



FLORIDA DEPARTMENT OF Environmental Protection

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January 17, 2024

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Melinda M. Miguel
Chief Inspector General
The Capitol
Tallahassee, FL 32399-0001

Dear Chief Inspector General Miguel:

In accordance with Section 20.055 (6) (h), Florida Statutes, the enclosed document represents the six-month status of the findings and recommendations included in the OPPAGA Report No. 23-04, *A Review of Exhaust System Noise*, dated June 2023.

Please let me know if you would like additional information regarding management's response.

Sincerely,

Candie M. Fuller
Inspector General

Enclosure

cc: Joint Legislative Auditing Committee



Department of Environmental Protection Office of Inspector General

6 MONTH FOLLOW-UP OPPAGA Report 23-04

Report: A Review of Exhaust System Noise

Final Report Issue Date: June 2023

Summary of Findings

Finding 1: Research Literature Finds Certain Adverse Health and Quality of Life Effects Related to Noise

OPPAGA reviewed numerous articles that assessed the adverse effects on health and quality of life due to environmental-related noise exposure in adults and children. Many studies found adverse effects of environmental noise on adults' cardiovascular health, sleep, stress, and annoyance. While less research is available regarding children, there are some findings of adverse effects of environmental-related noise pertaining to children and pregnancy outcomes.

Multiple studies reported various adverse effects of excessive environmental noise on physical and emotional wellbeing. Excessive noise exposure can adversely affect certain health problems in adults. Multiple studies reported that chronic exposure to environmental noise affects the cardiovascular system and can contribute to related health problems, including pre-hypertension or hypertension and heart disease. For example, one study found that with every 5 dB A increase in noise exposure, the risk of hypertension increased by 3.4%. The literature also points to a relationship between cardiovascular health and sleep. Although people become accustomed to noisy environments, a process called subjective habituation, the cardiovascular system does not adapt. Instead, in response to noise, the cardiovascular system experiences activations of the sympathetic nervous system, which alters stages of deep sleep to lighter stages of sleep. Sleep disturbance is considered the most severe non-auditory effect of noise exposure. Studies have shown an association between noise exposure and cardiovascular disease, hypertension, and habitual short sleep of less than six hours per night. A strong association between night traffic noise annoyance and sleep disorder also exists. Sleep issues such as falling asleep, waking up, and sleep quality, become more common as noise levels increase. Annoyance is another commonly found symptom of noise. Reported annoyance due to both traffic and aircraft noise is the most common effect discussed in the literature. Annoyance includes feelings of fear, anger, and belief that a person is avoidably harmed. Evidence supports that self-reported annoyance in men and women is statistically significant, as both reported high or extreme noise annoyance. In the literature, an association between traffic-related noise annoyance and the danger of hypertension was observed by researchers. Activities were also affected by high noise levels. Noise levels can disturb a person's ability to relax, listen to the TV or radio, or communicate with others, which can disrupt their quality of life. People with access to quiet places in their homes reported fewer issues with disturbances in their activities than those without access.

While less research is available regarding children, literature supports the negative associations between noise exposure and children and pregnancy outcomes. For children, environmental noise may affect behavior and academic performance. Various studies have found negative associations between environmental noise and lower reading comprehension, concentration deficits, and hyperactivity in children. Researchers have found a decline in reading comprehension in children exposed to high aircraft exposure levels, but the

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decrease was not considered statistically significant. Behavioral problems such as conduct problems, hyperactivity, and peer-relationship problems were also observed in children exposed to road traffic noise. Additionally, children were found to experience annoyance and some sleep problems. Exposure response relationships were demonstrated between aircraft noise and extreme annoyance in children at school. This means the louder the noise, the more annoyed children become. For example, the percentage of children annoyed by environmental noise increased to 12.1% at 60 dB compared to 5.1% at 50 dB. Findings on noise-related sleep issues in children were mixed. A cross-sectional study of 12-year-old children observed poor sleep quality and tiredness; however, statistically significant findings for difficulty falling asleep were not made. A few studies found an association between environmental noise and pregnancy outcomes. Results from the studies suggest a negative effect of road traffic noise in term birth weight, term low birth weight, and small size for gestational age. However, there were no effects of road traffic noise on premature birth. For combined exposures, such as road traffic noise and air pollution, strong associations for mild and early-onset pre-eclampsia were observed by researchers. Additionally, while it is unknown what sound levels are safe for pregnancy, the National Institute for Occupational Safety and Health recommends that pregnant women avoid sounds that are louder than 115 dB A.

