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TECHNICAL NOTE

Dataset of U.S. School Bus Fleets

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Technical notes document the research or analytical methodology underpinning a publication, interactive application, or tool.

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ABSTRACT

This dataset contains detailed information on the composition of school bus fleets in the United States. The available data vary by state. For most states bus-level information, such as the school district that the school bus serves, its model year, and fuel type are included; for many others the manufacturer and seating capacity are also available. The dataset contains data from the 46 states and the District of Columbia where this information was available. Prompted by requests from a range of stakeholders, WRI researchers compiled the dataset by submitting records requests to state governments between March and November 2022; they then harmonized and combined those state-level datasets to enable multistate analysis. This dataset can serve a range of environmental and equity use cases, including estimating reductions in greenhouse gas emissions or benefits to public health resulting from the electrification of all U.S. school buses, planning for electricity grid upgrades related to electric transportation, and identifying school districts with the oldest and probably most polluting school buses. There are two major limitations of this dataset. The first is missing data from four states (Colorado, Hawaii, Louisiana, and New Hampshire) and all the U.S. territories (Guam, Puerto Rico, U.S. Virgin Islands, Northern Mariana Islands, and American Samoa). The second limitation results from methodological and structural differences between states' original datasets.

1. INTRODUCTION

This dataset contains detailed information on the composition of school bus fleets in the United States. WRI researchers compiled this dataset by submitting records requests to state governments between March and November 2022; they then harmonized and combined these state-level datasets to enable multistate analysis. This dataset includes data from 46 states and the District of Columbia. Table 1 lists every state and U.S. territory alphabetically and notes whether school bus-fleet data were available for inclusion in this dataset, the data source, and the date that the source collected or most recently updated the data.

Table 1 | **Data Availability, Source, and Collection Date for Every U.S. State and Territory (alphabetical)**

STATE OR TERRITORY	DATA AVAILABLE?	DATA COLLECTION METHOD	SOURCE	DATE THAT THE SOURCE COLLECTED OR MOST RECENTLY UPDATED THE DATA
Alabama	Yes	Public records request	Alabama State Department of Education	18 October 2021
Alaska	Yes	Public records request	Alaska Department of Education and Early Development	30 June 2022
American Samoa	No	X	X	
Arizona	Yes	Public records request	Arizona Department of Education	September 2021 – May 2022 (varies by district)
Arkansas	Yes	Public records request	Arkansas Department of Education	February 2022
California	Yes	Public records request	California Highway Patrol	February 2022
Colorado	No	X	X	
Connecticut	Yes	Public records request	Connecticut Department of Motor Vehicles	July 2022
Delaware	Yes	Public records request	Delaware Department of Education	2019–2020
District of Columbia	Yes	Public records request	District of Columbia Office of the State Superintendent of Education	31 May 2022
Florida	Yes	Downloaded published data	Florida Department of Education	2021
Georgia	Yes	Public records request	Georgia Department of Education	March 2022
Guam	No	X	X	
Hawaii	No	X	X	
Idaho	Yes	Public records request	Idaho State Department of Education	March 2022
Illinois	Yes	Public records request	Illinois Secretary of State	2 June 2022
Indiana	Yes	Public records request	Indiana State Police	July 2022
Iowa	Yes	Public records request	Iowa Department of Education	17 March 2022
Kansas	Yes	Public records request	Kansas State Department of Education	6 April 2022
Kentucky	Yes	Downloaded published data	Kentucky Department of Education	2020–2021
Louisiana	No	X	X	
Maine	Yes	Public records request	Maine Department of Education	2021–2022
Maryland	Yes	Downloaded published data, public records request	Maryland State Department of Education, Maryland Motor Vehicle Administration	21 January 2022
Massachusetts	Yes	Public records request	Massachusetts Department of Transportation	May 2022
Michigan	Yes	Downloaded published data	Michigan State Police	31 August 2022
Minnesota	Yes	Downloaded published data	Minnesota Department of Education	2021
Mississippi	Yes	Public records request	Mississippi Department of Education	2021
Missouri	Yes	Public records request	Driver and Vehicle Safety Division, Missouri State Highway Patrol	2021
Montana	Yes	Public records request	Montana Office of Public Instruction	30 June 2022
Nebraska	Yes	Public records request	Nebraska Department of Motor Vehicles	
Nevada	Yes	Public records request	Nevada Department of Education	May 2022
New Hampshire	No	X	X	
New Jersey	Yes	Public records request	New Jersey Department of Environmental Protection	December 2021
New Mexico	Yes	Public records request	New Mexico Public Education Department	23 March 2022
New York	Yes	Public records request	New York Department of Transportation	2022
North Carolina	Yes	Downloaded published data	North Carolina Department of Public Instruction	2018–2019

Table 1 | **Data Availability, Source, and Collection Date for Every U.S. State and Territory (Alphabetical) (Continued)**

STATE OR TERRITORY	DATA AVAILABLE?	DATA COLLECTION METHOD	SOURCE	DATE THAT THE SOURCE COLLECTED OR MOST RECENTLY UPDATED THE DATA
North Dakota	Yes	Public records request	North Dakota Department of Public Instruction	2020–2021
Northern Mariana Islands	No	X	X	
Ohio	Yes	Public records request	Ohio Department of Education	21 March 2022
Oklahoma	Yes	Public records request	Oklahoma Tax Commission	4 November 2022
Oregon	Yes	Public records request	Oregon Department of Education	2021
Pennsylvania	Yes	Public records request	Pennsylvania Department of Transportation	June 2022
Puerto Rico	No	X	X	
Rhode Island	Yes	Requested records from contractor	First Student, Inc.	26 June 2022
South Carolina	Yes	Public records request	South Carolina Department of Education	2022
South Dakota	Yes	Public records request	South Dakota Department of Revenue	September 2022
Tennessee	Yes	Downloaded published data	Tennessee Department of Educsation	2019–2020
Texas	Yes	Public records request	Texas Education Agency	2021
U.S. Virgin Islands	No	X	X	
Utah	Yes	Public records request	Utah State Board of Education	2021
Vermont	Yes	Public records request	Vermont Department of Motor Vehicles	31 December 2021
Virginia	Yes	Public records request	Virginia Department of Education	2022
Washington	Yes	Downloaded published data	Washington State Office of Superintendent of Public Instruction	2022
West Virginia	Yes	Public records request	West Virginia Department of Education	31 May 2021
Wisconsin	Yes	Public records request	Division of State Patrol, Office of the Superintendent, Wisconsin Department of Transportation	2021
Wyoming	Yes	Public records request	Wyoming Department of Education	29 March 2022

Note: X indicates data that were not received.

