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Military Aviation Noise and Its Effects on Domesticated and Wild Animals

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Comments

Military Aviation Noise and its Effects on Domesticated and Wild Animals

I. Introduction

The United States Military uses assigned airspace over public and private lands for military training and testing of new military technologies.[1] There is a strong possibility of a variety of environmental consequences when these military operations are conducted, or when the military expands their airspace use. For instance, military operations can cause high levels of aircraft noise that can adversely affect the environment.[2] Some of the most serious environmental consequences stem from low-altitude military training flights.[3] Other problematic military actions include aircraft flying at supersonic speeds and sonic booms.[4]

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1. DOUGLAS N. GLADWIN, ET AL., U.S. FISH AND WILDLIFE SERVICE, EFFECTS OF AIRCRAFT NOISE AND SONIC BOOMS ON DOMESTIC ANIMALS AND WILDLIFE: BIBLIOGRAPHIC ABSTRACTS NERC-88/32 (1988) [hereinafter EFFECTS OF AIRCRAFT NOISE]. In order to fulfill the National defense mission the U.S. Air Force maximizes its use of current aircraft operating areas, varies military training routes, and acquires and maintains new airspace to give pilots the most substantial experience possible.

2. EFFECTS OF AIRCRAFT NOISE, *supra* note 1, at 1.

3. NATIONAL AIRSPACE COALITION, A CITIZEN'S GUIDE TO OPPOSING MILITARY AIRSPACE EXPANSION (1996). A free copy of the guide can be obtained from the National Airspace Coalition, 4117 Pebblebrook Circle, Bloomington, MN 55437 (612/831-3096/0387 fax) [hereinafter CITIZEN'S GUIDE] at 4.

4. EFFECTS OF AIRCRAFT NOISE, *supra* note 1.

Research shows that exposure to this type of noise pollution can be stressful and harmful to the health of both humans and animals. For instance, domestic animals like horses, cattle, and fowl have shown stress responses to aircraft noise exposure.[5] Furthermore, military training areas are often in remote regions, near U.S. wildlife refuges, national parks, and wilderness territories.[6] Research by Defenders of Wildlife reports that "[m]ilitary overflights are one of the most harmful activities affecting national wildlife refuges."[7] The concern is that low-level flights over wild animals may disturb natural physiological and behavioral responses that intern reduce those same animals' ability to survive.[8]

The purpose of this Comment is to analyze the harmful effects of aircraft noise on various animal species, from noise originating from aircraft flying at supersonic speeds and at low altitudes. This Comment will first consider the information necessary to assess the likely impacts on wildlife and domesticated animals from military airspace operations, and second, more importantly, consider applicable remedies to confront this issue.

II. Background

A. What is Military Airspace

The Federal Aviation Act provides that all navigable airspace in the United States is under the authority of the Federal Aviation Administration (FAA).[9] The FAA uses its authority to develop plans and regulations for the use of navigable airspace, including military training areas.[10] These training areas are known as "Special Use Airspace"

5. CITIZEN'S GUIDE, *supra* note 3, at 10. "There is documented evidence of panicked horses charging fences and breaking their legs, pregnant goats sent into miscarriage, and cattle stampeding through barbed wire barriers." *Id.*

6. *Id.*

7. ROBERT DEWEY & DEXTER MEAD, DEFENDERS OF WILDLIFE, UNFRIENDLY SKIES: THE THREAT OF MILITARY OVERFLIGHTS TO NATIONAL WILDLIFE REFUGE (1994) at 2 [hereinafter UNFRIENDLY SKIES].

8. NATIONAL PARK SERVICE, REPORT TO CONGRESS: REPORT ON EFFECTS OF AIRCRAFT OVERFLIGHTS ON THE NATIONAL PARK SYSTEM (1994) (available at www.nonoise.org/library/fctsheet/wildlife.htm) [hereinafter NATIONAL PARK SERVICE REPORT]. This report to Congress was prepared pursuant to Public Law 100-91, The National Parks Overflights Act of 1987. The information in this report represents the combined efforts of the Department of Interior, the National Park Service, and numerous scientists, specialists, and park service managers and staff.

9. *See generally* Federal Aviation Act, 49 U.S.C. § 40103 (2002).

10. *See id.* at 40103(b)(3). To establish security provisions that will encourage and allow maximum use of the navigable airspace by civil aircraft consistent with national security, the Administrator, in consultation with the Security of Defense, shall:

(SUA).[11] "SUA is airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not a part of those activities."[12] Types of military SUA include Prohibited Areas, Restricted Areas, and Military Operations Areas.[13]

A Prohibited Area is airspace in which no person may operate an aircraft without the permission of the using agency.[14] A using agency is the military unit or other organization whose activity has established the requirement for the SUA.[15] Prohibited areas are often designated for security or other reasons associated with the national welfare.[16]

A Restricted Area, also known as Exclusive Use Airspace, is airspace where aircraft flight is not wholly prohibited, but is subject to restriction.[17] Restricted areas are created when it is determined necessary to confine or segregate activities considered hazardous to nonparticipating aircraft.[18] For example, in these restricted areas military aircraft may engage in bombing practice and other hazardous activities.[19]

A Military Operations Area (MOA) is airspace established to separate or segregate certain nonhazardous military activities.[20] These areas are designated to contain military flight activities including, but not

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(a)establish areas in the airspace the Administrator decides are necessary in the interest of national defense; and (b) by regulation or order, restrict or prohibit flight of civil aircraft that the Administrator cannot identify, locate, and control with available facilities in those areas.

11. CITIZEN'S GUIDE, *supra* note 3 at 5. *See also* FEDERAL AVIATION ADMINISTRATION, PROCEDURES FOR HANDLING AIRSPACE MATTERS, FAA ORDER 7400.2E, § 21-1-2 (2002) [hereinafter FAA HANDBOOK]. This order prescribes policy, criteria, guidelines, and procedures for the FAA. It states the "primary purpose of the Special Use Airspace program is to establish/designate airspace in the interest of National Defense, security and/or welfare."

12. FAA HANDBOOK, *supra* note 11, at § 21-1-3(a). Special Use Airspace areas are defined by both vertical and horizontal boundaries. "The dimensions and times of use of the Special Use Airspace shall be the minimum required for containing the proposed activities, including safety zones required by military authority." FAA HANDBOOK, *supra* note 11 at § 21-1-6, § 21-2-2, § 21-2-3, § 21-2-4.

13. FAA HANDBOOK, *supra* note 11, at § 21-1-3(b).

14. FAA HANDBOOK, *supra* note 11, at § 22-1-1.

15. FAA HANDBOOK, *supra* note 11, at § 21-1-11. Whereas the controlling area is the "facility that exercises control of the airspace when a Special Use Airspace area is not activated." FAA HANDBOOK, *supra* note 11, at § 21-1-10.