Management's Current Status of Actions Taken:

OPPAGA's review of literature and research relating to potential adverse health and quality of life effects of excessive noise provides important context for understanding this issue. There are no specific action items or recommendations applicable to the Department's regulatory authority or enforcement activities derived from these findings. The Department will utilize OPPAGA's report as a shareable reference for any inquiries that the Department may receive pertaining to the health effects of noise.

Finding 2: Florida Statutes and Administrative Code Establish Standards and Penalties for Vehicle Noise, Including Exhaust System Noise

Noise emissions by motor vehicles are addressed in the Florida Statutes and rules adopted in the Florida Administrative Code. Statutes address exhaust system noise by setting standards for the sale of new vehicles and also by setting standards for operating vehicles on roadways. Florida Administrative Code further defines some of these statutory standards. However, some statutory requirements are not currently implemented by DEP. Further, some requirements appear to be preempted by the federal Noise Control Act for certain vehicles.

Statutes Establish Noise Requirements for the Operation and Sale of Vehicles; However, Some Provisions Are Not Being Implemented

State law prohibits the operation of excessively loud vehicles through several statutes pertaining to noise. Exhaust noise related violations are non-moving traffic violations under Ch. 316, Florida Statutes, the Florida Uniform Traffic Control Law. Among other provisions, this chapter provides for enforcement of exhaust noise related violations using two general approaches. The first approach is enforcement of modified, removed, or defective noise preventing equipment. The second approach is enforcement of decibel levels. The allowable decibel level is based on 50 feet from the center lane of travel and sets a maximum noise limit based on the vehicle type, vehicle year, and speed limit. Offenses are non-criminal traffic infractions, which are punishable by warnings, citations, and fines or fees. Some statutes specifically cover exhaust systems, while others generally cover vehicle noise. For example, ss. 316.272 and 316.455, Florida

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Statutes, apply specifically to noise from exhaust systems, while another section of statute could apply to other types of vehicle noise. Section 316.293(5), Florida Statutes, includes modifications to exhaust noise equipment, but also includes modifications to other noise-abatement equipment. Further, s. 316.293(2), Florida Statutes, provides decibel limits for operating noise levels in general. While these statutes include other noise from vehicles, law enforcement surveyed by OPPAGA reported using this statute to enforce exhaust noise related violations.

State law also establishes vehicle noise requirements related to the sale of vehicles and equipment; however, some provisions are not currently implemented. Section 403.415, Florida Statutes, contains several provisions that regulate the sale of certain vehicles and equipment. It sets noise limits for motorcycles and large vehicles. Specifically, large vehicles manufactured on or after January 1, 1977, have a noise limit of 83 dB A. Additionally, motorcycles manufactured on or after January 1, 1975, have a noise limit of 83 dB A. The decibel limits for motorcycles differ by one d BA between ss. 316.292 and 403.415, Florida Statutes, resulting in a situation where certain motorcycles could be legal to sell and illegal to operate because the operating noise limits are lower than the limit for new motorcycles (e.g. a motorcycle that is at the new vehicle limit of 83 dB A would be legal to sell but illegal to operate in Florida).

State law also requires DEP to assist with law enforcement training and to provide a sound-level meter loan program for law enforcement. DEP staff reported that only one law enforcement agency has requested training over the past 10 years. Upon request from law enforcement, DEP will provide training on topics including the procedure for setting up a sound-level meter and the type of evidence required for citations to withstand legal scrutiny. DEP staff also reported that the department has two sound-level meters available to lend to law enforcement. To date, no law enforcement agency has requested to borrow a sound-level meter.

There are other statutory requirements that DEP has not fully implemented.

