

A Quieter Alberta, What Would It Take?

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Introduction

Noise has often been defined as any sound which is disturbing, harmful, or unwanted. It stands to reason therefore that the sounds of greatest concern are those which threaten or affect the health or well-being of individuals. The World Health Organization (WHO) defined health as “state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.” The WHO believes environmental noise can have serious affects on people interfering with daily activities at school, work, and home and even affect health. If we accept the WHO definition of health, then, potentially, noise can be considered a health hazard.

With Alberta’s booming economy and the growth of industrial development, it is expected that more people will be impacted by noise causing conflicts between industry and the expectations of people for a quiet environment. The expectations may be quite different for the urban populations compared to the rural populations but everyone has some expectation for a reasonably quiet environment. The next question is what is quiet? Quiet can be defined to be “freedom from disturbance, noise or alarm”. So, the real question is “Can we make Alberta quiet?” Is this a possibility with the industrial growth in Alberta, differing expectations from the general population, and the subjective nature of noise? This paper will examine environmental noise at a global scale, challenges that Alberta faces with environmental noise, the regulations that are in place and recommendations to make a quieter Alberta.

Noise Sources and Impacts

Environmental noise is sound that travels over some distance from a source(s) to a receiver location and is typically emitted from industrial and recreational sources. An exception is noise in the workplace which is considered occupational noise and subject to a different health metric. Therefore the main sources of environment noise can be broken down into 4 categories:

1. Transportation noise which would include vehicles, railways and aircrafts.
2. Industrial noise which would consist of stationary sites such as manufacturing and processing facilities, construction sites, and ancillary work related activities.
3. Domestic noise can be comprised of neighbourhood activities (i.e., pets, parties, and loud music) and consumer products (appliances, lawn mowers, air conditioning units, etc).

4. Recreational noise can take in recreational equipment (snowmobiles, motorcycles, etc), parks and campgrounds, and public sports facilities.

Impacts of noise can be numerous and varied. The major health related effects can be categorized into two groups consisting of auditory effects and extra auditory effects. Auditory effects encompass hearing loss and the effects of hearing loss while extra auditory effects are categorized by annoyance, physiological reactions, stress, sleep interruption, and speech interference. Generally auditory effects are applicable to occupational situations for workers while environmental noise affects nearby residents and populations with extra auditory effects. There can also be economic impacts of noise both benefits and costs associated to the problem and solutions but that is a different subject and one that we will not deal with in much detail in this paper.

Noise on a global scale

Many organizations and agencies throughout the world have made varying degrees of attempts to quantify and assess the impact of environmental noise on humans. A review of several globally recognized standards organizations was made to see where noise sat as a perceived health impact and if there were certain commonalities that existed as well as some obvious gaps in critical areas.

For example the Organisation for Economic Co-operation and Development¹ (OECD) considers noise to be “one of the most important sources of environmental nuisance and a hazard to human health and welfare and that it is increasing in time and space.”. The United Nations System-Wide Earthwatch² considers noise “an increasingly omnipresent, yet underestimated, form of pollution”.

Compared to other environmental problems, noise pollution continues to grow and is associated with increasing number of complaints from affected individuals. The World Health Organization (WHO) indicates that the growth in urban environmental noise pollution is unsustainable globally because it has direct and cumulative health effects. It can also affect future generations by degrading residential, social and learning environments. Noise is not a local problem but a global issue that affects everyone. **(WHO Guidelines for Community Noise)**

The European Commission has found that many Europeans consider environmental noise, caused by traffic, industry and recreational activities, one of the main local environmental problems and the source of an increasing number of complaints from the public. Even though, European community measures to address environmental noise problems have been in existence for over thirty five years, environmental noise has had a lower priority than other environmental problems such as air and water pollution. **(Future Noise Policy, European commission, Green Paper, pg i,1).**

In the Unites States health specialists in the book “Noise Pollution, A Modern Plague” make the following incriminating statement “experiencing the manmade plague of environmental noise from which there is virtually no escape, no matter where we are – in our homes and yards, on our streets, in our cars, at the theatres, restaurants, parks, arenas, and in other public places. Despite attempts to regulate it, noise pollution has become an unfortunate fact of life worldwide. In a way that is analogous to second-hand smoke, second-hand noise is an unwanted airbourne pollutant produced by others; it is imposed on use without our consent, often against our wills, and at times, places, and volume over which we have no

¹ What is OECD (OECD Recommendation of the Council on Noise Abatement Policies C(78)73/Final 3 July 1978) – international organization founded in 1960 to stimulate economic progress and world trade.