16. UNITED STATES GENERAL ACCOUNTING OFFICE, AIRSPACE USE: FAA NEEDS TO IMPROVE ITS MANAGEMENT OF SPECIAL USE AIRSPACE, GAO/RCED-88-147 (1988) [hereinafter GAO REPORT]. For example, aircraft flights are prohibited over certain areas of Washington, D.C.

17. FAA HANDBOOK, *supra* note 11, at § 23-1-1.

18. FAA HANDBOOK, *supra* note 11, at § 23-1-2.

19. CITIZEN'S GUIDE, *supra* note 3, at 6.

20. FAA HANDBOOK, *supra* note 11, at § 25-1-1.

limited to, air combat maneuvers, air intercepts and low altitude tactics.[21] "Depending on the equipment used and authorization given, such activities may also include flights at supersonic speeds, jets dropping aluminum coated chaff to foil enemy radar, ejecting flares intended to decoy heat-sensitive weapons, and even low altitude flights as low as 100 feet above ground level."[22]

B. Who Uses Military Airspace

Special Use and Restricted Airspace is most often established at the request of the United States Air Force, however, Army and Navy units may also have designated airspace of their own.[23] Once an area is designated for Special Use to the using agency, it is also available for use by any other military branch.[24] Therefore, an area initially designated for one military unit, can later become an area for another branch, increasing the amount of training missions carried out in the area.[25]

C. How Military Airspace is Designated for Special Use

1. NEPA

Before a SUA can be designated, a proponent must request the designation from the FAA, because the FAA has the ultimate authority to designate SUA.[26] There are legally binding regulations that define the procedures by which SUA must be requested and approved.[27] The proponent of a SUA designation must file a written proposal with the FAA Regional Director in the area where the proposed airspace is located.[28] Some of the requirements of the proposal include a description of the area, a list of all the proposed activities, aeronautical studies to identify the impacts on safety and efficient use of airspace, and a statement of need and justification.[29]

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21. FAA HANDBOOK, *supra* note 11, at § 25-1-2.
22. CITIZEN'S GUIDE, *supra* note 3, at 5.
23. *Id.* at 6.
24. CITIZEN'S GUIDE, *supra* note 3, at 6. *See also* FAA HANDBOOK, *supra* note 11, at § 21-1-7. To ensure the optimum use of airspace, using agencies shall, where mission requirements permit, make their assigned Special Use Airspace available for the activities of other military unites on a shared-use basis.
25. CITIZEN'S GUIDE, *supra* note 3, at 6.
26. *Id.*
27. *Id.* at 7.
28. FAA HANDBOOK, *supra* note 11, at § 21-4-4. *See also* 14 C.F.R. § 11.63(2004).
29. FAA HANDBOOK, *supra* note 11, at § 21-3-3. An airspace statement of need and justification must:
1. Describe the purpose and need for the proposed airspace. Sufficient

Furthermore, an environmental analysis, in accordance with the National Environmental Policy Act of 1969, must also accompany the proposal.[30] The purpose of the National Environmental Policy Act of 1969 (NEPA), includes "to declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; [and] to enrich the understanding of the ecological systems and natural resources important to the Nation. . .[.]"[31]

All federal agencies issue a set of specific regulations, in addition to policy documents and guidelines that outline what is necessary for each agency to comply with NEPA.[32] Guidance for the environmental analysis for SUA proposals is contained in the FAA Policies and Procedures for Considering Environmental Impacts, the FAA/Department of Defence Memorandum of Understanding Concerning Special Use Airspace Environmental Assessment, and other relevant directives.[33]

NEPA requires that all federal agencies, including all military departments, consider the impacts their actions may have on the environment.[34] To document the potential environmental impacts in a SUA a military unit is required to prepare an Environmental Assessment (EA).[35] If, as a result of the EA, the military unit discovers that the proposed SUA will have no significant environmental effect, then the

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justification must be provided to support approval of the airspace. Additionally, any known or anticipated aeronautical impact on other airspace users must be addressed, including measures proposed, if any, to lessen the impact.

(a) For new Special Use Airspace, explain why the requirement cannot be met by using existing Special Use Airspace or by modifying an existing area. List Special Use Airspace areas within a reasonable distance that were considered and explain why each area is not acceptable.

(b) For proposals to increase the dimensions or times of use of an existing area, explain the need for the increase.

30. FAA HANDBOOK, *supra* note 11 at § 21-1-9. If an environmental analysis is incomplete, the proposal must indicate the status and estimated completion date.

31. The National Environmental Policy Act of 1969. 42 U.S.C. § 4321 (2000) [hereinafter NEPA].

32. NEPA, 42 U.S.C. at § 4322.

33. FAA HANDBOOK, *supra* note 11, at § 21-1-9.

34. GAO REPORT, *supra* note 16, at 14.

[The] FAA believes that any environmental impacts stemming from the use of special use airspace, such as the operation of military aircraft at altitudes close to the ground or the firing of ordnance, should have been considered by the military proponent requesting the airspace before FAA is asked to designate the airspace for the activity.

Id.

35. CITIZEN'S GUIDE, *supra* note 3, at 16.

agency issues a Finding of No Significant Impact (FONSI).[36] At this point the agency has fulfilled its NEPA obligations. However, if the military unit determines that its proposed SUA may have a significant environmental impact, it must prepare a full scale Environmental Impact Statement (EIS) in order to comply with NEPA.[37]

Before a military unit begins the EIS, it must go through a process of "scoping".[38] During this process the military unit determines what specific issues should be studied in the EIS by allowing for a public comment period and holding public hearings.[39] After the military unit finalizes what particular issues will be researched, the unit must draft an EIS, which will also be subjected to an additional comment period.[40] Once the EIS becomes final, the military unit will issue a Record of Decision on whether to proceed with the request of the proposed action.[41] If the decision is to proceed, the unit begins the process to formally request that the FAA designate the SUA by putting together the proposal.[42]

2. Rulemaking and Non-Rulemaking Procedures

After submission of the completed proposal, depending on the type of airspace requested, the proposal may undergo rulemaking or nonrulemaking procedures. If the proposal is for a Restricted Area or Prohibited Area, the proposal must be subject to rulemaking procedures. If the proposal is for a Military Operations Area then it must experience nonrulemaking procedures.[43]

If the FAA Regional Division reviews the proposal package and requires nonrulemaking procedures, a notice is circulated to all known aviation interested persons and groups.[44] If the proposal requires

