K-STATE Research and Extension | Biological and Agricultural Engineering

# National Air Quality Site Assessment Tool (NAQSAT) for Livestock Producers

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## What is NAQSAT?

The National Air Quality Site Assessment Tool (NAQSAT) is a free online tool that can assist livestock producers and their advisors with identifying opportunities for addressing air emissions from livestock and poultry operations. NAQSAT is based on the most accurate, credible data currently available regarding mitigation strategies for air emissions. The tool considers the influence of diet and feed management, animal housing, manure collection, transfer and storage, land application, mortality management, public perception, and on-farm roads on air emissions. NAQSAT is applicable for the following seven animal species: (1) swine, (2) dairy, (3) beef, (4) horse, (5) broiler chicken, (6) laying hens, and (7) turkeys.

## Who developed NAQSAT?

NAQSAT was developed with funding from USDA NRCS (Natural Resources Conservation Service) conservation innovation grants through the collaboration of a national team of animal air quality researchers and extension professionals from 12 land-grant universities and 10 industry/producer organizations.

## When to Use NAQSAT?

NAQSAT is designed for voluntary use by livestock producers and their advisors, including NRCS staff, whenever there is a possibility of an air quality resource concern based on producer interest, complaints, local regulations, etc. The tool may also be used when developing a Comprehensive Nutrient Management Plan (CNMP) for livestock operations. NAQSAT is not intended to provide quantitative emissions data and/or regulatory guidance. Instead, the tool catalogs the technologies and management practices for a given operation, and then estimates the degree to which emission of each air pollutant would change if the technologies and management practices were changed. NAQSAT may not answer all your questions on air emission management, but will point you in the right direction.

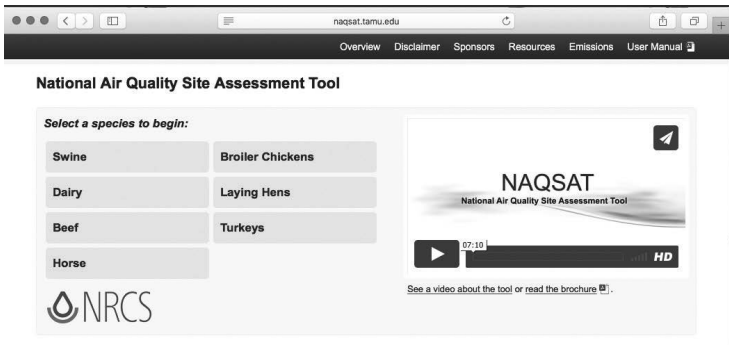
NAQSAT is currently the only tool approved by NRCS for evaluating air quality resource concerns at livestock and poultry operations. In 2015, NRCS released a national instruction that details when and how to use NAQSAT at confinement-based livestock and poultry operations with a maximum capacity greater than or equal to 300 animal units. Use of NAQSAT for smaller operations (i.e., less than 300 animal units) of these species is also encouraged.

## Benefits for Producers and Advisors

- Identify areas where there are opportunities to make changes that result in reduced air emissions as compared to current management practices.
- Compare how different practices or technologies might affect air emissions.
- Evaluate how a mitigation practice to reduce one pollutant affects other pollutants.
- Identify mitigation options and cross reference with NRCS practice standards.
- Run "what if" scenarios before expensive improvements are made.
- Prioritize investments.

## Three steps to use NAQSAT

NAQSAT can be accessed free of charge at http://naqsat.tamu.edu. The tool is used online and will not download onto the user's computer. Each NAQSAT session is assigned its own unique URL, which may be bookmarked




NAQSAT homepage

and saved by the user. All information entered in the tool is confidential and cannot be traced back to the user.

**NAQSAT starts with three simple steps:**

***1. Select animal species***

The first webpage of NAQSAT will ask the user to select one of the seven animal species.

***2. Answer single-choice questions***

Once the species is selected, the user will be asked to answer single-choice questions under each of the following eight management categories. It may take 30 to 60 minutes to answer all the questions.

- Animals and Housing
- Feed and Water
- Collection and Transfer
- Manure Storage
- Land Application
- Mortalities
- On-farm Roads
- Perception

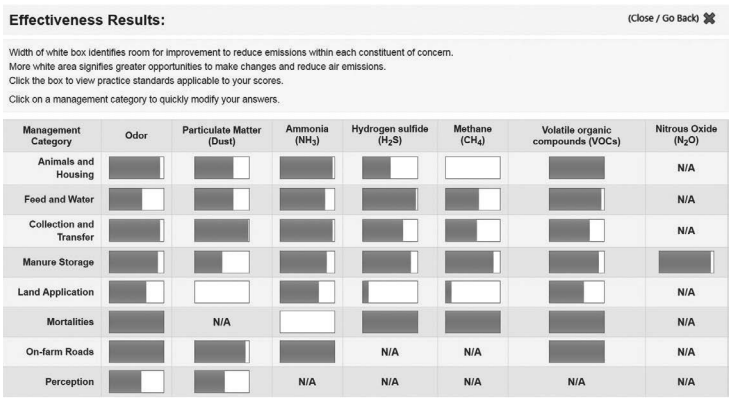
***3. Get the report***

Upon completion of all the questions, the user can click on the "Get Results" button at the bottom of the page to view the report. The report will provide scores for each management category and each air pollutant so that priority areas can be identified.

