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Building a Greenway: Using EnviroAtlas in the Classroom

CASE STUDY

Office of Research and Development
National Exposure Research Laboratory
National Health and Environmental Effects Research Laboratory

EnviroAtlas
people health nature economy

Case Study

Building a Greenway:
Using EnviroAtlas in the Classroom

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Disclaimer

The city of Canton and the detailed narrative are fictional. They are intended to represent situations that could occur and the challenges and opportunities that may accompany said circumstances. Though this material was reviewed and approved by EPA, it does not necessarily reflect official Agency policy. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Preface

This document was created as an activity for educational use to introduce students to the concept of greenways, using maps in decision-making, and EnviroAtlas.

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For questions regarding this case study and supplemental materials, please contact the EnviroAtlas Team at Enviroatlas@epa.gov.

Acknowledgments

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Guidance for Instructors

Case Study Overview

In this hypothetical case study, funding to complete a pilot section of a greenway has been granted to a city Parks and Recreation Department. The proposed pilot section is being presented to the city council for review and approval. The proposal was drafted by the Parks and Recreation Department and selected to meet the goals of the Department. Numerous data and maps were used in determining this selection and are included in the proposal. The reader is asked to generate an opinion and justification for supporting or not supporting the proposed route. The Parks and Recreation Department goals include the following:

- Improve access to and use of parks and green spaces,
- Enhance habitat for biota,
- Encourage physical activity and recreational opportunities, particularly for aging populations.

This case study is intended to showcase ways in which EnviroAtlas, an interactive web-based tool that combines maps, analysis tools, fact sheets, and downloadable data, can support decision-making.

Available data can inform alternatives and help prioritize action at the local, regional, and national level. Such planning efforts also present a unique educational opportunity for students to be introduced to complex problems and learn to analyze and interpret relevant data while being asked to generate recommendations.

Learning Objectives

After completing this activity, students/participants should be able to do the following:

- Interpret an issue or problem from multiple perspectives.
- Integrate data from multiple sources to generate an argument.
- Compare and contrast different ecosystem services as they relate to sustainable and healthy communities.
- Integrate an environmental justice perspective into decision-making.
- Discuss the opportunities and challenges associated with multi-sectoral decision-making.
- Compare scenarios that integrate access to recreational opportunities, conservation of open space, and community development.
- Generate and defend recommendations based on the available data.

Curriculum Alignment

This case study is intended for secondary education, undergraduate, and community (i.e. municipal agencies and community organizations) education/engagement programs focusing on

ecology, environmental science, urban planning, public health, or public policy/civics. Prior to starting this activity, participants should possess a basic understanding of ecological principles and cartography/map interpretation.

This case study meets a number of secondary education curriculum requirements, including those for applied science, environmental science, information and technology, civics, humanities, human health, literacy, mathematics, and engineering. Examples of these requirements from both the Common Core and Next Generation Science Standards are listed below.

	NEXT GENERATION SCIENCE STANDARDS http://standards.nsta.org/AccessStandardsByTopic.aspx
HS-LS2-6	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-LS4-5	Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species
HS-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
HS-ESS3-3	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

	COMMON CORE STANDARDS http://www.corestandards.org/read-the-standards/
RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
RST.9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

RST.9-10.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
SL.11-12.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
HSS-IC.B.6	Evaluate reports based on data.
MP.2	Reason abstractly and quantitatively.

Using this Case Study without Internet

This case study can be carried out completely without the use of the internet. Use the following as guidance for administering this case study in the classroom. *It is recommended that each student have their own copy of 1) the case study and 2) the Understanding Maps Worksheet.* Map sets can be printed in color to be used in groups or displayed on computer/projector screens. Printing appendices is optional, though glossary terms, citations, and additional maps can be found there.

Teaching Plan

Case Preparation

There are multiple options for using the Building a Greenway Case Study. First, decide which activity or activities you wish to complete. Some options are below.

- **Option 1: Carry out the case study as written.** *This requires minimal prior class preparation and can be completed in a 45 - 60 minute class session.* Students will read the case study and complete the Understanding Maps Worksheet. Prior to the case study class session, have students read the case narrative, complete the 'Questions from the Reading', and come up with a few key points they would make. All students will complete the case study from the viewpoint of the Parks and Recreation Department, whose goals are outlined in the case study. Additional questions for class discussion are provided below.
- **Option 2: Assign each student a role from which to complete the case study.** *This requires some prior class preparation and may take 90 minutes of class time.* This is a great way to promote spirited discussion and will increase student understanding of the complexity of the decision making process.
    - Potential roles include: representative from the parks and recreation department, city planner, environmentalist, concerned citizen, environmental justice advocate, public health worker, neighborhood representative, or small business owner. Once roles are assigned, create groups that have a mix of roles.
    - Prior to the case study class session, have students read the case narrative and come up with a few key points they would make to their group based on their role. Point

them to Page 6 of the case study for guiding questions to prepare their report-back. If desired, encourage students to do some outside research for background for their role.

- **Option 3: Complete an activity from the Suggested Activities section below.** *More significant preparation outside of class time will be needed. In class time needed will vary among these activities. More than one class period will be required to complete the case study and an additional activity.* These individual activities can be used to tailor the Building a Greenway case study to individual class curricula and learning objectives. Students will complete the case study during class time and have an additional activity from the Suggested Activities assigned for more in-depth discovery. Students will need to make use of additional resources and work outside of classroom hours to complete assigned activities.

Completing the Case Study

Priming Questions for the Instructor

Students should have already read and become familiar with the case study. Take the first 10 minutes of class and prime the class for more in-depth discussion. The most straightforward way to do this is to use some of the prompting questions students that were given as a part of the case narrative, including:

- What is the situation? What issues are at stake?
- What is the context of the problem? What are the underlying assumptions of the case?
- What key facts should you consider?
- What questions do you have?
- What criteria should you use when selecting a route?
- What alternatives are available? What are the pros and cons of each alternative?
- What other information, including maps, would be useful to have in making your decision?

After priming the class, reiterate the instructions based on the class option that you have chosen. Students should have access to the map set during class time in order to complete the assignment.

- **Option 1: Carry out the case study as written.**
  - Each student should use the provided map set to complete the Understanding Maps Worksheet. Once they complete the worksheet, students should draft a short paragraph explaining their recommendation for the public hearing.
  - Have a few students read their recommendations to the class or introduce interesting observations from the Understanding Maps Worksheet.
  - If time allows, continue discussion with some of the provided discussion questions.
- **Option 2: Assign each student a role from which to complete the case study.** *Depending on class length, this activity may be split into two class sessions.*
  - During class time, have students complete the Understanding Maps Worksheet and draft their paragraph for their preferred route based on their individual role.

- Place students in their assigned group and have them report back their recommendations to their groups. Have students complete the Group Decision portion of the case study and attempt to agree on a pilot route collectively.
- If time allows, have student groups report back to the class on the route they decided on collectively. If groups did not come to consensus, have them explain why no consensus could be reached.

- **Option 3: Complete an activity from the Suggested Activities section below.**
  - Class Session 1: Each student should use the provided map set to complete the Understanding Maps Worksheet. Once they complete the worksheet, students should draft a short paragraph explaining their recommendation for the public hearing. Have a few students read their recommendations to the class. Assign the additional activity for students to complete.
  - Class Session 2: Complete Additional Activity or report-back on additional activity that was assigned for homework.

Continuing the Conversation – Discussion Questions

Begin to explore some of the underlying issues present in the case. These issues may be present in a variety of situations, not just this case, and may spark a discussion related to other topics in the course curriculum. Sample discussion questions include:

- How important is public input in the decision-making process?
- How can cities balance goals across economic, social, and environmental sectors?
- Who is responsible for promoting/encouraging healthy communities?
- What impact do you think this decision will have in the next year? 5 years? 20 years?

Measuring Impact

For recording a grade, have students turn in their Understanding Maps Worksheet and short rationale paragraph.

Using this Case Study with Internet

If you have access to the internet, you can use the EnviroAtlas Interactive Map and available online resources to teach this case study. Having students use the internet will allow them to explore the maps via the mapping application and gain practical experience with online mapping tools. The below procedure is our recommendation for completing the case study using internet resources. *Using the internet to complete the case study will require more in-classroom preparation to become familiar with the greenway concept and the EnviroAtlas mapping application. Completing the case study using internet resources will require at least two 45 minute class sessions, plus student time outside of the classroom.*

Teaching Plan

Prior to class time, have students read the case narrative, complete the 'Questions from the Reading', and come up with a few key points they would make.

Class Session 1: Case Preparation

By the end of the first class, students should have a thorough understanding of the greenway concept and know how to access and navigate the EnviroAtlas interactive map.

- If you are going to assign students to a role other than the Parks and Recreation Department, assign them at the beginning of Class 1. Create groups composed of the varied roles. Potential roles include: city planner, environmentalist, concerned citizen, environmental justice advocate, public health worker, neighborhood representative, small business owner, or outdoor enthusiast.
- To get students engaged and further acquainted with the greenways concept, consider showing 1 or 2 short introduction videos. Here are a few to choose from:
    - Greenville, NC https://www.youtube.com/watch?v=84D8n65TeuI (stop at 2:40)
    - Greenways, Please! Buncombe County, NC https://www.youtube.com/watch?v=8p3H0X4SDzI (4:54)
    - Ecusta Trail 20 mile Regional Greenway http://riverlink.org/ecusta-trail-video-touts-greenway-benefits/ (7:48)
    - Knoxville, TN – Urban Wilderness Park, Greenway system https://www.youtube.com/watch?v=05AoArAsg1A (3:47)
- Next, introduce the students to EnviroAtlas. Start with the EnviroAtlas overview video: https://www.youtube.com/watch?v=ZMU8ZLsCmUM.
- To get familiar with using the online mapping application, have students watch the EnviroAtlas Demonstration Video, which explains the interactive map components and how to navigate the map. Access the video here: http://enviroatlas.epa.gov/enviroatlas/howtouse/Demo/InteractiveMap_Demo_release.swf
- Go over the Map Guidance document step-by-step with students. It provides in-depth directions for accessing the maps used in this case, changing the base map, and adding the trailhead points. If students have individual classroom computers, have them follow along with you as you show the Map Guidance document. Find the Map Guidance here: http://www.epa.gov/enviroatlas/enviroatlas-guides-and-training

  NOTE: The majority of EnviroAtlas maps have an accompanying fact sheet. These fact sheets provide background information on each map, including why the topic is important, how one might use the data, and a brief description of how the data were created. Have students use these fact sheets to provide additional contextual information for completing the case study and answering the questions in the Understanding Maps Worksheet. Fact sheets can be searched and sorted from here: http://www.epa.gov/enviroatlas/enviroatlas-dynamic-fact-sheet-matrix
- If students have individual computers or computers for group use, allow them to explore the EnviroAtlas interactive map and other resources and ask questions during class time.
- **As a homework assignment:** Have the students complete the Understanding Maps Worksheet and their short rationale paragraph for The Public Hearing based on their assigned role. Encourage students to use their knowledge of the interactive map to explore the maps presented in the case study and other available maps.

Class Session 2: Case Study Report-back and Discussion

If individual roles are not assigned.

- Start class discussion by asking students to report-back on which maps they found to be most useful in their Public Hearing paragraph. They should highlight their answers to the following questions:
    - What maps support your selection? How?
    - What were your primary considerations when selecting your route?
- Continue discussion among the class by asking, "What other information/maps would have been useful to have available to help make this decision?" Use the EnviroAtlas interactive map to explore additional maps during the discussion.
- Encourage discussion on the importance of access to information and data. What resources would they have used if they didn't know about EnviroAtlas?

If individual roles are assigned.

- Place students in their assigned group and have them report back their recommendations to their groups. Have students complete the Group Decision portion of the case study and attempt to agree on a pilot route collectively.
- Have student groups report back to the class on the route they decided on collectively. If groups did not come to consensus, have them explain why no consensus could be reached.
- Continue discussion among the class by asking, "What other information/maps would have been useful to have available to help make this decision?" Use the EnviroAtlas interactive map to explore additional maps during the discussion.

Continuing the Conversation – Discussion Questions

Begin to explore some of the underlying issues present in the case. These issues may be present in a variety of situations, not just this case, and may spark a discussion related to other topics in the course curriculum. Sample discussion questions include:

- How important is public input in the decision-making process?
- How can cities balance goals across economic, social, and environmental sectors?
- Who is responsible for promoting/encouraging healthy communities?
- What impact do you think this decision will have in the next year? 5 years? 20 years?

Measuring Impact

For recording a grade, have students turn in their Understanding Maps Worksheet and short rationale paragraph.

Additional Suggested Activities

These are potential activities that could be completed once students have completed the general case study assignment and are familiar with the case study concepts.

Advanced Topics for Class Discussion

These questions (and potential responses for instructors) were developed to help guide in-class discussion about this case study. Other options include modifying or adding questions that address topics covered in class or asking students to submit possible discussion questions after reading. *This discussion would likely require one 45 minute class session.*

- **What does Canton's City Council need to consider when deciding where to invest in a greenway pilot section?**

As with many long term decisions and investments, competing interests may play a role. These can include financial considerations, such as sources of funding and the projected lifetime benefits of the project; time and resources invested, predicted benefits of the choice made, and any requirements (i.e. laws/regulation, or funding requirements) that need to be met. Additional issues may also include public support, precedent set by other communities or projects, and overarching city goals. These factors may impact the council's ability to garner support and aid in identifying possible tradeoffs or alternatives.

- **Should the location of the pilot section be determined by scientific data or public opinion?**

Both need to be a consideration. Utilizing data in the decision making process helps to ensure that public opinion is not simply a reflection of who is speaking loudest or most adamantly. How ensure equal representation of all stakeholders, including those who may benefit from the proposal but might be unaware of its existence, may be achieved is a primary consideration.

- **How does the city's financial situation affect its ability to successfully implement its plans?**

The city currently only has enough funding for a pilot section even though a complete greenway network has been proposed and identified in the city planning process. This means that it could be a while before other sections are completed and linked together. Completing a cost/benefit analysis of the proposed section along with alternatives may be a method used to support an opinion. In addition to funding, considerations of current infrastructure (highways, etc.) that may increase costs associated with construction may impede plans for the "best" pilot route.

- **What role does current public opinion on sustainability play in determining the results of the proposal?**

Sustainability is currently a "hot" topic across the country and around the world. Ideas of sustainability are the foundation of Canton's greenway plan. What might happen if public opinion regarding sustainability sways? Consider financing, political support, etc. Are there other

frames of thought that could support greenway development (i.e. public health, community engagement, climate adaptation, etc.)

- **What role would collaboration play in this development?**

The greenway plan calls for a long term investment of both time, money, and human resources. Collaboration may serve as a mechanism to reach stakeholders and secure support and buy-in that will endure. How could this collaboration be facilitated?

- **(If students were not assigned an alternative role) Do you think the proposed section would change had a different department or office received the grant? How and/or why**?

The proposed pilot section was determined based on the goals of the Parks and Recreation Department. Priorities are likely to be different based on interests (i.e. environmental, social, and economic) and scale (i.e. department, city, region).

- **What other information/data would be useful?**

As the case is discussed or students tackle a project on their own, additional data sets or information may be helpful. Additional data on budget and finances, information on any existing trails, data on greenway/trail usership (i.e. demographics, preferred design features, barriers to use), and information on other planning projects or developments that could affect greenway access may aid in final selection of a pilot section. While an opinion can be formed from the data provided, asking students to recognize the limitations of available information and solutions to address these limitations can aid in developing critical thinking skills essential for solving complex problems.

- **Why might you want to avoid constructing a greenway in an area where habitat is well-connected?**

Connectivity is an essential component of ecological integrity. If an area of core habitat is intersected or interrupted by the placement of a trail there could be negative consequences for the biota in that area.

- **The benefits of greenways are explicit in the case. What might be some arguments against creating one?**

Identifying counterarguments and determining how they may be addressed is an important component to pushing an agenda forward. Some disbenefits of a greenway could include: safety (i.e. injury, crime), spread of invasive species, disease transmission (i.e. lyme disease), and edge effect (presence of more common species and not more uncommon species).

Opinion Piece

An opinion piece could be written as a submission to a newspaper or as a blog post. This task would require participants to take a stance in support of or against the proposal and justify their arguments. Also, due to limitations in word count, concise writing techniques must be utilized.

This would be an individual task to be completed as a homework assignment before or after discussing the case in class.

