sailboat Aux. Inboard	Unused (included in 4-stroke Inboard)
2282005025	Mobile Sources Marine Vessels, Recreational Pleasure Craft, Gasoline 2-Stroke Sailboat Aux. Outboard	Unused (included in 4-stroke Outboard)
2282010020	Recreational Pleasure Craft, Gasoline 4-Stroke Sailboat Aux. Inboard	Unused (included in 4-stroke Inboard)
2282010025	Recreational Pleasure Craft, Gasoline 4-Stroke Sailboat Aux. Outboard	Unused (included in 4-stroke Outboard)
2282005005	Recreational Pleasure Craft, Gasoline 2-Stroke Inboards	Unused (included in 2282010005 as a technical type)
2282020015	Recreational Pleasure Craft, Diesel Sterndrive	Unused (included in 2282020005)
2282020020	Recreational Pleasure Craft, Diesel Sailboat Aux. Inboard	Unused (included in 2282020025)

\* The “xx” denotes that all fuel types (diesel (“70”), 2-stroke gasoline (“60”), 4-stroke gasoline (“65”), LPG (“67”), and CNG (“68”) engines) are included with the new or altered application categories.

## Appendix C

The conversion from PSR applications to SCC categories.

SCC	SCC Description	PSR Code	PSR Description
22xx001010	Recreational Vehicles Motorcycles: Off-Road		Included in 22xx001030
22xx001020	Recreational Vehicles Snowmobiles	71	Snowmobile
22xx001030	Recreational Vehicles All Terrain Vehicles	91	All-Terrain Vehicles
22xx001040	Recreational Vehicles Minibikes	93	Mini-Bikes
22xx001050	Recreational Vehicles Golf Carts	94	Golf Carts
22xx001060	Recreational Vehicles Specialty Vehicle Carts [diesel now also includes PSR "Utility Vehicle" sales category]	62 +32	Specialty Veh./Carts
22xx002003	Construction Equipment Asphalt Pavers	41	Pavers
22xx002006	Construction Equipment Tampers/Rammers	95	Tampers/Rammer
22xx002009	Construction Equipment Plate Compactors	61	Plate Compactors
22xx002012	Construction Equipment Concrete Pavers		Unused (included in 22xx002003)
22xx002015	Construction Equipment Rollers	39	Rollers
22xx002018	Construction Equipment Scrapers	29	Scrapers
22xx002021	Construction Equipment Paving Equipment	35	Paving Equipment
22xx002024	Construction Equipment Surfacing Equipment	23	Surfacing Equipment
22xx002027	Construction Equipment Signal Boards	73	Light Plants
22xx002030	Construction Equipment Trenchers	42	Trenchers
22xx002033	Construction Equipment Bore/Drill Rigs	37	Bore/Drill Rigs
22xx002036	Construction Equipment Excavators	28	Excavators
22xx002039	Construction Equipment Concrete/Industrial Saws	77	Concrete/Ind Saws
22xx002042	Construction Equipment Cement & Mortar Mixers	57	Cem/Mtr Mixers
22xx002045	Construction Equipment Cranes	27	Cranes
22xx002048	Construction Equipment Graders	30	Graders
22xx002051	Construction Equipment Off-highway Trucks	40	Off-Highway Truck
22xx002054	Construction Equipment Crushing/Proc. Equipment	34	Crush/Proc Equipment
22xx002057	Construction Equipment Rough Terrain Forklifts	84	Rough Terrain Forklifts
22xx002060	Construction Equipment Rubber Tire Loaders	33	R/T Loader
22xx001060	[was Rubber Tire Dozers 22xx002063. EPA now combines #32 with #62 Specialty Vehicle Carts above]	32	Utility Vehicles
22xx002066	Construction Equipment Tractors/Loaders/Backhoes	43	Tractor\Loader\ Backhoe
22xx002069	Construction Equipment Crawler Dozer	31	Crawler Dozers
22xx002072	Construction Equipment Skid Steer Loaders	38	S/S Loader
22xx002075	Construction Equipment Off-Highway Tractors	68	Off-Hwy Tractors
22xx002078	Construction Equipment Dumpers/Tenders	60	Dumpers/Tenders
22xx002081	Construction Equipment Other Construction Equipment	36	Other Construction
22xx003010	Industrial Equipment Aerial Lifts	64	Aerial Lifts