- **Measurement procedures.** Statutes require DEP, in consultation with the Department of Highway Safety and Motor Vehicles (DHSMV), to establish measurement procedures for determining the compliance of operating vehicles with statutorily established decibel limits. To address these requirements, DEP promulgated two rules related to measuring sites, ambient sound, calibration techniques, and microphone orientation. These rules account for factors that affect sound-level measurements to ensure an accurate representation of the sound. Statute also states that DEP may include adjustment factors for noise measurements other than 50 feet from the center lane of travel. This would allow law enforcement more flexibility in measuring vehicle noise because it would provide different decibel limits for different distances from the center lane of travel. However, the current DEP rule that specifies noise measurement procedures does not contain adjustment factors.

- **New vehicle test procedures.** Statute requires DEP to establish test procedures for determining compliance for new vehicle noise limits. These procedures would specify measurement conditions and procedures for noise testing, such as testing sites and decibel meter requirements. DEP staff reported that the department had rules for this requirement, but the rules were repealed in 2012 because DEP determined that new vehicle noise limits are preempted by federal noise regulations. While the federal government does have regulations for new vehicle noise limits for certain large vehicles and motorcycles, state requirements for new vehicle noise limits and certifications may still apply to other types of vehicles (e.g. school buses and multipurpose passenger vehicles).

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- **Vehicle certifications.** Statutes require DEP to receive noise compliance certification from vehicle and noise abatement device manufacturers, distributors, importers, or designated agents. DEP staff reported that the department does not receive these certifications because the federal government preempts the statutes requiring the certifications. While the federal government does have regulations for new vehicle noise limits for certain large vehicles and motorcycles, state requirements for new vehicle noise limits and certifications may still apply to other types of vehicles (e.g., school buses and multipurpose passenger vehicles).
- **Decibel levels.** Statutes direct DEP, in consultation, with DHSMV, to adopt a regulation establishing maximum decibel levels for motor vehicle exhaust systems. DEP staff reported that this requirement was superseded by the decibel limits established in ss. 316.293 and 403.415, Florida Statutes. These statutes provide decibel limits for general vehicle noise as opposed to decibel limits for exhaust systems.

Management's Current Status of Actions Taken:

The Department has not undertaken any rulemaking activity pertaining to vehicle noise since the rules referenced in OPPAGA's report were repealed in 2012. The Department recognizes the statutory authority that the Florida Legislature has granted to the agency, and the Department will continue to work with our partners in local law enforcement and the Department of Highway Safety and Motor Vehicles to provide technical assistance and support regarding the measurement of vehicle noise. The Department will continue to defer to the federal noise standards applicable across vehicle classes, as these standards reflect significant reductions in vehicle noise year over year. The Department will assess the extent to which any state standard for vehicle classes not addressed under federal standards would be effective or practicable.

Finding 3: Local Ordinances Take Diverse Approaches to Regulating Vehicle Noise

Many Local Governments Address Vehicle Noise Through Local Ordinances

Many local governments have ordinances that prohibit excessive noise. These ordinances sometimes include a section stating that excessive noise harms public health, safety, and quality of life. Some local ordinances specify certain causes of excessive noise that are covered under the ordinance, and many local ordinances include a prohibition on excessive noise from motor vehicles. These ordinances range from excluding vehicle noise to explicitly prohibiting excessive noise from motor vehicles. The associated standards and penalties widely vary among counties and cities that explicitly regulate vehicle noise or with noise ordinances that do not exempt vehicle noise.

Florida counties regulate vehicle noise in a variety of ways. OPPAGA reviewed the ordinances of all 67 Florida counties. Nineteen counties did not have any noise ordinances. Of the 48 counties with a noise ordinance, 18 explicitly excluded exhaust noise from the noise ordinance, 7 did not mention vehicle noise that does or could include exhaust noise, and 6 had contradictory ordinances that specifically prohibited excessive vehicle noise and also exempted noise from motor vehicles. The remaining 17 counties had prohibitions on vehicle noise that include exhaust noise. The 17 counties with ordinances that regulate vehicle noise that include exhaust noise used a variety of standards. Additionally, 12 of these counties used more than one standard to regulate vehicle noise. These standards included the following.