- EXAMPLE: Writing a letter to the editor/opinion piece http://ctb.ku.edu/en/table-of-contents/advocacy/direct-action/letters-to-editor/main
- EXAMPLE: Writing Lesson - Better Blogs http://www.educationworld.com/a_lesson/better-blog-writing.shtml

Policy Brief/Memo

Utilizing a Brief or Memo writing assignment enables a direct tie in to a policy based discussion. Students need to write formally and concisely, supporting their stance by citing theory and additional resources. *This would be an individual task to be completed as a homework assignment after discussing the case in class.*

- EXAMPLE: The Policy Brief- Instructions http://policyinstitute.ucdavis.edu/files/Policy-Institute-Policy-Brief-Instructions.pdf

Role Play or Debate

Assign participants roles that are represented in the narrative. Examples of possible roles include: city council members, representatives from various city departments and offices, citizen groups (i.e. neighborhood associations), scientists, special interest groups (i.e. conservation, recreation, business, etc.). The activity demonstrates the multifaceted nature of decision-making requiring the identification of trade-offs and negotiating solutions. *This would primarily be an in-class activity that fosters interaction and teamwork and would likely require two or more 45 minute class sessions.*

EXAMPLE: What is a public hearing? How do you conduct one? http://ctb.ku.edu/en/table-of-contents/advocacy/direct-action/public-hearing/main

Make a Map, Tell a Story

Have the students use the EnviroAtlas Interactive Map or other software to create a map that substantiates their opinion. *[The students should use the Tampa, Florida community, as all maps in this case study are from the Tampa area.]* The map could be: the data layer they feel is most important, an overlay of the data layers they feel best inform their choice, or a data layer that ties into other course curricula in some way. Encourage the use of cartographic principles in this assignment (i.e. directional arrow, labels and headings, symbology and legend, source information, etc.). This assignment brings technology and a spatial component into the decision-making process. This can be done as a team or individual assignment in class or as homework. *This activity would likely require two or more 45 minute class sessions.*

EXAMPLE: National Education Association - Teaching with Maps
http://www.nea.org/tools/lessons/teaching-with-maps.html

Use EnviroAtlas to inform a local decision

After discussing the case study in class, particularly how the information presented can be used and what additional data might be beneficial, pose a local or regional situation or issue for them to explore. Task the students with developing materials to inform stakeholders or draft position papers on the topic. This could be done in teams or as individuals. *This activity would likely require two 45 minute class sessions and additional time outside of class. The Map Guidance document could be useful in getting students started with the Interactive Map to explore other maps for their decision context.*

EXAMPLE: Resources on how to use EnviroAtlas including a demonstration video and use cases http://www.epa.gov/enviroatlas/how-use-enviroatlas

Additional Readings and Resources

- Eco-Health Relationship Browser: The Browser is a tool that visually illustrates linkages between ecosystems, ecosystem services, and human health. A growing body of evidence demonstrates that ecosystems can provide protection from natural and man-made hazards, and promote healthful behaviors. http://www.epa.gov/enviroatlas/enviroatlas-eco-health-relationship-browser
- Great summary website on the benefits of greenways http://www.americantrails.org/resources/benefits/
- Jennifer R. Wolch, Jason Byrne, Joshua P. Newell, Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough', Landscape and Urban Planning, Volume 125, May 2014, Pages 234-244, ISSN 0169-2046, http://dx.doi.org/10.1016/j.landurbplan.2014.01.017 http://www.sciencedirect.com/science/article/pii/S0169204614000310
- Sustainability Planning Toolkit: A guide written by ICLEI: Local Governments for Sustainability to aid cities and counties in developing sustainability plans. http://portal.hud.gov/hudportal/documents/huddoc?id=20399_iclei_sustainabil.pdf
- Greenways have been completed in many cities and counties. Two examples with resources such as trail maps, a description of the greenway development process and historical context are:

- Capital Area Greenway Trail Systems - Raleigh, NC: http://www.raleighnc.gov/parks/content/PRecDesignDevelop/Articles/CapitalAreaGreenwayTrailSystem.html

- Greenways for Nashville - Nashville, TN: http://www.greenwaysfornashville.org/greenways/

Answers to Comprehension Questions

Questions from the Reading

1. What are overarching goals of the Canton Sustainability Plan?
    a. The overarching goals of the Sustainability Plan are to support equal access to resources, conservation of open space, and economic development.
2. What are some benefits/services provided by green spaces?
    a. Recreation, physical activity, positive effects on health, hazard mitigation and buffering, air and water filtration
3. How are greenways important for preserving natural ecosystems?
    a. Greenways increase connectivity and biodiversity and encourage conservation.

Understanding Maps Worksheet

1. Do you see any trends related to the elderly population and green space?
    a. The larger populations of elderly people generally live near green space. Toward the middle of the map there is an area where there are larger elderly populations but lower green space.
2. How does Figure 3 help illustrate why the chosen route would benefit the Parks and Recreation Department? Who else might be interested in access to parks?
    a. The proposed route would connect three parks and create a pathway for people to go from one park to another, increasing usage. There are also areas along the route that are not within short walking distance to a park; adding the greenway may make it more likely that people in these areas would access existing parks via the greenway. The proposed route is also near waterbodies which will encourage greenway users.
    b. Community members, environmental justice advocates, public health workers, fishermen, birders, outdoor enthusiasts, and parents, among others, may be interested in access to parks.
3. How might connectivity be important in the selection of the pilot section of the greenway? Is the proposed pilot section the best choice for increasing connectivity?
    a. The greenway could help connect areas that are disconnected by development.
    b. It depends on what your goals are. The proposed pilot route connects multiple small areas. Other potential routes could connect larger patches.

4. Looking at Figure 5, what is the most common land cover type in Canton? How might the land cover affect where a trail would be placed? Think about current developed land the presence of local businesses.
    a. Trees and Forest and Impervious are prominent land cover types.
    b. Multiple answers are possible. Some potential answers: Green spaces could be easily converted to a greenway but developed land might be harder to convert. People might want the greenway to be placed next to areas of significant development or where there are businesses so that people will have destinations along the greenway. There needs to be 'green' for a greenway, so if you had to place a greenway route along an area of too much development it might not be well-received. It might be nice to have a greenway next to water so that people could enjoy it. Some land cover types, like wetlands, may be prohibited to develop for a paved trail.
5. Would the proposed pilot route increase park access to those who have little access comparatively? How?
    a. Yes, it would. The pilot route goes through several block groups that have at least 97% of people who do not have a park within 500m.
6. When considering where to construct the pilot and subsequent trails, how might intersection density and walkability affect placement?
    a. Higher intersection density areas may indicate that the residents are more likely to walk or bike places, and therefore more likely also to adopt and use a greenway if placed in the area. Greenways can also pass through areas of lower intersection density, where walkability is lower to improve walkability and connect the more walkable areas.

Canton Greenway Case Study

Case Study Synopsis

In this hypothetical case study, funding to complete a pilot section of a greenway has been granted to a city Parks and Recreation Department. The proposed pilot section is being presented to the city council for review and approval. The section proposal was drafted by the Parks and Recreation Department and was selected to meet the goals of the Department. They used a number of maps from EnviroAtlas, a web-based decision support tool, to help them determine their pilot section; these are included in the proposal. The Parks and Recreation Department goals include the following:

- Improve access to and use of parks and green spaces,
- Enhance habitat for biota,
- Encourage physical activity and recreational opportunities, particularly for aging populations.

As a concerned citizen, you are asked to review the case and weigh in on the selection of a pilot section for the greenway at an upcoming public hearing. For the hearing, you must be prepared to support your stance on whether the proposed pilot section is the best option. *If the instructor assigns you a particular role, form your stance based on the assigned role.*

Introduction

EnviroAtlas

EnviroAtlas is a collection of interactive tools and resources that allows people to explore the many benefits people receive from nature (e.g., clean water), often referred to as ecosystem services. Though critically important to human well-being, ecosystem services are often overlooked. Using EnviroAtlas, many types of users can access, view, and analyze diverse information to better understand how various decisions can affect an array of ecological and human health outcomes. EnviroAtlas is intended to be used by a wide range of audiences, including planners, educators, students, researchers, and decision-makers from all levels of government.

In this case study, the Parks and Recreation Department used multiple maps from the EnviroAtlas interactive map to make the case for their chosen pilot section. Visit the website at http://www.epa.gov/enviroatlas.

Canton Greenway Case Study

The Canton Parks and Recreation Department recently received an EPA Sustainability grant to implement the creation of the Canton Greenway, a network of trails connecting destinations in the city, which was proposed in the Canton 2025 Sustainability Plan. The overarching goals of the Sustainability Plan are to support equal access to resources, conservation of open space, and economic development. The major access points to the greenway have been predefined and the network of trails will connect these points (Figure 1). While the grant money received is not enough to complete the greenway in its entirety, it is enough to complete a pilot section. The Parks and Recreation Department has developed, and is ready to submit, a proposal for the location of a pilot section of the greenway for approval at an upcoming city council meeting. **As an active member of the community, you need to review the proposal and decide whether you support or oppose the selected location of the proposed pilot section.**

"Conserved land in the form of linear greenways has the potential to connect habitats and protect sensitive natural features while simultaneously providing a setting for recreational or utilitarian physical activity and the alleviation of psychological and social stressors." (Coutts, 2010, p 10)

Greenways first came into use in the U.S. in the 1800's in the form of linear parks and open space in urban areas (Flink, C.A., 1993). Providing routes for movement is the defining feature of a greenway (Searns, R.M., 1995). While originally implementation of greenways focused on aesthetics and beautification (Searns, R.M., 1995), the greenway approach has evolved to be more multi-purpose to meet infrastructure needs for alternative transportation and water management, provide resources for outdoor education, address habitat needs for wildlife, and provide hazard mitigation and buffering services (Flink, C.A.1993; Searns R.M., 1995). Greenways provide a number of benefits including health promotion, economic incentives, and landscape preservation. Greenways are more than just parks; they represent an opportunity to provide balance in the provision of ecosystem services and the public demands for the use of such services.

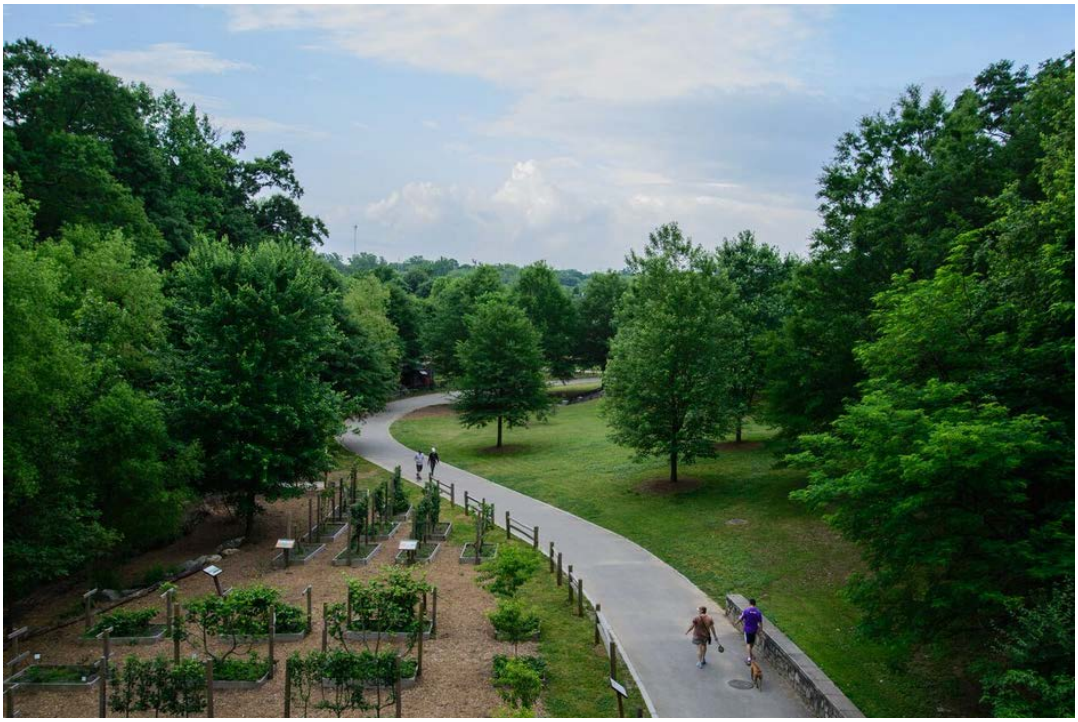

Image 1: Greenway in Atlanta, GA. Photo credit: Riley Perszyk.

Green areas have been shown to have a number of benefits including positive health outcomes stemming from the provision of ecosystem services. These green areas can provide places for recreation and engagement with nature, as well as filter air and water pollution, while minimizing impacts from natural hazards such as floods and heat waves. Through services like these, greenways have the potential to impact a number of health outcomes including obesity, birth outcomes, mental health and longevity (Jackson L.E. et al., 2013). Increasing neighborhood connectivity and access to destinations can have a positive impact on active transportation, such as bike commuting, and aid people in achieving recommended physical activity targets. A recent study on the potential benefits of a greenway development in Ireland demonstrated that increasing physical activity rates by 10% could have a significant impact on preventing incidence of diseases like heart disease and type 2 diabetes in populations near a greenway (Dallat M.A.T., et al, 2013).

Implementing greenway systems also aids in the preservation and restoration of natural ecosystems. Greenways have the potential for both urban and rural land conservation as well the promotion of habitat connectivity and biodiversity. The fragmentation of habitats has become a significant issue for many species. As development and urbanization take place, habitats that were once expansive and linked are decreasing in patch size and/or connectivity, causing negative impacts ranging from decreased genetic diversity and increased inbreeding to increased transmission of vector borne diseases (e.g., the spread of Lyme disease via ticks). Maintaining and creating connections among core habitat areas with natural corridors are critical for retaining biodiversity. Greenways can serve not only as habitat themselves, but also as corridors that can link habitat patches of various sizes and improve species mobility across areas.

Despite the many benefits, the costs associated with the construction and maintenance of greenways can be significant. Land costs, infrastructure, and safety features all impact the bottom line. However, as an amenity, park systems have the potential to add value in a number of ways including: property value, tourism, direct use, health, community cohesion, clean water, and clean air. Multiple studies have shown that greenways can have a positive or neutral impact on property values, with most of the positive value being captured within 500 -2,000 ft of the greenway (Nicholls, S. and Crompton, J.L., 2005; Campbell, H.S. Jr. and Munroe, J.K., 2007; and Lindsey, G., 2004). Property values and associated tax revenue serve as a motivator for commercial, residential, and recreational siting within a community. While not considered income like property or sales tax revenue, factors such as social capital, health promotion, and hazard buffering can result in savings for both communities and individuals.

Scenario Overview

Canton is a mid-sized urban city in the United States. As of the most recent U.S. Census, approximately 300,000 people live within the city boundary and the population has been slowly, but steadily declining since the mid-1960's. The majority of residents identify as white (43%) or Hispanic (39%) and 32% of those over the age of 25 have at least a Bachelor's degree. The population is gradually aging with a 5% increase from the last U.S. Census for those identified as being over 70 years of age. Canton is known throughout the region for its cultural and performing arts center, architectural design, and Green State College. The city has a number of parks and green spaces, particularly near the rivers and lakes.

As a part of the city planning cycle, a 2025 Sustainability Plan was developed and approved in 2010. Multiple city departments and offices played a role in the plan's development, including the Mayor's Office, the Economic Development Department, the Office of Planning and Community Development, and the Parks and Recreation Department. Upon the completion of a sustainability assessment in 2009, the city developed a series of goals to guide the planning process toward balancing development and conservation. Based on this assessment and identified goals, Canton's primary areas of interest in the 2025 Sustainability Plan became land use planning and design, economic development, and community health and wellness. Within each of these areas, a number of priorities were established (Table 1).

TABLE 1: Canton 2025 Sustainability Plan Areas of Interest and Priorities (adapted from ICLEI Sustainability Planning Toolkit)

AREA OF INTEREST	PRIORITIES
Land Use Planning and Design	▪ Zone to promote mixed-use land uses ▪ Review City policy and planning framework to ensure that City infrastructure and development planning is centered more on pedestrian and active transportation ▪ Reduce greenhouse gas emissions ▪ Reduce ecological footprint (focus on reducing consumption and waste).
Economic Development	▪ Strengthen City - Community Partnerships with business, academic and non-profit sectors ▪ Partner with community-based business development organizations to focus on business skills development and training for artists, young people, and newcomers ▪ Meet with developers and the community to discuss and remedy any potential barriers which would discourage the reuse and reclamation of existing buildings and/or brownfield sites
Community Health and Wellness	▪ Increase accessibility to services ▪ Work in partnership with community based organizations to develop community gardens ▪ Ensure community safety and security ▪ Improve health and well-being through active lifestyles

While the completion of the Canton Greenway is part of the 2025 Sustainability Plan, it has been difficult to gain approval for funding and maintenance in the city's annual budget. Some parties feel that the Greenway is not worth the time and financial investment as its completion is anticipated to take the better part of a decade. Others support the concept of developing a Greenway but challenge the idea that existing funds should be used to support the project.

In hopes of creating momentum, the Parks and Recreation Department was able to secure a small grant to begin work on a pilot section of the planned greenway network. The entrances for the greenway network have already been chosen based on land parcels that are already owned by the city (Figure 1). Given the locations of these access points, a pilot section proposal in line with the amount of funds awarded has been drafted.