² United Nations System-Wide Earthwatch - a UN initiative to coordinate, harmonize and catalyze environmental observation activities among all UN agencies for integrated assessment purposes (Earthwatch emerging issues)

control.... That noise pollution continues to grow in scope, variety, and magnitude is unquestioned; it is only the extent of the growth that remains unknown.”³

Throughout the United States, environmental noise is considered to degrade quality of life for millions of people. The 2000 United States consensus found that 30% of Americans complained of noise, and that 11% found it to be bothersome. Among those who complained, noise was sufficiently bothersome to make nearly 40% want to change their place of residence.

On the other side of the world in Australia, the State of the Environment Report has included noise as an emerging issue for the last 10 years. The 1997 report identified key industrial areas for environmental noise issues. It recognized that there limited information was available regarding the impact of industry on environmental noise levels and surrounding communities, community awareness of environmental noise was increasing, there was a higher expectation to reduce noise levels, and there was generally a lack of data regarding community noise exposure, particularly outside the metropolitan area. Although land use zoning was being used to separate incompatible activities generating noise, changing land uses over many decades and earlier inappropriate zoning controls had resulted in unacceptable noise levels for some areas and uses.

A new report issues in 2003 indicated that quality of life was affected from occupation and environmental noise and that the cumulative impacts of noise pollution were being increasingly acknowledged.

Although statistics on noise impact on the populations is scarce and poor in relation to other environmental issues. It is estimated that 20 percent of the European Union’s population (about 80 million people) suffer from noise levels that scientists and health experts consider to be unacceptable, causing increased incidences of annoyance and sleep disturbance and other adverse health effects. An additional 170 million citizens are living in so-called ‘grey areas’ where noise levels are such to cause significant annoyance during the daytime.” Recent data from Europe shows that the overall noise problem is worsening and the numbers of people living in ‘grey areas’ has increased. In 1996, the Federal Environmental Agency in Germany reported two out of three of its citizens had complained about excessive noise.

In a Brisbane Australia Noise survey, 66 percent of respondents were concerned about noise. The 1998 Brisbane Community Noise Survey found 48 percent of adult population were significantly annoyed by noise and 66 per cent reported to be seriously affected by noise but did not complain. Complaints, often used as an annoyance measure, typically under-report public concerns about noise.

Road noise is a large contributor to environmental noise. Surveys of Australian cities in 1988 showed 14% to 25% exceedences of 65 dBA Leq (24h), maximum limit set by the WHO. Statistics indicate that “almost 25% of the European population is exposed, in one way or another, to transportation noise over 65 dBA Leq (24h).” At this level, sleeping becomes seriously disturbed and people become annoyed.

Generally, environmental noise has a lower priority than other environmental problems despite the fact that the public considers noise as one of the main causes of declining quality of life.

The Alberta Perspective

³ “Noise Pollution: A Modern Plague” Lisa Goines, RN, Louis Hagler, MD, Southern Medical Journal, 2007; 100 (3):287-294, Lippincott Williams & Wilkins

People face noise in all aspects of their lives. It is in the environment, at work and at home. In Alberta, people are concerned with noise and any associated health impacts. The Alberta government identified noise as an emerging issue in the 1970's recognizing that the subjective nature of noise made it difficult to control and manage. The Environment Council of Alberta (the Council) took the task of examining noise legislation that may be appropriate for Alberta and made recommendations to the Minister of Environment releasing a two-volume report in 1979 titled "*Noise in the Human Environment*" that was intended to spark public reaction. In 1981, "the Government of Alberta, by Order-in-Council, requested that the Environment Council of Alberta to:

1. Inquire into all aspects of the effects of noise on the environment within the province of Alberta, giving particular attention to
 - a. Noise sources and problems,
 - b. The effects of exposure to noise on health and the human environment, and
 - c. Technological and other practices that may be adopted to control noise levels and resolve problems.
2. Hold public hearings at suitable locations throughout the province, and report to the minister of the Environment and the Lieutenant-Governor in Council on the completion of the report of the findings." (Public Hearings on Noise in Alberta)

Public Hearings on Noise in Alberta was released with the Council's findings. It included the impacts of noise, noise sources, and recommendations for change. The findings indicated while in the past quietness in Alberta was taken for granted, it was no longer the norm and that a significant number of Albertans were exposed to excessive noise levels. The main noise problems were associated to transportation, Alberta's growing population increasing urban sprawl and the resulting increase in rural development. While the hearings showed that Alberta's problems were at an early stage compared to global situation, the trends were similar.

