Group Activity: Pollution and the built environment

Names of Group Members: _____

Objectives of this Activity:

1. Explore the geographical relationship between various forms of pollution/pollutant effects and the built environment;
2. Explore how mapping tools can help us understand the actual or potential distribution of pollutants and their effects;
3. Find evidence for environmental injustice related to the geographical distribution of pollutants and their effects; and
4. Report your findings to the rest of the class.

Instructions:

1. This activity builds on skills learned in a previous group activity, "How biodiversity impacts ecosystem services". If you need to review these skills, download the instructions for this previous activity from the *Learning Management System* (*LMS*).
2. Technically, your group only needs one computer to complete this activity, but it may be helpful to have multiple computers going so that you can expand the breadth of your group's explorations.
3. To complete this activity, you must navigate to the U.S. Environmental Protection Agency's "EnviroAtlas" tool. Below is the information you need to gain access to this tool:

   URL: http://enviroatlas.epa.gov/enviroatlas

4. During this activity, we will be using EnviroAtlas' "Interactive Map" tool. You can access this tool by returning to the *EnviroAtlas Home* page and clicking on the "**EnviroAtlas Interactive Map**" link. On the main EnviroAtlas page, hit the "**Launch the Map**" link.
5. Your first task is to use the *Interactive Map* to find a correlation between a *measure of pollution/ pollutant effects* and a *measure of the built environment*. Here are some tips for completing this task:
   - **a.** Because the "layering" features of the *Interactive Map* are pretty difficult to use, it is probably better to use the ability to toggle datasets "on" and "off" to search for correlations.
   - **b.** There are a lot of *measures of pollution/pollutant effects* in the various datasets, most of which can be found in the "National" dataset; there are several categories in this dataset that explicitly relate to pollution.
   - **c.** You can also find *measures of the built environment* in the "National" dataset. Some valuable categories include "Land Cover", "Near-Road Environments", "Engagement with the Outdoors", and "Crop Productivity". There are also *measures of the built environment* in the "EnviroAtlas Communities" datasets; be warned that most of these datasets only display at smaller scales (and will "grey out" when unavailable at a larger scale).

6. Once your group has found a correlation that you believe is significant/important/interesting, record the following information about this correlation in the table below:

measure of pollution/ pollutant effects	
measure of the built environment	
What kind of correlation can be seen between the maps of these two "measures"?	
How do you explain this correlation? Why might this correlation exist?	

7. After you have filled out the table above, take screenshots of your two maps so that you can share them with the rest of the class via a post to this week's WORKSPACE forum. Make sure that your post:

a. Indicates in the SUBJECT area the correlation you are demonstrating through your post (*for example*, "Stream Length Impaired by Nutrients versus Percent Cropland").

b. Uses the MESSAGE area to display the correlation between a *measure of pollution/pollutant effects* and a *measure of the built environment*. Label each of your map images, which can be inserted on the LMS using this button. ⇒ ⇒

c. Uses the MESSAGE area to describe the correlation you see between your two maps and explain what you think this correlation tells us about the relationship between pollution and the built environment.

d. Lists somewhere in the MESSAGE area of your post the names of all group members.

8. *Discuss and answer these questions:* **It is a common scientific saying that "correlation is not causation". What does this saying mean, and how does it apply to the correlation that you discovered and described? What scientific evidence would be required to establish a causative relationship between the correlated maps that you discovered?**

9. Next we will look at a different issue that is also at the geographical intersection of pollution and people: **environmental justice**. Here is how the *U.S. Environmental Protection Agency*[1] defines 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."

10. To explore this concept, your group is going try to discover a potential case of *environmental injustice* by searching for a correlation between some *measure of pollution/pollutant effects* and a *measure of social demographics*. "Social demographics" include the aforementioned race, color, national origin, and income but can also include other factors such as whether a person lives in a rural or urban environment. You can find a few *measures of social demographics* in the "National" dataset, but most of the relevant data is in the "EnviroAtlas Communities" datasets; be warned that most of these datasets only display at smaller scales (and will "grey out" when unavailable at a larger scale).

11. Once your group has found a correlation that you believe is significant/important/interesting, record the following information about this correlation in the table below:

measure of pollution/ pollutant effects	
measure of social demographics	
What kind of "environmental injustice" is revealed by the correlation you discovered? What might be the cause(s) of this injustice?	

[1] For more on U.S. EPA environmental justice work, see: http://www.epa.gov/environmentaljustice/

12. After you have filled out the table above, take screenshots of your two maps so that you can share them with the rest of the class via a post to this week's WORKSPACE forum. Make sure that your post:

a. Indicates in the SUBJECT area the correlation you are demonstrating through your post (*for example*, "Stream Length Impaired by Nutrients versus Percent Below Poverty Level").

b. Uses the MESSAGE area to display the correlation between a *measure of pollution/pollutant effects* and a *measure of social demographics*. Label each of your map images, which can be inserted on the LMS using this button. ⇒ ⇒ ⇒

c. Uses the MESSAGE area to describe the correlation you see between your two maps and explain what you think this correlation tells us about environmental injustice.

d. Lists somewhere in the MESSAGE area of your post the names of all group members.

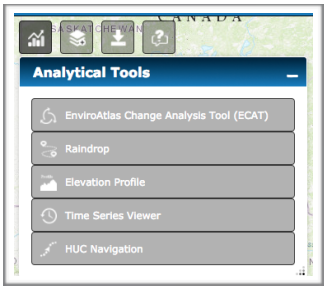
13. *Discuss and answer these questions:* **How would an urban planner benefit from understanding environmental justice? How might mapping of the kind you did above help an urban planner to avoid propagating environmental *injustices*?**

14. Finally, we will consider how a simple mapping tool -- the "Raindrop Tool" -- can be used to reduce the impacts of pollution. To access and use this tool you should:

a. Navigate to ANALYSIS TOOLS > RAINDROP TOOL in the menu bar of the *Interactive Map*.

b. In the "Raindrop Tool" control panel, hit SELECT RAINDROP POINT.

c. Click your mouse on the map where you want to drop your virtual raindrop; observe the path that raindrop is predicted to take to a local water feature.



d. Play around with this tool, dropping virtual raindrops and seeing where they end up.

15. *After your group has had a chance to play around with the virtual raindrop tool, discuss and answer these questions:* **In what ways would this tool be useful to an urban planner? How could this tool be used to reduce the contribution of the built environment to pollution problems?**