36. *Id.*
37. *Id.*
38. *Id.* at 17.
39. CITIZEN'S GUIDE, *supra* note 3, at 17.
40. *Id.*
41. *Id.*
42. *Id.*
43. FAA HANDBOOK, *supra* note 11. Special Use Airspace is broken down into two categories. Regulatory actions which require rulemaking and nonregulatory actions which require nonrulemaking procedures. Proposals for prohibited areas or restricted areas are classified as regulatory actions, therefore invoking rulemaking procedures. Proposals for Military Operating Areas are classified as nonregulatory actions, therefore invoking nonrulemaking procedures. *See also* 14 C.F.R. § 73 (2004): Special Use Airspace. *See also* 14 C.F.R. § 11 (2004): General Rulemaking Procedures.
44. FAA HANDBOOK, *supra* note 11, at § 2-6-3. Circulation lists should include, but not limited to state aviation agencies, regional military representatives, national and local offices of aviation organizations, local flight schools, local airport owners, mangers, and fixed base operators, local air taxi and charter flight offices.

rulemaking procedures, an original Notice of Proposed Rulemaking is forwarded for publication in the Federal Register.[45] Regardless of what type of procedure is used, the purpose of the notice is to invite the public to comment on the impact of the proposal.[46] If comments are received that indicate that the proposal may be controversial, or there is a need to obtain additional information, the FAA Regional Division will determine if an informal airspace meeting is necessary.[47] These meetings are used to inform the affected users of the planned airspace of changes and to gather additional facts and information relevant to the proposed action.[48]

3. FAA Determination

The FAA Regional Division will make a determination after considering all the pertinent information of the proposal, including any information gathered at any hearings or meetings, aeronautical study results, environmental analysis documents, and any comments received during the public comment period.[49] All comments received are evaluated and need to be addressed in the final rule or in the nonrulemaking case file.[50] Copies of pertinent public comments are given to the appropriate military representative.[51] Furthermore, environmental and land use comments are forwarded to the proponent of the action for them to consider in appropriate environmental analysis documents.[52] The Regional Division may first choose to negotiate changes with the proponent.[53] However, if the proposal is modified, the Regional Division must determine if the changes are significant enough to necessitate a supplemental public comment period.[54]

After review of the proposal, the Division can approve and

45. FAA HANDBOOK, *supra* note 11, at § 2-5-7.

46. FAA HANDBOOK, *supra* note 11, at § 21-1-13. In most cases the public comment period will last a minimum of 45 days.

47. FAA HANDBOOK, *supra* note 11

48. FAA HANDBOOK, *supra* note 11, at § 2-7-2. It is the policy of the FAA to hold, if at all practical, informal airspace meetings to inform the affected users of planned airspace change in advance of rulemaking/nonrulemaking airspace actions. *Id.* The regional office shall submit a draft notice of informal airspace meetings for processing and publication in the federal register. FAA HANDBOOK, *supra* note 11, at § 2-7-3.

49. FAA HANDBOOK, *supra* note 11, at § 21-5-4. In coordination with the Regional Environmental Specialist, the Division will review the proponent's draft and final environmental documents to ensure that the environmental analysis matches the proposed airspace parameter. Any environmental issues identified in this review must be forwarded to the proponent for consideration.

50. FAA HANDBOOK, *supra* note 11, at § 21-5-2.

51. FAA HANDBOOK, *supra* note 11 at § 21-5-2.

52. FAA HANDBOOK, *supra* note 11 at § 21-5-2.

53. FAA HANDBOOK, *supra* note 11 at § 21-5-2.

54. FAA HANDBOOK, *supra* note 11, at § 21-5-5.

recommend its approval to FAA headquarters, which will then make the final determination.[55] Although a proposal may be forwarded to FAA headquarters before all the environmental documents have been finalized, "[i]n all cases, a final determination on the proposal by FAA headquarters shall be deferred until applicable NEPA requirements are completed."[56] The "FAA does not substantially review or independently evaluate the military's environmental assessment. Rather it simply determines that the military . . . has complied with NEPA provisions."[57]

Lastly, the Regional Director may decide to disapprove the proposal. In such a case, the Director must inform the proponent of the reasons for the disapproval. However, prior to rejecting the proposal, the Director must make reasonable efforts with the proponent to resolve the problems within the proposal.[58]

III. Analysis

A. Aircraft Noise and Sonic Boom Characteristics[59]

Animals, like humans, respond to sound as pressure.[60] Sound is measured in terms of the amplitude or intensity of a pressure fluctuation in the atmosphere and is measured by the decibel (dB).[61] A decibel is the unit to express the intensity of a sound and is logarithmic, rather than

55. FAA HANDBOOK, *supra* note 11, at § 21-5-5. FAA Headquarters is the final approval authority for all permanent and temporary Special Use Airspace.

56. FAA HANDBOOK, *supra* note 11, at § 21-5-5.

57. GAO REPORT, *supra* note 16, at 14. The Council on Environmental Quality, the agency that oversees federal agency implementation of the procedural provisions of NEPA, says that its regulations do not permit FAA to delegate responsibility for NEPA compliance. However, the Council believes that FAA has an independent responsibility to carefully evaluate that the documentation provided by the military unit accurately addresses the environmental impacts.

58. FAA HANDBOOK, *supra* note 11, at § 21-5-6.

59. A brief overview of the characteristics of sound, aircraft noise, and sonic booms is included to familiarize the reader with the terminology and the concepts so that they can have a better understanding of the impact analysis.

60. RONALD P. LARKIN, ET AL., U.S. ARMY CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, EFFECTS OF MILITARY NOISE ON WILDLIFE: A LITERATURE REVIEW USACERL Technical Report 96/21 (1996) [hereinafter RONALD P. LARKIN]. This literature review looks at research on the effects on wildlife of noise associated with military training.