SCC	SCC Description	PSR Code	PSR Description
22xx003020	Industrial Equipment Forklifts	18	Forklifts
22xx003030	Industrial Equipment Sweepers/Scrubbers	21	Scrubbers/ Sweepers
22xx003040	Industrial Equipment Other General Industrial Equipment	74	Other General Industrial
22xx003050	Industrial Equipment Other Material Handling Equipment	19	Other Material Handling
22xx003060	Industrial Equipment AC\Refrigeration	14	Refrigeration/AC
22xx003070	Industrial Equipment Terminal Tractors	16	Terminal Tractors
22xx004010	Lawn & Garden Equipment Lawn mowers (Residential)	65	Lawn Mowers
22xx004011	Lawn & Garden Equipment Lawn mowers (Commercial)	65	Lawn Mowers
22xx004015	Lawn & Garden Equipment Rotary Tillers < 6 HP (Residential)	59	Tillers
22xx004016	as above except (Commercial)	59	Tillers
22xx004020	Lawn & Garden Equipment Chain Saws < 6 HP (Residential)	70	Chainsaws
22xx004021	as above except (Commercial)	70	Chainsaws
22xx004025	Lawn & Garden Equipment Trimmers/Edgers/Brush Cutters (Residential)	53	Trimmer/Edger/ Cutter
22xx004026	as above except (Commercial)	53	Trimmer/Edger/ Cutter
22xx004030	Lawn & Garden Equipment Leafblowers/Vacuums (Residential)	66	Leaf Blower/Vac
22xx004031	as above except (Commercial)	66	Leaf Blower/Vac
22xx004035	Lawn & Garden Equipment Snowblowers (Residential)	56	Snowblower
22xx004036	as above except (Commercial)	56	Snowblower
22xx004040	Lawn & Garden Equipment Rear Engine Riding Mowers (Residential)	82	Rear Engine Rider
22xx004041	as above except (Commercial)	82	Rear Engine Rider
22xx004045	Lawn & Garden Equipment Front Mowers (Residential)	88	Front Mowers
22xx004046	as above except (Commercial) [diesel versions are now referred to as "Commercial Mowers"]	88	Front Mowers
22xx004050	Lawn & Garden Equipment Shredders < 6 HP (Residential)	96	Shredders
22xx004051	as above except (Commercial)	96	Shredders
22xx004055	Lawn & Garden Equipment Lawn & Garden Tractors (Residential)	63	Lawn & Garden Tractor
22xx004056	as above except (Commercial)	63	Lawn & Garden Tractor
22xx004060	Lawn & Garden Equipment Wood Splitters (Residential)	75	Wood Splitter
22xx004061	as above except (Commercial)	75	Wood Splitter
22xx004065	Lawn & Garden Equipment Chippers/Stump Grinders (Residential)	26	Chippers/ Grinders
22xx004066	as above except (Commercial)	26	Chippers/ Grinders
22xx004070	Lawn & Garden Equipment Commercial Turf Equipment (Residential)		Unused
22xx004071	as above except (Commercial)	67	Commercial Turf
22xx004075	Lawn & Garden Equipment Other Lawn & Garden Equipment (Residential)	76	Other Lawn Garden
22xx004076	as above except (Commercial)	76	Other Lawn Garden
22xx005010	Farm Equipment 2-Wheel Tractors	98	2-Wheel Tractors
22xx005015	Farm Equipment Agricultural Tractors	45	Agricultural Tractor

SCC	SCC Description	PSR Code	PSR Description
22xx005020	Farm Equipment Combines	47	Combines
22xx005025	Farm Equipment Balers	49	Balers
22xx005030	Farm Equipment Agricultural Mowers	55	Agricultural Mowers
22xx005035	Farm Equipment Sprayers	69	Sprayers
22xx005040	Farm Equipment Tillers > 6 HP	59	Tillers
22xx005045	Farm Equipment Swathers	48	Swathers
22xx005050	Farm Equipment Hydro Power Units	85	Hydro Power Unit
22xx005055	Farm Equipment Other Agricultural Equipment	46	Other Ag Equipment
22xx005060	Farm Equipment Irrigation Sets	44	Irrigation Sets
22xx006005	Light Commercial Generator Sets	9	Generator Sets
22xx006010	Light Commercial Pumps	11	Pumps
22xx006015	Light Commercial Air Compressors	10	Air Compressors
22xx006020	Light Commercial Gas Compressors	89	Gas Compressors
22xx006025	Light Commercial Welders	17	Welders
22xx006030	Light Commercial Pressure Washers	58	Pressure Washer
22xx007005	Logging Equipment Chain Saws > 6 HP	70	Chainsaws
22xx007010	Logging Equipment Shredders > 6 HP	96	Shredders
22xx007015	Logging Equipment Skidders	24	Forest Equipment
22xx007020	Logging Equipment Fellers/Bunchers		Unused (included in 22xx007015)
22xx008005	Airport Service Equipment Airport Support Equipment	81	Aircraft Support
22xx008010	Airport Service Equipment Terminal Tractors		Unused
22xx009010	Other Underground Mining Equipment	13	Underground Mine Equipment
22xx010010	Other Oil Field Equipment	12	Oil Field Equipment
22820xx005	Recreational Pleasure Craft, Inboards	50	Powerboats
22820xx010	Recreational Pleasure Craft, Outboards	99	Outboard Motors
2282005015	Pleasure Craft, Gasoline Personal Water Craft	92	New SCC Description
22820xx020	Pleasure Craft, Sailboat Aux. Outboard	79	Sailboat Aux.
22820xx025			Unused
228500x015	Railway Maintenance	80	Railway Maintenance