Geography Education Dossier

Teaching the Environment in School Geography: A view from the United States

Jerry Mitchell[1]

[1] Universidade da Carolina do Sul – Estados Unidos

p. 1-11

How to cite this article:
MITCHEL, J. Teaching the Environment in School Geography: A view from the United States. **Geousp – Espaço e Tempo** (Online), v. 29, n. 1, p. 1-11, abr. 2025, ISSN 2179-0892.

Available at: https://www.revistas.usp.br/geousp/article/view/230715. doi: https://doi.org/10.11606/issn.2179-0892.geousp.2025.230715.

Este artigo está licenciado sob a Creative Commons Attribution 4.0 Licence

revista geo USP espaço e tempo

Volume 29 • nº 1 (2025)

ISSN 2179-0892

Teaching the Environment in School Geography: A view from the United States

Abstract

As a discussant at the 2024 ENPEG meeting in São Paulo, Brazil, I reviewed how to teach environmental impacts in geography education. My lecture focused on the organization of academic standards in the United States and their influence on environmental teaching. I highlighted the unique aspects of geography, emphasizing the relationship between people and the environment, as defined by scholars like Susan Hanson and Yi-Fu Tuan. While environmental content appears in schools in biology and environmental science, geography often gets sidelined in U.S. education, largely due to incomplete teacher training and the lack of dedicated geography standards across states. I proposed that effective environmental geography teaching must show the interconnectedness of human and physical systems. Two teaching strategies illustrated this approach, and I concluded that good environmental geography education requires well-trained teachers and integrated curricula that reflect the complexity of environmental issues, moving beyond a fragmented approach to teaching.

Keywords: environmental geography, geography education, United States

Ensinando o meio ambiente na geografia escolar: Uma visão dos Estados Unidos

Resumo

Como debatedor na reunião ENPEG 2024 em São Paulo, Brasil, revisei como ensinar impactos ambientais na educação geográfica. Minha palestra focou na organização dos padrões acadêmicos nos Estados Unidos e sua influência no ensino ambiental. Destaquei os aspectos únicos da geografia, enfatizando a relação entre as pessoas e o meio ambiente, conforme definido por estudiosos como Susan Hanson e Yi-Fu Tuan. Embora o conteúdo ambiental apareça nas escolas de biologia e ciências ambientais, a geografia muitas vezes é deixada de

lado na educação dos EUA, em grande parte devido à formação incompleta dos professores e à falta de padrões geográficos dedicados em todos os estados. Propus que o ensino eficaz de geografia ambiental deve mostrar a interconexão dos sistemas humanos e físicos. Duas estratégias de ensino ilustraram esta abordagem, e concluí que uma boa educação em geografia ambiental requer professores bem treinados e currículos integrados que reflitam a complexidade das questões ambientais, indo além de uma abordagem de ensino fragmentada.

Palavras-chave: geografia ambiental, educação geográfica, Estados Unidos

La enseñanza ambiental en la educación geográfica: una perspectiva desde los Estados Unidos

Resumen

Como ponente en la reunión ENPEG de 2024 en São Paulo, Brasil, revisé cómo enseñar los impactos ambientales en la educación geográfica. Mi conferencia se centró en la organización de los estándares académicos en los Estados Unidos y su influencia en la enseñanza ambiental. Destaqué los aspectos únicos de la geografía, enfatizando la relación entre las personas y el medio ambiente, tal como la definen académicos como Susan Hanson y Yi-Fu Tuan. Si bien el contenido ambiental aparece en las escuelas de biología y ciencias ambientales, la geografía a menudo queda de lado en la educación estadounidense, en gran parte debido a la formación incompleta de los docentes y la falta de estándares específicos de geografía en todos los estados. Propuse que la enseñanza eficaz de la geografía ambiental debe mostrar la interconexión de los sistemas humanos y físicos. Dos estrategias de enseñanza ilustraron este enfoque, y llegué a la conclusión de que una buena educación en geografía ambiental requiere docentes bien capacitados y planes de estudio integrados que reflejen la complejidad de las cuestiones ambientales, yendo más allá de un enfoque fragmentado de la enseñanza.