Because of time constraints on the grant, a decision must be made quickly and a special city council meeting has been declared. A public hearing for the proposal is scheduled for 7 days prior to this city council meeting to gather community feedback on the selected pilot section.

As an active member in your community, you plan to attend the hearing and have reviewed available materials to inform your opinion of the proposed pilot section of the Greenway.

Questions from the Reading

Use information from the case study text to answer the following questions:

1. What are overarching goals of the Canton Sustainability Plan?
2. What are some benefits/services provided by green spaces?
3. How are greenways important for preserving natural ecosystems?

The Proposal- Canton Greenway Pilot Section

There are five major access points to the greenway that have been predefined. The completed network of trails will connect these points. The pilot section of the greenway could run between any of these points. However, because of their interests and concerns, as well as available funds, the Parks and Recreation Department has chosen a trail route that runs between points 1 and 4 to be the pilot section (Figure 1).

When selecting the pilot route from trail heads 1 to 4, the Parks and Recreation Department was most concerned with improving access to parks (Figure 3) and improving the connectivity of existing habitat patches (Figure 4). They used maps from EnviroAtlas to develop a proposal for the pilot section that addressed their concerns.

Review the attached map set, which contains the maps the Parks and Recreation Department used to make their case. Answer the worksheet questions and consider the maps from the point of view of the Parks and Recreation Department.

- Why is each map important to making the case for the Parks and Recreation Department?
- If you were assigned a different role, consider the maps from your assigned point of view.
    - Do these maps help make your case as well? How?
    - What other information do you need to support your point of view?

Worksheet - Understanding Maps

1. Figure 2 shows the percent of the Canton population that is over 70 years old, on top of a map showing percent green space in Canton. The demographic data, in this case the elderly population, are represented by orange circles. The size of the circle indicates the relative number of elderly individuals in a given census block group. Block groups that have the most green space are dark blue, while those with the least are yellow.

- **Do you see any trends related to the elderly population and green space? Explain.**

2. Figure 3 shows the estimated walking distance (in meters) via roads to a park entrance in the proposed trail network area. Dark green areas indicate a short distance to a park entrance. This map can be used to identify neighborhoods that have ready access to parks and those that are underserved and may benefit from additional parks or new park entrances to increase access. The blue lines seen on this map are an overlay of water flowlines - i.e. the presence of flowing waters such as streams.

- **How does Figure 3 help illustrate why the chosen route would benefit the Parks and Recreation Department?**
- **Besides the Parks and Recreation Department, which other advocacy groups or community members would be interested in better access to parks?**

3. Figure 4 shows the connectivity of the natural land cover, with water included as background. Connectivity describes the ways in which a landscape promotes or impedes movement among core areas of potential habitat or cover. Connectivity is important to the concept of green infrastructure, which is used in land and water quality management.

- **How might connectivity be important in the selection of the pilot section of the greenway?**
- **Is the proposed pilot section the best choice for increasing connectivity? Explain.**

4. Figure 5 shows the land cover classification for the area of interest in Canton. Land cover data are necessary for sound urban planning and sustainable development. There are 8 land cover classes: Water, Impervious Surface, Soil and Barren, Trees and Forest, Grass and Herbaceous, Agriculture, Woody Wetlands, and Emergent Wetlands.

- **Looking at Figure 5, what is the most common land cover type in Canton?**
- **How might the land cover affect where a trail would be placed? Think about current developed land and the presence of local businesses.**

5. Figure 6 shows the residential population not within 500m of a park entrance, summarized by census block group. This map uses some of the same information as Figure 3, but takes the presence of people into account and is summarized by block group. The summaries by census block group can be used to evaluate park access per capita. When overlaid with socio-economic layers within EnviroAtlas, these maps can highlight park proximity for specific age groups or other demographic groups for whom access could be especially beneficial.

- **Would the proposed pilot route increase park access to those who have little access comparatively? How?**

6. Figure 7 shows the street intersection density in the area of interest in Canton. Intersection density is the number of intersections per square mile. Higher intersection density is typically associated with smaller blocks, which are more walkable.

- **When considering where to construct the pilot and subsequent trails, how might intersection density and walkability affect placement?**

Student Task

The public hearing to discuss the proposed pilot section of the Greenway is rapidly approaching. **Your primary objective is to ensure that the pilot section of the greenway is completed in the best location.** *In preparation for the meeting, you identify the most important issue(s) in selecting a site, review the proposal materials, formulate an opinion on whether you support the proposed site, and defend your decision using the available information.*

Figure 1. Proposed trail network area in Canton

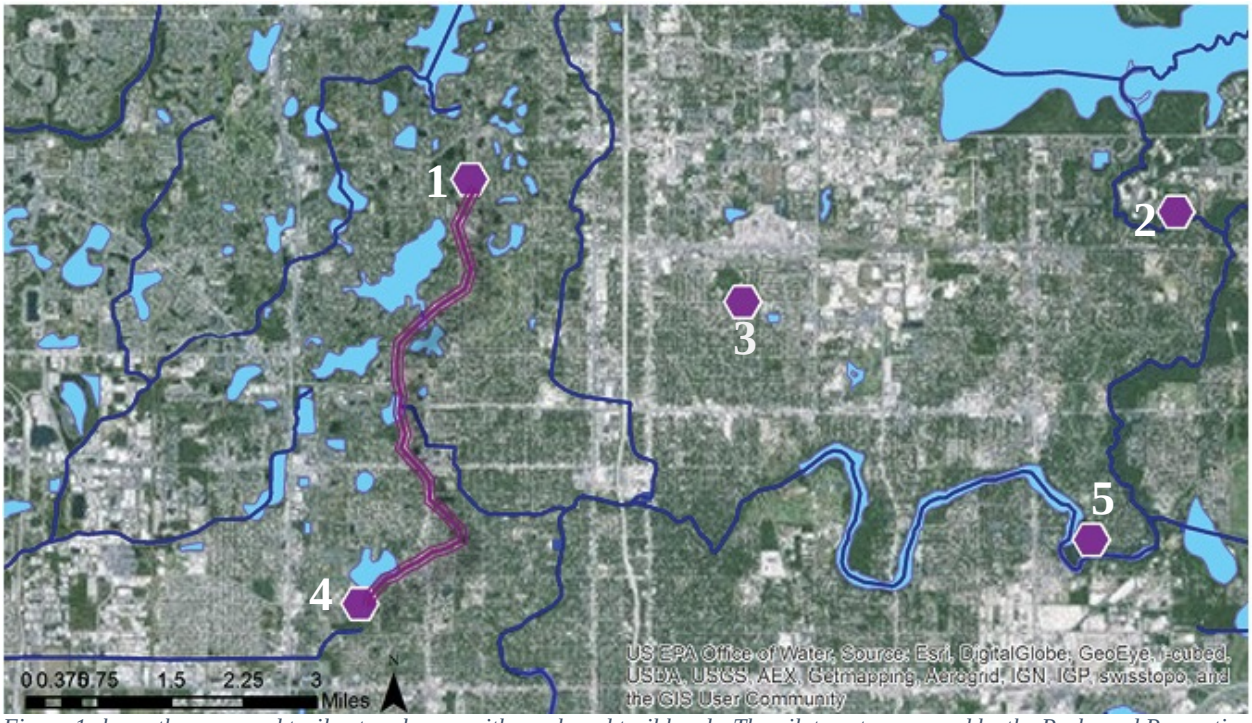

Figure 1 shows the proposed trail network area with numbered trail heads. The pilot route proposed by the Parks and Recreation Department runs from trail head 1 to 4. In this aerial image, waterbodies were identified and appear in light blue, with streams in dark blue.

When considering the case study and the pilot section proposal, keep the following questions in mind:

- What is the situation? What issues are at stake?
- What is the context of the problem? What are the underlying assumptions of the case?
- What key facts should you consider?
- What questions do you have?
- What criteria should you use when selecting a route?
- What alternatives are available? What are the pros and cons of each alternative?
- What other information, including maps, would be useful to have in making your decision?

The Public Hearing

Now that you are at the hearing, you must present your argument for the chosen route (based on your assigned role). Draft a short paragraph addressing the following questions:

- What route would you recommend — and why?
- What maps support your selection? How?
- What were your primary considerations when selecting your route?
- Are there other routes that you would be willing to consider based on your research?

Group Decision

If you were assigned to a group, each group member should report back on the four questions that are above. Once each group member has presented their rationale for their chosen route, you must attempt to get the group to agree on one route to put forth for the pilot section.

- Were you able to collectively decide on the most favorable route? If no, why not?
- Do you agree with the original pilot section route the Parks and Recreation Department chose? If not, which route did you collectively decide was preferable?
- What were the main factors in your decision?
- What information would have been useful to have available to help make this final decision?

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Appendix II: Glossary

Active Transportation: Any form of human-powered transportation – such as walking, cycling, using a wheelchair, in-line skating or skateboarding.

Alternative Transportation: Alternative Transportation promotes and encourages the use of alternative modes of transportation (e.g., bicycling, walking, vanpooling, carpooling, riding transit) to get to, from, and around destinations instead of a single occupancy vehicle.

Biodiversity: The variability among living organisms (plants, animals, genetics, habitats) from terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part.

Buffering: Occurs when streamside vegetation filters stormwater and protects stream banks

Case Study: An in depth examination of a particular situation. It is a method used to focus a very broad field of research on one easily researchable topic.

Community Cohesion: Community cohesion (also called social capital and neighboring) refers to the quantity and quality of interactions among people in a community, as indicated by the degree residents know and care about their neighbors and participate in community activities (Cochrun 1994; LGA 2004; CASE)

Conservation: preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife. Conservation activities include examination, documentation, treatment, and preventive care, supported by research and education.

Connectivity: Connectivity represents the pattern of core areas of potential habitat or cover that allow the movement of organisms across an intact or fragmented landscape. Landscapes with

high connectivity allow species to move freely among core areas, while landscapes with low connectivity tend to isolate species within scattered patches of habitat.

Ecosystem Services: Outputs of natural ecological functions or processes that directly or indirectly contribute to human welfare, or have the potential to do so in the future (Boyd and Banzhaf, 2007).

Greenspaces: EnviroAtlas defines green space as all vegetated land, including agriculture, lawns, forests, wetlands, and gardens. Barren land, water, and impervious surfaces such as concrete and asphalt are excluded.

Greenway: A greenway is a long, narrow piece of land, where vegetation is encouraged, and is managed for public recreation and active transportation.

Habitat: The home or environment of a plant, animal, or other organism

Health Outcomes: A health outcome is a change in health, or lack of, following some factor or treatment. In the study of ecosystem services, this typically refers to environment-related changes in human health.

Inbreeding: Breeding with close genetic relatives over generations

Mitigation: A human intervention to reduce negative impacts on the climate system; examples include strategies to reduce greenhouse gas sources and emissions restoring coastal wetlands to dampen storm surge.

Neighborhood Connectivity: Neighborhood connectivity refers to the relative ease and directness of getting from one place to another (e.g. from home to school) by road, path, or trail. One way to measure urban connectivity is with the density of street intersections.

Patch (habitat): Refers to an area of distinct habitat type that has a definite shape and is used by species for breeding or survival. The size of a given patch is typically an important consideration when determining habitat quality

Preservation: The protection of cultural property and natural lands through activities that minimize chemical and physical deterioration and damage and that prevent loss of informational content. The primary goal of preservation is to prolong existence.

Public Hearing: A meeting for receiving testimony from the public at-large on a local issue, or proposed government action. Testimony from both sides of an issue is usually recorded for

public record and a report summarizing the key points is generated. All levels of government hold public hearings - from city on up to the national level. Hearings may also be less formal - they may or may not be sponsored by a government body - and may not require that individuals from multiple sides of an issue get time to speak.

Restoration: Return of an ecosystem to a close approximation of its presumed condition prior to disturbance.

Siting: Determining where to position or locate a particular structure.

Social Capital: The sum of social interactions with other humans and connections within a social network; the idea that social networks have value.

Sustainability Plan: A common framework to guide efforts in improving the social equity, environmental, and economic conditions in a government jurisdiction. A sustainability plan ties together a community's goals, strategies, implementation plans, and metrics for improving sustainability.

Urbanization: The concentration of development in relatively small areas (cities and suburbs). The U.S. Census Bureau defines "urban" as referring to areas with more than 1.5 people per acre.

Vector Borne Diseases: Bacterial and viral diseases that are transmitted by a vector, typically mosquitoes, ticks and fleas.

Student Map Set

Figure 2. Percent population over 70 years old, overlaid over Percent green space

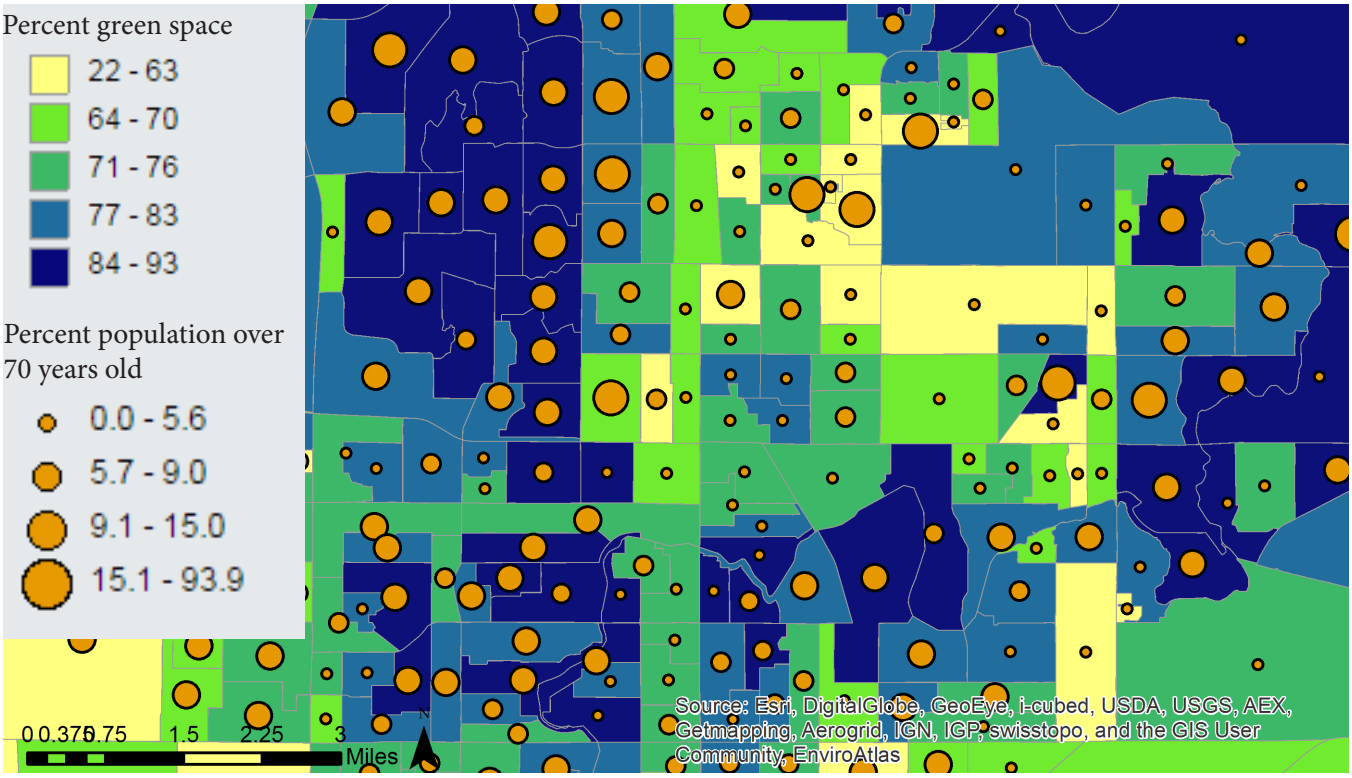


Figure 2 shows the percent of the Canton population that is over 70 years old, on top of a map showing percent green space in Canton.