Sources: Table was compiled by WRI authors. Full citations of data sources are included in the References, pp. 19–21.

The dataset includes over 450,000 buses owned by about 12,600 entities. Nearly 9,000 of these are school districts; the remaining entities include other bus owners or primary users, such as contractors, Head Start programs, day-care facilities, and churches. Most school districts were able to be matched with their Local Education Agency Identification Number (LEAID, sometimes called NCES ID), a unique identification number assigned by the National Center for Education Statistics (NCES) to each school district in the country. The LEAID makes it possible to cross-reference this dataset with a range of others, especially NCES's datasets on school district demographics, educational outcomes, and administrative characteristics.

This dataset includes approximately 30 variables that describe the buses based on characteristics including the bus owner or user, model year, fuel type, the school district that the bus serves, the manufacturer, and seating capacity. The specific data available vary by state. Cover Sheet – Data Maps in the dataset shows which variables are present for each state in the dataset. Most (40) original datasets were structured at the bus level, but some (7) were structured at the school district level and could not be disaggregated to the bus level.

There are two major limitations of this dataset: missing data and methodological and structural differences between the original datasets.

Data were not available from every state, and this is therefore not a complete dataset of all school bus fleets in the U.S. Data were unavailable from the four states of Colorado, Hawaii, Louisiana, New Hampshire and from all the U.S. territories—American Samoa, Guam, U.S. Virgin Islands, Northern Mariana Islands, and Puerto Rico. Table 2 provides more detail on our attempts to gather data from these states and territories.

Some states (like Wyoming) included only school buses owned by school districts, and others (like New York and Maryland) included buses owned by both school districts and contractors (often referred to as "private fleet operators"). In states that did not include buses owned by contractors, the total number of buses for each school district and the state overall is likely an undercount. In some states, it was unclear whether the number of school buses per district included buses owned by a contractor in addition to those owned by the district. Cover Sheet – Data Maps in the dataset shows which variables are present whether a given state's data include buses owned by a contractor.

Each state's dataset contained different fields and different sets of allowed values within multiple-choice fields; therefore, some of the data are not directly comparable between states. The authors standardized multiple-choice options whenever possible. Table 3 and Table 4 detail how data were standardized. In addition, each state collected their data at a different time; this dataset includes the most recently available data from each state. The original datasets are available for download in a .zip file on the dataset download page. See Section 4 for a more detailed discussion of limitations and how they were mitigated.

2. MOTIVATION

WRI's Electric School Bus Initiative created this dataset to help fill a major knowledge gap related to school bus fleets. No nationwide, district-level dataset of school bus fleets in the U.S. is publicly available. State-level and school district-level data are rarely made public, and key stakeholders, like policymakers and advocates, probably lack the capacity to undertake the time-intensive data collection process that was required to compile this dataset. WRI's Electric School Bus Initiative created this dataset in direct response to frequent queries from stakeholders, including utilities, environmental justice advocates, government agencies, media, and researchers from non-profit organizations. Given the high level of demand for these data and the intensity of effort required to compile them, we hope that moving forward a federal agency will create and maintain a public dataset of U.S. school buses.

Landscape of current datasets on school bus fleets

The existing nationwide datasets on school bus fleets have significant limitations. Data from *School Bus Fleet Magazine* (*School Bus Fleet Magazine* 2021) and the Federal Highway Administration (U.S. Department of Transportation 2020) only estimate the total number of school buses in each state and provide no district-level information or detail on fleet composition. Data from many states are missing, and there are often methodological problems with what data are available. For example, survey data that does not include accompanying documentation prevents users from evaluating the data quality and mitigating any issues that are identified.

More detailed datasets on school bus fleets are available for purchase. IHS Markit purports to have a similar proprietary dataset, but it is costly (over US$60,000 for a one-time purchase of zip code-level data); buyers are prohibited from publishing any portion of it; and it is intended primarily for commercial use (e.g., to inform a company's sales or marketing strategy) rather than for policy, advocacy, or research uses.[1] Atlas Public Policy's EV Hub (Atlas Public Policy 2019) offers a dataset of medium- and heavy-duty vehicles (including school buses) based on those IHS Markit data. At a much more affordable price (half of users pay nothing, and the other half pay rates ranging from $300 to $500 per user per year), Atlas EV Hub is targeted to public agencies and non-profits. However, the smallest spatial disaggregation is the state, and it takes time to set up the institutional account or purchase agreement to access the dataset. Neither dataset enables users to disaggregate or match data to the school district level, even though school districts are a primary unit of analysis for school transportation policy and research.

Use cases

This dataset can serve a range of environmental and equity use cases. For example, it could be used to identify the school districts with the oldest diesel-powered buses, which create the most pollution and health problems (Beatty and Shimshack 2011). In turn, this information could help direct national- or state-level funding to those areas where the health burden from pollution from current diesel buses is highest; or it could help communities and advocates focus their campaigns on areas where they would have the greatest impact. This dataset could also be used to more accurately estimate the total number, bus type, and fuel type of U.S. school buses, which would result in better estimates of the effect of electrifying all U.S. school buses on greenhouse gas emissions or public health. A better estimate of the total number and type of buses in a region would also be useful for cities, regional governments, and utilities that are planning for the increased electricity demand and grid upgrades associated with the electrification of transportation. Finally, a district-level count of school buses, when combined with WRI's Dataset of Electric School Bus Adoption in the United States (Lazer and Freehafer 2022), makes it possible to estimate the percentage of school districts' buses that are electric, painting a more nuanced picture of local progress and leadership in school bus electrification.