61. KAREN M. MANCI, ET AL., U.S. FISH AND WILDLIFE SERVICE NATIONAL ECOLOGY RESEARCH CENTER, EFFECTS OF AIRCRAFT NOISE AND SONIC BOOMS ON DOMESTIC ANIMALS AND WILDLIFE: A LITERATURE SYNTHESIS, NERC-88/29 (1988) at 2 [hereinafter KAREN M. MANCI]. This report was produced as the result of a cooperative project between the National Ecology Research Center of the U.S. Fish and Wildlife Service, and the U.S Air Force Engineering and Services Center in Fort Collins, Colorado.

linear.[62] For example, something that creates 90 dBs of sound intensity is actually 10 times louder than something that creates 80 dBs.[63] Therefore, even small increases in decibels can represent tremendous increases in the sound experience.[64] The zero-end of the scale indicates the lowest level of sound that an average human ear can hear, whereas a value of 120 dB corresponds to a point in which the sound becomes painful.[65]

In addition to pressure level, a sound also has a characteristic pitch.[66] The pitch is the distribution of sound pressure as a function of frequency, measured in Hertz (Hz) and is determined in terms of how often the fluctuation of pressure repeats during a given period, usually one second.[67] The audible frequency range for the average human varies from 20 Hz to about 16,000 Hz.[68] Generally, humans are less sensitive to low frequency sounds than to high frequency sounds.[69] However, it appears from some studies that animals may be more sensitive to noise disturbance than humans.[70]

Turbojet engines are major sources of aircraft noise and generally produce noise in the high frequency range.[71] Furthermore, a jet that can travel at supersonic speed generates high pressure noise in the environment through sonic booms.[72] However, even aircraft flying below super sonic speeds can be extremely loud. For instance, the F-16, one of the military's most common aircraft can send out a level of noise

62. CITIZEN'S GUIDE, *supra* note 3, at 10.
63. *Id.*
64. *Id.*
65. KAREN M. MANCI, *supra* note 61, at 2.
66. *Id.* at 3.
67. *Id.*
68. *Id.*
69. *Id.*
70. E. Borg, *Physiological and Pathogenic Effects of Sound*, 381 ACTA OTOLARYGOL. SUPPL. 7 (1981).
71. KAREN M. MANCI, *supra* note 61, at 6. The primary sources of turbo jet engine noise are from the roar of the jet exhaust stream and the high pitched noise generated by the engine's turbo machinery, compressor and blades. Although the U.S. Airforce also uses turboprop-powered aircraft, the noises generated by these machines are relatively minor compared to the jet-powered aircraft. *Id.*
72. The McGraw-Hill Companies, *Sonic Boom*, at http://www.accessscience.com (Nov. 22. 2001). A sonic boom is an audible sound wave (shock wave) generated by an object that moves faster than the speed of sound. These shock waves are the main components of a sonic boom, and they are generated the entire time that an object flies faster that the speed of sound, not just when it breaks the sonic barrier. *See also* KAREN M. MANCI, *supra* note 61, at 7. Under certain types of aircraft operating conditions, such as accelerations, dives, turns, and climbs, the sonic boom waves generated by the aircraft may intersect one another. This effect is known as sonic boom focusing. A focused sonic boom may be of much greater intensity than other sonic booms. Fighter aircraft practicing in "dogfight" training maneuvers most often generates focused sonic booms.

reaching up to 133.9 dB, which is well above the human ear's threshold for pain.[73]

B. Effects on Animals

The effect of noise pollution on humans has been a recognized problem for decades.[74] In response to public fear of adverse ecological impacts of aircraft noise, many research studies were conducted during the 1960s and 1970s to investigate the potential effects of supersonic jets in the environment.[75] Most studies focused on human responses, so the knowledge gained is not directly applicable to animal behavior and responses.[76] "Although we recognize that noise can affect humans physiologically and be physically injurious, little attention has been paid to the potential effects that noise may have on individual animals and animal populations within a given area."[77] However, since the 1970s research on the effects of noise on various animal species has increased.[78]

The consequences of aviation noise has drawn considerable attention from state and federal wildlife managers, environmentalists, conservation organizations, farmers, ranchers, and the scientific community.[79] Also, in more recent years, it has been reported that reviewers of Air Force proposals for new SUA designations have often expressed concern on the effects of jet noise on wildlife and farm animals.[80]

Although there has been an increase in research studies, it has been difficult to draw concrete conclusions. Because it can be difficult to study the effects of aviation noise on animals in their own environment,

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73. CITIZEN'S GUIDE, *supra* note 3, at 9.

74. Autumn Lyn Radle, World Forum for Acoustic Ecology, *The Effect of Noise on Wildlife: A Literature Review,* (available at http://interact.uoregon.edu/MediaLit/wfae/readings/radle.html.) (Nov. 22, 2002) [hereinafter AUTUMN LYN RADLE].

75. KAREN M. MANCI, *supra* note 61, at 1. Researchers sponsored by the U.S. Air Force conducted much of the work.

76. *Id.*

77. AUTUMN LYN RADLE, *supra* note 74, at 2.

78. *Id.* at 1.

79. NATIONAL PARK SERVICE REPORT, *supra* note 8, at 5.1. "The issue is of special concern to wildlife managers responsible for protecting populations, and to private citizens who feel it is unwise and/or inappropriate to disturb wildlife." *Id. See also* Rene Romo, *German Bomb Range Facing Storm of Protest: Environmentalists, Ranchers Team up*, ALBUQUERQUE J., May 19, 1998 at A1. The federal Bureau of Land Management and environmentalists are concerned about the likely effects of a new training Air Force Base in Southern New Mexico on the endangered aplomado falcon and other species, and on wilderness lands. Ranchers, rural residents and cattle growers are also concerned about effects on their lifestyle.

80. L.R. Shotton, *Response of Wildlife and Farm Animals to Low-Level Military Jet Overflights*, REPORTER II (6) 161 (1982).

much of the research has been conducted in the laboratory setting.[81] However, there have been numerous studies that have looked to animal responses under natural conditions. Nevertheless, these studies may present conflicting results because of the many variables that can interfere with the determination of the real effects that the noise is having on any given species.[82]

Animal species vary greatly in their responses to noise.[83] Animal responses can depend on the animal's hearing ability, the duration of the noise, the type of habitat, time of day and year, the activity the animal is engaged in at the time of exposure, sex and age of the animal, level of any previous exposure, and whether other physical stresses are present.[84] Despite these variable factors, most researchers agree that noise does have an effect on animal physiology and behavior, effects that can potentially lead to problems in an animal's general health and long-term survival.[85]

1. Three Types of Effects of Noise

The effects of noise on an individual animal or animal species can be categorized as primary, secondary, or tertiary.[86] Primary effects of aircraft noise can include direct physical auditory changes in the animals' auditory system, such as an eardrum rupture and temporary or permanent hearing loss.[87] This hearing loss can occur after as little as one-hour of exposure to loud stimulus; the severity of the hearing loss depends on the amount of exposure and the susceptibility of the individual animal species.[88] The auditory systems of some animals may be particularly susceptible to physical damage if they live in quiet environments and have evolved particularly fragile ears.[89] Furthermore, chronic aircraft noise can lead to the masking of auditory signals in the environment.[90] The masking of signals can lead to the inability of an animal to hear important environmental signs, such as noises made by potential mates, predators, and/or prey.[91]