Palabras clave: geografía ambiental, educación geográfica, Estados Unidos

Introduction

In September 2024, I had the privilege to speak to the attendees of the ENPEG meeting (Encontro Nacional de Prática de Ensino de Geografia) in São Paulo, Brazil. The roundtable session was focused on issues related to teaching about environmental impacts in our school classrooms and featured three speakers of which I was the only one from outside Brazil. As an overview, my remarks focused on how academic standards are organized in the United States and how those same standards can (or cannot) impact how we teach about the environment. These thoughts were followed by two case study examples, or rather teaching strategies, that I have employed with preservice and in-service teachers in my home state of South Carolina to explore ways about teaching the environment. In the text that follows, which takes on a conversational tone, I will share with the reader an overview of my lecture along with observations that may lead us toward successful teaching about environmental geography.

The "Environment" and Geography

So, what exactly distinguishes the discipline of geography from other forms of inquiry? I think one useful starting point is the work up Susan Hanson (2004), who spoke of the Geographical Advantage. She focuses on four main aspects that serve as the core of geographic inquiry. The first is the importance of spatial variability and all of us here recognize the importance of understanding that what occurs in one place has great potential to be different in another place for a whole variety of different reasons. The second aspect is recognizing that processes operate on multiple geographic scales, and that what is occurring at a local level does not do so in the same fashion on a regional or a global level. Her third point relates to the importance of the integration of spatial and temporal analysis. Places of course change over time and where things happen are important in historical sense as well. It is here where geographical and historical inquiry often pair well together in a school classroom. Finally, it is her fourth aspect that is important for our discussion here. This last advantage is that geographers focus on relationships between people and the environment.

Geographers, of course, do not have a corner on the study of Earth's environment. But it is true that geographers, more than others I believe, look uniquely at the interplay between humans and the natural world. Yi-Fu Tuan's (1991) definition of geography sums this up neatly, I think. He describes geography as "the study of Earth as the home of people." If we were to just look at the first part of this definition, geography as the study of Earth, well that then too could be oceanography or geology. Similarly, if we just look to the last piece of the definition of geography, the study of people, we could be talking about anthropology or sociology. It is the two pieces taken together, the physical and the social, or rather the environmental and the human, that makes geography the discipline that it is. To study Earth as the home of people means to understand both the environment and its occupants.

So, what exactly does this mean for teaching about environmental issues in school classrooms in the United States? First, as I mentioned previously, geography is not the only place where we see an interest in the environment. In our schools there is clearly environmental content with biology courses, but the focus there is often on the non-human world with an

appropriate emphasis on abiotic factors such as sunlight and wind and soil, along with other aspects of nature. This teaching appears in early grades all the way through upper grades in high school, and in those upper grades we also see an interest in environmental science. Environmental science in many ways is physical geography. So, what then do we see in geography courses? Unfortunately, the answer is a bit murky. In many schools in the United States, geography is not taught at all. However, where it is taught, it is primarily taught as human geography. It is taught as part of the social studies alongside history, economics, and civics.

Why this is so has something to do with our academic standards, to which I will address momentarily, but it also relates to our teacher training programs. The majority of teachers in the social studies have a history degree paired with their education courses, and very few have had any geography coursework. Therefore, it makes sense that there is a reluctance to teach about environmental issues, which many social studies teachers see as science-oriented content that they are unprepared to teach. This cycle continues due to teacher training programs. Teacher training program faculty tend to be former classroom teachers, and as classroom teachers they were not personally prepared to teach geography, they did not teach geography, and in their current role as university faculty they do not see the discipline's value and therefore do not promote geography. Accordingly, we are not preparing geography teachers as we should and are clearly not preparing a group of educators capable of teaching about environmental issues and not just human geography.

The Role of Academic Standards – and Geography Standards – in the United States

The United States differs from many other countries and that it does not have a national curriculum. Each of the country's 50 states is responsible for the education of its citizens residing there. There are then 50 different sets of academic standards for social studies, science, language, mathematics, and all other subject areas. Rarely is there a stand-alone set of geography standards unless it is specific to one particular academic grade. This is something that we do see in South Carolina for grades 3, 7, and 9, but many years of work by academic geographers were required to get these standards in place.