3. METHODS

Data collection

WRI researchers collected these data from state-level governmental departments between March and November 2022. Eight states had published data available for download. For the rest, researchers sent public records requests (often called Freedom of Information Act (FOIA) requests) to state departments and agencies that were likely to keep records on school bus fleets. In most states, each department or agency had a separate process for submitting records requests (as opposed to a state-wide FOIA request process). The processes included at least some of the following steps: submitting a PDF form via email; submitting an online form; creating an account in a FOIA portal in which users submit, track, and receive responses to requests; and emailing the department's designated FOIA contact. The time between submitting a request to the correct state department and receiving data ranged from less than a week to several months.

Records about school buses are held by different departments in each state. The most challenging part of data collection was identifying which department (if any) had the data and determining the department's process for obtaining them. The process was complicated by the fact that state departments that did not have the requested data often incorrectly informed us that no other state department had them either. We typically contacted two to three departments per state before identifying the one that held the records; but in some cases, we contacted eight or more. See Table 1 for a full list of data sources.

The most common data sources were departments of education (or the state's equivalent, such as North Dakota's Department of Public Instruction), and second most common was the state police, highway patrol, or equivalent department. However, in some states, records were held by other departments—for example, by the Secretary of State in Illinois. Different departments had different reasons for collecting the data, which informed what information they collected. For example, state police concerned with documenting bus safety inspections focused on identifying the most recent inspection dates of individual buses. Data collected by departments of education often described the state's school transportation program and therefore included more contextualizing information, including school district served; the ownership model of the buses; and operational data, like mileage. Table 1 provides a full list of data sources.

For a number of reasons, Departments of Motor Vehicles (DMVs) were often not the best source of school bus-registration data. In most states, DMVs could only share the county where a bus was registered. Since counties and school districts often have different boundaries, it would be difficult or impossible to determine which school district the bus served, especially if it was registered to a contractor with buses operating in multiple districts. Citing privacy concerns, DMVs often refused to disclose who owned a given bus (i.e., the school district or a contractor). Moreover, whereas data from departments that deal specifically with school transportation often included fields relevant to the use cases of this dataset, such as the bus's district or bus type (A, B, C, or D), the data from DMVs were often less pertinent. Finally, DMVs consistently charged—typically around $100 to $500—for access to these public records. However, since their databases are updated on an ongoing basis, DMVs often have very recent data, while departments of education tend to compile school bus-fleet data once per year.

As noted above, the dataset is missing data from four states (Colorado, Hawaii, Louisiana, and New Hampshire) and all U.S. territories (Guam, Puerto Rico, U.S. Virgin Islands, Northern Mariana Islands, and American Samoa). See Table 2 for more detail on our attempts to collect data from these states and territories. The scope of our data collection efforts, however,

was limited to state-wide datasets. Individual school districts maintain records of their own school bus fleets, and users interested in fleets in states or school districts where data were unavailable should consider directly contacting those districts, which are also subject to FOIA laws. Many state departments of education publish lists of superintendents or other school district contact-points.

Data compilation, harmonization, and analysis

The data on each state's school bus fleets were shared in different formats and contained different fields. The authors had to compile and harmonize the data received from states to create a consistent dataset of all states. Most states shared their data as a spreadsheet, but some shared them as PDF files, including Maryland, Massachusetts, New Jersey, New Mexico, and Ohio. Data received as PDFs were converted to spreadsheets using the free tool Tabula.[2]

First, a "data map" noting which fields were present in each state's dataset was created (see "Cover Sheet – Data Maps" in the dataset). This allowed us to determine which fields were present in multiple states' datasets and could be combined into one field in the final, harmonized dataset. This included determining fields that contained functionally equivalent data, which could therefore be combined. For example, "Shell Capacity," "Rated Capacity," and "Design Capacity" were determined to be functionally equivalent and were combined, as were "District ID" and "System ID," both of which refer to state-level school district identification numbers.

Table 2 | **Departments Contacted in States Where Data Were Determined to Be Unavailable**

STATE, TERRITORY, OR AGENCY	POSSIBLE DATA SOURCES THAT WERE CONTACTED	NOTES
U.S. Department of Education	U.S. Department of Education (DOE)	
Bureau of Indian Education	Bureau of Indian Education (U.S. Department of the Interior)	The Bureau of Indian Education was not in possession of any compiled data on school buses owned by tribal nations. Some states included data on school buses owned by tribal nations located within their borders.
Colorado	Colorado Department of Education, Colorado Department of Public Health and Environment, Colorado Department of Transportation, Colorado Department of Motor Vehicles, Regional Air Quality Council, Colorado State Pupil Transportation Association	
Guam	Guam Department of Education	
Hawaii	Hawaii State Department of Education, Hawaii Open Data	Hawaii is a single school district that contracts 100% of student transportation services out to private contractors. While Hawaii DOE has access to their fleet information, they were unable to share it with outside sources because the contractors are privately owned entities.
Louisiana	Louisiana Department of Education, Louisiana Department of Transportation, Louisiana State Police	
New Hampshire	New Hampshire Department of Education, New Hampshire Department of Transportation, New Hampshire State Police, New Hampshire Department of Environmental Services, New Hampshire Department of Energy, New Hampshire Department of Motor Vehicles, New Hampshire Department of Health and Human Services	
Puerto Rico	Puerto Rico Department of Education	
U.S. Virgin Islands	Virgin Islands State Department of Education	

Source: WRI authors.

Based on the equivalencies determined in the data map (see "Cover Sheet – Data Maps" in the dataset), the authors then combined the state-level datasets into a multistate dataset of school bus fleets. Most of the data contained a separate row of data for each individual bus, so we compiled a sheet of that bus-level data. However, some of the data organized at the district or fleet level were impossible to disaggregate to the bus level, so these data were added to the dataset in a separate district-level tab. Original data received from states are available for download on the dataset landing page.

Matching school district names and LEAIDs

We then added the school district's federal Local Education Agency Identification Number (LEAID, sometimes called NCES ID), a unique number assigned to each school district in the country, whenever only the state-level district ID or the school district name was included in the original data. (Below, we explain how we identified entities without LEAIDs). Their inclusion was a priority because LEAIDs enable cross-referencing with a range of other datasets, such as the Electric School Bus Initiative's Dataset of Electric School Bus Adoption (Lazer and Freehafer 2022) and the NCES's various datasets, which include information on school district demographics, educational outcomes, and administrative characteristics.