## Interpreting the NAQSAT Report

The NAQSAT report will show a series of bars that provide a non-quantitative score for each of the above eight management categories and for each of the seven air pollutants, including odor, particulate matter, ammonia, hydrogen sulfide, methane, volatile organic compounds (VOCs), and nitrous oxide. The scores (i.e., the percentage of green in a bar) reflect the degree to which an operation has incorporated all of the feasible practices that would effectively minimize emissions of the seven air pollutants from the facility. For example, a bar that is predominantly green (gray in the black and white illustration at right) for odor from animals and housing indicates that a producer is employing a relatively high degree of management and incorporating most of the best practices currently available for controlling odor for the animals and housing component of the operation. If all bars are completely green, it does not mean there are no emissions. Fully green bars simply indicate that the current management practices for the existing structural facilities provide few or no opportunities to reduce the emissions of that pollutant in that management category. A mostly white bar indicates that there are additional measures or improvements in management that the producer should consider.

NAQSAT is designed to provide a score for the selected management practice relative to the best possible management practice of that particular operation. A higher proportion of white area displayed indicates there is more room for improvement. Management areas receiving low scores (mostly white bar) generally present more opportunities for improvement. The NAQSAT report compares "what is" against "what could be" in the particular operation. And it is designed to help producers estimate the present management level of air emissions, and which area of the farm should be given more attention. It should be noted that NAQSAT does not allow for comparison of two or more operations, since each operation is scored against itself and its own potential.



**Effectiveness Results:** (Close / Go Back)

Width of white box identifies room for improvement to reduce emissions within each constituent of concern.
More white area signifies greater opportunities to make changes and reduce air emissions.
Click the box to view practice standards applicable to your scores.

Click on a management category to quickly modify your answers.

| Management Category | Odor | Particulate Matter (Dust) | Ammonia ($NH_3$) | Hydrogen sulfide ($H_2S$) | Methane ($CH_4$) | Volatile organic compounds (VOCs) | Nitrous Oxide ($N_2O$) |
|---|---|---|---|---|---|---|---|
| Animals and Housing | | | | | | | N/A |
| Feed and Water | | | | | | | N/A |
| Collection and Transfer | | | | | | | N/A |
| Manure Storage | | | | | | | |
| Land Application | | | | | | | N/A |
| Mortalities | | N/A | | | | | N/A |
| On-farm Roads | | | | N/A | N/A | | N/A |
| Perception | | | N/A | N/A | N/A | N/A | N/A |

NAQSAT report for a facility

Scores for each management category (e.g., Animals and Housing, Feed and Water, etc.) are not weighted for their relative importance to the overall emissions from the operation. For example, a mostly white bar for ammonia for one category may not necessarily represent an air quality resource concern because of the relatively small contribution of total facility ammonia emissions from that category. When reviewing the report, users should consider the importance of each air pollutant in relation to the air quality resource concerns at the particular site.

After evaluation of a baseline scenario NAQSAT report for the operation, the user can determine whether an air quality concern exists. If so, NAQSAT can be used to identify potential mitigation practices. The user can run NAQSAT multiple times with proposed changes to determine the impact of these changes on emissions. Changing a practice in one part of the farm may affect emissions from another source within the farm. Also, changing a practice to reduce emission of one air pollutant may actually increase the emission of another air pollutant. Trade-offs may exist within a housing type such that all categories of emissions cannot effectively be minimized.

## Tips for NAQSAT Users

- If multiple species are present at the operation, a NAQSAT report should be prepared for each species.

- Users may run as many "what if" scenarios as needed. Each scenario may be bookmarked with a unique name so that each proposed management change may be quickly identified.
- Comparing results from multiple runs of the program may highlight unintended consequences where a mitigation measure to reduce one pollutant may inadvertently increase one or more other pollutants of concern.
- The program is set up to include or remove questions from view on the basis of user input. Answers to some questions will generate additional questions to be answered.
- All NAQSAT sessions bookmarked by the user are maintained on the host computer and may be accessed by the user over the next 30 days for updates and additional comparisons.
- The NAQSAT report cannot be used to compare one livestock facility to another because the evaluation pertains to a given facility relative to its potential given current understanding of management practices and mitigation options.

## Contact for more information

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### References

National Air Quality Site Assessment Tool, http://naqsat.tamu.edu/

National Air Quality Site Assessment Tool User's Manual, available at http://naqsat.tamu.edu/docs/user-manual.pdf.

Video about the NAQSAT, available at https://vimeo.com/23497742.

NAQSAT Fact Sheet, available at http://www.conservationwebinars.net/webinars/naqsat-conservation-planning-dairies.

USDA NRCS. 2015. National Instruction on National Air Quality Site Assessment Tool, available at https://directives.sc.egov.usda.gov/ViewerFS.aspx?hid=36874

### Purpose of the fact sheet

Provide guidance to livestock producers and conservation planners on how to use NAQSAT, a NRCS approved educational website to identify air quality concerns at livestock operations.

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