There are, however, a set of national geography standards in the United States, but these are completely advisory. No state nor any teacher nor any school is required to follow these standards, but they do form the basis of a number of state standards. Importantly, these national standards do have a focus on environmental issues, but these do not tend to make up the core of geography teaching that is primarily focused on mapping and human geographic elements related to population, culture, economic systems, and political systems.

The standards, and there are 18 of them, are known as *Geography for Life* (2012) and were first published in 1994 with an update in 2012. A sample of the standards (I share only 9) is shown in Table 1 to give you an understanding of how they inform the teaching of geography in the United States. The first standard, how to use maps other geographic representations, is exactly as it seems and refers to identifying, analyzing, and constructing maps or other representations such as geographic models as part of our inquiry. I share next two other standards that focus

directly on the environment but are more appropriately focused on what will be called physical geography, and these relate to things such as landforms, climate, and ecosystems. Then there are the standards related to human geography that have students investigate topics such as population, migration, economic systems, and political geography. But it is the last three standards shared here where one can see the interplay between humans and the natural world. One standard focuses on humans and how they modify the physical environment. This could relate to things such as dam building or even agriculture. Its converse is how physical systems affect humans systems, and we might use natural hazards such as hurricanes as an example. The final standard investigates resources, largely focusing on natural ones such as solar energy, petroleum, minerals, or wood, and how the distribution of those resources varies from place to place and how people have different meanings for resources and thus their use.

Table 1. An abbreviated selection of standards from Geography for Life (2012), the National (USA) Geography Standards.

Standard
1. How to use maps and other geographic representations.
7. The physical processes that shape the patterns of Earth's surface.
8. The characteristics ecosystems on Earth's surface.
9. The characteristics human populations on Earth's surface.
11. The patterns of economic interdependence on Earth's surface.
13. How forces of cooperation and conflict influence the control of Earth's surface.
14. How human actions modify the physical environment.
15. How physical systems affect human systems.
16. The changes that occur in the meaning, use, distribution, and importance of resources.

I think a key thing to emphasize here is that none of these standards should be taught alone. For example, the final standard related to resources very much has to do with political geography (who has access), economic geography (how we trade those resources), population geography (the distribution of people is often related to where resources exist), and finally, we often use the first standard, mapping, to showcase where those resources are located in space. It is this last point that I think is of utmost importance when teaching environmental geography. Environmental issues are not standalone issues. They are very much intertwined with everything else we investigate on Earth. As such, the two teaching strategies I share next highlight investigations that seem to be about much more than just the environment. And that is a very deliberate choice.

What is Good Environmental Geography Teaching?

Good environmental geography teaching, to me, must encompass a wide variety of skills and topical areas that show the interconnections between people and the spaces that they inhabit. While this stance may be a subjective one, I do believe that the teaching strategies I share here will bear out that student learning can be more engaging and impactful as a result.

Mapping Ducks – A Novel Way Toward Investigating Pollution

First, I focus on a lesson developed several years ago with a classroom teacher. She came to me wanting to teach about ocean currents in a way that was in her words "more interesting than just showing where they were located on a map." This strategy was published and you can read up on it more fully in Mitchell and Hance (2014), but in the paragraphs that follow I will give you some of the highlights of the lesson and illustrate for you the way that we bring mapping skills and other academic disciplines together to introduce students to an important environmental issue.

The lesson begins with a children's book read aloud. The book by Eric Carle is *10 Little Rubber Ducks* (2005). It is a small and short book about the journey of rubber ducks as they are made in a factory, loaded onto a truck, and then loaded onto a ship. The ship while at sea encounters stormy weather and one of the shipping containers is washed off the ship. The ducks, now adrift, float about the ocean where they encounter a seal, a bird, a dolphin, and another marine animals. It is a cute story that engages students, surprisingly even those near 10 years old. In addition to reading the story, there are opportunities to talk about basic themes in geography such as movement, an example of which is the ducks journey on a ship or in the truck before they go to sea.

