Testimony of Daniel Walker, Preti Flaherty

On behalf of the Mainers Against Coastal Noise Pollution

In Opposition to

LD 114, An Act to Address Airboat Operation in the State

Joint Standing Committee on Inland Fisheries and Wildlife
Joint Standing Committee on Marine Resources

April 12, 2021

Senator Dill, Senator Miramant, Representative Landry, and Representative McCreight, and Members of the Inland Fisheries and Wildlife Committee and the Marine Resources Committee, my name is Dan Walker, and I represent Mainers Against Coastal Noise Pollution. I testify today in opposition to LD 114, An Act to Address Airboat Operation in the State.

I testify as a member of the IFW/MR consensus-based rulemaking committee. There is much about LD 114, that we support, but there is also much that we do not support.

Thank you to the Departments of Inland Fisheries and Wildlife and Marine Resources for the open and transparent rulemaking process undertaken throughout this past Fall and Winter. Especially, I would like to thank the Commissioners for their decision to enter into a consensus-based rulemaking process, which I know is not a usual process, and for their willingness to be open to the process, including setting up and executing an airboat presentation in Freeport. I would also like to thank Deputy Commissioner Tim Peabody for his leadership throughout the rulemaking process, and especially through the consensus based rulemaking meetings. Finally, thank you to Rep. McCreight for submitting this bill and being open to communication throughout this process.

However, unfortunately, we need to oppose this version of the legislation. LD 89, An Act to Regulate Airboats, which will be heard next, is the best way to proceed to begin the process of regulating airboats and to provide relief for many weary coastal residents, who have been negatively experiencing the uniquely loud noise of airboats at all hours of the day. You will hear many testimonies today from coastal residents who have lived for years on the coast with no issues, until the use of airboats has become more widespread and disruptive.

LD 114 includes necessary provisions, including shifting to a shoreline decibel measurement (SAE J2005), maintaining an airboat/coastal resident workgroup, and further study. However, the major flaw with LD 114 is that the temporary airboat decibel limits are simply too high and provide little relief to coastal residents and wildlife, especially during the early morning hours. Attached to my testimony is a report from a national expert, Frank Turina, who spent his career working on sound issues for the National Park Service, which discusses in great detail the damaging effect of loud noises like airboats on humans and wildlife.

During the very productive consensus based rulemaking process, the coastal residents offered several proposals regarding airboat decibel limits and operation, responding after each meeting in the hopes of a compromise, as is reflected in the Report to the Legislature: Public Law Chapter 662: An Act to Address Decibel Level Limits for Airboats ("DIFW/DMR Report") presented today. The airboat operators offered one proposal, which the coastal residents did not agree with, and that is the decibel proposal offered today in LD 114. The coastal residents and the airboat operators feel they made major concessions in their proposals, but we remain 10 decibels apart. Sound measurements in decibels are measured logarithmically, which translates into the airboat operator proposal limits being twice as loud as the coastal residents'.

We understand that these decibel limits are a temporary measure that will be repealed, and we do need some limits in place. However, the version provided in LD 114 only perpetuates the unacceptable status quo, as airboats will have to make very few changes, if any to operations or the mechanics, to be able to meet these standards. The limits proposed by coastal residents can be achieved by today's airboats, which has been demonstrated in the various demonstrations and tests performed by IFW Wardens and Marine Patrol Officers, which are detailed in the DIFW/DMR Report.

During the Freeport demonstration on February 9, 2021, the loudest reading from the loudest airboat, which carried significantly extra weight, was 83.4 db from 749 feet, and the other airboats were significantly below this measurement. See Appendix B, DIFW/DMR Report. Additionally, on February 2, 2021, IFW performed a practical test using shoreline readings on two airboats, with constant readings "in the 60s" and a maximum reading of 77 db. See p. 10 and Appendix E, DIFW/DMR Report.

Importantly, we believe that unregulated airboats have a damaging effect on humans and wildlife living proximate to their use. See Turina report. They also have a disruptive effect on recreation and tourism. As a result, the working group created as part of this legislation should include representatives of environmental and recreational groups.