Two methods were used for matching. First, if a state-level district identification number was included, we referred to the NCES's Common Core of Data (NCES n.d.) to identify corresponding LEAIDs. This was done with the XLOOKUP function in Excel.

Second, if only school district names were included, we ran a customized machine routine to attempt to determine the LEAID for that school district. We used this method for about 5,700 school districts, bus owners, or primary bus users (entities) from Illinois, New York, Oregon, Tennessee, Vermont, Washington, and Wisconsin, which were identified only by a name and not by any ID number. The customized machine routine, which was developed by former Electric School Bus Initiative intern Naveen Raman, compares the entity name from the state dataset to a full list of school district names and LEAIDs from NCES's Common Core of Data (NCES n.d.). It uses the Jellyfish Python library for approximate and phonetic matching of strings (Turk 2022) and the string distance algorithm (Jaro 1989) to create an index of the frequency of direct matches and possible transpositions (re-arrangements of pairs of letters) that describe how similar two strings (school district names) are. The routine exhaustively tries every possible match and then chooses the match with the best score (0-100), producing a single best guess of which LEAID matches a given school district's name.

We then conducted an informal visual inspection to see which match scores seemed correlated with a relatively high share of correct matches. We generated three categories:

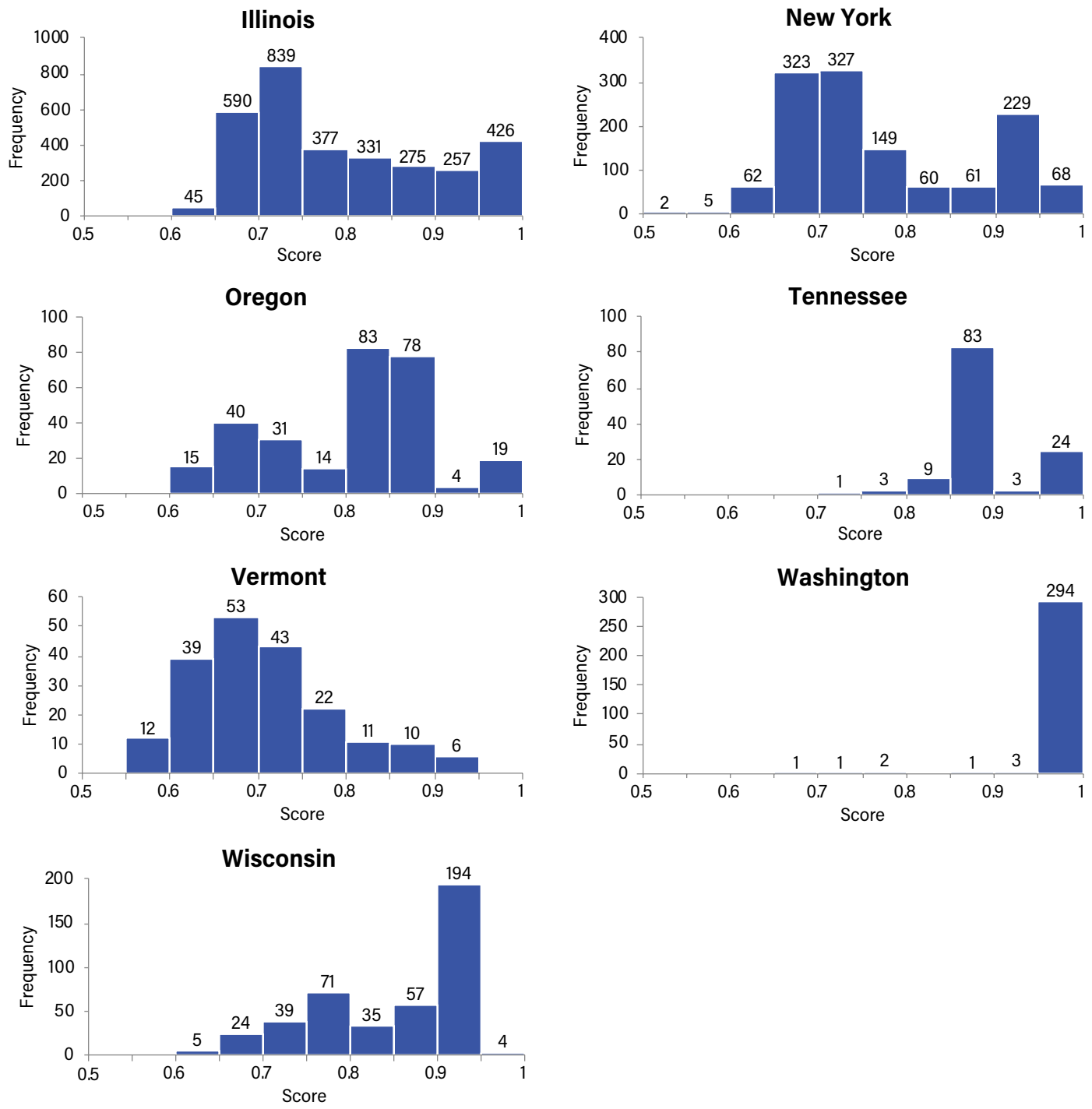
- **Low match, 0–74.9:** Matches with a score below 75 seemed to have a very low share of correct matches. This category included 2,489 matches, which we initially discarded because manually inspecting them seemed too time-consuming. As capacity allowed later on, we did inspect some of these matches manually and confirmed another 39 correct matches from among those with scores between 62 and 75.
- **Moderate match, 75–86:** A majority of matches with scores between 75 and 86 appeared to be correct, so we manually inspected them by comparing the school district name from the state dataset to the school district name of the guessed NCES LEAID. Of 1,385 matches, 956 were confirmed.
- **High match, 87–100:** We automatically accepted all 1,917 matches with match scores 87 and higher, because a visual inspection of a sample of several dozen of those matches showed all correct matches. Of these, 281 had scores of 100 percent match.

Some examples of guessed matches that we confirmed based on visual inspection include "HELIX SCHOOL DIST 1" and "helix sd 1" and "WEYAUWEGA FREMONT" and "weyauwega-fremont school district." Examples of incorrect guessed matches include "SWCAP HEAD START" and "aupaca school district" and "NORTHLAND LUTHERAN HIGH SCHOOL ASSOCIATION INC" and "northland pines school district."