Figure 3. Estimated walking distance to a park entrance in the proposed trail network area

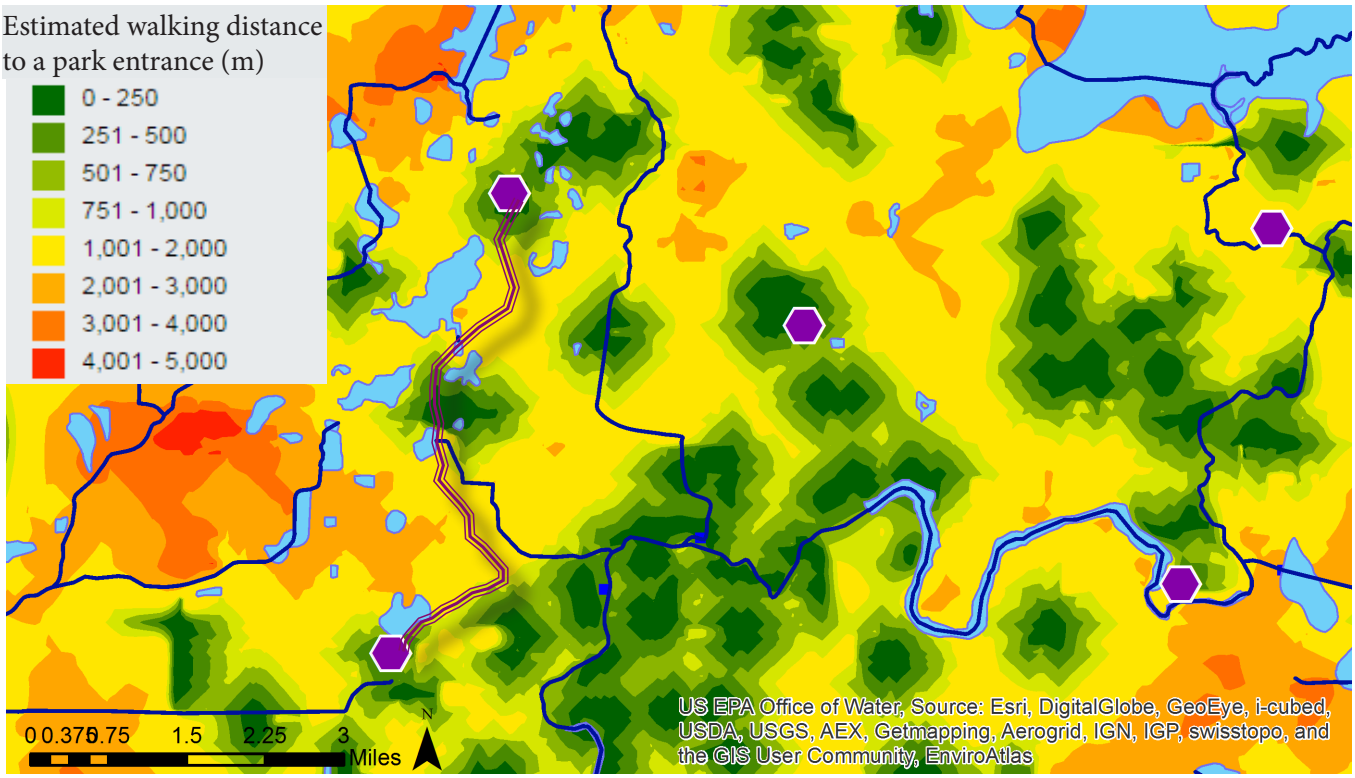


Figure 3 shows the estimated walking distance (in meters) via roads to a park entrance in the proposed trail network area. Waterbodies were identified and are shown in light blue, with streams in dark blue.

Figure 4. Connectivity

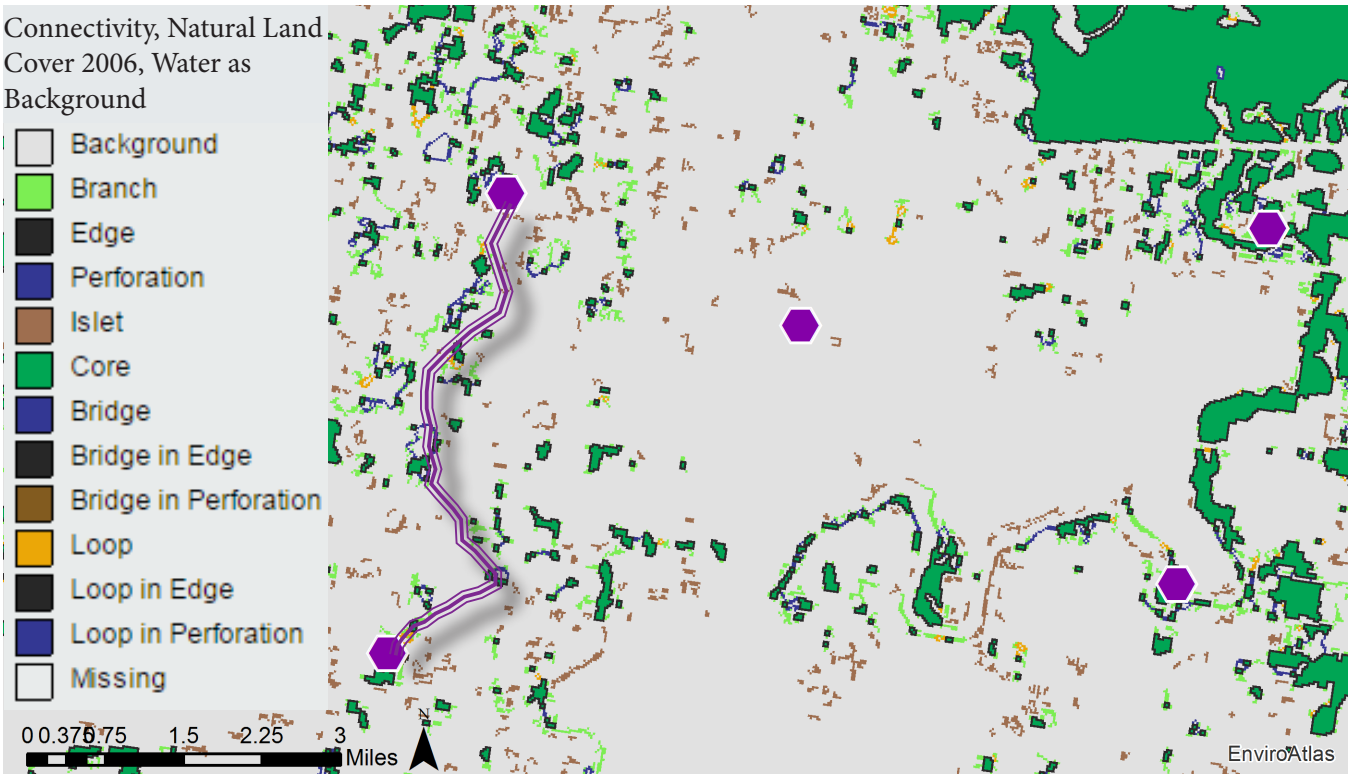


Figure 4 shows the connectivity of natural land cover types, with water classified as background.

Figure 5. Land cover classification

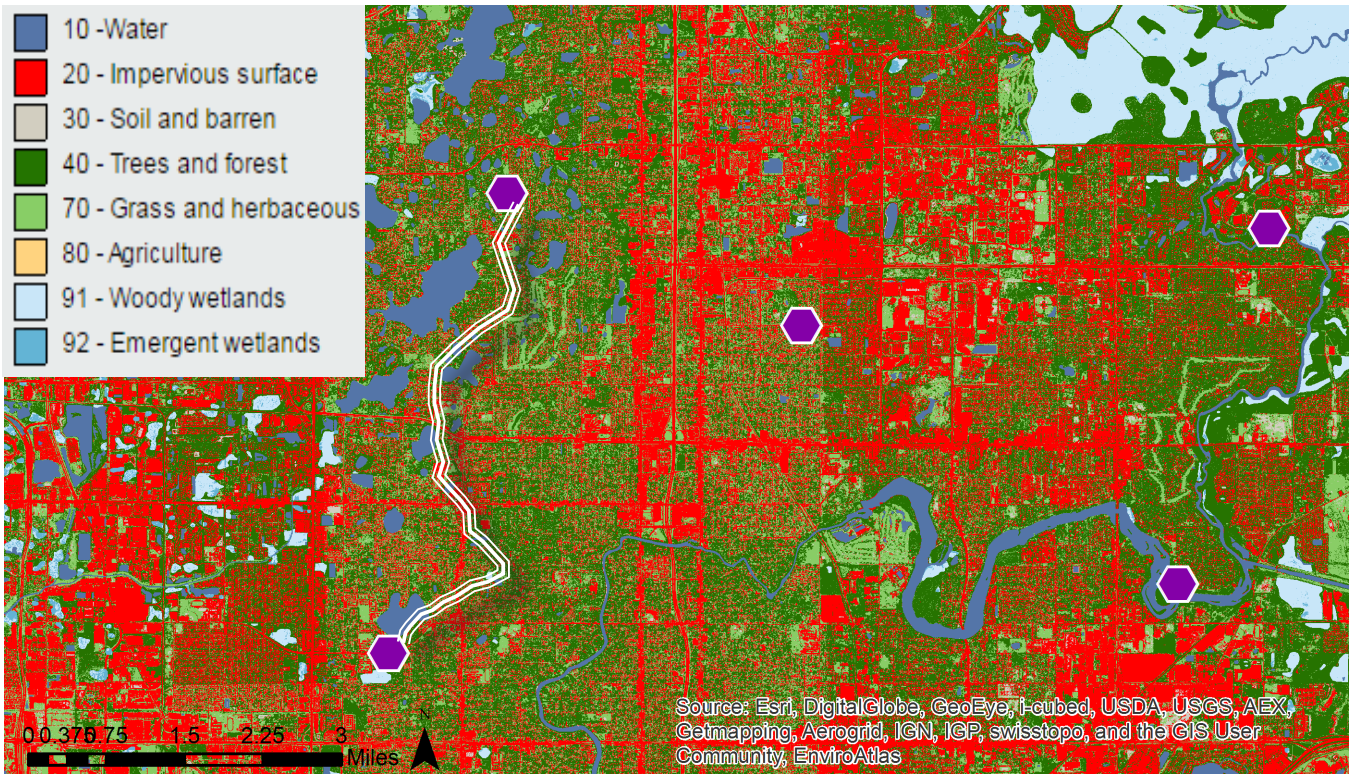


Figure 5 shows the area of interest in Canton with the landscape classified into 8 land cover classes.

Figure 6. Residential population not within 500m of a park entrance

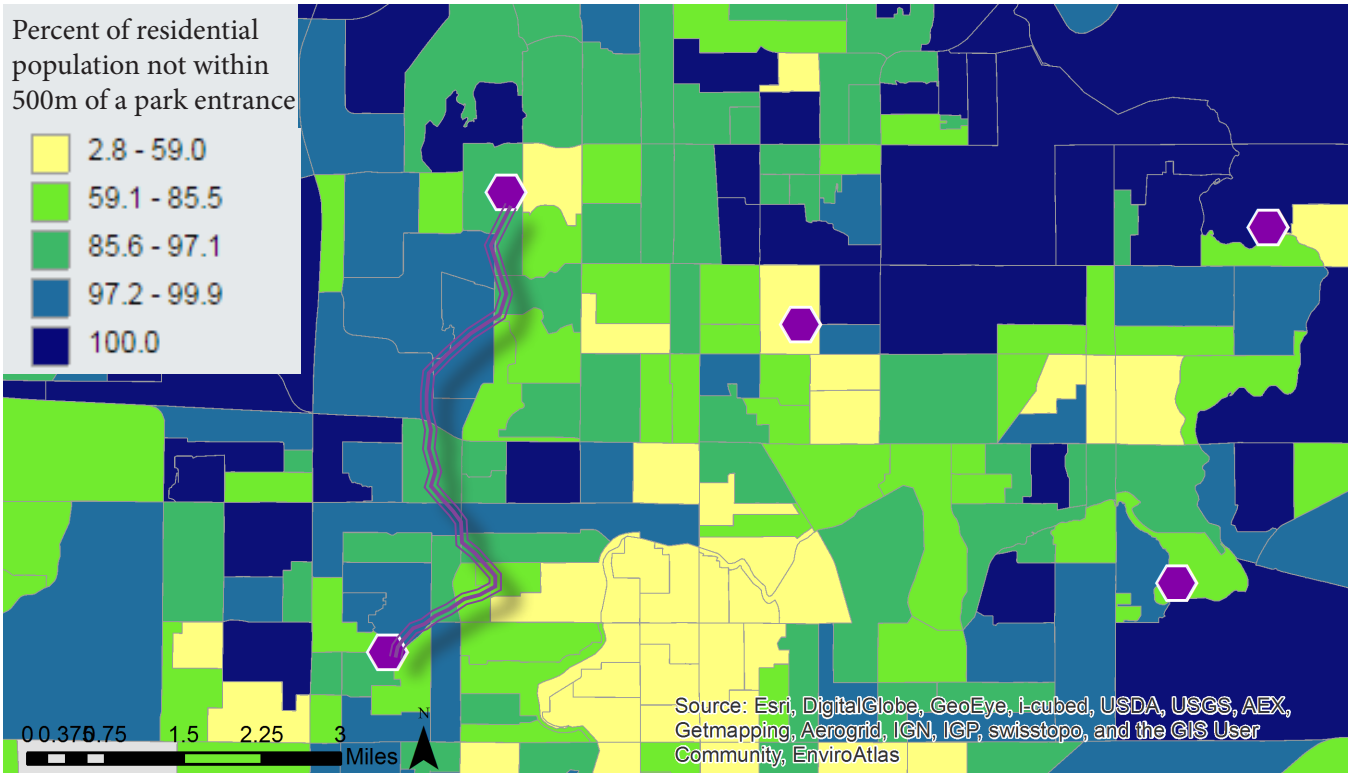


Figure 6 shows the residential population not within 500m of a park entrance, summarized by census block group.

Figure 7. Street intersection density from EPA's Smart Location Database

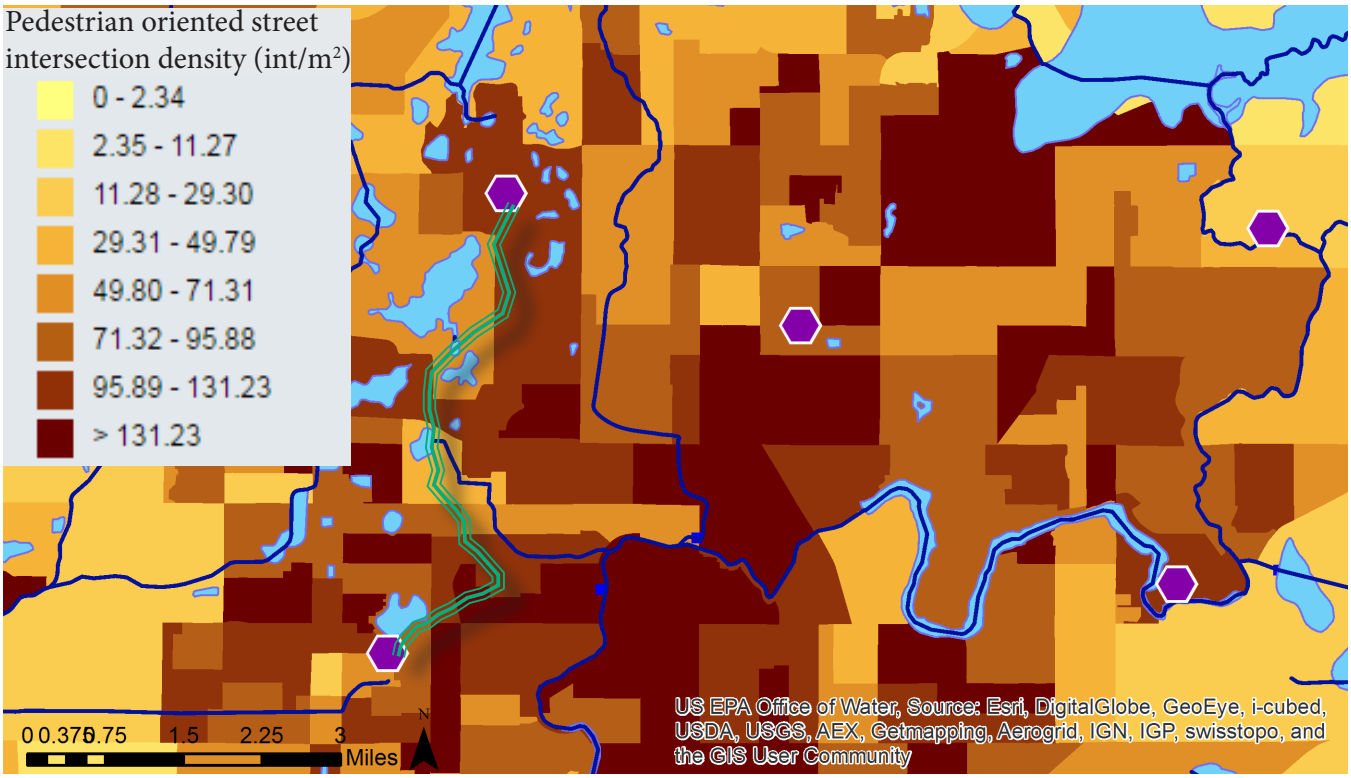


Figure 7 shows the street intersection density in the area of interest in Canton. Intersection density is the number of intersections per square mile.

Other Maps to Consider

These maps were not presented by the Parks and Recreation Department, but may be useful in considering the best pilot route.

