

North Carolina Community Mapping System and Environmental Justice Tool

Version 1.0



Preface to Version 1.0:

The North Carolina Department of Environmental Quality's Community Mapping System, Version 1.0, is the latest version of the mapping tool created to provide North Carolinians with permitting and other environmental information for the purpose of increasing knowledge, understanding, local outreach and public participation. It was developed to be an interactive tool that allows a variety of constituents to access important data about their communities.

Following the release of the beta version of the Community Mapping System in May 2019, the North Carolina Department of Environmental Quality (DEQ) opened a comment period to solicit input from the public. DEQ received more than 100 comments from community members, academics, advocates and industry. As a result of many of those comments, the beta version was updated to make the mapping tool more representative of the needs and requests of North Carolina's diverse communities.

1. Introduction:

DEQ is committed to conducting the people's business in an open and transparent way. As a part of this commitment, DEQ created the North Carolina Community Mapping System (NCCMS), . The system's goals are two-fold: (1) to present program information (including permitting and incident tracking), and (2) to provide an environmental justice tool (EJ Tool) that allows all users to understand the sociodemographic and health characteristics of communities across North Carolina. The CMS can be used by all interested parties, including community organizations, DEQ and other state government employees, academia, local and Tribal governments, city and county officials and planners, and industry stakeholders.

The NCCMS incorporates many previously separate data sets into one easy-to-understand interface, simplifying access to data from many sources. The spatial representation of data allows users to type in an address and access information and better understand the role that DEQ decisions and permitting play in their community. The NCCMS is not an exhaustive representation of the state of North Carolina's current environment. Instead, the NCCMS can be used in concert with a variety of other tools and methodologies, including but not limited to, EPA's EJSCREEN, academic research, and local and community research and knowledge.

DEQ aims for the NCCMS to be dynamic and evolve as more data sets become available and are integrated into the system. As changes are made to the system, DEQ will continue to release updated versions of the NCCMS and associated documentation. The Department will continue to conduct outreach through in-person training and webinars to ensure that anyone who may have an interest in the tool has the opportunity to acquire the skills and knowledge to use the system.

2. Environmental Justice:

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

DEQ has developed the Environmental Justice Tool within the NCCMS to provide relevant demographic and health data (the full list of which is included in the Glossary of Terms). The purpose of the EJ Tool is to supplement the environmental information included in the NCCMS to provide a more complete picture of the communities.

For more information on environmental justice within the Department, visit the NCDEQ Environmental Justice Program website at: <https://deq.nc.gov/outreach-education/environmental-justice>.

For more general information on environmental justice, visit:
<https://www.epa.gov/environmentaljustice>.

3. Beta Version:

The NCCMS debuted at the May 22, 2019 quarterly meeting of the Secretary's Environmental Justice and Equity Advisory Board after six months of information gathering and internal development. The original beta version was released to the public on May 23, 2019. To develop the concepts for the system, DEQ:

- 1. Conducted Comparative Research:** DEQ performed extensive research on similar efforts developed by other states. After compiling this material, DEQ selected aspects that would be most beneficial for North Carolina's mapping system.
- 2. Conducted Academic Interviews and Focus Groups:** In the winter of 2018, DEQ conducted interviews and focus groups with academic institutions in the state. The goal was to hear from the academic community about the technical feasibility of proposed efforts as well as any other relevant statewide work.
- 3. Hosted an Online Survey:** DEQ posted a survey online for individuals to provide comments on the NCCMS' development. This [online survey](#) continues to be available for individuals to share feedback and suggestions.
- 4. Held Community Meetings:** DEQ held community meetings in Goldsboro, Winston-Salem and Spindale to discuss the creation of the NCCMS with the public as well as to gather suggestions.
- 5. Met with Non-Governmental Organizations:** DEQ participated in informal discussions with non-governmental organizations to understand their data needs and what they saw as information gaps. More than 15 organizations were consulted during this process.

Initial Development:

The main goals of the beta version that shaped the NCCMS remain in place in Version 1.0.

- I. Let the user define their community:** DEQ does not know the extent of an area that a user may define or identify as "his/her community." Therefore, DEQ created the NCCMS to allow the user to determine the scale or size of the area of interest. The user may also determine a radius around a point or area he/she would like to select within the 'Info Summary' to find the number of recorded facilities or incidents in that selected area.
- II. Develop an interactive system:** The NCCMS and EJ Tool are both interactive and dynamic in nature. As the user zooms in or out, or pans across the screen, the number of facilities or incidents automatically adjusts to reflect what is displayed in the current extent of the screen. The same automatic adjustment occurs with-in the EJ Tool, where census data and health data are averaged across all of the block groups or counties displayed within the current extent.
- III. Ensure data are up-to-date:** When possible, data sets in the NCCMS automatically update as newer data becomes available. However, some data sets will have to be updated manually.
- IV. Show DEQ-relevant data:** As this is a DEQ developed tool, the data included were selected based on which data would be most relevant to communities.