Approximately 3,000 matches were confirmed (of about 5,700), and the resulting LEAIDs were incorporated into the dataset.

Figure 1 shows the frequency of match scores by state. States with data from departments of education tended to have higher matches because the naming conventions are more likely to adhere to those included in the NCES Common Core of Data (such as Tennessee and Oregon). Conversely, states with data from agencies like the DMV tended to have lower match scores (such as Vermont). Aside from these correspondences, we are not aware of any characteristics shared by school districts that were not matched with an LEAID. As far as we know, unmatched districts are distributed randomly across states, locales, and so on.

Figure 1 | **Histogram of Match Scores by State**



Source: WRI authors.

Identifying entities without LEAIDS

After the machine routine, we were left with about 1,800 entities whose LEAID could not be determined. This is not necessarily a matching issue; entities that are not school districts, such as certain types of private schools or Head Start programs, are not assigned an LEAID by NCES. To enable better data management and aggregation in the "District Summary" tab, we therefore created a new identification number, called a "WRI Entity ID." We assigned a WRI Entity ID to every primary user, including those that have LEAIDs, those that inherently do not have an LEAID, and those that we were not able to match with LEAIDs through one of the processes described above.

A primary user is defined as an entity that uses the bus on a day-to-day basis; they may or may not own the bus. Examples of primary users include a school district that owns and uses a school bus, a school district that uses buses leased from a contractor, and a day care that uses a school bus, the identity of whose owner is unknown to us. In cases in which we know the owner of the bus and the owner is different from the primary user, only the primary user was assigned a WRI Entity ID. For example, if a Bank of America leasing corporation owns a school bus, and a private school called Springfield School leases that bus from Bank of America and uses it on a day-to-day basis, Springfield School is the primary user. Only Springfield School would have a WRI Entity ID; Bank of America would not.

WRI Entity IDs are in the format of a five-digit numerical sequence and were assigned to entities sorted alphabetically by state and then by "Name of school district or primary user." The "District Summary" tab includes one row for every unique primary user, including school districts and other entities. The variable "Public school district or other?" allows users to filter for primary users that are school districts.

Standardizing allowed values for each variable

For the variables that are most important to the use cases of this data, "Fuel Type," "Bus Type," and "Year," the authors standardized the data so that each variable contained a limited set of allowed values. For example, original bus type values included both "Type A" and "A" when referring to the same type of bus, so we standardized all values to "A" to enable aggregation and analysis. Similarly, values referring to diesel buses included "D" "1 – Diesel" and "Diesel," so we standardized them all to "Diesel." In many instances, this process required us to contact the original data source to obtain the key for the abbreviations they used. Keys were often not provided with the original dataset and were sometimes not obvious. For example, West Virginia used "Type A" and "Type B" to refer to buses widely identified as "Type C" (Conventional). In Vermont, fuel type "B" stands for "Both gas and electric," which is more commonly referred to as "Hybrid." One surprising finding was the range of fuel types used in school buses; the authors were not previously aware that there were eight or more possible fuel types. The original datasets included a variety of variables indicating the year or age of the bus, such as "Model Year," "Date Delivered," "Age" and more. For the summary statistics, we combined all the variables that were functionally equivalent to "Model Year" into one new variable. See Table 3 and Table 4 for the raw and cleaned allowed values for bus type and fuel type.

For the approximately 6,700 buses for which we had the VIN but no model year, we used the VIN to look up the model year. This was possible because the model year is encoded in a specific location within the VIN. A given year is represented by a specific character, such as D representing 2013 for medium-duty vehicles. We used a key extracted from Atlas EV Hub's VIN Decoder (Atlas Public Policy n.d.) to create an Excel-based decoder for the model year from school bus VINs. We also used the National Highway Traffic Safety Administration's VIN Decoder (National Highway Traffic Safety Administration 2022) for some spot-checks and additional lookups.

Table 3 | **Clean and Raw Set of Allowed Values – Bus Type**

RAW	CLEAN	NOTE
1	1	
2	2	
Type A Bus	A	
Type A Bus with Lift	A	
A	A	
A1	A	
A2	A	
A-Mini Bus	A	
A-I	A	
A-1	A	
A-II	A	
A-11	A	
A-2	A	
BUS TYPE A - 23 PAX (NO LIFT)	A	
TYPE A	A	
A II 24	A	
A I 28	A	
AI 24	A	
AI 30	A	
A II 28	A	
A I 24	A	
Type B Bus	B	
Type B Bus with Lift	B	
B	B	
TYPE B	B	
A - West Virginia	C	Conventional Regular
B - West Virginia	C	Conventional Special Ed
BUS TYPE C - 29 PAX (LIFT)	C	
BUS TYPE C - 33 PAX (LIFT)	C	
BUS TYPE C - 62 PAX	C	
BUS TYPE C - 65 PAX	C	
BUS TYPE C - 66 PAX	C	
BUS TYPE C - 72 PAX	C	
BUS TYPE C - 75 PAX	C	
BUS TYPE C - 77 PAX	C	
C	C	
C 42	C	
C 54	C	
C 60	C	

CLEAN SET OF ALLOWED VALUES
1
2
A
B
C
D
Other[a]
[Blank if unknown][b]