Currently, people feel noise to be a growing problem over which they have little control and are expressing frustration with both the problem and the lack of solutions.

The Alberta Challenge

Urban Sprawl

World-wide noise levels are increasing. This is largely due to increased urbanization and associated increase in industrial development, and transportation by road, rail, and air. The Environment Council predicted that noise (in the early 1980's) was increasing at a rate of about one decibel per year in the cities. The projection was that the population of Alberta and especially the cities of Calgary and Edmonton would increase dramatically as would the gross domestic product over the same time period. It seems their predictions were quite accurate.

If the council's statement of a decibel increase per year in the cities is true, then cities in Alberta are no longer following behind global trends but have a problem with noise levels that are impacting much of the urban population.

Rural Population Growth

Acceptance of noise differs between urban and rural populations. Typically, urban areas have higher noise levels due to the larger populations, higher dwelling densities, increased traffic from cars, trucks, and airplanes, etc. Consequently, many urban areas experience excessive environmental noise levels. This has created a situation where people are looking for quieter environments to live in. Thus, there is the move from urban cities to acreages or rural areas for a more peaceful setting; the same areas where industrial facilities locate themselves to impact less people. The movement of people into rural areas is in direct conflict with industries that locate themselves in these same areas. With the increasing industrial development in Alberta, conflicting land use between the rural population and industrial facilities is

escalating. From the Above Table, the population of Alberta has increased by approximately 30% in the last 10 years. In this same time frame, there has been a tremendous growth in the industrial sector. An example is the number of compressors that have been approved see table below.

What is Being done in Alberta Today

While the Alberta Energy & Utilities Board (EUB) has comprehensive requirements for environmental noise, these regulations are only applicable to industrial facilities that the EUB regulates. The remaining industrial facilities approved under different jurisdictions within Alberta do not have any meaningful requirements regulating noise levels. When these non-EUB regulated facilities do meet noise requirements, it is typically at a municipal level however municipal noise requirements vary greatly throughout the province and some jurisdictions may not have the experience necessary to develop, implement and regulate noise adequately. These inconsistencies do not provide a level playing field for all industrial facilities when it comes to environmental noise requirements nor does it provide an adequate public safety framework for addressing environmental noise problems consistently within the province.

What are Other Jurisdictions Doing

The WHO has set maximum levels for indoor and outdoor noise levels. “For dwellings, the critical effects are sleep disturbance, annoyance and speech interference. Specifically, for bedrooms the critical effect is sleep disturbance. Recommended guideline values for bedroom inside are 30 dB LAeq for steady-state continuous noise and 46 dB LAm_{ax}. Lower levels may be annoying depending on the nature of the noise source. Outdoor noise levels should not exceed 45 dB LAeq nighttime, so that people may sleep with bedroom windows open.

The WHO held its second meeting on noise guidelines in Geneva, Switzerland in 2004, Professor Peter Lercher proposed noise management philosophies which included two difference methods for noise management. The first being a specific acoustical approach which included approaches based on dose-effect relationships, events (oriented towards avoiding or stopping noise sources) and psychoacoustical factors. The second consisted of an integrated approach which included acoustic ecology, soundscape approaches and mult-sectoral environmental health impact assessment approaches.

In 1972, the Noise Control Act was passed by US Congress, declaring that it was a policy to “promote an environment for all Americans free from noise that jeopardizes health and welfare.”⁴ The Environment Protection Agency(EPA) estimated in 1974 that nearly 100 million Americans lived in areas where the daily average noise level exceeded those identified as being safe. In 1982, the government terminated funding for the Office of Noise Abatement and Control. Currently, there is no effective national noise policy. However, it is believed that clear guidelines on federal versus local responsibilities need to be established, make clear jurisdictional decisions about what the agencies should do, and what states and local agencies should do. One important component of a national policy would have to be the establishment of effective and cooperative engineering noise control programs.