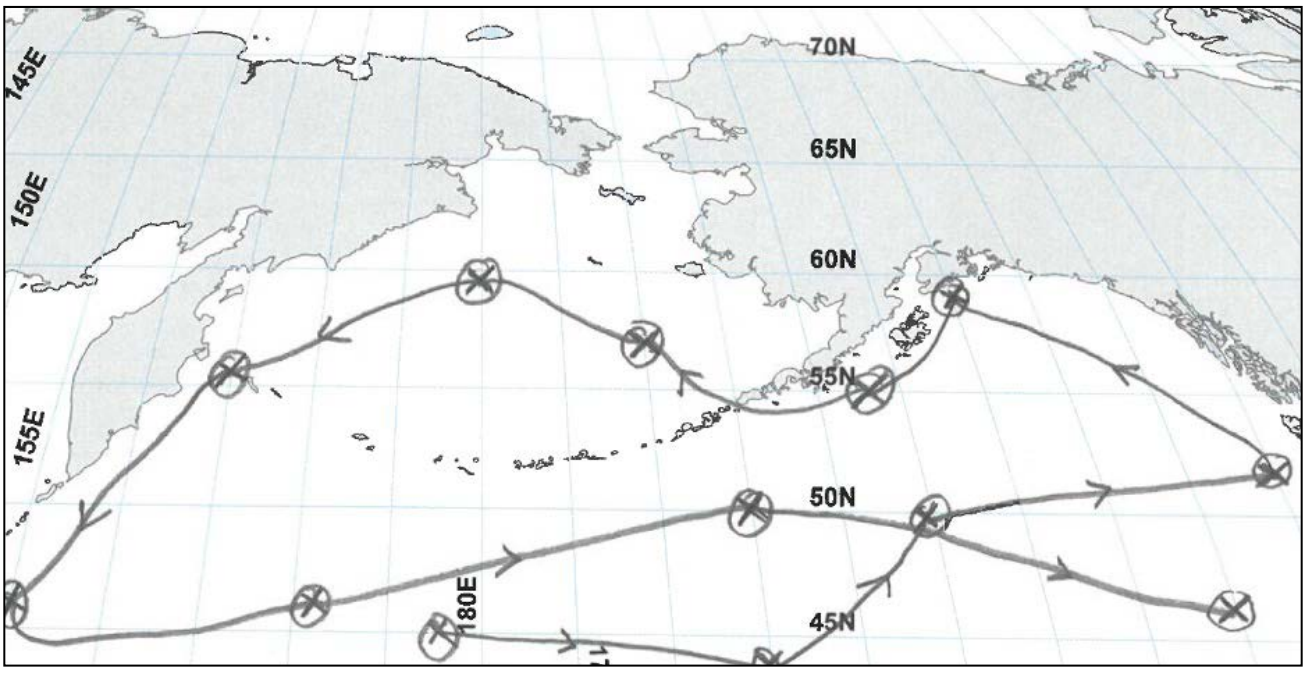
After reading the book, the students are informed that this is not make-believe. This story is based upon an event in 1992 where nearly 29,000 bath toys fell off this ship in the Pacific Ocean. The students are then provided with a task: given a set of geographic coordinates it is now their job to map where the ducks went. A map of the north Pacific is provided to each student along with the coordinates and then they set about mapping the locations where the ducks were sighted. They draw a line connecting each location and soon they have a "duck path" through the ocean (Figure 1). Some students need to work with others or have extra guidance from their teacher, especially since the coordinates cross the 180° Meridian. This can provide some confusion with some degrees being East and the others West right next to each other. There's another important reason for engaging in this activity at this age. The academic standards for my state have students learning about Cartesian grid systems at this age, so it is also giving them a parallel to their mathematics class.