Table 3 | **Clean and Raw Set of Allowed Values – Bus Type (Continued)**

RAW	CLEAN	NOTE
C 66	C	
C 66 wb pr	C	
C 72	C	
C 72 wb	C	
C-Conventional Bus	C	
TYPE C	C	
Type C Bus	C	
Type C Bus with Lift	C	
F	D	Transit Spare
Type D Bus	D	
Type D Bus with Lift	D	
D	D	
D-Flat Nose Bus	D	
BUS TYPE D - 66 PAX	D	
BUS TYPE D - 78 PAX	D	
D	D	
TYPE D	D	
H	D	
D RE 78	D	
D FE 81	D	
D RE 75	D	
D RE 66	D	
D FE 66	D	
D RE 48	D	
E - West Virginia	D	Transit Special Ed
V	Other	Van
O		Stands for "Other." Bus type unknown. Left blank.
MPV	Other	Note from data source: "'Multipurpose Passenger Vehicle' (MPV) means every motor vehicle with less than ten passenger positions (including the driver) and that cannot be certified as a bus or school bus by federal standards. (In determining passenger capacity, wheelchair positions are counted as 4 passenger positions.) Although a school entity may use such a vehicle as a station wagon, full-sized sedan, suburban, etc., to transport pupils to and from school or related events, the vehicle shall not be identified as a school bus (including color) and shall not stop or control traffic on the traveled portion of the roadway to load or unload passengers. Drivers of such vehicles shall utilize the same precautions to safeguard the safety of their passengers as they would if they were driving a privately owned passenger vehicle. See Section 9, Multipurpose Passenger Vehicle, for additional requirements. https://wyoleg.gov/ARULES/2011/AR11-054PTSB.pdf."[c]
Y		Bus type unknown. Left blank.
N - Idaho		"Non-reimbursable" or "non-confirmed."[d] Bus type unknown. Left blank.
Other Activity Bus		Bus type unknown. Left blank.
3		Bus type unknown. Left blank.
OTHER		Bus type unknown. Left blank.
X – West Virginia		Contracted Vehicle Bus type unknown. Left blank.

Table 3 | Clean and Raw Set of Allowed Values – Bus Type (Continued)

RAW	CLEAN	NOTE
E - Indiana		"The Type E is a special purpose bus, basically a bus of several size types that are not school bus yellow and are used for various type of student transportation (generally they are MFSAB activity buses, but some could be full size buses). Many times district will report those buses by their size type instead of the Type E designation. It was a way to track non-school buses in the state."[e] Bus type unknown. Left blank.
T	D	Stands for "transit style."[f]

Notes:

a "Other" indicates a vehicle type known to be something other than a Type A, B, C, or D school bus, such as a van.

b [Blank] indicates an unknown bus type; the vehicle type could not be determined based on the available information. The bus type was left blank.

c See Wyoming Department of Education 2022.

d See Idaho State Department of Education 2022.

e See Indiana State Police 2022.

f See California Highway Patrol 2022.

Source: WRI authors.

Table 4 | Clean and Raw Set of Allowed Values – Fuel Type

RAW	CLEAN	NOTE
Alternative Fuel	Alternative fuel	A common definition of "alternative fuel" is any fuel type other than diesel and gasoline. Buses in this category use one of the other fuel types in this column, but it is unknown which fuel type they use, because it is not possible to disaggregate this general label into specific fuel types. Only Arizona, Idaho, and Minnesota use this category, which might refer to different fuel types in each case.
Alternative	Alternative fuel	
4-CNG	CNG	
CNG	CNG	
Compressed Nat Gas	CNG	
Compressed Natural Gas	CNG	
D84CNG	CNG	
C	CNG	
Alternate Fuel BIO	Diesel	Based on the VINs of school buses with this fuel type, it seems to be biodiesel.
Clean Diesel	Diesel	
Bio-diesel	Diesel	
2-Diesel	Diesel	
A22D	Diesel	
A22DL	Diesel	
A34D	Diesel	
A34DL	Diesel	
B34D	Diesel	
B34DL	Diesel	

CLEAN SET OF ALLOWED VALUES

- Alternative Fuel (not otherwise specified)
- CNG
- Diesel
- Electric
- Flexible fuel
- Gasoline
- Hybrid (diesel)
- Hybrid (gasoline)
- Hybrid (not otherwise specified)
- LNG
- Natural gas
- Propane
- [Blank if unknown]

Table 4 | **Clean and Raw Set of Allowed Values – Fuel Type (Continued)**

RAW	CLEAN	NOTE
C48D	Diesel	
C48DL	Diesel	
C60D	Diesel	
C60DL	Diesel	
C77D	Diesel	
C77DL	Diesel	
D	Diesel	
D1	Diesel	
D48D	Diesel	
D48DL	Diesel	
D60D	Diesel	
D60DL	Diesel	
D84D	Diesel	
D84DL	Diesel	
D90D	Diesel	
D90DL	Diesel	
DIE	Diesel	
Diesel	Diesel	
H84D	Diesel	
DSL	Diesel	
5-Electric	Electric	
A34E	Electric	
C77E	Electric	
C77EC	Electric	
D84E	Electric	
E	Electric	
ELE	Electric	
Electric	Electric	
EV	Electric	
Plug In Electric	Electric	
F	Flexible fuel	
FLEX FUEL	Flexible fuel	
Flexible	Flexible fuel	
Gasoline Flex	Flexible fuel	
Flexible Fuel	Flexible fuel	
1-Gasoline	Gasoline	

Table 4 | **Clean and Raw Set of Allowed Values – Fuel Type (Continued)**

RAW	CLEAN	NOTE
A22G	Gasoline	
A22GL	Gasoline	
A34G	Gasoline	
A34GL	Gasoline	
B34G	Gasoline	
C60G	Gasoline	
C60GL	Gasoline	
C77G	Gasoline	
C77GL	Gasoline	
G	Gasoline	
G`	Gasoline	
Gas	Gasoline	
Gasoline	Gasoline	
DIESEL HYBRID	Hybrid (diesel)	
GASOLINE HYBRID	Hybrid (gasoline)	
B (Vermont)	Hybrid (not otherwise specified)	Includes both gasoline-electric hybrids and diesel-electric hybrids.
LNG	LNG	
natural gas	Natural gas	
NG	Natural gas	
N	Natural gas	"Stands for 'Natural' – any type of natural gas"[a]
L	Propane	Used VIN decoder to determine that "L" stands for LPG, not LNG.
3-Propane	Propane	
A34P	Propane	
A34PL	Propane	
C60P	Propane	
C60PL	Propane	
C77P	Propane	
C77PL	Propane	
Liquified Petroleum Gas	Propane	
LPG	Propane	
P	Propane	
PRO	Propane	
Propane	Propane	
LPG, PROPANE	Propane	

Table 4 | **Clean and Raw Set of Allowed Values – Fuel Type (Continued)**

RAW	CLEAN	NOTE
Other		Unknown for the purposes of this dataset.
0		Unknown for the purposes of this dataset.
26		Typo—same as seating capacity. Fuel type unknown. Left blank.
35		Typo—same as seating capacity. Fuel type unknown. Left blank.
62		Typo—same as seating capacity. Fuel type unknown. Left blank.
82		Typo—same as seating capacity. Fuel type unknown. Left blank.
N/A		Fuel type unknown. Left blank.
Not Identified		Fuel type unknown. Left blank.
S		Only one CA bus; seems to be a typo. Fuel type unknown. Left blank.