Figure A1. Percent tree cover, overlaid with population with income twice below the US poverty level

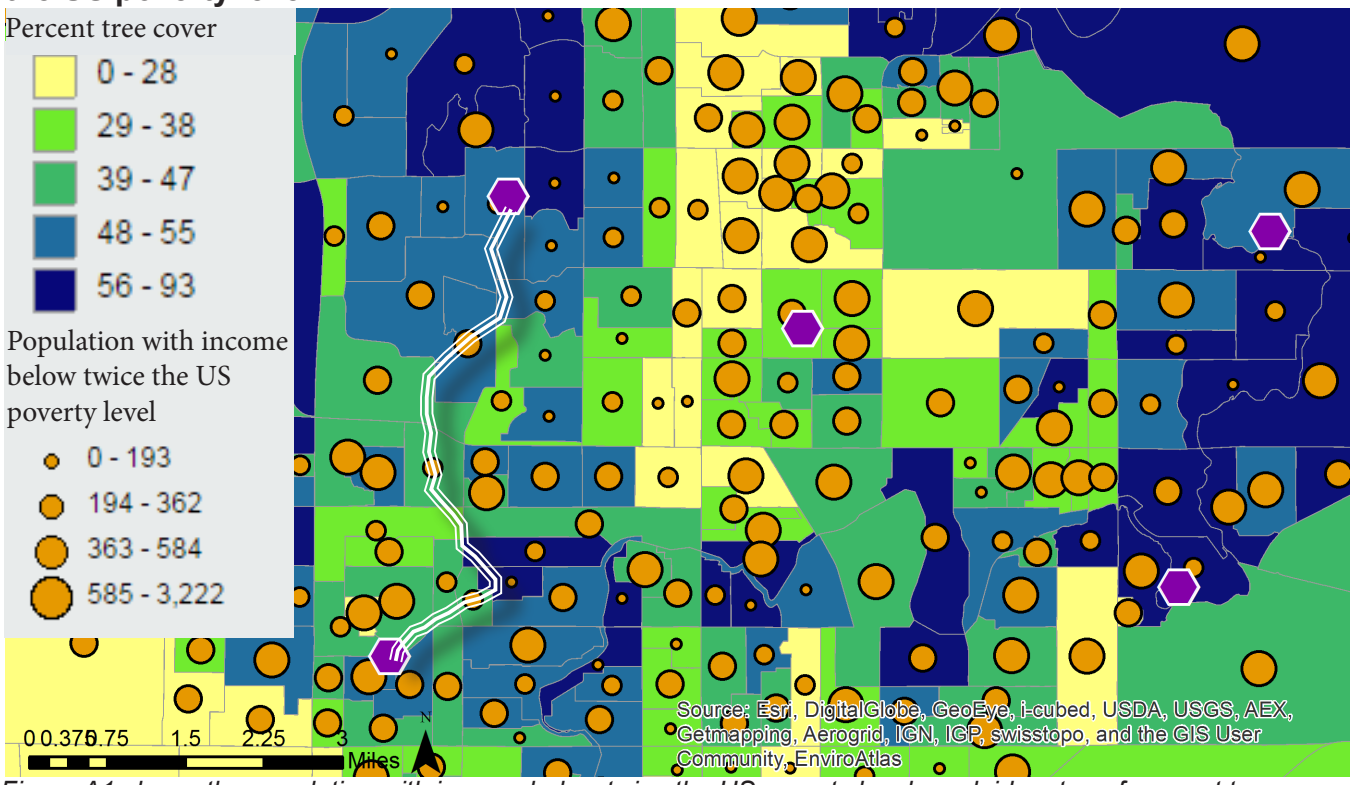


Figure A1 shows the population with income below twice the US poverty level overlaid on top of percent tree cover.

Figure A2. Dasymetric allocation of population

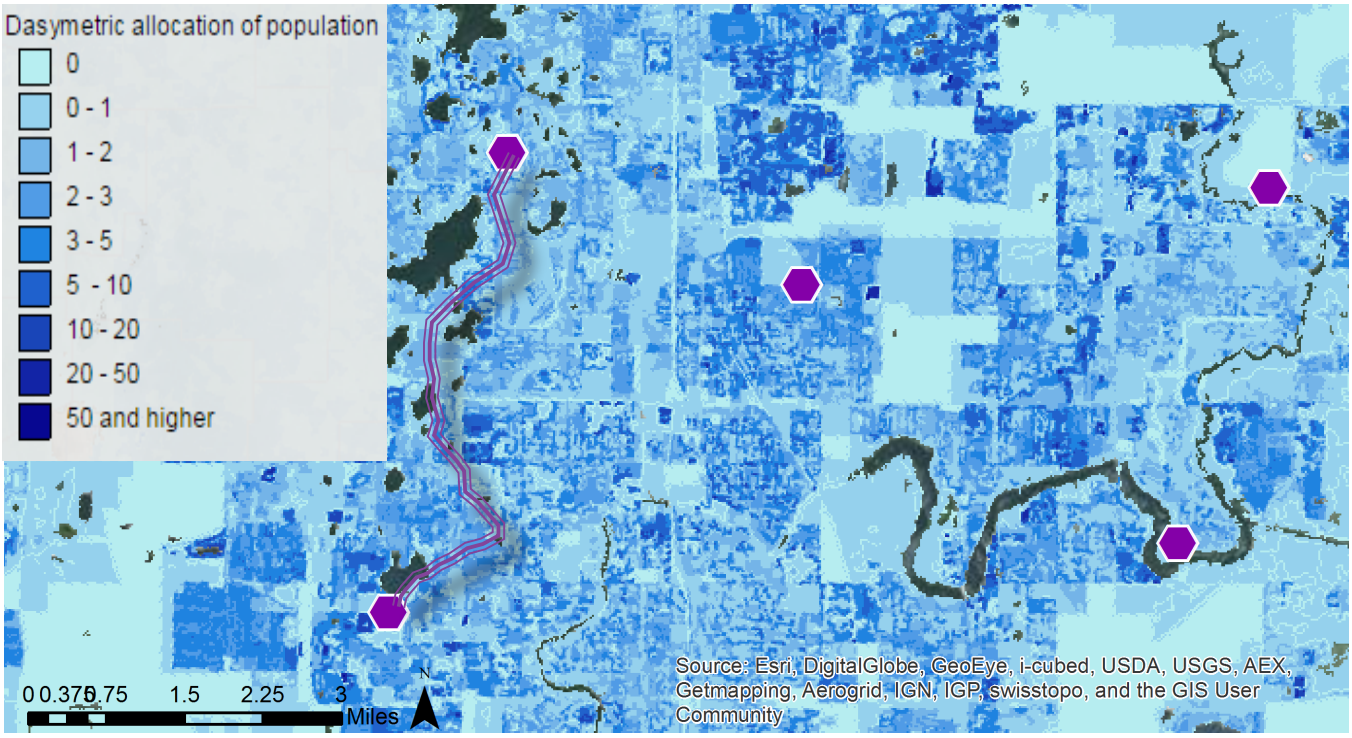


Figure A2 shows the dasymetric allocation of population for the Canton area of interest. This means that the population is distributed to depict where people may actually live .

Building a Greenway: Using EnviroAtlas in the Classroom

Guidance for accessing EnviroAtlas maps

This is a quick guide for using the EnviroAtlas Interactive Map to access the maps included in the Building a Greenway case study and appendices.

- Narrative layers
  - Percent population over 70 years old
  - Percent green space (Tampa, FL)
  - Estimated walking distance to a park entrance (Tampa, FL)
  - Tampa, FL land cover
  - Connectivity (water as background)
  - Residential population not within 500m of a park entrance
- Appendix layers
  - Percent population below twice the U.S. poverty level (Tampa, FL)
  - Estimated tree cover in 50m stream buffer (Tampa, FL)
  - Dasymetric allocation of population

Start by going to www.epa.gov/enviroatlas

Access the 2 page fact sheet for each map from http://www.epa.gov/enviroatlas/enviroatlas-dynamic-fact-sheet-matrix. Use the fact sheets to provide additional contextual information. These fact sheets can also help students answer questions in the case study worksheet.

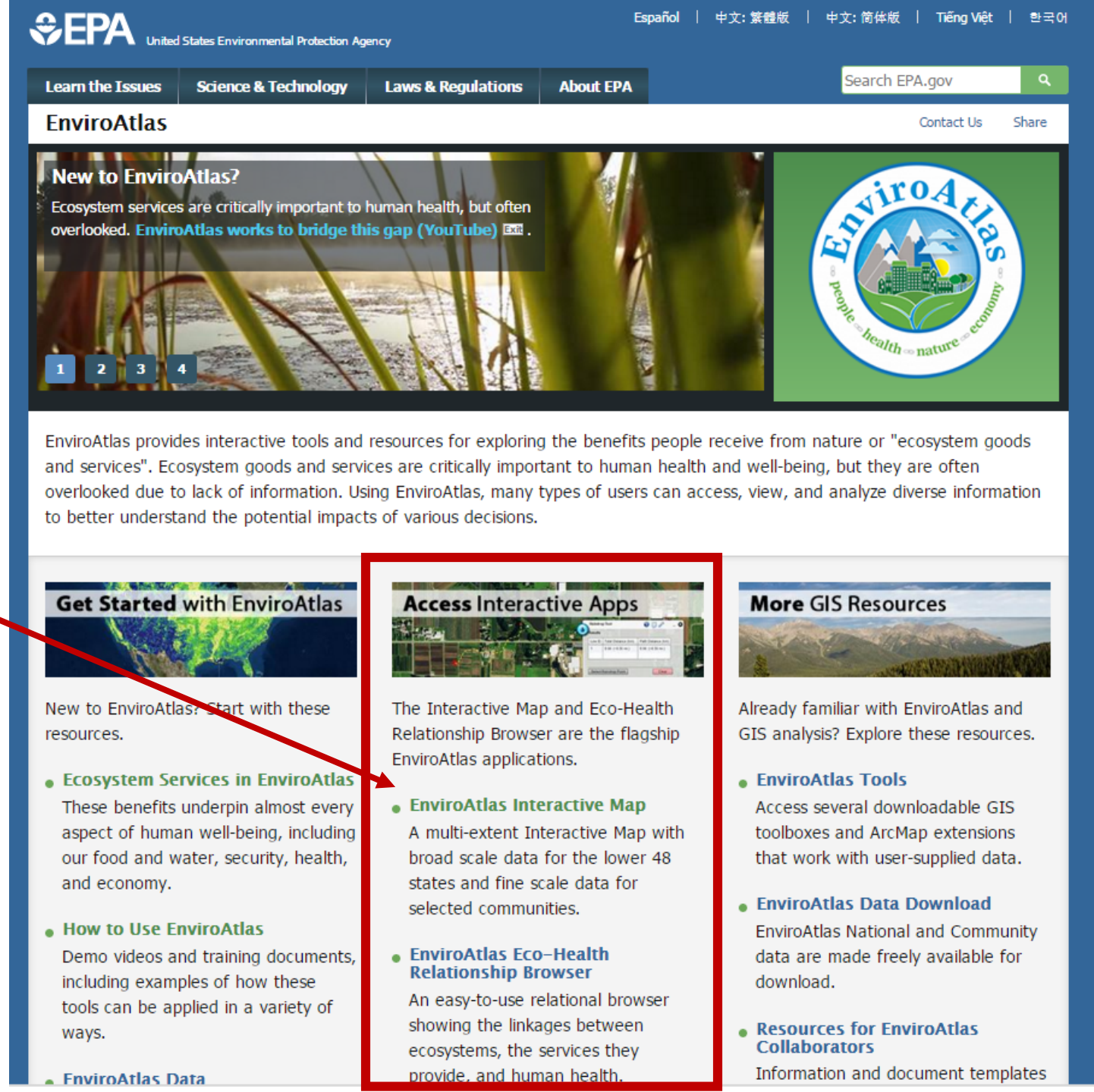
www.epa.gov/enviroatlas

This is the EnviroAtlas home page.
Use this page as a starting point for accessing all background information and resources in EnviroAtlas.

To get to the mapping application, click on the linked name **EnviroAtlas Interactive Map**.

The **Eco-Health Relationship Browser** is another tool you may want to check out.

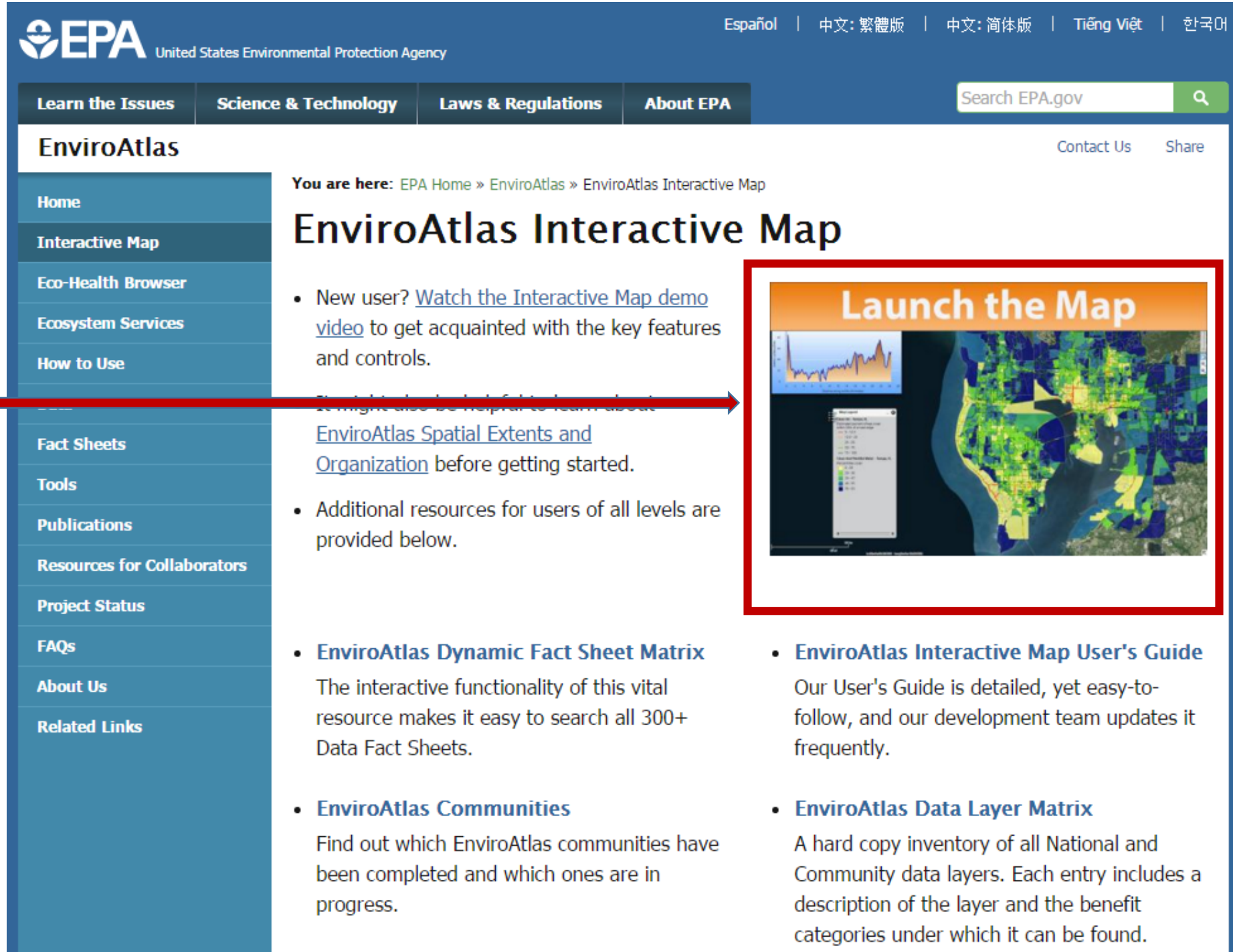
It provides literature from an extensive review on the connection between the environment and human health outcomes, in an easy-to-use tool.