4. Comments Received on Beta Version:

Approximately three weeks after releasing the beta version to the public, DEQ held an official comment period between June 10 and July 11, 2019. DEQ received comments from 108 individuals and organizations. These comments resulted in more than 300 suggestions about the mapping system and its functionality. The com-

ments fell generally into four categories: content, usability, display and implementation.

Content: Comments on content centered on the desire to include/display additional layers or data and to alter the scale at which this data existed within the interface. Many comments received stated that cumulative risk should be more easily shown through the mapping system. Other comments included recommendations to consider additional data for the interface such as flood inundation maps, wetland layers, environmental quality information like air quality monitoring sites and impaired water locations, and other health data.

From a data scale perspective, many commenters responded that a lower scale of both health (sub-county/zip code) and demographic data (census block group) should be used in the NCCMS. In addition, commenters suggested there should be more comparative aspects within the map, such as comparing demographic data for the selected area to the county or state. Some commenters also suggested that EJ topics and themes should be more prevalent, either through an orientation to EJ somewhere within the system, or including defined areas on the map that are classified as an “EJ community” or a community of concern.

Usability: From a usability standpoint, commenters noted that the User Guide could benefit from specific examples and recommended it be accessible from the map interface itself. Commenters also shared that the attribute table has many abbreviations and extensive use of acronyms that can hinder a user’s understanding. Other usability comments included requests for more flexibility in the search function (for example: being able to search for a specific type of facility, an owner’s name, etc.).

Display: Comments about the display emphasized the request for the symbology of facilities in the NCCMS to contribute to more understanding (relative size, relative emissions, etc.). Commenters also asked for improved data visualization, especially within the EJ Tool, including more descriptive charts and graphs. Other comments referred to accessibility, such as being able to access the EJ Tool and health information more easily through the interface.

Implementation: Many responders commented that the NCCMS and EJ Tool should be used in Department decision-making.

5. Changes Made to Beta Version:

DEQ documented and carefully considered all of the comments received during the public comment period. In Version 1.0, the Department integrated comments and suggestions that would most improve the NCCMS’ quality and usability, and could be incorporated using the tools and resources available to the agency. The changes made fell into three major categories: display, facilities map and EJ Tool/demographics dashboard.

Display: Modifications were made to the system display to increase ease of use. Specifically, the attribute tables were removed because all relevant data for the facilities are included in the facility pop-ups. Display issues with some of the layers (including the Dry-Cleaning Contamination layer and Petroleum Contaminated Soil Remediation Permits layer) were addressed. Additionally, the county boundary color was changed to a darker color after receiving feedback that the color was difficult to see. Symbols were improved for some types of facilities to increase ease of understanding by the user. Usability of the Report Tool was improved. A new tab labeled ‘Facility, Permit and Incident Layers’ was added, so users can select or deselect different permit types and environmental layers. Finally, an ‘Info’ tab was added to the map interface with basic instructions and a direct link to the comprehensive User Guide to improve accessibility for new users.

Facilities Map: For Version 1.0, a flood hazard layer and a natural spaces layer (parks, nature preserves, conservation easements, etc.) were added as optional layers to the facility map under a new ‘Environmental Layers’ tab. A mining permits layer was also added to this version.

EJ Tool and Demographics Dashboard: The NCCMS, Version 1.0 uses demographic data at the census block group level (the smallest level for which most demographic indicators are available through the US Census Bureau), instead of census tract level data, in the Environmental Justice Tool and the Demographics Dashboard. This allows for a smaller unit of analysis from a demographic perspective, which increases precision and allows the user to more easily understand and identify demographic shifts across the landscape. This change is specified in the initial pop-up box, which clarifies it as a Block Group instead of an area.

Due to the change in data used (from Census Tract to Block Group), there also were changes in some of the data variables displayed. Because the Block Group level is smaller, some data layers are not available at this scale.

In the beta version of the dashboard, the following demographic data were incorporated:

- i. Race,
- ii. Gender,
- iii. Disability,
- iv. Household Income, and
- v. Poverty.

The dashboard has been updated to display following information:

- i. Race and Ethnicity,
- ii. Annual Income,
- iii. Median Household Income,
- iv. Homeowner Status,
- v. Dependent populations (certain age groups), and
- vi. Limited English Status.