Finally, the effort to regulate airboats is not an attack on the working waterfront, but an effort to regulate an extremely loud and disruptive tool that has only recently started to spread in popularity along the coast of Maine. These airboat limits (in both bills) are significantly higher than other limits in statute for all other participants in the working waterfront. These limits will have no effect on lobstering, oyster farming, clam harvesting with a skiff, or the many other activities in the working waterfront.

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MEMORANDUM

To:

From: Frank Turina, PhD

Date: October 15, 2020

Subject: Potential Effects of Airboat Noise on Humans and Wildlife

This Memorandum is prepared at the request of a group of Freeport residents to assist the State of Maine in its development of regulations limiting airboat noise. The professional qualifications of the author are attached at the end of this Memorandum.

The Maine legislature has recently drawn a distinction between airboats and watercraft, thereby exempting airboats from the laws specifically limiting boats noise to 75 dB – 90 dB, depending on the distance of measurement from the source. These long existing limits for boat noise should not be increased for airboats, and to do so would be adversely affect wildlife and humans.

This memorandum addresses potential impacts to humans and wildlife from airboat noise. Section 1 describes acoustic characteristics of air boat noise and environmental conditions that influence the propagation of acoustic energy. Section 2 addresses effects to wildlife from noise. Section 3 discusses several metrics and mechanisms by which noise affects humans. Section 4 addresses efforts taken by various jurisdictions to manage airboats. Many of these efforts were prompted by citizen complaints about excessive noise levels.

1 – Airboat Noise: Acoustical and environmental considerations

Airboat Noise Attenuation and Propagation: Airboat noise is extremely loud. The levels measured by DIFW indicate average noise levels of 98 dBA at 4000 RPM. These levels were measured at a distance of 50 feet. There is a well-supported concept in acoustics that noise levels drop 6 dBA every time you double the distance from a source. In this scenario, the noise level from airboats would drop to 92 dBA at 100 feet and 86 dBA at 200 feet. To put this level in perspective, OSHA requires employees to use hearing protection when noise exposure reaches 85 dBA averaged over 8 working hours. At 3200 feet, nearly three quarters of a mile, the noise level would be 60 dBA – enough to disrupt conversation. At 6400 feet, about 1.25 miles, the noise would be about 54 dBA – still clearly audible under most circumstances. These are estimates of the noise levels based on atmospheric absorption rates. As discussed below, these levels could be higher due to the low frequency of air boat noise, propagation over water, wind conditions, temperature, topography and other factors. To more accurately assess the propagation of airboat noise, an analysis using acoustic models such as CadnaA, SoundPLAN, or NMSim should be conducted. These models incorporate other factors that could reduce noise attenuation rates and increase propagation distances.

Low Frequency Noise: In general, airboats generate predominantly low-frequency noise. In 2008, NPS measured the spectral characteristics of air boat noise at Everglades National Park. The measurements indicated the sound pressure levels for 33 different frequency bands (1/3 octave bands). The data indicate that the highest sound energy levels in air boat noise fall in frequencies between 31Hz and 250Hz. Humans can detect sounds in a frequency range from about 20Hz to 20,000Hz, so most of the energy in airboat noise is in the low frequency bands. This has several implications for the perception and propagation of airboat noise.

Our understanding of the effects of low-frequency noise has increased in recent years and research has demonstrated that low frequency noise is more detrimental to humans and wildlife than higher frequencies. Low frequency noise travels more efficiently through the environment and is more difficult to mitigate. Whereas high frequency noise is easily scattered and absorbed by air, vegetation, topography, and structures (dwellings, walls, and hearing protection), low-frequency noise travels through and around these obstacles with far less attenuation. As a result, low frequency noise from airboats is more likely to be audible at greater distances, even inside local residences and businesses.

Intense low-frequency noise can produce respiratory impairment, and evidence suggests that a number of adverse effects of noise in general arise from exposure to low frequencies. For example, loudness judgments are sometimes reported to be greater for low-frequency noise than other noises and people tend to be more annoyed by low frequencies. Low frequency noise is also more efficient at masking other sounds, making them more difficult to hear. In addition, speech intelligibility may be reduced more by low-frequency noise sources, such as air boats (Berglund, Hassmen, and Job, 1996).