http://www.epa.gov/enviroatlas/enviroatlas-interactive-map

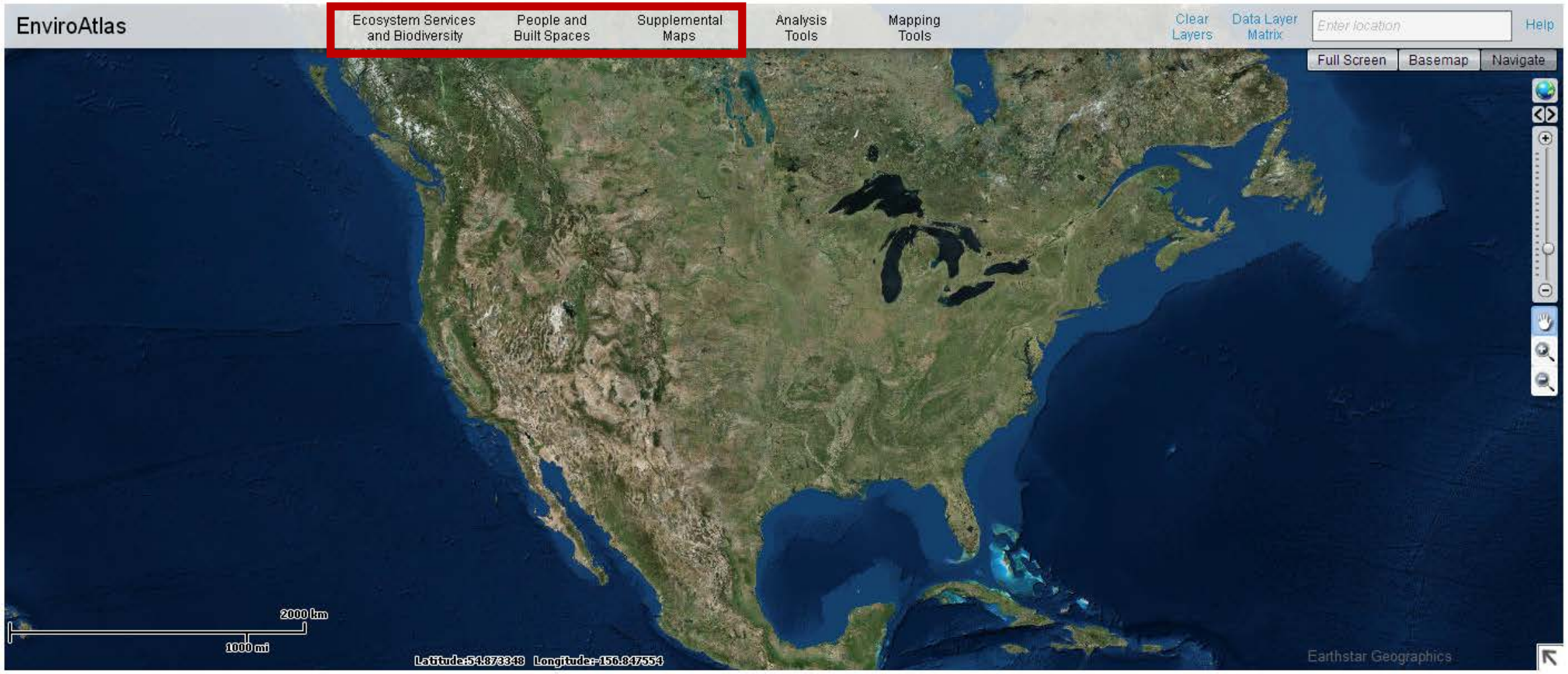
From this page, you can access the Interactive Map by clicking on the **Launch the Map** image.

This page also provides useful background information and resources, including a User's Guide for the Interactive Map and its tools.



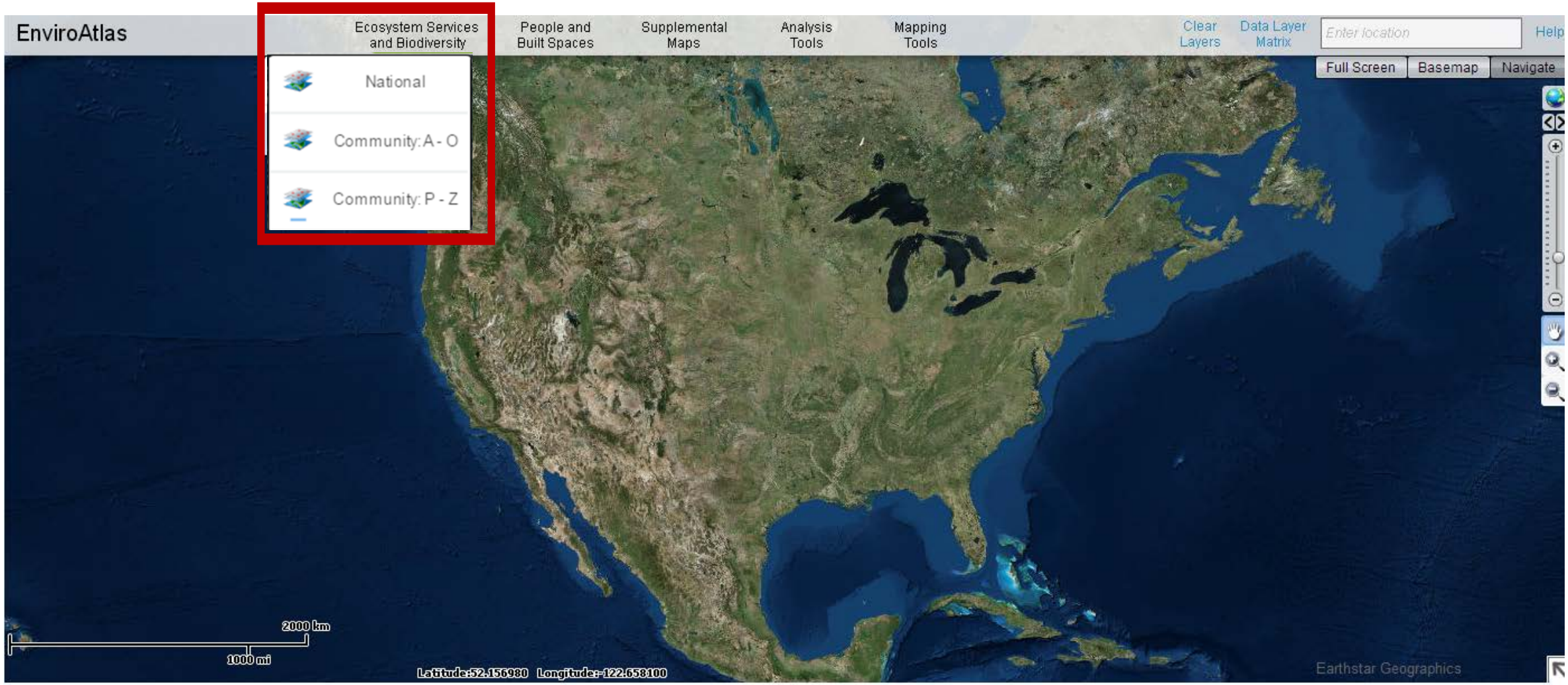
When you get to the opening screen for the Map, you will need to accept the disclaimer and select the state of Florida.

The data in EnviroAtlas are organized into the first three tabs. Select **Ecosystem Services and Biodiversity**.



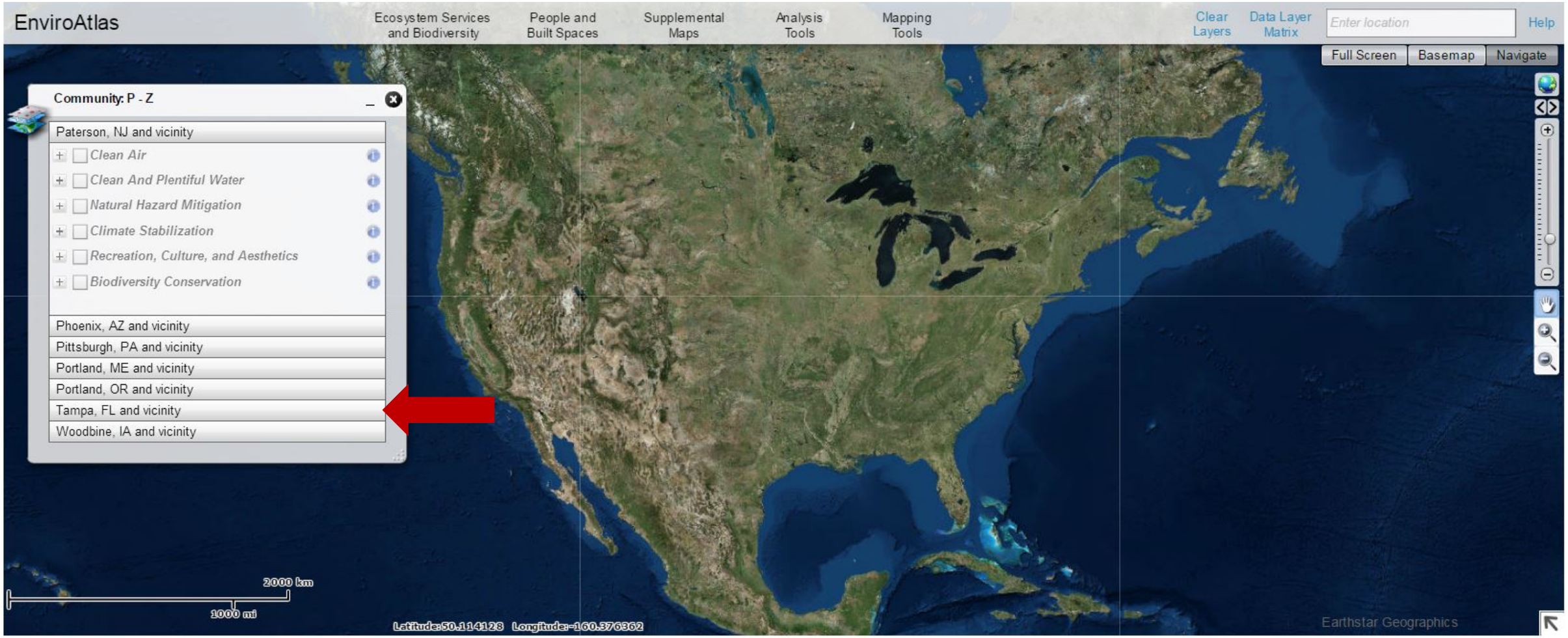
EPA LandScope America NRCS USDA USGS

From the drop-down, select **Community P-Z**.



EnviroAtlas provides the same maps for multiple communities. From here, select the Community you are interested in. The case study uses maps from the Tampa, FL community.

Select **Tampa, FL and vicinity**.



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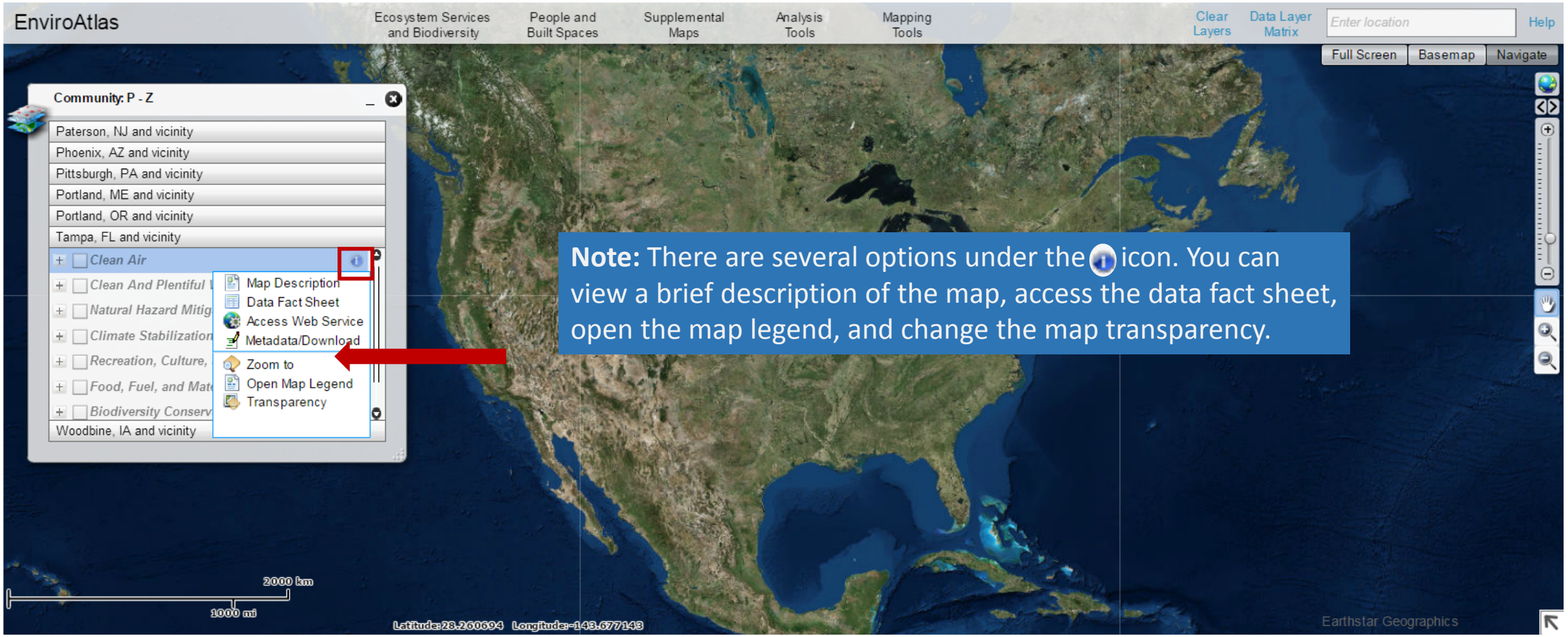
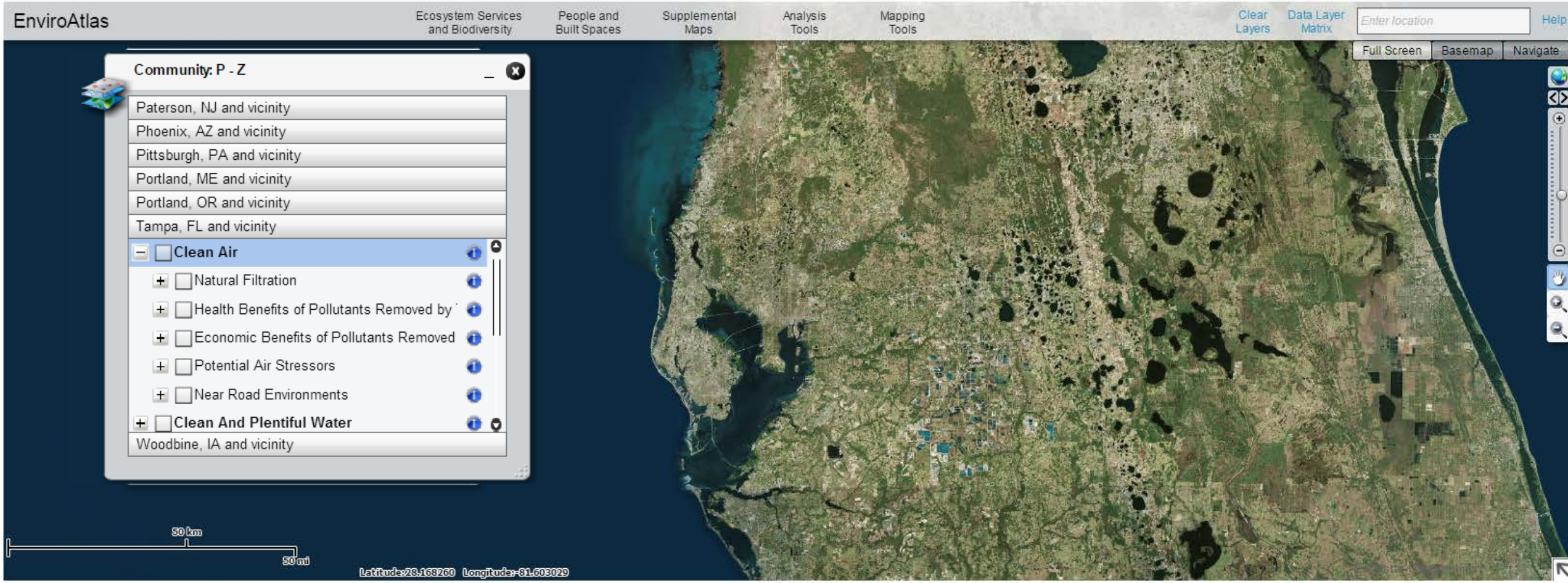
You can zoom directly to the community of interest.

Select the blue icon, and select 'zoom to'.



For more complex analyses or inquiries into the data, you can access the web service and the data download page as well.

Now our view is zoomed into the Tampa area.