Note:

a See Vermont Department of Motor Vehicles 2021.

Source: WRI authors.

Aggregating data in summary sheets

We then aggregated the data in a "District Summary" sheet and a "State Summary" sheet. Summary statistics included the number of buses, the number of buses of each fuel type, the number of each bus type (A, C, D, etc.), and so on. Not all data were summarized, only the variables that the authors determined would be most useful to the target audience and for which there were data from a significant share of states. The summary sheets contain the following fields:

DISTRICT SUMMARY SHEET:

- Source Sheet
- State
- WRI Entity ID
- LEAID
- Name of School District or Primary User (primary users include day care centers, churches, scout groups, and other entities that make regular use of school buses)
- Public School District (with LEAID) or Other?
- Total Number of Buses
- Fuel Type
  - Diesel
  - Percent diesel
  - Gasoline
  - Percent gasoline
  - Propane
  - Percent propane
  - Electric
  - Percent electric
  - CNG
  - Flexible fuel
  - Hybrid (diesel)
  - Hybrid (gasoline)
  - Hybrid (not otherwise specified)
  - LNG
  - Natural gas
  - Other
  - Unknown
- Bus Age
  - Number of buses 2000 and older
  - Number of buses 2001–10
  - Number of buses 2011–20
  - Number of buses 2021 and newer
  - Age unknown

- Bus Type
  - Type A
  - Type B
  - Type C
  - Type D
  - 1 (California only)
  - 2 (California only)
  - Other
  - Unknown

STATE SUMMARY SHEET:

- Source Sheet
- State
- Total Number of Buses
- Number of Buses Owned by School Districts or Primary Users
- Percent of Buses Owned by School Districts or Primary Users
- Number of Buses Owned by Third Party
- Percent of Buses Owned by Third Party
- Number of Buses with Unknown Ownership
- Percent of Buses with unknown ownership
- Fuel Type
  - Diesel
  - Percent diesel
  - Gasoline
  - Percent gasoline
  - Propane
  - Percent propane
  - CNG
  - Electric
  - Flexible fuel
  - Hybrid (diesel)
  - Hybrid (gasoline)
  - Hybrid (not otherwise specified)
  - LNG
  - Natural gas
  - Other
  - Unknown
- Bus Type
  - A
  - B
  - C
  - D
  - 1
  - 2
  - Other
- Bus Age
  - Number of buses 2000 and older
  - Percent of buses 2000 and older
  - Number of buses 2001–10
  - Percent of buses 2001–10
  - Number of buses 2011–20
  - Percent of buses 2011–20
  - Number of buses 2021 and newer
  - Percent of buses 2021 and newer
  - Number of buses with age unknown
  - Percent of buses with age unknown

COMPILED BUS-LEVEL DATA SHEET:

- Identity, Location, and Ownership
  - State
  - WRI Bus ID Number
  - State District ID
  - WRI Entity ID
  - LEAID
  - Name of school district or primary user
  - Public school district (with LEAID) or other?
  - Does the school district or primary user own the bus?
  - Third party involved
  - County
  - County 2
  - Zip code

- Type, Size, and Fuel
  - Bus type
  - Shell capacity
  - Seating capacity
  - Fuel type
- Date and Age
  - Year for "District Summary" sheet
  - Model year
  - Chassis year
  - Build date
  - Date into operation
  - Purchase date
  - Delivery date
  - Bus age
- Bus ID and Manufacturer
  - VIN
  - Body manufacturer
  - Chassis manufacturer
  - Manufacturer (not otherwise specified)
  - Model
- Date updated or last inspected

COMPILED DISTRICT-LEVEL DATA SHEET:

- Identity, Location, and Ownership
  - State
  - WRI Entity ID
  - State District ID
  - LEAID
  - Name of school district or primary user
  - Who owns the buses?
  - Is a contractor used for some or all of the buses?
  - Contractor name
- Number, Fuel, and Type
  - Total number of buses
  - Gasoline
  - Diesel
  - Propane
  - CNG
  - Unknown fuel type
  - Public owned A
  - Public owned B
  - Public owned C
  - Public owned D
  - Public owned Total
  - Contract owned A
  - Contract owned B
  - Contract owned C
  - Contract owned D
  - Contact owned Total
  - Total type A
  - Total type B
  - Total type C
  - Total type D
  - Total type A/B
  - Total type C/D
  - Other (motorbuses, cars, vans, etc.)
- Date and Age
  - Has some age data?
  - 1977 and earlier
  - 1989–99
  - 2000–04
  - 2005–09
  - 2010–14
  - 2015–20
  - 5 years and newer
  - 6–10 years
  - More than 10 years
  - More than 15 years
  - Unknown age
- Date Updated or Last Inspected

4. LIMITATIONS AND CONCLUSION

Data were not available from every state; this is therefore not a complete dataset of all school bus fleets in the U.S. Data were unavailable from the following states and territories: Colorado, Hawaii, Louisiana, New Hampshire, American Samoa, Guam, U.S. Virgin Islands, Northern Mariana Islands, and Puerto Rico.

Some states (like Wyoming) included only school buses owned by school districts, and others (like New York and Maryland) included buses owned by both school districts and private contractors. In states that did not include buses owned by private contractors, the total number of buses for each school district and the state overall is likely an undercount. In some states, it was unclear whether the number of school buses per district included buses owned by a contractor or not. The data map includes a field indicating whether the state's data include buses owned by a contractor (see "Cover Sheet – Data Maps" in the dataset).

Each state's dataset contained different fields and different sets of allowed values within multiple-choice fields, making it impossible to aggregate some of the data. For example, some states included separate designations for all known fuel types, while others combined several fuel types (like CNG or propane) together under "Alternative Fuels." When it was possible to do so with certainty, the authors standardized multiple-choice options like "Gas" and "Gasoline." In another example, states used different dates to indicate age, such as "Purchase Date" (Iowa), "Build Date" (Florida), or "Date Into Operation" (Georgia). (See Tables 6 and 7 for details on how data were standardized.)