- Nuisance standard, such as prohibiting disruptive or unreasonably loud noise (12 counties)

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- Equipment standard, such as requiring that a vehicle be equipped with a working muffler (9 counties)
- Decibel standard, such as prohibiting vehicle noise louder than a specified decibel level (9 counties)
- Plainly audible standard, such as prohibiting sound from any vehicle which is plainly audible at a certain distance (5 counties)

Florida municipalities also have a wide range of ordinances related to vehicle noise. OPPAGA reviewed the ordinances of 42 Florida cities. Of these cities, eight did not have an ordinance related to noise. Of the 34 cities with a noise ordinance, 18 had regulations about vehicle noise that include exhaust noise. Seven cities explicitly excluded exhaust noise from the noise ordinance, and 6 did not mention vehicle noise that includes exhaust noise. Three cities had contradictory ordinances that specifically prohibited excessive vehicle noise and also exempted noise from motor vehicles from the noise ordinance.

Cities that prohibited excessive vehicle noise that includes exhaust noise did so using a variety of standards and some used multiple standards. Five cities used more than one type of standard. For example, two cities had ordinances that established both a nuisance standard and an equipment standard. These standards included the following.

- Equipment standard, such as requiring that a vehicle be equipped with a working muffler (13 cities)
- Nuisance standard, such as prohibiting disruptive or unreasonably loud noise (4 cities)
- Decibel standard, such as prohibiting vehicle noise louder than a specified decibel level (4 cities)
- Plainly audible standard, prohibiting sound from any vehicle which is plainly audible at a distance of 50 feet or more (1 city)
- Per se standard, classifying the use of motorcycles after 9:00 p.m. as a violation of the city's noise ordinance (1 city)

Counties and cities have penalties for violating vehicle noise ordinances. Some ordinances provide that violations related to excessive vehicle noise may be punished by a fine. For example, law enforcement officers surveyed reported fine amounts from \$50 for a first offense to \$500 for a second or subsequent offense. Some local governments also include imprisonment or vehicle impoundment as potential penalties for excessive vehicle noise. Local governments sometimes reserve more severe penalties for repeated violations. However, statutes may preempt local ordinances related to vehicle operating noise and new vehicle noise limits. Ch. 316, Florida Statutes, includes two general preemptions on local ordinances.

- Section 316.002, Florida Statutes, provides that “it is unlawful for any local authority to pass or to attempt to enforce any ordinance in conflict with the provisions of this chapter.”
- Section 316.007, Florida Statutes, provides that “the provisions of this chapter shall be applicable and uniform throughout this state and in all political subdivisions and municipalities therein, and no local authority shall enact or enforce any ordinance on a matter covered by this chapter unless expressly authorized.”

Thus, excessive motor vehicle noise appears to be a matter preempted to the state. The general preemptions in Ch. 316, Florida Statutes, cover sections that address noise from the operation of motor vehicles, such as ss. 316.272, 316.293, and 316.455, Florida Statutes. More specifically, s. 316.0076, Florida Statutes, provides that the “regulation of the use of cameras for enforcing the provisions of this chapter is expressly preempted to the state.” Section 316.008, Florida Statutes, does recognize broad powers of local authorities to regulate traffic. However, the Supreme Court of Florida has held that, other than where explicitly noted, these powers do

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not encompass imposing punishment outside the framework of Chs. 316 and 318, Florida Statutes, for conduct prohibited by Ch. 316, Florida Statutes, and subject to punishment under Ch. 318, Florida Statutes. Further, s. 403.415, Florida Statutes, may preempt local ordinances related to new vehicle noise limits. Section 403.415(10), Florida Statutes, provides that “no local authority shall enact or enforce any ordinance on a matter covered by this section unless expressly authorized.”

Management’s Current Status of Actions Taken:

The findings under this section do not apply directly to the Department of Environmental Protection. The Department will utilize OPPAGA’s report as a shareable reference for any inquiries that the Department may receive pertaining to local vehicle noise ordinances.