Temperature, Wind, and Surface Characteristics: In addition to the physical acoustic characteristics of the noise, airboats operate in environments that tend to minimize noise attenuation and increase propagation. When sound travels through the environment, attenuation occurs as a result of acoustic energy losses due to surface interactions. These losses will depend on surface characteristic. For example, thick grass or porous soils may result in rapid attenuation over short distances, especially for higher frequency sounds. In contrast, smooth, hard surfaces such as water result in minimal attenuation and noise may propagate over long distances. High frequencies are generally attenuated more than low frequencies so low frequency noise from airboats will likely propagate for much great distances over water than if the sound was generated over land (Everest and Pohlmann, 2015). This is an important consideration when trying to compare the rock, mud and water of Maine to the grassy marshlands of the Florida Everglades. The noise would likely attenuate less in the conditions found in Maine.

Temperature inversions, which often occur over bodies of water are another factor that may increase the propagation of airboat noise. Under normal conditions, air temperatures decrease as altitude increases. This causes sound to bend upward, away from ground based receivers. When a temperature inversion occurs, air temperatures increase with increasing altitude. Under these conditions, sound waves will be refracted downward, and may be heard over larger distances. Wind also affects the propagation of sound. In general, sound waves will be refracted down toward the ground when traveling with the wind and upward when traveling against the wind. Therefore, when there is an on-shore breeze as often occurs in the early morning, noise will travel farther (Harris, 1966; Ingard, 1953).

As a result of the extreme intensity (sound pressure levels) and low frequency of air boat noise, and the environmental conditions in which they operate (e.g. water surfaces, frequent inversions, and wind) noise from airboats is likely to propagate over long distances.

2 - Effects on wildlife

Scientific Literature: The scientific literature on the effects of noise on wildlife has seen a dramatic increase over the past decade. Numerous behavioral and physiological responses to noise have been documented in many different taxa. Graeme and McKenna, et.al. (2016) conducted a systematic review of the scientific literature published from 1990 to 2013 on the effects of anthropogenic noise on wildlife, including both terrestrial and aquatic species. The majority of studies documented direct and indirect effects from noise, including altered vocal behavior to mitigate masking, reduced abundance in noisy habitats, changes in vigilance and foraging behavior, and impacts on individual fitness and the structure of ecological communities. The review, which looked at nearly 250 studies, shows that terrestrial wildlife responses begin at noise levels of approximately 40 dBA, and 20% of papers documented impacts below 50 dBA. Noise from airboats will likely exceed these levels far inland from the shore, potentially affecting sensitive species in areas where airboats operate.

Reduction in Listening Area: To further assess potential impacts to wildlife, the National Park Service (NPS) has developed a metric called "reduction in listening area." Reduction in listening area quantifies the loss of hearing ability for humans and animals as a result of an increase in ambient sound level. Under ambient acoustic conditions, a sound (e.g. prey, predator, potential mate) is audible within a certain area around an animal. This is known as the animal's "listening area" for that sound. If the ambient level is increased due to a noise event, the area in which the sound is audible decreases. For example, under natural ambient conditions, an owl perched in a tree may be able to hear a mouse scurrying through the brush anywhere within an area of 100 square meters of the perch. If a noise event increases the ambient level by 3 dBA, the area in which the owl can hear a mouse would decrease by 50 percent to approximately 50 square meters. An increase of 6 dBA would decrease the area by half again resulting in a 75% reduction from the original area. A 10 dBA increase results in a 90% loss in listening area. (See Figure 1) This relationship is valid regardless of the type of noise or species involved. As discussed above, airboats are likely to generate noise above natural conditions for large distances (Barber, Crooks, and Fristrup, 2010).