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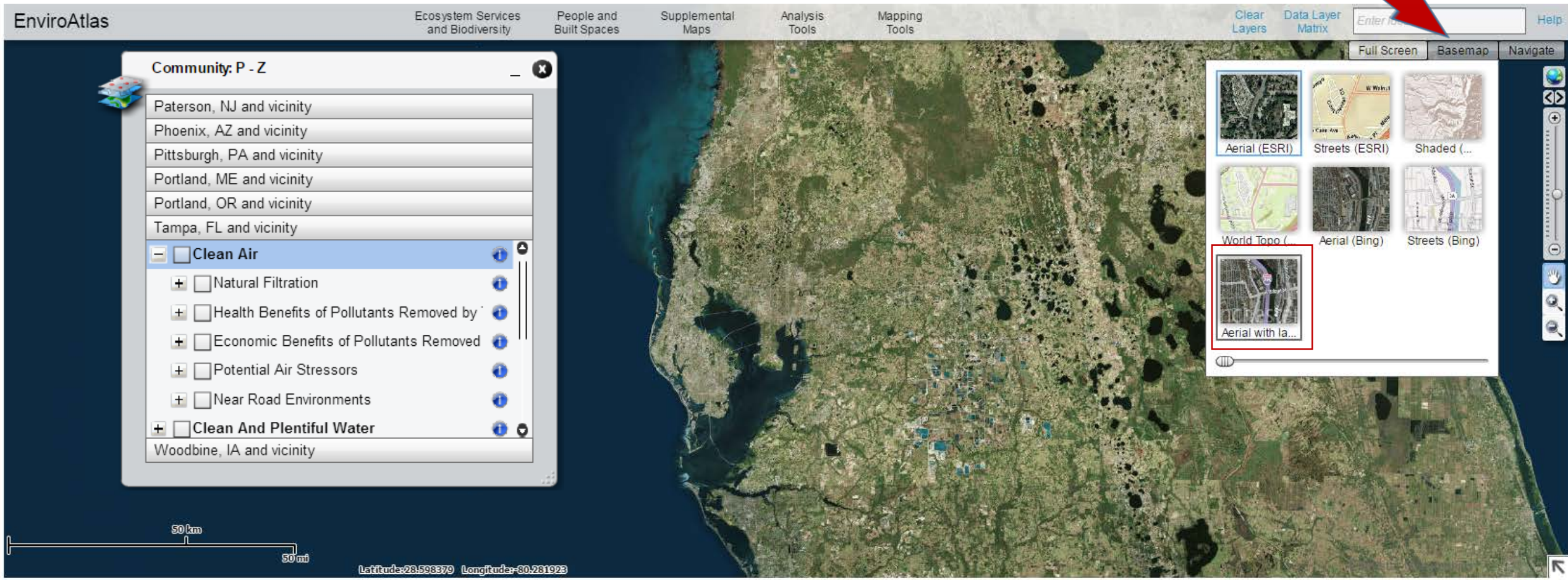
You can change the basemap to show additional information.

Select **Basemap** and choose the last option, **Aerial with labels**.



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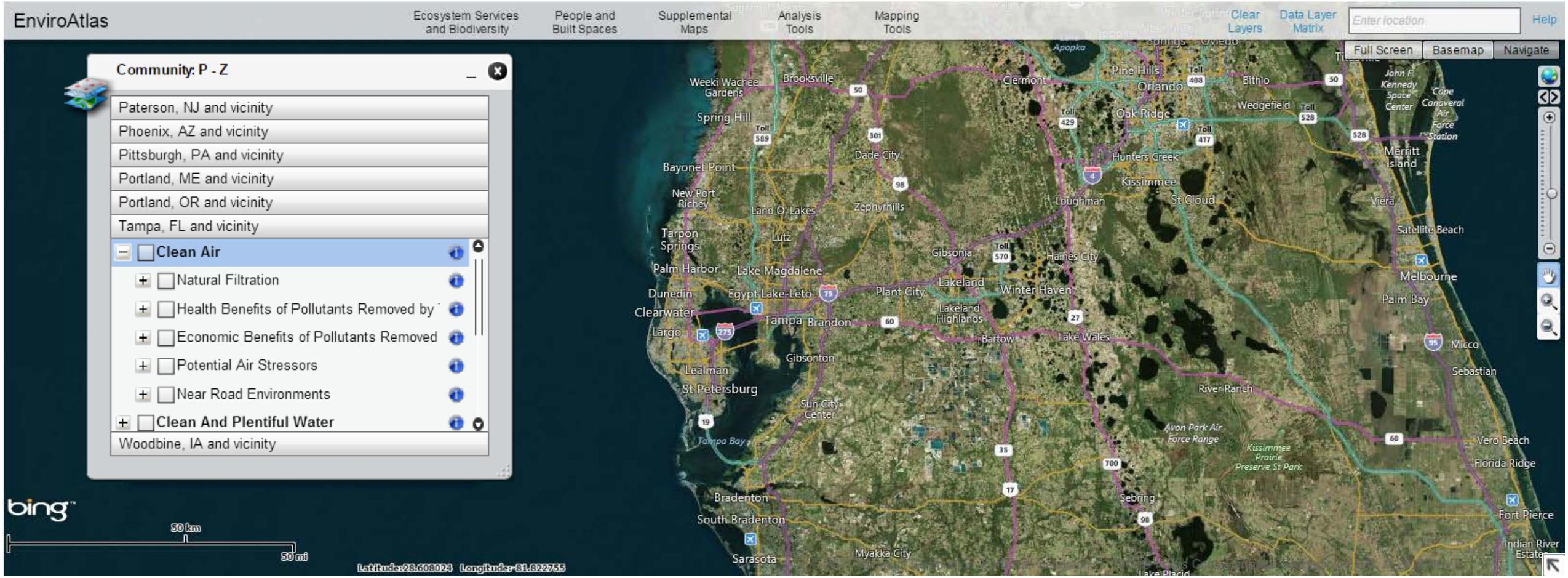
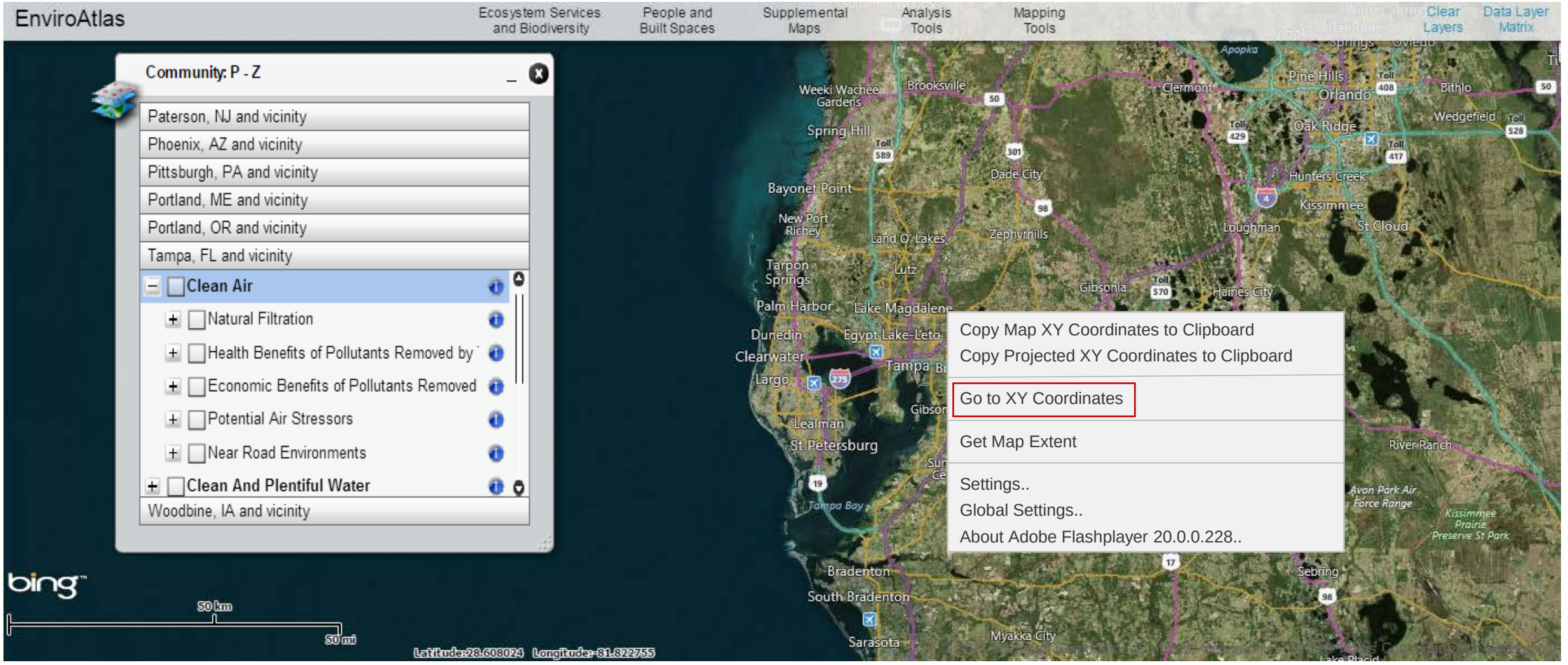
The Aerial with Labels basemap provides an aerial map with streets and other landmark information.

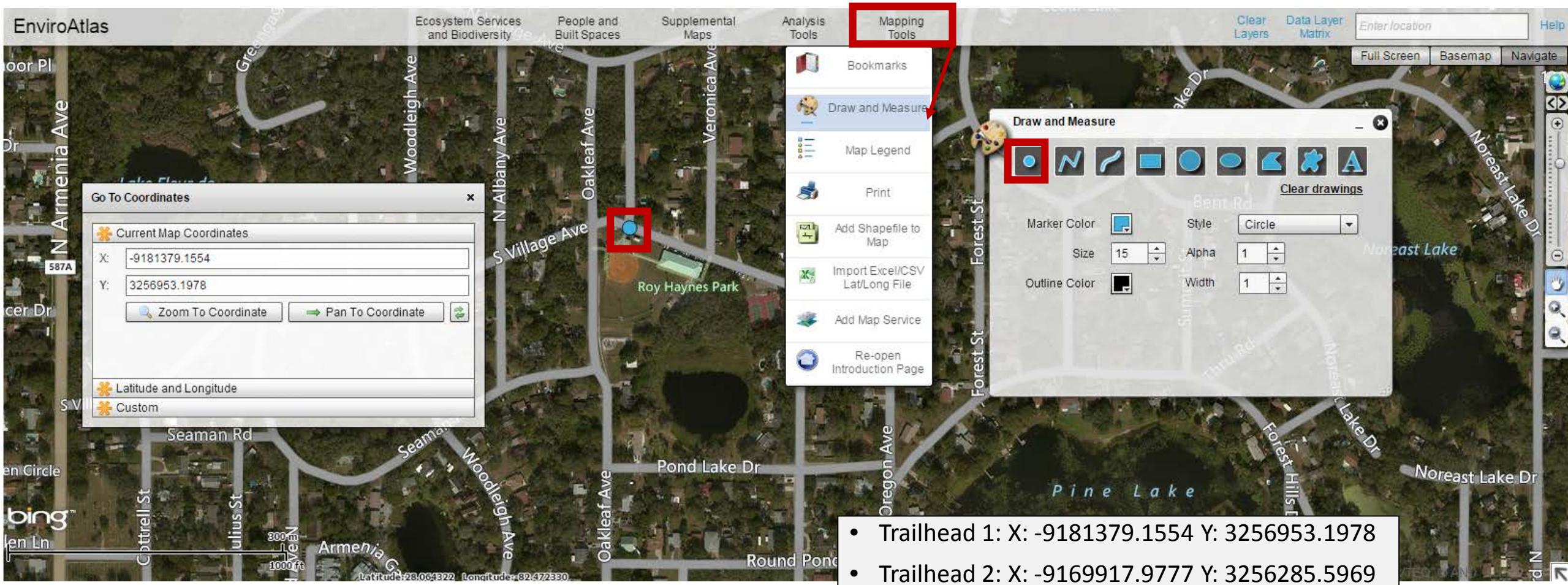


To use the Interactive Map to evaluate potential pilot routes, the 5 trailhead points need to be added to the map using X,Y coordinates. To do this, **right click** on the map, and select **Go to XY Coordinates**.

Enter the coordinates for the first trailhead point: X: -9181379.1554 Y: 3256953.1978

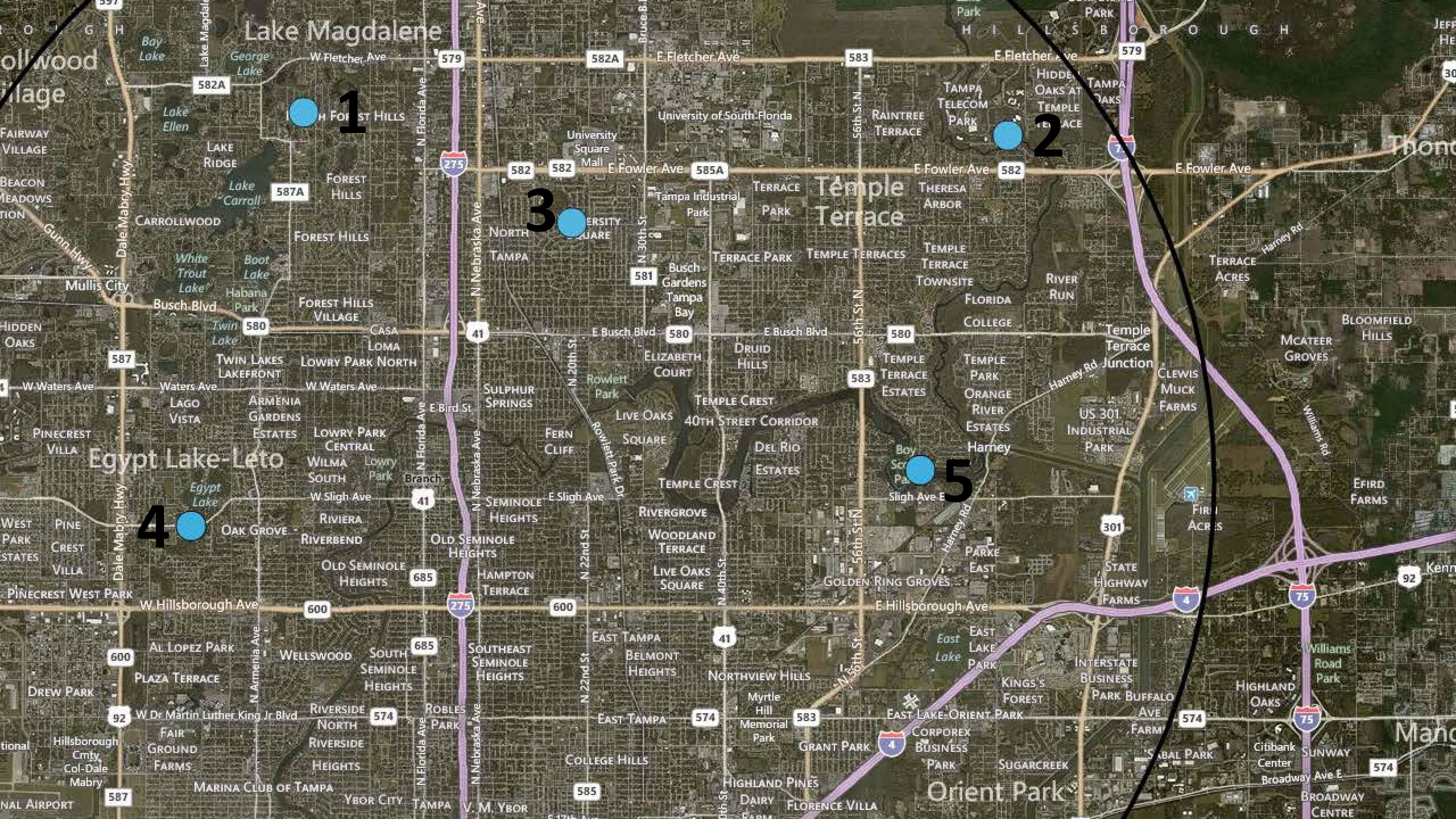


After the coordinates are entered, it will zoom to that location. Drop a point there using the **Draw and Measure** function, found under **Mapping Tools**.



- Trailhead 1: X: -9181379.1554 Y: 3256953.1978
- Trailhead 2: X: -9169917.9777 Y: 3256285.5969
- Trailhead 3: X: -9176923.7937 Y: 3255102.6105
- Trailhead 4: X: -9183275.8301 Y: 3249863.0911
- Trailhead 5: X: -9171055.9547 Y: 3250914.4387

Repeat this process with the coordinates for each trailhead, until all 5 points are on the map.