Finding 4: Law Enforcement Practices Vary for Enforcing Exhaust Noise Related Violations; Citations Have Increased and Over OneThird Adjudicated Guilty

Local ordinances for exhaust noise related violations are rarely enforced; however, enforcement of state statutes for exhaust noise related violations have increased in recent years. The enforcement practices for state statutes vary among entities. The most common disposition for these offenses is an adjudication of guilt; the median citation amount is \$116. While enforcement has increased in recent years, there are several enforcement challenges.

Law Enforcement Rarely Enforces Local Ordinances for Exhaust Noise Related Violations

OPPAGA’s survey of local law enforcement found that very few respondents (2 offices) reported that they had enforced local ordinances regulating excessive exhaust noise. For a first offense, respondents would issue a verbal warning, written warning, or citations. For a second or subsequent offense, respondents would issue a written warning or citation. One respondent reported issuing fewer than 20 citations in the past year and one reported issuing only one citation in the past year. Survey respondents reported a variety of reasons for not enforcing local vehicle noise ordinances. Some pointed to the lack of significant penalties for violating the ordinance. Several respondents reported preferring to use state statute rather than local ordinance to address excessive noise from vehicles. Some identified practical barriers, such as requiring decibel meters or difficulty inspecting modified exhaust equipment in the field.

There Are Different Enforcement Approaches Used for Exhaust Noise Related Violations Under State Statutes

Law enforcement practices for enforcing exhaust noise related statutes vary. OPPAGA’s survey of sheriff’s offices and police departments found that law enforcement are most commonly made aware of violations by hearing loud exhaust while on patrol (92%), followed by citizen complaints (72%), and other (4%), which can include targeted enforcement operations. After identifying a vehicle with loud exhaust, law enforcement has discretion on how to handle the offense. OPPAGA’s survey found that most respondents reported providing a written warning for an exhaust noise related violation; for second or subsequent offenses, most write a citation. Some respondents also issue a compliance ticket, which is also known as a fix-it ticket citation and allows the driver to fix the exhaust equipment and have the citation dismissed.

Citations Under State Statutes for Exhaust Noise Related Violations Have Increased

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While law enforcement uses a variety of enforcement approaches, including verbal and written warnings, available statewide traffic data is limited to citations. Overall, non-moving traffic violation citations have declined, with the total number of citations decreasing from 730,323 citations in 2017 to 562,789 citations in 2021. However, over a similar period, exhaust noise related citations increased from 857 in Fiscal Year 2017-18 to 3,018 in Fiscal Year 2021-22. This increase may be due to a rise in citizen complaints regarding loud exhaust noise. Most (67%) survey respondents also reported that the prevalence of vehicles or motorcycles with loud exhaust has increased over the past five years, and 22% reported that it stayed about the same.

Most Exhaust Noise Related Citations Under State Statutes Are Equipment Related Instead of Decibel Related

From Fiscal Year 2017-18 through Fiscal Year 2021-22, 89% of exhaust noise related offenses were associated with improper or modified equipment. Over the same period, only 105 offenses (1%) were recorded under the decibel statute. While the overall number of citations issued for decibel statute violations is low, enforcement increased from 7 citations in Fiscal Year 2017-18 to 36 citations in Fiscal Year 2021-22. Citations do not account for warnings from law enforcement to drivers or citations written under local ordinances. In OPPAGA's survey, 60% (78 of 130) of law enforcement respondents reported enforcing exhaust noise related violations. Of those enforcing such violations, 96% used one of the equipment statutes. Law enforcement reported using the equipment statutes for several reasons. Eighty-eight percent of respondents reported that equipment-related statutes are easier to enforce than the decibel statute. Other reasons include that it is obvious to see modifications so enforcement can happen without having an officer staged on a sidewalk with a decibel meter. In OPPAGA's survey, only two law enforcement respondents reported enforcing the decibel statute for exhaust noise related violations. These respondents reported that the benefits of using the decibel statute are that a decibel meter is easy to use and provides an objective measurement of noise, which is clear evidence to use in court. Additionally, one respondent stated decibel readings do not require an officer to examine the vehicle for modified exhaust equipment. These offices reported enforcing the decibel statute at special events or specific problematic locations. For example, using one approach, the traffic unit sets up a tripod with a decibel meter at the problematic location, then the officer controlling the decibel meter communicates with another officer who pulls the vehicle over when a violator drives past the location.