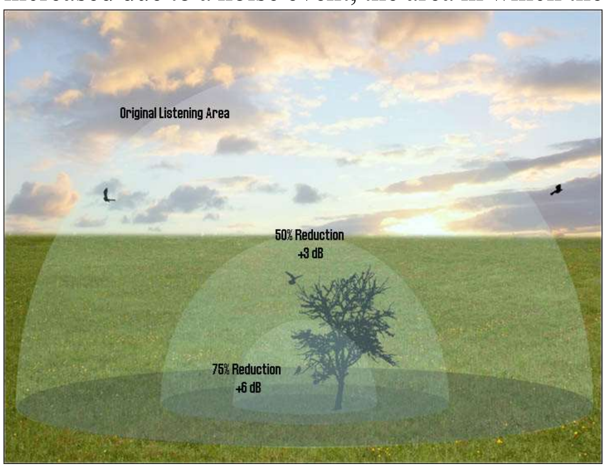

Figure 1 - Reduction in Listening Area

Tolerance and Habituation: Animals are said to be habituated when their response to a stimulus is diminished over time. Evidence of habituation is often cited to imply that noise impacts are transient and inconsequential. However, rather than demonstrating that noise does not have lasting effects on wildlife, habituation and tolerance to noise ***IS*** the impact. Within any population, animals will possess a range of tolerance to high levels of noise. Individuals with low tolerance levels will likely abandon noisy habitats while only tolerant individuals remain. In addition, declining foraging success and body condition as well as physiological and psychological stress can cause individuals to diminish their reaction to noise because they cannot afford decreased feeding rates or the energy costs of a response (e.g. flushing). As a result, habituation is not a process that serves to mitigate effects from noise. NPS recommends that managers minimize wildlife exposure to noise and avoid habituation to noise whenever possible (Barber, Turina, and Fristrup, 2010).

3 - Effects on Humans

Physiology and Health: There have been numerous studies that show a relationship between exposure to noise and several markers of physiological, behavioral, and psychological health. Reports of increased levels of heart disease, hypertension, stress, and depression in people exposed to chronic noise are common in the literature. For example, Haralabidis et al. (2008) showed increases in blood pressure and heart rates in sleeping humans at levels as low as 35 dBA. Other studies have demonstrated relationships between noise and reduced cognitive performance, aggressive behavior, and increased risk of myocardial infarction

(Moudon, 2009). Under most scenarios, airboat noise will be sporadic and will not pose a significant risk to public health. However, the psychological and physiological effects of stress are cumulative and noise from airboats can have a contributory effect on health outcomes when added to other stressful stimuli.

Sleep interruption: In 1997, the Federal Interagency Committee on Aircraft Noise (FICAN) issued a report on sleep interruption. The report contains a model for estimating the probability of awakening due to a noise event based on the intensity of the sound (see Figure 2). The model developed in 1997 indicates that the likelihood of awakening from a 30 dBA noise event is close to zero percent. At 65 dBA, about the level of a normal conversation, there is a 5 percent chance of awakening, and at 80 dBA, the likelihood increases to 10 percent. The FICAN study uses the sound level exposure (SEL) metric to determine the probability of awakening, however maximum sound level (Lmax) can also be used. Lmax provides a more conservative estimate of sleep interruption because the Lmax of an event is always lower than the SEL. As a result, using the Lmax in figure 2 will slightly underestimate the likelihood of sleep interruption.

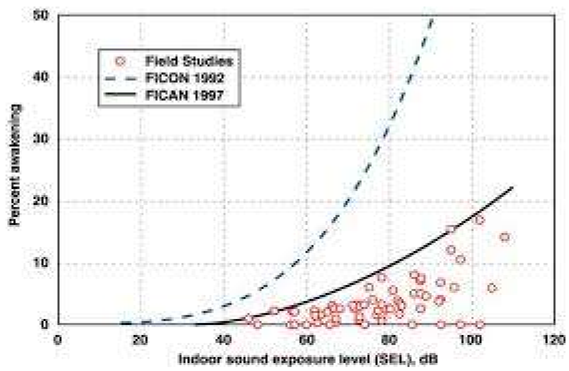

Figure 2 Probability of sleep interruption from noise

The World Health Organization (WHO) (Berglund, Lindvall, and Schwela, 1999) recommends noise levels below 45 dBA inside bedrooms. They state, it is important to limit the number of noise events with a LAmax exceeding 45 dBA. To protect sensitive persons, a still lower guideline value would be preferred when the background level is low. FICAN explicitly cautions against applying this criterion in campgrounds or other temporary residences, where people are typically more prone to disturbance. Therefore, the actual likelihood of sleep interruption may be greater for hotels and other temporary accommodations. Due to the low frequency characteristics of air boat noise and the greater propagation of low frequency sound waves, night time operations of air boats are likely to cause sleep disturbance for some nearby residents.