At the world stage, (what exactly does this mean, who is the world stage, what is the document in which these recommendations were made, and what authority does it carry?) the recommendations for noise management include:

- monitoring human exposure to noise
- have health control require mitigation of noise emissions considering the following:
 - o specific environments such as schools, playgrounds, homes, hospitals, etc
 - o environment with multiple noise sources or which may amplify the effects of noise

⁴ “Noise Pollution: A Modern Plague” Lisa Goines, RN, Louis Hagler, MD, Southern Medical Journal, 2007; 100 (3):287-294, Lippincott Williams & Wilkins

- sensitive time periods such as evenings, nights and holidays
- groups at high risk (kids and the hearing impaired)
- consider noise consequence when planning transport systems and land use
- surveillance systems for noise-related health effects
- assess effectiveness of noise policies in reducing adverse health effects and exposure, and in improving supportive “soundscapes”
- adopt precautionary actions for a sustainable development of the acoustic environments.

(Is this another part of the recommendation or is it a separate step in the process?) As part of an implementation strategy, government should protect the population from environmental noise and consider it an integral part of their policy for environmental protection. The action plans should include short-term, medium-term and long-term objectives for reducing noise levels. Legislation should be in place to allow for the reduction of sound levels. Existing legislation should be enforced. Municipalities should develop low noise implementation plans.

Governmental administrative means (whose government, what department, by what authority?) to reduce noise involve five kinds of function.

- ◆ Planning involves decision on the future use of resources, guidance and coordination, etc. Regulating defines the rules of the game.
- ◆ Enforcement of regulation is being made by supervision to ensure compliance with laws and regulations.
- ◆ Incentives includes economic and non-economic measures to persuade public or private parties concerned.
- ◆ Investment including allocation of public funds for infrastructure, equipment, research. In practice, the objective of noise abatement policies are rarely explicit and quantified.
- ◆ Coordination which is frequently inadequate and there is significant imbalance in government action. (community noise, page 227-228)

“The [European] commission believes that changes in the overall approach are required if a noise abatement policy is to be successful. This requires a framework based on shared responsibility involving target setting, monitoring of progress and measures to improve the accuracy and standardization of data to help improve the coherency of different actions.

The local nature of noise problems does not mean that all action is best taken at local level....Effective action is very dependent on strong local and national policies and these need to be more closely relate to the measures to be decided at Community level” (European commission, Green Paper, pg ii)

Recommendations for Changes in Alberta

The most obvious problem with controlling noise is the lack of consistent requirements and lack of coordination between regulatory bodies within the province. To address these inconsistencies the most ambitious and forward thinking solution would be to re-examine one of the primary recommendations from the Environment Council of Alberta report recommending the creation of an agency within the provincial government whose sole responsibility would be noise control. This agency would provide the leadership needed in achieving a quiet environment in Alberta. Such an agency would take the lead role in number of key areas necessary to thoroughly address the various needs of the Alberta’s diverse population including administration of the noise requirements, education, and research. It would have the core technical expertise on noise control and be able to advise provincial departments, municipalities and the general public on these matters. The agency should develop noise standards for acceptable noise limits in building design and community and land use planning, while being responsible for addressing all noise concerns and complaints. Other secondary programs that the agency could be involved in would cover

noise level monitoring, noise exposure modelling and mapping, evaluation of innovative noise control approaches such as mitigation and precautionary measures.

With the development and implementation of a comprehensive provincial noise management plan, many noise problems will be prevented at a design stage and at a lower cost rather than in response to a later concern or complaint. Environmental noise impact analysis would be central to managing noise and should be required before implementing any project that would significantly increase the level of environmental noise and could include such information as baseline description of existing noise environment, expected levels from the new sources, evaluation of the adverse health effects, an estimation of the population at risk including assessment of risk and a cost-benefit analysis.

In conclusion, the authors believe that unchecked environmental noise will be a serious provincial problem and barrier for future development. Given the appropriate profile as outlined in the recommendation above, Alberta will continue to be ranked by organizations like the UN as one of the most desirable places in the world to live that can provide an unsurpassed quality of life that includes a vibrant economy coupled with a responsible policy on environmental noise control.

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