Each state collected their data at a different time. While this dataset includes the most recently available data, the reality on the ground may have changed since the data were collected—for example, a school bus might have been added mid-year. There are no current plans to publish an update to this dataset, but WRI may decide to do so in the future if, for example, data from more states are found.

The data are also subject to data entry errors imported from the raw datasets. The authors were able to identify obvious typos and some duplicates. We also checked against other data sources to confirm that the number of buses reported in each state did not differ significantly from other estimates. However, beyond these limited corrections and crosschecks, we were not able to validate the data or check for other errors. We were unable to develop a quantitative estimate of data quality issues.

ENDNOTES

1. Since this landscape analysis was conducted, IHS Markit was acquired by S&P Global: https://ihsmarkit.com/index.html.
2. Tabula is available online here: https://tabula.technology/.

REFERENCES

Alabama State Department of Education. 18 October 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Alaska Department of Education and Early Development. 30 June 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Arizona Department of Education. September 2021–May 2022 (varies by district). "Records Request—School Bus Data." Released to the World Resources Institute.

Arkansas Department of Education. February 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Atlas Public Policy. 2019. "Atlas EV Hub, Medium and Heavy Duty Vehicle Dashboard." Washington, DC: Atlas Public Policy. https://www.atlasevhub.com/materials/medium-and-heavy-duty-vehicle-registrations-dashboard/

Beatty, T.K.M., and J.P. Shimshack. 2011. "School Buses, Diesel Emissions, and Respiratory Health." *Journal of Health Economics* 30 (5): 987–99. doi:10.1016/j.jhealeco.2011.05.017.

California Highway Patrol. February 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Connecticut Department of Motor Vehicles. July 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Delaware Department of Education. 2019–2020. "Records Request—School Bus Data." Released to the World Resources Institute.

District of Columbia Office of the State Superintendent of Education. 31 May 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Division of State Patrol, Office of the Superintendent, Wisconsin Department of Transportation. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Division of State Patrol, Office of the Superintendent, Wisconsin Department of Transportation. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Driver and Vehicle Safety Division, Missouri State Highway Patrol. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

First Student, Inc. 26 June 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Florida Department of Education. 2022. "Florida School District 2020–21 Transportation Profiles." https://www.fldoe.org/core/fileparse.php/7585/urlt/schtrandist2021.pdf.

Jaro, M.A. 1989. "Advances in Record-Linkage Methodology as Applied to Matching the 1985 Census of Tampa, Florida." *Journal of the American Statistical Association* 84 (406): 414–20. doi:10.1080/01621459.1989.10478785.

Georgia Department of Education. March 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Idaho State Department of Education. March 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Illinois Secretary of State. 2 June 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Indiana State Police. July 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Iowa Department of Education. 17 March 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Kansas State Department of Education. 6 April 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Kentucky Department of Education. 26 October 2022. "Pupil Transportation: Buses." https://education.ky.gov/districts/trans/Pages/Buses.aspx.

Lazer, L., and L. Freehafer. May 2022. "A Dataset of Electric School Bus Adoption in the United States." Washington, DC: World Resources Institute. https://datasets.wri.org/dataset/electric_school_bus_adoption.

Maine Department of Education. 2021–2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Maryland State Department of Education, Maryland Motor Vehicle Administration. 21 January 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Massachusetts Department of Transportation. May 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Michigan State Police. 2021. "School Bus Inspection Report for School Year 2020/2021." https://www.michigan.gov/-/media/Project/Websites/msp/cved/bus/school_bus_inspection_results_2021.pdf?rev=cfcc5dd69e7246c0bc2782a6dc13122a.

Minnesota Department of Education. n.d. "Data Reports and Analytics."

Mississippi Department of Education. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Montana Office of Public Instruction. 30 June 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

National Highway Traffic Safety Administration. 2022. "VIN Decoder." Washington, DC: U.S. Department of Transportation. https://vpic.nhtsa.dot.gov/decoder/.

NCES (National Center for Education Statistics). n.d. "Common Core of Data (CCD)." https://nces.ed.gov/ccd/files.asp. Accessed October 20, 2021.

North Carolina Department of Public Instruction. 2018. "North Carolina School Bus Safety Web." http://www.ncbussafety.org/resources.html.

Nebraska Department of Motor Vehicles. 28 November 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Nevada Department of Education. May 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

New Jersey Department of Environmental Protection. December 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

New Mexico Public Education Department. 23 March 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

New York Department of Transportation. 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

North Dakota Department of Public Instruction. 2020–2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Ohio Department of Education. 21 March 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Oklahoma Tax Commission. 4 November 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Oregon Department of Education. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Pennsylvania Department of Transportation. June 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

School Bus Fleet Magazine. 2021. "School Bus Fleet 2021 Factbook." Torrance, CA: *School Bus Fleet Magazine*. https://www.schoolbusfleet.com/download?id=10131920&dl=1.

South Carolina Department of Education. 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

South Dakota Department of Revenue. September 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Tennessee Department of Education. 2020. "State of Tennessee Annual Statistical Report of the Department of Education for the Scholastic Year Ending June 30, 2020." Tennessee Department of Education. https://eric.ed.gov/?id=ED612382.

Texas Education Agency. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Turk, J. 2022. "Jellyfish." Python. https://github.com/jamesturk/jellyfish.

U.S. Department of Transportation, Federal Highway Administration. 2021. "Bus Registrations: 2020." Highway Statistics Series. Washington, DC: Federal Highway Administration. https://www.fhwa.dot.gov/policyinformation/statistics/2020/mv10.cfm.

Utah State Board of Education. 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Vermont Department of Motor Vehicles. 31 December 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Virginia Department of Education. 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

Washington State Office of Superintendent of Public Instruction. n.d. "School Bus Inventory Report." https://eds.ospi.k12.wa.us/BusDepreciation/default.aspx?pageName=busSearch. Accessed November 15, 2022.

West Virginia Department of Education. 31 May 2021. "Records Request—School Bus Data." Released to the World Resources Institute.

Wyoming Department of Education. 29 March 2022. "Records Request—School Bus Data." Released to the World Resources Institute.

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Our challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

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