Other studies (Haralabidis, 2008) suggest that sound events as low as 35 dBA can have adverse effects on blood pressure while sleeping. Research on the effects of noise on sleep patterns of other animal species is sparse. However, protecting humans from sleep interruption likely provides other vertebrates a level of protection from sleep disruption. Sleep interruption standards for wildlife should be reexamined as more data on non-human sleep interruption becomes available.

Speech interference: Speech interference represents the likelihood that noise may interfere with human speech (EPA, 1994). The potential for speech interference from a noise depends on the distance between the speaker and listener and the acceptable level of intelligibility. Figure 3 illustrates thresholds for speech interference for various distances and intelligibility levels. Based on 95 percent speech intelligibility and normal voice communications at 2-meters, the EPA's speech interference threshold is 60 dBA. Given the estimate of noise propagation from airboats provided in Section 1, noise levels with the potential to interfere with speech could occur at a distance of 3200 feet.

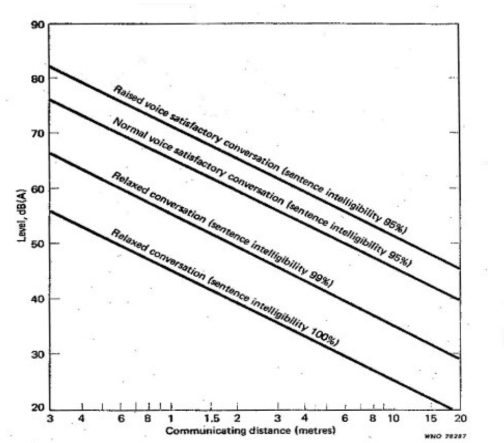

Figure 3. Maximum distances outdoors over which conversation is considered to be satisfactorily intelligible in steady noise

Low frequency components of the noise are likely to travel even further. Acoustic modeling should be conducted to provide a more accurate assessment of noise propagation from airboats

Annoyance

Annoyance is the most prevalent response to environmental noise and may result in negative emotional responses, including poor mental health and high levels of perceived stress. The FAA has, for decades, used the percentage of residents likely to be "highly annoyed" to assess and manage noise near airports. Stress from noise can "interfere with daily activities, feelings, thoughts, rest or sleep, and may be accompanied by negative emotional responses such as irritability, distress, exhaustion and other stress-related symptoms." (Jensen, Rasmussen, and Ekholm, 2018) Other studies have documented relationships between exposure to noise and depression and anxiety.

In yet another series of studies, scientists have determined that noise diminishes our appreciation for scenic beauty. Perhaps due to the psychological effects of noise, subjects exposed to environmental noise (motorcycles, helicopters, automobiles, etc.) rated photographs of nature less favorably than subjects exposed to natural sounds or no sounds at all (Mace, Bel, and Loomis, 1999; Benfield, et.al, 2010; Weinzimmer, D. et.al., 2014; Benfield, et.al. 2018). As a result, noise from air boats will likely cause a reduction in the peacefulness, tranquility, and beauty of coastal areas and other natural settings.

4. Airboat Regulations

There have been few efforts to manage airboat noise, specifically. One of the few places to address the issue is Everglades National Park. The effort to manage air boats in the park goes back at least as far as the "Everglades National Park Expansion Act." Signed by George H.W. Bush on December 13, 1989, the Act began the process of phasing out private airboats in the park and limiting commercial airboat operation to a small number of concessionaires selected by the NPS.