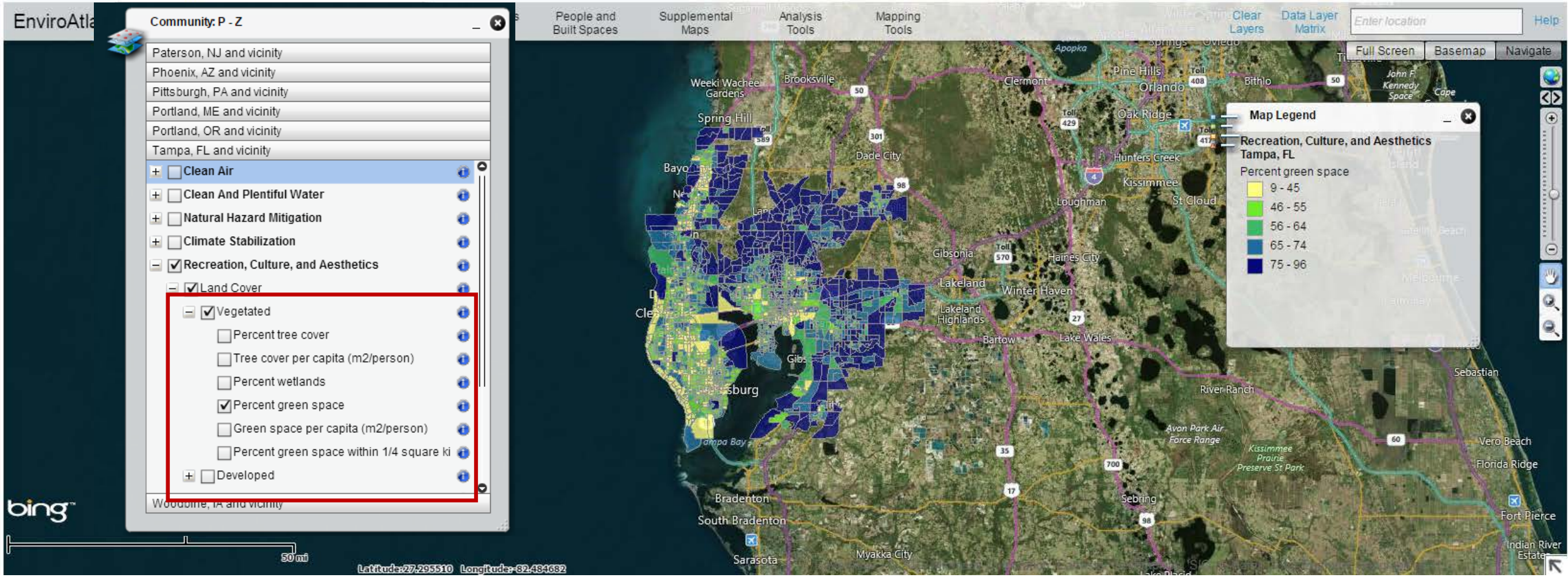


1
2
3
4
5
Lake Magdalene
Bay Lake
George Lake
W Fletcher Ave
582A
579
E Fletcher Ave
583
Lake Ellen
Fairway Village
Lake Ridge
Lake Carroll
587A
Forest Hills
Carrollwood
Beacon Meadows
Gunn Hwy
Dale Mabry Hwy
White Trout Lake
Boot Lake
Mullis City
Busch Blvd
Habana Park
Twin Lake
580
Forest Hills Village
Casa Loma
Hidden Oaks
587
Twin Lakes Lakefront
Lowry Park North
W Waters Ave
Waters Ave
Lago Vista
Armenia Gardens Estates
Pinecrest Villa
Egypt Lake-Leto
Lowry Park Central
Wilma South
Lowry Park
Egypt Lake
W Sligh Ave
West Park Estates
Pine Crest Villa
Oak Grove
Riviera
Riverbend
Old Seminole Heights
685
Pinecrest West Park
W Hillsborough Ave
600
Al Lopez Park
Wellswood
South Seminole Heights
Plaza Terrace
Drew Park
92
W Dr Martin Luther King Jr Blvd
Riverside North
574
Fair Ground Farms
Hillsborough Cmty Col-Dale Mabry
Riverside Heights
Marina Club of Tampa
Ybor City
Tampa
V. M. Ybor
N Florida Ave
275
N Nebraska Ave
582
University Square Mall
E Fowler Ave
585A
North Tampa
University Square
41
Sulphur Springs
E Bird St
Fern Cliff
Seminole Heights
E Sligh Ave
Branch
Old Seminole Heights
Hampton Terrace
Southeast Seminole Heights
Robles Park
N 20th St
Rowlett Park
Rowlett Park Dr
N 22nd St
N 30th St
Tampa Industrial Park
581
Busch Gardens Tampa Bay
E Busch Blvd
Elizabeth Court
Druid Hills
Live Oaks Square
Temple Crest
40th Street Corridor
Del Rio Estates
Rivergrove
Woodland Terrace
N 40th St
East Tampa
Belmont Heights
Northview Hills
Myrtle Hill Memorial Park
College Hills
Highland Pines
Dairy Farm
Florence Villa
585
University of South Florida
Raintree Terrace
Terrace Park
Temple Terrace
Temple Terraces
Terrace Park
56th St N
Tampa Telecom Park
Hidden Oaks at Temple Terrace
Tampa Oaks
Theresa Arbor
Temple Terrace Townsite
Florida College
River Run
Temple Terrace Estates
Temple Park
Orange River Estates
Harney
Harney Rd
Sligh Ave
Parke East
Golden Ring Groves
E Hillsborough Ave
East Lake
East Lake Park
Kings's Forest
East Lake-Orient Park
Corporex Business Park
Grant Park
Sugarcreek
Orient Park
Temple Terrace Junction
Clewis Muck Farms
US 301 Industrial Park
301
State Highway Farms
Interstate Business Park
Buffalo Ave Farms
Sabal Park
75
4
Terrace Acres
McAteer Groves
Bloomfield Hills
Efird Farms
Williams Rd
Williams Road Park
Highland Oaks
Citibank Center
Sunway
Broadway Ave E
Broadway Centre

The proposed route between trailheads 1 and 4 can now be evaluated. Start by going to the first map, Percent green space. From the Tampa, FL community menu, **select the plus sign** next to the following:

1. **Recreation, Culture, and Aesthetics**, then
2. **Land Cover**, then
3. **Vegetated**

Select the box next to Percent green space to turn the map on.



Like Percent green space, other maps in the case study are also accessed from the **community** menu. To get to each of these maps, follow the given paths:

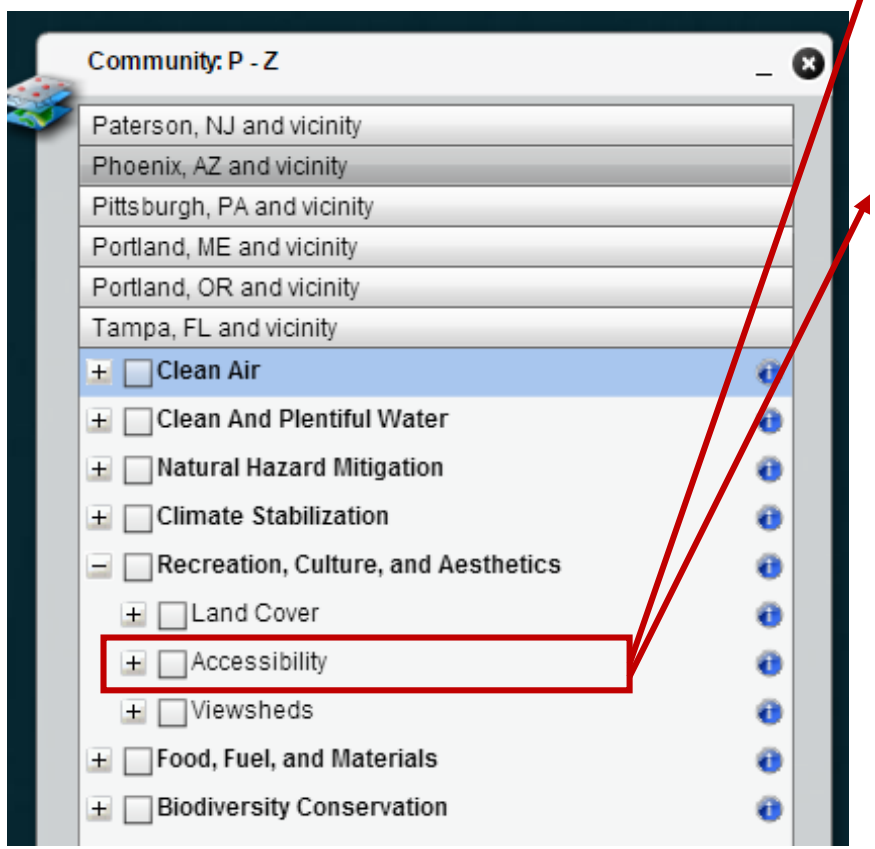
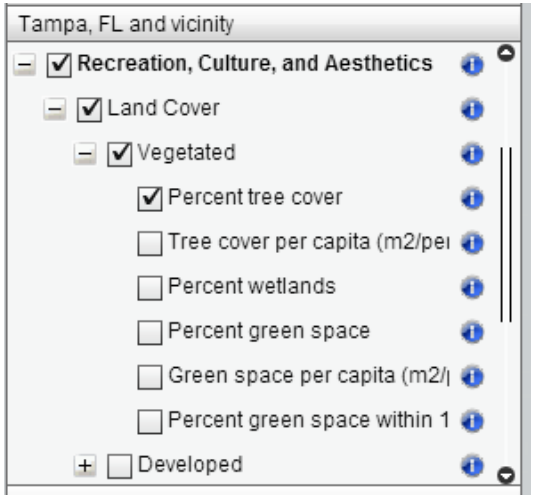


Figure 3: Estimated walking distance to a park entrance
Recreation, Culture, and Aesthetics → Accessibility → Access to Parks → Estimated walking distance to park entrance

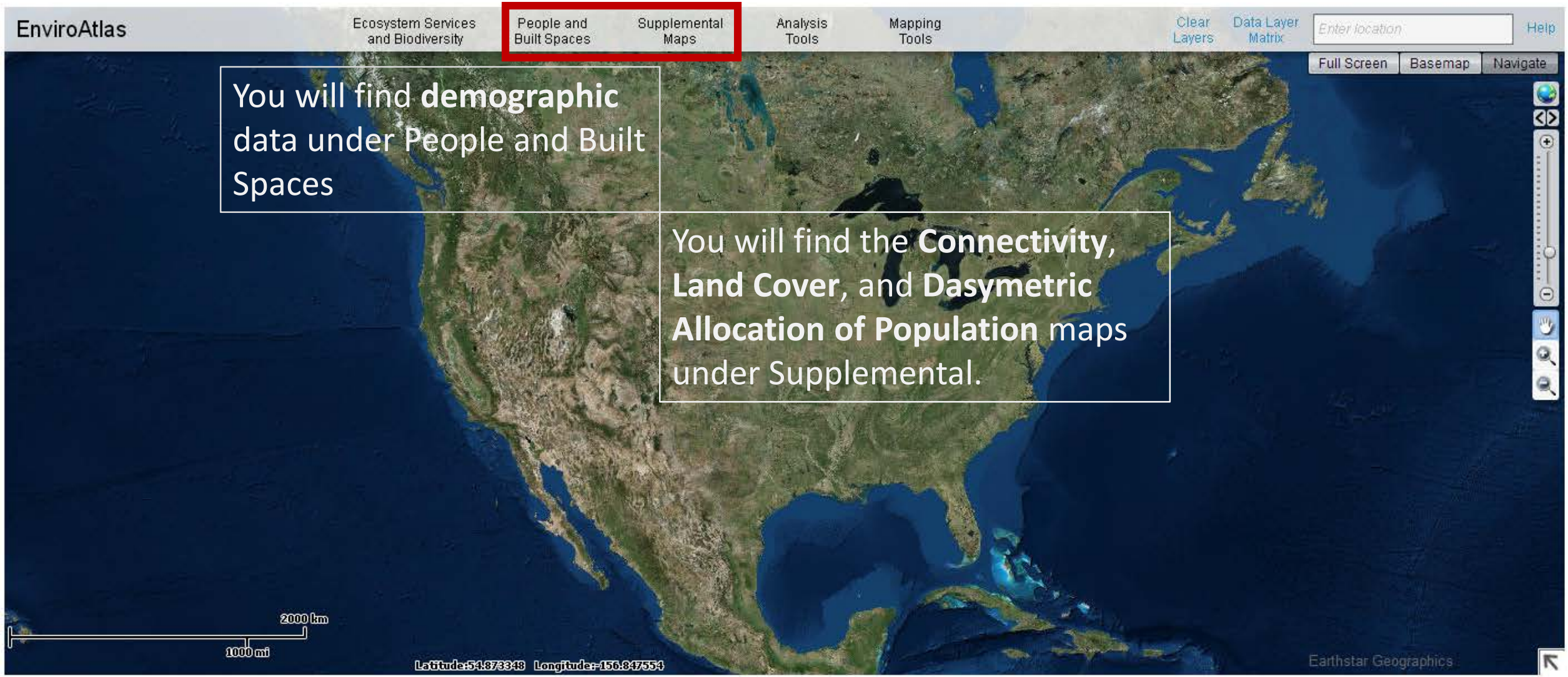
Figure 6: Residential population not within 500m of a park entrance
Recreation, Culture, and Aesthetics → Accessibility → Access to Parks → Residential population not within 500m of a park entrance

Figure A1: Percent tree cover
In the menu, this map is above the Percent green space map we accessed previously.

Recreation Culture and Aesthetics →Land Cover → Vegetated → Percent Tree Cover

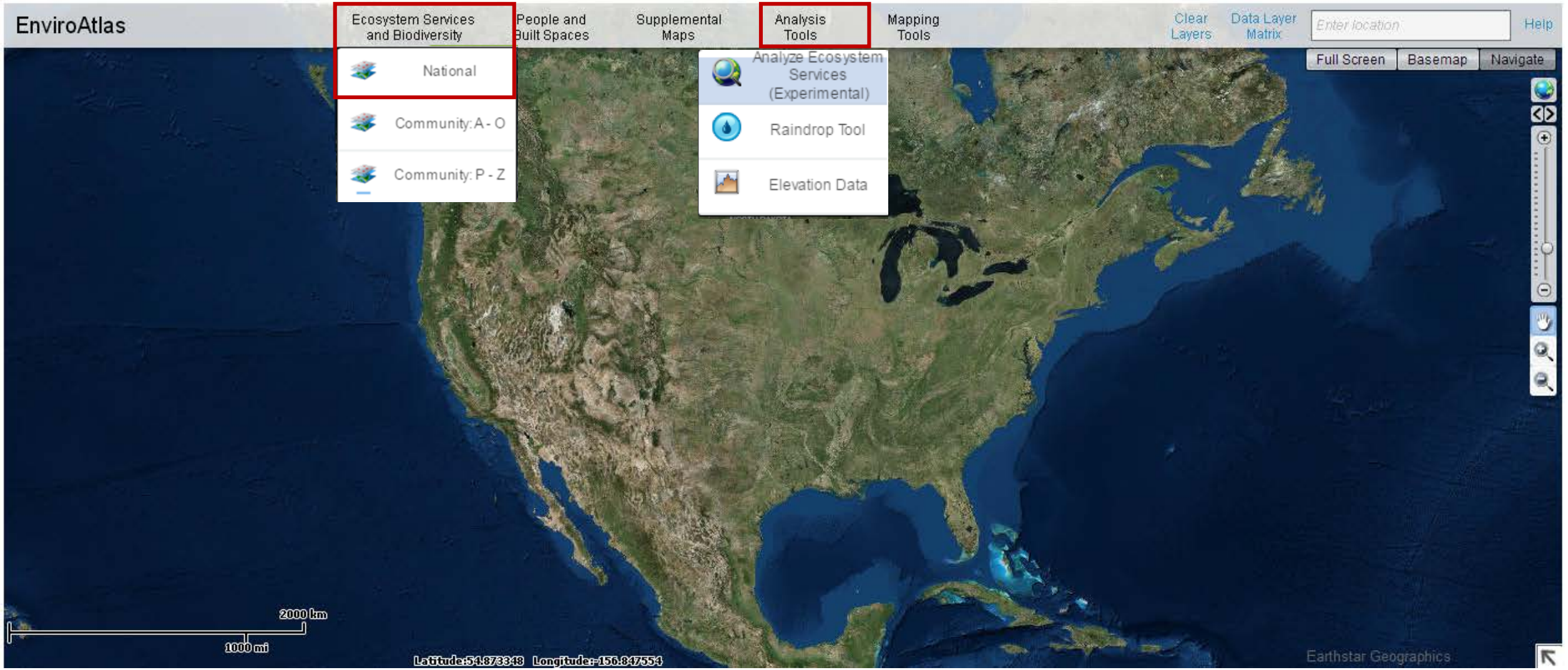


Other maps used in the case study can be found in the **People and Built Spaces** and **Supplemental** tabs.



EPA LandScope America NRCS USFS USGS

EnviroAtlas has many more maps and tools to explore. If time allows, check out additional maps, including national maps under **Ecosystem Services and Biodiversity** and other demographic and supplemental layers.



Check out EnviroAtlas **Analysis Tools** to find out more about elevation, water flow, and ecosystem services in a geographical area of interest.

Other resources and additional guidance can be found on the EnviroAtlas website: www.epa.gov/EnviroAtlas

Start with the User's Guide for more in-depth guidance on using the Interactive Map http://www.epa.gov/sites/production/files/2015-05/documents/enviroatlasuserguide.pdf

We want to hear from you!

Contact us at enviroatlas@epa.gov to let us know how you are using the case study or if you need further assistance.