Secondary effects include nonauditory physiological effects, stress

81. KAREN M. MANCI, *supra* note 61, at 14.
82. AUTUMN LYN RADLE, *supra* note 74, at 1.
83. KAREN M. MANCI, *supra* note 61, at 14.
84. *Id.*
85. AUTUMN LYN RADLE, *supra* note 74, at 1. *See also* NATIONAL PARK SERVICE REPORT, *supra* note 8, at 5.1. In general, animals do respond to aircraft noise.
86. EFFECTS OF AIRCRAFT NOISE, *supra* note 1.
87. KAREN M. MANCI, *supra* note 61, at 13.
88. NATIONAL PARK SERVICE REPORT, *supra* note 8, at 5.3.
89. *Id.*
90. KAREN M. MANCI, *supra* note 61, at 14.
91. *Id.*

responses and behavioral changes in the animal.[92] Physiological disturbances from aircraft noise can range from mild responses, such as an increase in heart rate and slight changes in body position, to more extreme responses, which affect the animal's metabolism and hormone balance.[93] A sudden and unfamiliar sound, like a sonic boom, can act as an alarm to the animal and activate the sympathetic nervous system.[94]

Animal researchers maintain that excessive stimulation of the nervous system can lead to chronic stress.[95] Response to stress includes activation of the neural and endocrine systems, leading to increases in blood pressure and changes in the availability of glucose levels.[96] Prolonged exposure to stress may exhaust an animal's resources and may even result in death.[97] Behavioral responses, such as panic and escape behavior, can lead to injury, decrease in food intake, and energy loss triggered by sudden movement away from frightful noise.[98] This sudden movement can cause the animal to avoid or abandon its natural habitat, which could ultimately affect survival.[99]

Tertiary effects result from both primary and secondary effects; effects categorized by: the decline in species populations; the destruction of animal habitats, and; the possibility of species extinction.[100]

2. Specific impacts on domestic animals

Studies on the effect of aircraft noise on farm animals have found a varied effect.[101] Some studies report that the comprehensive effects on domestic animals are inconclusive, or show that animals exhibit only minimal physical and behavioral reactions.[102] However, there are some studies reporting negative physiological and/or behavioral effects.[103]

For example, some studies reporting negative effects show that behavioral reactions observed in livestock exposed to sonic booms or

92. *Id.*
93. Noise Pollution Clearinghouse, *Fact Sheet: Effects on Wildlife*, available at http://www.nonoise.org/library/fctsheet/wildlife.htm. (Nov. 22, 2002).
94. KAREN M. MANCI, *supra* note 61, at 14.
95. NATIONAL PARK SERVICE REPORT, *supra* note 8, at 5.2.
96. KAREN M. MANCI, *supra* note 61, at 14.
97. *Id.*
98. NATIONAL PARK SERVICE REPORT, *supra* note 8, at 5.3.
99. *Id.*
100. KAREN M. MANCI, *supra* note 61, at 14.
101. UNITED STATES AIR FORCE, INITIAL F-22 OPERATIONAL WING BEDDOWN, DRAFT ENVIRONMENTAL IMPACT STATEMENT, VOLUME 2, APPENDIX NR-4: NATURAL RESOURCES REVIEW OF LITERATURE ON THE EFFECTS OF NOISE ON LIVESTOCK AND WILDLIFE (2001) [hereinafter APPENDIX NR-4].
102. *Id.*
103. *See id.*

low-altitude subsonic flights consist generally of startle reactions.[104] These startle reactions are typified by background jumping and stampeding, and often lead to injury to animals startled from low-level overflights.[105] Stampeding and jumping behaviors have been shown to cause broken limbs, torn udders and stomachs, and other deep lacerations through attempted penetration of barbed wire fences.[106] Horses have also been observed to exhibit "intensive flight reactions, random movements, and biting and kicking behavior."[107] Researchers suggest that the effects of these types of responses are more dangerous for animals that are tied up, confined to small areas, or caged.[108] For example, low level overflights can cause turkey flocks, kept inside turkey houses, to pile up and experience high mortality rates.[109]

Furthermore the effects of these disturbances may be harsher on animals harboring certain physiological conditions, such as pregnancy.[110] Both pregnant animals and newly born animals may be easily frightened by sudden noise and movement, making calving seasons a particular sensitive time of year for these vulnerable animals.[111] In 1983, the U.S. Air Force summarized the results of case studies conducted in a variety of airspaces across the country and found negative impacts on pregnant cattle.[112] For instance, one study suggested that two out of ten cows in late pregnancy aborted after showing a rise in estrogen and a falling of progesterone levels that specifically correlated to fifty-nine aircraft overflights.[113] Another study showed that three out five pregnant cows aborted after exposure to flyovers by six different aircraft.[114]

A number of studies dealing with the reproductive and growth effects on fowl have shown that intense noise may affect growth of chickens.[115] Chicks subjected to simulated sonic booms weighed significantly less than a group of control chicks, or chicks not exposed to

104. KAREN M. MANCI, *supra* note 61.
105. *Id.*
106. U.K. House of Commons, Defense Committee, Fifth Report on Low Flying. March 28, 1990 [hereinafter U.K. House Report].
107. APPENDIX NR-4, *supra* note 101, at 6.
108. Y. Espmark, *Behavioral Responses in Cattle and Sheep Exposed to Sonic Booms and Low-altitude Subsonic Flight Noise*, 94 VET. REC 106 (1974).
109. APPENDIX NR-4, *supra* note 101, at 7. *See also* KAREN M. MANCI, *supra* note 61. Study showed that chickens also displayed a violent crowding response, occasionally resulting in death, to intermittent sound exposure at 110-118 dB.
110. Y. Espmark, *supra* note 108.
111. U.K. House Report, *supra* note 106.
112. APPENDIX NR-4, supra note 101.
113. *Id.*
114. *Id.*
115. KAREN M. MANCI, *supra* note 61.

intense auditory stimulation.[116] Reduced egg production has also been found to correlate with hen exposure to aircraft noise for three or more days.[117] This loss of egg production was attributed to a behavioral change, rather than a physiological change; the hens kept themselves away from feed and water due to noise stress.[118] However, some research has shown a chicken physiological response attributable to high levels of noise in the environment, response including increase in steroid levels in blood.[119]

Studies show that other animals demonstrate physiological stress reactions as well. A high glucose level is a recognized stress response.[120] When eighty dairy cows were exposed to an engine sound of 97 dB there was an increase in the glucose concentration in the blood, and when exposed to a tone of 110 dB there was a significant increase in circulating glucose and a significant decrease in hemoglobin.[121] When the endocrine system responds to stress in this manner the animal's hormonal balance may be affected; for example, release of thyroid stimulating hormones known to affect growth can be inhibited after a stress response.[122]