Everglades continues to recognize and manage the effects of airboat noise on park resources and visitor experience. In their recent Foundation Document, the park acknowledged that "Noise from private airboat use on nonwilderness areas will affect opportunities for solitude by visitors in adjacent wilderness areas until private airboat use is phased out in accordance with the 1989 Everglades National Park Expansion Act."

In addition to Everglades National Park, a few other state and local jurisdictions have placed restrictions on airboat operations. Florida requires all airboats to have mufflers, (see Fla. Stat. § 327.391(1)), and prohibits any airboat from being used while it lacks a muffler. (See Fla. Stat. § 327.391(2)). In addition, the muffler must be able "to effectively abate the sound of exhaust gases . . . and prevent excessive sound.. . . " (See Fla. Stat. § 327.02(30). See also Fla. Stat. § 327.65 (further defining muffling devices)). In Michigan, "motorboats" must have mufflers. (See Mich. Comp. Laws Ann. § 324.80156). According to an attorney general opinion, this law applies to the motors of airboats but not to their propellers. (See Mich. Att'y Gen. Op. 7124 (Feb. 20, 2003), available at 2003 WL 46543). Michigan also prohibits airboats from operating "within 450 feet of a residence between the hours of 11 p.m. and 6 a.m. at a speed in excess of the minimum speed required to maintain forward movement." (See Mich. Comp. Laws Ann. § 324.80108a(l)). In New Hampshire, airboats are not permitted to operate within 150 feet from shore except to go directly to and from a point of destination on the shore and then only at a course which is as close to 90 degrees to the shore as possible. The regulation allows airboats to be throttled up only to the minimum extent necessary to raise it onto the air cushion and move at headway speed within 150 feet from the shore. The New Hampshire law also prohibits the use of an air boat whenever such use "adversely affects fish and wildlife habitat…threatens public safety, or adversely affects the natural environment." (See N.H. Rev. Stat. Ann. § 270:25-a(I)(c); Jarvis, 2019). Similar requirements for air boats in Maine could help reduce complaints and protect the state's natural resources.

PROFESSIONAL QUALIFICATIONS OF THE AUTHOR

Frank Turina served as Program Manager for Policy, Planning, and Compliance for the National Park Service (NPS), Natural Sounds and Night Skies Division. In this position, Dr. Turina was responsible for developing policy and guidance for mitigating the effects of noise on visitors, wildlife, wilderness character, cultural landscapes, and other national park resources and values. He assisted parks by incorporating principles of acoustics and natural resource management into park planning documents and decision-making processes, and developed methodologies for assessing impacts from noise for environmental impact assessments. Dr. Turina led teams of scientists, policy experts, resource managers, park staff, and environmental professionals in addressing and mitigating noise from multiple sources including aircraft overflights, snowmobiles, off-road vehicles, transportation systems, motorcycles, personal watercraft, energy development, construction, motorized boats, and park maintenance. He wrote the first Soundscape Management Plan at Zion National Park and led the NPS team involved convening a multidisciplinary workshop on best practices for protecting park soundscapes. The results of the workshop were published as a National Academy of Engineering Report titled Protecting National Park Soundscapes. He was a recipient of the NPS Director's Award for Excellence in Wilderness Stewardship as part of a team that developed NPS policy for protecting wilderness character. Dr. Turina earned a PhD. in Public Affairs/Environmental Policy from the University of Colorado and currently serves as an adjunct faculty member in the Environmental Policy and Management program at the University of Denver.

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MEMORANDUM

To: Daniel Walker, Esq.

From: Frank Turina, PhD

Date: December 10, 2020

Subject: Addendum to Potential Effects of Airboat Noise on Humans and Wildlife

This memorandum provides additional information related to the potential impacts to humans and wildlife from airboat noise and updates my previous memorandum dated October 15, 2020. This addendum is in response to the Notice of Agency Rule-making Proposal Chapter 13 - Watercraft Rules (Airboat Noise Limits) released by the Maine Department of Inland Fisheries and Wildlife on November 11, 2020.