The charts and displays in the EJ Tool were improved to include a comparison of the census block group (or groups) in the selected area to the state average.

Finally, a third map was added within the Demographics Dashboard that identifies important sensitive receptors such as hospitals, schools, churches and elder care facilities. Sensitive receptors are areas where the occupants may be more susceptible to the adverse effects of exposure to pollutants.

Other Changes: The accompanying User Guide was updated to be more example-based and includes answers to common questions. In addition, DEQ recorded a NCCMS training video to increase user understanding. Efforts were also made to highlight other mapping tools available, either through the Department or outside sources.

6. Comments Not Incorporated in Version 1.0:

Cumulative Risk:

Due to a lack of available cumulative risk tools that could be easily integrated into the CMS, and a lack of a standardized methodology for calculating cumulative risk, DEQ was not able to address this request.

Inclusion of Environmental Quality Information:

The Department added some, but not all, of the requested data sets and environmental layers. The NCCMS is intended to fill a gap in public access to information on DEQ permitting activities. By spanning many different datasets that were previously available to the public but difficult to visualize in context together, DEQ now has a robust way to visually share this information. However, many high quality statewide and nationwide maps and mapping systems already exist pertaining to broader environmental quality data (see Other Resources). Because of this, DEQ chose not to include more general environmental quality information in this version. Instead, users are encouraged to continue to use the NCCMS in concert with those existing tools. A list of other mapping tools is included in the 'Other Resources' section of this document.

More Precise Health Data:

Unfortunately, health data are not publicly available at the sub-county level. As a policy, DEQ only uses publicly available data within the NCCMS to both ensure transparency and allow all users to access the original-sources of data. Ideally, all data included in the EJ Tool would be at the same analysis level; however, data limitations prevent this from being a possibility. The Department will continue to monitor statewide health data with the intention to integrate sub-county health data into the system if, and when, it becomes available.

Purposes of the Tool:

The NCCMS is intended to be used as a tool to inform stakeholders—government officials (local, tribal, and state), industry officials, community members, academics—when addressing zoning and permitting throughout the state. DEQ will continue to use the system internally to inform decisions.

7. Conclusion:

The DEQ Community Mapping System is an ongoing effort by the Department to increase ease of access to departmental, environmental, and demographic/socioeconomic data that is relevant to North Carolinians. In an effort to be responsive to community requests and public comments received, the beta version has been updated to this Version 1.0 that incorporates with the aforementioned changes made. This latest version, Version 1.0, integrates meaningful changes that increase the functionality of the NCCMS as an instrument to be utilized used by any interested stakeholders within the state. As noted in its title, this system is designed for communities and community analysis. The Department will continue to engage with the public on educational opportunities to inform and educate the public about the system, and will continue to include stakeholders in ongoing development efforts to further develop the NCCMS.

If you wish to sign up for the mailing list to receive updates on the CMS, please email ej@ncdenr.gov.

Other Resources:

The NCCMS was created to work alongside many existing mapping resources. A non-comprehensive list of other relevant resources is included below.

EJSCREEN (<https://www.epa.gov/ejscreen>):

EJSCREEN is an environmental justice mapping and screening tool developed by the Environmental Protection Agency with a nationally consistent data set and approach for combining environmental and demographic indicators. EJSCREEN includes a method for combining environmental and demographic indicators into EJ indexes.

EPA's EnviroAtlas (<https://www.epa.gov/enviroatlas>):

EnviroAtlas provides geospatial data, easy-to-use tools, and other resources related to ecosystem services, their chemical and non-chemical stressors, and human health.

EPA's ECHO (<https://echo.epa.gov/>):

Use EPA's Enforcement and Compliance History Online website to search for facilities in your community to assess their compliance with environmental regulations.

NC Air Quality Forecast Center (<https://xapps.ncdenr.org/aq/ForecastCenterEnvista>):

Provides daily air quality forecasts for North Carolina.

NCDEQ Impaired Waters & TMDL Map (<https://ncdenr.maps.arcgis.com/apps/MapSeries/index.html?appid=14df5075d8e3437b8476c89c3db3f0a5>)

Ambient Water Quality Station Locations and Data Download (<https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/ecosystems-branch/ambient-monitoring-system>)

NCDEQ Air Quality Monitoring (<https://deq.nc.gov/about/divisions/air-quality/air-quality-data/current-monitoring-data-by-site>)

NCDEQ Ozone Design Value Predictor (http://www2.ncair.org/airaware/forecast/DesignValues_National/predictor.php)

Federal Remediation Sites (<https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/waste-management-gis-maps/federal-remediation-sites>)

Superfund Sites (<https://www.epa.gov/superfund/search-superfund-sites-where-you-live#map>)