Another focus of study has been on the effects of aircraft noise on feed consumption and milk production. These studies have produced conflicting results. One study has found that when dairy cows were exposed to a sudden high intensity noise, feed consumption was reduced as was the yield and rate of milk production.[123] Goats too have shown the similar effect of reduced milk yield after exposure to jet noise.[124]

Other studies, however, report no difference in milk production. For example, one study concluded that the milk yield of dairy cows in an area of frequent sonic booms was similar to other cows not exposed.[125] However, the test animals in this study had been previously exposed to at least four to eight sonic booms per day for several years prior to data

116. *Id.*
117. *Id.*
118. *Id.*
119. *Id.*
120. KAREN M. MANCI, *supra* note 61.
121. J. Broucek, et al., *The Effect of Noise on the Biochemical Characteristics of Blood in Dairy Cows*, 28 ZIVOC. VYR. 261 (1983).
122. KAREN M. MANCI, *supra* note 61.
123. K. Kovalcik & J. Sottnik, *The Effect of Noise on the Milk Efficacy of Cows*, 28 ZIVOC. VYR. 795 (1971). The everyday noise level of the animals' surroundings was 50-60 dB. Noise as high as 80 dB had no significant effect on the dairy cows. However, immediate exposure to a high intensity noise of 105 dB resulted in decreased feed consumption, milk yield and intensity of milk released.
124. KAREN M. MANCI, *supra* note 61.
125. *Id.*

collection.[126] Accordingly, it may be possible for animals to habituate to the disturbances over time, thus helping to diminish any long-term impacts. However, the possibility of long-term habituation would not alleviate possible immediate harms and injuries to animals.

3. Specific impacts on wildlife

Research has looked at the impacts of military aviation noise on different wildlife populations, research concentrating mostly on large mammals and birds.[127] Just as with the cases of domestic animals, effects of noise on wild animals can vary. Reactions can "range from minor behavioral responses to severe changes in the use of an area."[128] The primary concern expressed by environmental researchers is that "low level flights over wild animals may cause physiological and/or behavioral responses that reduce the animals' fitness or ability to survive."[129] It is believed that responses to military overflights may lead to excessive arousal and alertness, chronic stress, interference with the raising of young and disruption of habitat use.[130]

In an attempt to gather information on the nature and extent of aircraft induced impacts on wildlife species populations and habitat utilization, the National Ecology Research Center (NERC)conducted a survey of all the U.S Fish and Wildlife Service (Service) regional directors, research centers, ecological and endangered species field office supervisors, and wildlife refuge managers.[131] The NERC gathered responses from 132 Service installations.[132]

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126. *Id.*

127. APPENDIX NR-4, supra note 101.

128. DOUGLAS N. GLADWIN, KAREN M. MANCI, U.S. FISH AND WILDLIFE SERVICE, EFFECTS OF AIRCRAFT NOISE AND SONIC BOOMS ON FISH AND WILDLIFE, RESULTS OF A SURVEY OF U.S. FISH AND WILDLIFE SERVICE ENDANGERED SPECIES AND ECOLOGICAL SERVICE FIELD OFFICERS, REFUGES, HATCHERIES, AND RESEARCH CENTERS NERC-88/30 (1988) [hereinafter SURVEY].

129. NATIONAL PARK SERVICE REPORT, *supra* note 8, at 5.1

130. *Id.*

131. SURVEY, *supra* note 128. "Because many of the US Fish and Wildlife Service field installations are located near military airports and flight training areas, the results of the survey could be useful to Service personal who must comment on proposed flight operations." *Id.* at 1.

132. *Id.* Respondents were asked to provide background information or data on wildlife reactions to low-altitude aircraft disturbances, including physiological, behavioral, and reproductive/population effects. The Survey stressed that because of the current lack of information on the effects of aircraft on wildlife, any type of information that could be supplied would be of interest. Specifically, the survey asked for information such as:

1. observations of animals reaction(s) to aircraft operations, such as aircraft overflights and/or intense sonic booms;

2. instances of areas where aircraft noise is known or believed to be responsible

Many of the installations reported that low altitude aircraft had negative impacts on different large wild mammals.[133] Antelope behavioral reactions, observed as a result of low-altitude jet aircraft fly-overs, included panic running behavior.[134] Additionally, bighorn sheep and pronghorn displayed startle reactions to intense sonic booms; startle reactions such as stampeding, jumping and running.[135]

Many of the Service installations also reported observations of various negative impacts on wild bird behavior.[136] For example, many of the respondents reported that low-level aircraft was disruptive and caused a flushing out of waterfowl, pelicans, shorebirds and refuge birds.[137] Many of these birds would remain airborne for long lengths of time while the low-altitude aircraft was within its proximity.[138]

In addition to the above behavioral observations, further formal research studies on the effects of aviation noise have been conducted. Some of these studies have shown that overflights can lead to physiological responses, such as increased heart rates in pronghorn, elk, and bighorn sheep.[139] Heart rate acceleration is an indicator of stress and by itself may not cause great harm, but many animal biologists maintain that excessive stimulation can amount to chronic stress which in itself can be quite harmful to animal health, growth and reproductive fitness.[140]

Studies have reported numerous indirect effects caused by behavioral responses to the aircraft noise.[141] In these studies researchers

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for reduced population size;

3. descriptions of areas or sites where adequate background data on wildlife habitat and populations are available to compare impacted and nonimpacted sites;

4. any other data or information that might be relevant or helpful in determining the direction and design of future aircraft impact studies; and

5. expression of the importance of aircraft/wildlife impact information to the U.S. Fish and Wildlife Service.

133. SURVEY, *supra* note 128.

134. *Id.* Behavioral reactions reported by Hart Mountain National Wildlife Refuge of Oregon.

135. *Id.* Behavioral reactions reported by Cabeza Prieta National Wildlife Refuge of Arizona.

136. *Id.*

137. *Id.* Behavioral reactions reported by Fallon National Wildlife Refuge of Nevada. Flushing out is when birds leave and fly away from their nest or perch.

138. SURVEY, *supra* note 128. Behavioral reactions reported by Wichita Mountains National Wildlife Refuge of Oklahoma.

139. NATIONAL PARK SERVICE REPORT, *supra* note 8.

140. *Id.* The "[e]ffects [of stress]could be synergistic, especially when coupled with natural catastrophes such as harsh winters or water shortages." *Id.* at 5.2.

