**Development Plan for NEXUS Tool’s**

**“Proximity-based Source/Sector Multi-Pollutant Risk and EJ Analysis” Module**

*AQAD/AQMG, March 18, 2021*

**Purpose:** Develop a multi-pollutant proximity analysis capability within the NEXUS tool. This capability can be applied to individual sources within a specific geographic area or for sector groups at the national level (“zoom-out” to nationwide).module to equip NEXUS with multi-pollutant and climate risks and EJ analysis capabilities for a selected industrial source and its sector group (“zoom-out” to nationwide)

**Resources:** In-house staff time (Carey, Jim, Shannon, Matt, etc.) with expected OAQPS funding to support this new NEXUS development effort.

**Data Requirements:**

Need to retrieve and/or generate new datasets based on “Census block group” level of resolution (NEXUS’s current datasets are based on “Census tract” level). The datasets required are given below (Table 1).

**Table 1. Data requirements**

|  |  |  |
| --- | --- | --- |
| **Type of data** | **Potential source** | **Level of resolution** |
| Industrial source & sector group emissions data (2017) | EIAG (NEI for CAPs/HAPs) | Point |
| PM2.5 & O3 concentration data (2017) | AQMG/AQAG | Census tract |
| PM2.5 & O3 risk data (2017) | MP team/RBG | Census tract |
| Air toxics risk data (2017) | MP team/ATAG | Block group |
| Climate risk data (2017) | Climate team? EJSCREEN climate risk indicator? | Block group |
| Population | Census’ American Community Survey (ACS) | Block group |
| EJ data (minority group, income group, education, linguistic isolation, life expectancy, etc.) | EJSCREEN | Block group |
| Tribal data (boundaries, etc.) | OAQPS public site & CTPG | Block group |

**Draft Module Design: ”Proximity-based Multi-pollutant Risk and EJ Analysis” module**

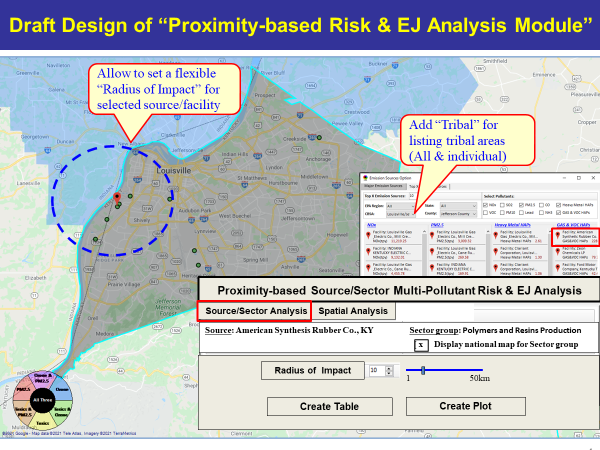
* Develop proximity-based multi-pollutant risk and EJ analysis capabilities for a selected industrial source (local) and its sector group (“zoom-out” to nationwide)
* For a selected emission source/facility, allow to set a flexible “Radius of Impact” (e.g., 1 ~ 50 km)
* Create a summary table & chart (example table & chart given below) to cross-examine the potential linkages of
  + Multi-pollutant risks (PM2.5, O3, and Air toxics)
  + Demographic and socio-economic data (population, minority group, low income, etc.)
  + Climate risks (fire, flood, sea level rise, heat, disease, etc.)

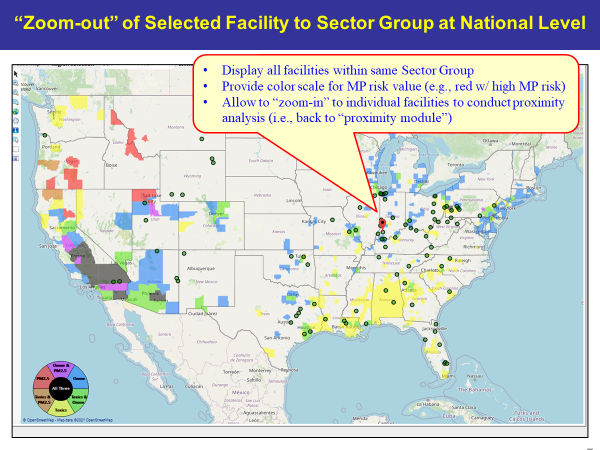
By extending the tool to:

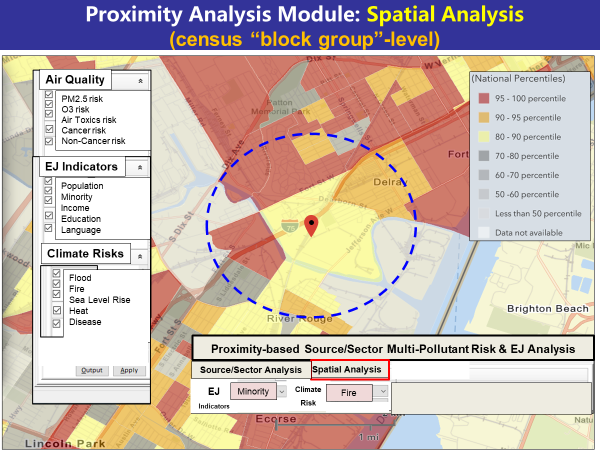
* + Provide plots/charts based on the selected table attributes
  + Expand from the selected source/facility and “zoom out” to its “sector group” nationwide (within the same selected radius of analysis)

(*Note: this function could be computationally challenging*)

* + Link to a national map with all facilities within the same Sector group with point value of MP risks displayed in color scale
* Provide “Spatial analysis” (map) functions for MP risks and EJ indicators
* Include “Tribal areas” to provide similar analysis capabilities
* Include Air toxic “top risk drivers” and “risk threshold” analysis capabilities
* Also add “EJ” indicators as one of the four key metrics (PM, O3, AT & EJ) in main page

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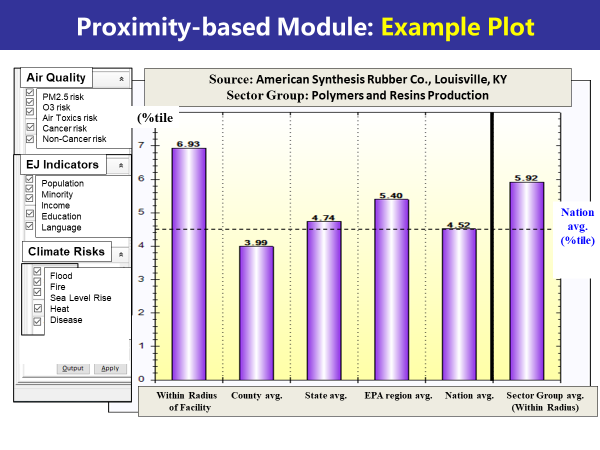
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**Example Table:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Facility: American Synthesis Rubber Co., Louisville, KY**  **Sector Group: Polymers and Resins Production**  **Top Risk Drivers: ETO, Formaldehyde** | | | | | **Selected Options:**  **Radius of Impact: 10km**  **Number of CBSAs: 25 (top MP risk ranking)**  **Air Toxics Risk threshold: 10 (“x”-in-a million)** | | | |
|  | **Within Radius of Facility** | **County Avg.** | **State Avg.** | **EPA Region Avg.** | | **Nation Avg.** | **Sector Group (within radius) National avg.** | **Sector Group (within radius) Top 25 CBSAs** |
| **Population total** | x,xxx | xx,xxx | xxx,xxx | xxx,xxx | | xxx,xxx | xxx,xxx | xxx,xxx |
| **PM2.5 risk (metric)** | x | x | x | x | | x | x | x |
| **Ozone risk (metric)** | x | x | x | x | | x | x | x |
| **Air Toxics risk:** |  |  |  |  | |  |  |  |
| **Cancer risk value**  **(“x”-in-a million))** | x.x | x.x | x.x | x.x | | x.x | x.x | x.x |
| **Cancer risk value above selected threshold**  **(population %tile)** | x% | x% | x% | x% | | x% | x% | x% |
| **Non-cancer risk**  **(Hazard Index)** | x.x | x.x | x.x | x.x | | x.x | x.x | x.x |
| **Climate risks:**  **Flood** | x% | x% | x% | x% | | x% | x% | x% |
| **Sea level rise** | x% | x% | x% | x% | | x% | x% | x% |
| **Fire** | x% | x% | x% | x% | | x% | x% | x% |
| **Disease** | x% | x% | x% | x% | | x% | x% | x% |
| **EJ/Demographics**  **Minority group (%tile)** | x% | x% | x% | x% | | x% | x% | x% |
| **Low-income group (%tile)** | x% | x% | x% | x% | | x% | x% | x% |
| **Demographic Index (%tile)** | x% | x% | x% | x% | | x% | x% | x% |
| **Linguistic Isolation (%tile)** | x% | x% | x% | x% | | x% |  | x% |
|  |  |  |  |  | |  |  |  |

**Example Chart:**

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