100 dB Maximum Noise Level

The 100dB maximum noise level for the operational test is extreme and unprecedented for vehicles operating near communities and residential neighborhoods. I am unaware of a noise regulation for any vehicle that is comparable to the proposed level. For example, the State of California established a maximum noise level[1] for Off Highway Vehicles (OHV) of 96dB, *measured at a distance of 20 inches from the exhaust outlet*. By definition, these vehicles are designed to travel in more remote areas, generally further from residences and communities than other modes of transportation.

To provide some perspective on the 100dB limit, consider noise levels generated by motorcycles. In 2013, the Department of Transportation measured noise levels generated by various classes of motorcycles as they travelled past a noise level meter positioned 50 feet from Blue Ridge Parkway. The loudest motorcycles measured were in the "cruiser" class. Cruisers included "choppers" and generated a "deep throated 'Harley' rumble sound." The average operational noise level of these motorcycles was about 73dB at 50 feet[2]. This level is similar to those measured by the National Park Service at Glacier National Park. In general, a 3dB increase represents a doubling of noise energy, so if one cruiser creates 73dB, two cruisers operating simultaneously would generate 76dB. Using this 3dB rule, 100dB is equivalent to 512 cruiser class motorcycles operating at the same time.

As discussed in my previous memorandum, noise from airboats would have substantial effects on speech intelligibility, sleep, and wildlife. The following sections provide additional information on noise limits established in the proposed rule with respect to recommended noise levels for speech intelligibility and sleep. An additional discussion on the relationship between noise and annoyance is also provided.

Conversation and Sleep

As noted in my previous memorandum, noise from airboats are likely to interrupt normal conversation at great distances. Based on a speaker-to-listener distance of about 1 m, the World Health

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[1] See: https://ohv.parks.ca.gov/?page_id=24891 Sec 45(h)(1)

[2] Motorcycle Noise in a Park Environment Natural Resource Technical Report NPS/NSNS/NRTR—2013/781 Available online at: https://irma.nps.gov/DataStore/DownloadFile/474440

Organization[3] (WHO), concludes that speech in relaxed conversation can be understood fairly well in background levels of 45dB. Speech with more vocal effort can be understood when the background sound pressure level is about 65dB. Noise from the 100dB operational limit established in the proposed rule, would attenuate to 65dB in just over half a mile. Noise levels from these airboats would exceed the recommended level of 45dB up to 5 miles away.

According to WHO, the 45dB level may be a more appropriate target as a majority of the population belongs to groups sensitive to interference with speech perception. Most sensitive are the elderly, and children before language acquisition has been completed. From about 40 years of age, people demonstrate impaired ability to interpret difficult, spoken messages, when compared to younger people.

To avoid sleep disturbance, WHO recommends maximum indoor noise levels for bedrooms of 30dB for continuous noise and 45dB for single sound events. Lower levels may be annoying, depending on the nature of the noise source. Outdoor noise levels would exceed World Health Organization recommended levels for bedrooms (45dB) for nearly five miles. Noise attenuation from walls and buildings would mitigate this effect somewhat, depending on structural characteristics. Glass panels and widows are less effective at reducing noise than solid walls.

Annoyance

Research has consistently demonstrated a strong relationship between annoyance and noise. Noise annoyance shows dose-response relationships from a relatively low noise levels of about 50 dBA[4]. For decades the Federal Aviation Administration has based their noise limits around airports on the percentage of people who would be highly annoyed by aircraft noise levels. FAA established 65dBA[5] as the noise exposure level above which aircraft noise "create[s] a significant annoyance for most residents."

Other studies[6] have demonstrated the odds of being highly annoyed or annoyed were significantly higher among individuals exposed to noise levels above 65dBA compared to the 55dBA noise level group. Chronic noise exposure is associated with various health issues including cardiovascular disease[7, 8] and cognitive decline[9].

Noise from airboats operating at the levels proposed in the rule would exceed 65dB at well over half a mile and 50dB at nearly 2.5 miles.

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3 See WHO Guidelines for Community Noise Available online at: https://www.who.int/docstore/peh/noise/Comnoise-4.pdf

4 European Commission. Position paper on dose response relationships between transportation noise and annoyance. Office for Official Publications of the European Communities. Luxembourg. 2002.
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