141. *Id.* Whether or not such indirect effects occur depends on other factors associated with the natural history of a species. Some animals are more susceptible than others to disturbance, because of unique life history patterns such as colonial breeding, habitat requirements, and restricted distribution.

have shown that behavioral reactions have the potential to cause injury sustained as a result of animal falls, object collisions, and/or the stampeding and trampling triggered by panic and flee from offending aircraft; especially where animals are closely grouped and/or are running through rugged terrain.[142]

Behavioral reactions may influence breeding success by altering patterns of attendance to young. It has been reported that when birds fly away from their nests they may accidentally break eggs, knock eggs or young out of the nest, or leave eggs exposed to predators.[143] Additionally, adult and young mammals may become separated when they panic and flee; separation that leaves young animals exposed vulnerable to predators.[144]

There have been studies to address the effects of overflights on the breeding success of large mammals.[145] One study compared mortality rates of caribou calf exposed to overflights to a group not exposed.[146] Researchers found that the mortality rates were significantly higher in the exposed group.[147] Researchers have further suggested that milk release may be inhibited in caribou mothers disturbed by the noise, leaving young calves emaciated and undernourished.[148]

Behavioral responses can also result in energy losses for the animal.[149] An animal will have a decrease in energy intake when they forced to stop food ingestion because of sudden startle.[150] At the same time, an animal will be increasing their energy output because they are running and moving to get away from the aircraft noise.[151] "Hence, frequent disturbance imposes a burden on the energy and nutrient supply for animals, which can compromise growth and reproduction."[152]

Habitat avoidance and abandonment is another outcome of behavioral responses to aircraft noise.[153] "This subject has drawn attention because the consequences of habitat abandonment can be serious, particularly for species whose high quality habitat is already

142. *Id.* Study on caribou calf mortality documented three young caribou were trampled during a panic response.
143. *Id.* at 5.12.
144. NATIONAL PARK SERVICE REPORT, *supra* note 8 at 5.12.
145. *Id.*
146. FACT SHEET, *supra* note 93.
147. *Id.*
148. *Id.*
149. NATIONAL PARK SERVICE REPORT, *supra* note 8.
150. *Id.*
151. *Id.*
152. *Id.*
153. *Id.* Many wildlife biologists are concerned that the disturbance from overflights could cause sensitive animals to abandon their habitats.

scarce."[154] Studies show that some animals do indeed abandon their habitat because of noise disturbance.[155] Grizzly bears, mountain sheep, and mountain goats have been observed to leave their habitats because of aircraft overflights.[156]

Due to the limitations of conducting long-term research studies, most behavioral responses observed of wildlife are short-term.[157] However, researchers suggest that long-term responses might include "permanent changes in habitat use, increased mortality of birds during migration, or population effects due to reduced reproductive success."[158] The Desert National Wildlife Refuge of Nevada suspects that the declining population of the desert bighorn sheep is due to an increase in extensive and intensive military jet operations.[159] The lack of long-term studies makes valuable and arguably necessitates additional research in this area, more conclusive research that will aid scientists in determining the impact of aviation noise on various wildlife species.

C. Possible Remedies

As the research suggests, military aviation overflights can and do produce demonstrable impact on a wide spectrum of animals. Accordingly, the issue should not solely be focused on whether in fact there is a noise impact on animals, but should instead focus on how the current laws and regulations might be utilized to prevent harmful and unnecessary airspace designations that effect domestic and wild animals, and the environment as a whole.

One possible way to halt a proposed SUA designation is through application of the Endangered Species Act.[160] This act "makes it illegal for anyone, including the military, to harass or harm an endangered or threatened species."[161] The airspace proponent must consult with the

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154. NATIONAL PARK SERVICE REPORT, *supra* note 8. Furthermore, wildlife and national park managers are also concerned because animals may be forced out from parks and refuges into area where hunters have access to the protected animals.

155. *Id.*

156. *Id.* Studies report that some animal species do not abandon their habitats. Researchers suggest that it may depend on the sensitivities of individual animals, or it may be due to differing levels of exposure, such as differing flight altitudes, aircraft types, and flight frequencies during the studies.

157. *Id.* There have not been many studies assessing long term effects. Most studies are "conducted only once or twice per season, and generally they are avoided during poor weather, when stressing an animal could result in harm, and during parts of the breeding season, when the consequences of disturbance might be compounded.

158. *Id.*

159. SURVEY, *supra* note 128.

160. CITIZEN'S GUIDE, *supra* note 3.

161. *Id.* at 19. *See generally* The Endangered Species Act, 16 U.S.C. § 1538 (1973). The Act makes is it illegal to "take" an endangered species. Take has been defined as

U.S. Fish and Wildlife Service if any federally endangered or threatened species is present in the proposed airspace area.[162] The proposed military activity will not proceed if it is determined that the activity will cause harm to an endangered species.[163]

Another resource protection Act that may be used to halt potentially harmful fight proposals is the Wilderness Act.[164] Pursuant to this Act, Congress has set aside "Wilderness Areas" for the very "purpose of keeping those areas free from man's intrusions."[165] Acknowledging that overflight noise can be disruptive to wilderness areas, the FAA signed an interagency agreement with the National Park Service, Fish and Wildlife Service, and Bureau of Land Management in January of 1993.[166] As part of this agreement, the FAA agreed not to allow flights below 2000 feet over designated Wilderness Areas.[167] However, the agreement states that compliance is entirely voluntary.[168] Therefore, refuge managers and citizens must rely on personal negotiations with the local military bases to solve any overflight concerns.[169]

Unfortunately, the military is often unresponsive to efforts to resolve overflight conflicts and often end up violating restrictions that they have agreed to comply with.[170] Thus, although there may be "no flight" and "restricted" area regulations in effect, in reality there is little that can, and has been, done to enforce them.[171] This static level of enforcement necessitates the consideration of additional legal alternatives for use in both the resolution of overflight conflicts and the prevention of new risks from added military airspace designations.

Ensuring military compliance with NEPA requirements is another way that many private groups and citizens utilize in trying to stop SUA

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harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Endangered Species Act, at § 1532(19).

162. Endangered Species Act, at § 1532(19).

163. *Id.*

164. *Id. See also* The Wilderness Act of 1964. 16 U.S.C. § 1121 (1964).

165. CITIZEN'S GUIDE, *supra* note 3, at 20.

166. *Id.*

167. UNFRIENDLY SKIES, *supra* note 7, at 13.

168. INTERAGENCY AGREEMENT BETWEEN NATIONAL PARK SERVICE, FISH AND WILDLIFE SERVICE, BUREAU OF LAND MANAGEMENT AND FEDERAL AVIATION ADMINISTRATION (1993) available at: http://www.defenders.org/pbs-us08.html (last visited on February 8, 2004) [hereinafter INTERAGENCY AGREEMENT]. The agreement states whereas, the FAA, NPS FWS, BLM, while recognizing the public freedom of transit of the navigable airspace, desire to act in cooperation to reduce the incidence of low-flying aircraft, including fixed-wing aircraft, helicopters, ultralight vehicles, balloons, and gliders over NPS, FWS and BLM administered land by seeking voluntary cooperation with the 2000 feel above ground level minimum altitude advisory.