Over One-Third of Citations Under State Statutes Result in a Guilty Adjudication; Citations Have a Median Cost of \$116

For offenses committed in Fiscal Year 2017-18 through Fiscal Year 2021-22, 39% (3,507) of citations were adjudicated guilty. Over the same period, 26% (2,336) of citations were dismissed. Additionally, 25% (2,224) of citations are documented as a paid fine or civil penalty but do not have additional disposition information in the traffic or clerk data.²³ About 9% (775) of cases resulted in adjudication withheld.

Violators paid a median citation cost of \$116. As part of nonmoving traffic citations, drivers may be required to pay fines and fees. Florida statutes establish a base cost of \$108 in fines and fees for nonmoving traffic violations. While fine and fee amounts vary by county and municipality, the median cost for exhaust noise related citations was \$116. Section 318.18(23), Florida Statutes, establishes an additional fine specifically for modified exhaust systems or other noise abatement equipment. This additional fine does not apply to the other exhaust noise statutes. In addition to other penalties imposed, law enforcement may impose a fine of \$200 for a first offense and a fine of \$500 for a second or subsequent offense. There is some evidence in

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the data of this additional fine being used. OPPAGA identified approximately 159 citations with the \$200 additional fine and approximately 13 citations with the \$500 additional fine. In OPPAGA's survey, 50% of respondents reported that their organization is aware of the increased fine yet the organization has not imposed the increased fine amount, 5% reported awareness of the fine increase and have imposed it, and 46% reported not being aware of the increased fine amount.

Some Law Enforcement Offices Do Not Enforce Exhaust Noise Related Statutes for a Multitude of Reasons and Most Have Not Received Relevant Training

Forty percent (52 of 130) of respondents reported that their organization does not enforce decibel or equipment state statutes for exhaust noise related violations. Respondents provided several reasons why the decibel statute is not easily enforceable. For instance, 56% reported that it is impractical to prepare a decibel meter to target a moving vehicle to measure noise levels. Sixteen respondents reported other factors that contribute to the inability to enforce the statute, including 8 respondents who said their agency does not have sufficient decibel meters. Further, 36% indicated that ambient noise and distance from a vehicle are some of the many factors that officers must account for when enforcing the decibel statute. Most agencies attribute law enforcement officers' inability to enforce equipment-related statutes to a lack of specialized knowledge regarding exhaust modifications. For instance, 52% of respondents reported that law enforcement officers did not have the knowledge to determine if a motor vehicle or motorcycle had exhaust equipment that was louder than originally manufactured. OPPAGA also found that law enforcement officers experienced difficulty providing evidence of violations in court. For example, 46% of respondents indicated that it is difficult to prove to the court that a motor vehicle or motorcycle has exhaust equipment that is modified, removed, or in disrepair.

Most law enforcement organizations have not received relevant training to enforce exhaust noise related violations. Law enforcement officers receive training on general traffic enforcement at the law enforcement academy and through field officer training in their employing organization. However, of the 116 survey respondents who answered training related questions, 79% (92) reported that deputies or officers have not received any training for exhaust noise related violations. Sixteen percent (19) reported that a deputy or officer has received training on how to use decibel meters to measure noise from vehicles or motorcycles. Examples of training included that the topic is covered in the employing local law enforcement organization's Sound Meter Training Class, using lasers to measure distance required in the decibel statute, and vendor specific training materials. Only 5% (six) reported that a deputy or officer has received training on how to identify modified, removed, or defective exhaust equipment. Examples included in-house training from senior traffic unit deputies or officers and how to recognize aftermarket parts versus stock parts.

Management's Current Status of Actions Taken:

The findings under this section do not apply directly to the Department of Environmental Protection. The Department recognizes the statutory authority that the Florida Legislature has granted to the agency, and the Department will continue to work with our partners in local law enforcement and the Department of Highway Safety and Motor Vehicles to provide technical assistance and support regarding the measurement of vehicle noise. The Department will utilize OPPAGA's report as a shareable reference for any inquiries that the Department may receive pertaining to law enforcement practices and noise ordinance enforcement.