169. UNFRIENDLY SKIES, *supra* note 7.

170. *Id.*

171. *Id.*

designation.[172] Many complaints are based on the idea that because the FAA allows the military to be responsible for its own environmental assessment, bias on the part of the military enters into these assessments, and therefore environmental issues are not adequately considered.[173]

For example, in *Shoshone-Paiute Tribe v. United States*, plaintiffs challenged the final EIS filed by the U.S. Air Force.[174] The plaintiffs contended that the Air Force violated the requirements of NEPA by failing to conduct a full environmental analysis and considering all the aspects of a training range proposal.[175] The Court held that military actions must be viewed, considered and analyzed cumulatively in the impact statement.[176]

At times, many concerned citizens and organizations have and will in the future join together to oppose proposals for expanded military airspace areas.[177] In June of 1998, the U.S. Air Combat Command announced a proposal to build a bombing range in Otero Mesa, and to open low-level flight paths over desert and forest lands across Southern New Mexico and West Texas.[178] Similar military training activities at other bases included jets flying as low as 200 feet above ground.[179] In Otero Mesa, New Mexico, the Otero County Cattlemen's Association, the Lincoln Forest Permittees' Association and 20 individuals filed suit against the U.S. Air Force to block expansion of low-level training missions.[180]

The plaintiffs in this case claimed that the EIS conducted by the U.S. Air force "failed to adequately consider other alternatives or the full impact the low-level, high speed jets flights would have on the environment."[181] They contended that the EIS focuses more on the needs

172. *Id.*
173. *Id.* at 17
174. *See* Shoshone-Paiute Tribe v. United States, 889 F. Supp. 1297 (D. Idaho 1994).
175. *Id.*
176. *Id.*
177. Diane Stallings, *Area Coalition Files Suit Against Airforce*, RUIDOSO NEWS, 1998, at 2A [hereinafter *Area Coalition*].
178. Rene Romo, *Otero Ranchers Sue to Bar Flights*. ALBUQUERQUE J., Sept. 1, 1998 [hereinafter *Ranchers Sue*].
179. Chris Newman, *West Texas Ranchers Threaten to Sue Over Noise From Air Force Bomber Training*, THE ASSOCIATED PRESS, Apr. 7, 1999 [hereinafter *West Texas Ranchers*].
180. *Id. See also* Patrick Armijo, *Ranchers, Air Force, Start Talks, Details on Sorties Sought; Parties to Meet Again in Dec.*, ALBUQUERQUE J., Nov. 7, 1998, at C1. A hearing in Albuquerque before U.S. District Court Judge Bruce Black ended after plaintiff's testimony and witnesses were finished. It was at this time that the Air Force attorneys approached Judge Black agreed to continue private negotiations outside the courtroom seeking settlement.
181. *Ranchers Sue*, *supra* note 179.

of the military rather then the impacts to the environment.[182] Furthermore, they claimed that the EIS is flawed and misleading due to the fact that analysis was based on studies conducted over Amsterdam, Berlin, Copenhagen, and Chicago, rather than rural areas, where impacts on wildlife and land would be considerably greater than the larger city environment.[183]

Many of the ranchers and citizens also participated in the EA and EIS public review processes by submitting oral and written comments on the effect the proposal will have on their cattle and land.[184] However, the ranchers claimed that there was a lack of attention on the military's part in considering input from people who are most directly affected.[185]

Besides claims of violations of NEPA requirements, the Otero Mesa residents also alleged that the low-level flights over private land amounts to trespassing in their airspace, and that the military has failed to consider financial compensation for the disturbance.[186]

Claiming violations of constitutional rights is another method that citizens have used to challenge military proposals. The Fifth Amendment to the U.S. Constitution bars the government from taking private property for public use without just compensation.[187] In *United States v. Causby*, the Supreme Court held that the Fifth Amendment guarantee applies when low-level overflights result in direct, immediate, and substantial interference with the enjoyment and use of property.[188] "[Other] cases make clear the citizens whose property is affected by low-level overflights still can rely on the same guarantee."[189]

In *Wildwood Mink Ranch v. United States*, an owner of a mink ranch brought an action against the U.S. for loss of mink caused by disturbances from low flying military aircraft.[190] The Court held that military pilots who flew jets over private land at 800 to 1000 feet constituted a trespass and nuisance.[191] Even more recently, in 1996, the United States Court of Appeals confirmed that the owners of a ranch used for recreation and cattle ranching in Texas, may be entitled to compensation under the Fifth Amendment, due to military overflights.[192]

182. *Area Coalition*, *supra* note 177.
183. *West Texas Ranchers*, *supra* note 180.
184. *Id.*
185. *Area Coalition*, *supra* note 177.
186. *Ranchers Sue*, *supra* note 179.
187. U.S. CONST. amend. V.
188. *See* United States v. Causby, 328 U.S. 256 (1946).
189. CITIZEN'S GUIDE, *supra* note 3, at 20.
190. *See* Wildwood Mink Ranch v. United States, 218 F. Supp. 67 (D. Minn. 1963).
191. *Id.*
192. *See* Brown v. United States, 73 F.3d 1100 (Fed. Cir. 1996).

IV. Conclusion

Although there are studies that report no effects in domesticated and wild animals, there is well-documented research that shows that these animals are indeed negatively impacted by aviation noise. Domesticated and wild animals both display behavioral and physiological responses to military aviation practices including low-level overflights and sonic booms. Research has shown that responses can prove to be harmful for the animal's health and can possibly affect its long-term ability to survive.

Unless the FAA can find ways to mitigate these impacts, military overflights will continue to harass farm animals and undermine conservation efforts for wildlife. Therefore, it seems that there is a clear need for Congress to establish more formal and legally binding environmental guidelines for the FAA to use when approving SUA.

There is also a need for the creation of formal procedures to minimize conflicts between the military and affected groups, especially when military units are not complying with the FAA recommendations. Until then, private citizens, environmental groups, wildlife refuges, and farmers must continue to use the remedies that are currently available to enforce their rights. "Ultimately, the choice rests in our hands, but to choose to protect the welfare of other animals in addition to ourselves, we must summon the courage to challenge those who would deny the rights of wildlife. . . . "[193]

Nathalie M.Armas

193. AUTUMN LYN RADLE, *supra* note 74, at 11.