After mapping the duck journey, students are asked "what did you just map?" Of course, they mapped where the ducks went, but the teacher then shows them a map of ocean currents. It becomes clear that it's not just the ducks that they were learning about. The teacher then can discuss Earth's rotation, the shape of landforms, and the role of wind in determining the flow of ocean currents. The lesson does not stop here, however, as students are asked to think about whether or not the ducks could make their way to Europe. Looking at a traditional map, students typically suggest that the ducks could make their way around South America, but when shown the ocean current map again, they realize that this is not possible. The teacher then shows a different map, one focusing on the North Pole and here the students can see a very different way of looking at Earth and how warming climate makes the journey possible in a different way.

At this point students have used maps in two different ways to explore a simple story about ducks. To engage them further the teacher then asks how fast do the ducks travel? Students then measure the distance between points on the map and using the amount of time taken between

two points and the number of hours in a day, the students are able to calculate how fast the ducks move in the ocean. It is a simple way to introduce mathematics into geography. At this point, just as it seems the lesson is drawing to a close, the students are asked another question: "As cute as the ducks are, what are they really in the ocean?" The answer of course is that the ducks are pollution and now the teacher brings the students into a conversation about the Great Pacific Garbage Patch, an area swirling with plastics and other debris. So, what we have in this scenario is a lesson that begins with the children's book and ends in a very real conversation about a very real environmental problem. A cute story became real. An event that seemed far away was now close as each student understands what pollution looks like in their home. And now armed with this information, they begin to care about and value their place.

Figure 1. The "duck path" in the Pacific Ocean as plotted by a student.



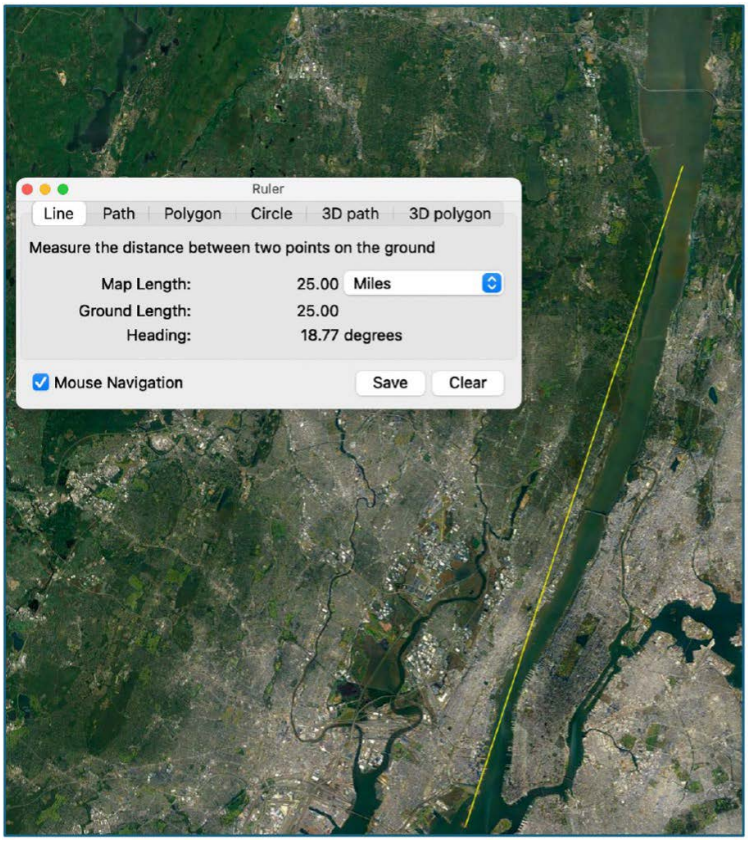
Source: Author.

Building Bridges – What is the Role of the Environment?

The second lesson strategy, one used with older students, has a surprising twist related to the environment and also the ways that people can ignore its constraints (Mitchell; Cantrill; Kearse, 2012). The topic is the location of a bridge, now named the Mario Cuomo Bridge (formerly named the Tappan Zee Bridge), just north of New York City in the United States (Figure 2). The students are shown in aerial image, using something like Google Earth, and asked to comment on anything that they see that seems strange to them related to the bridge. After a few moments, one or more students typically notices that the bridge is located at the widest part of the river. This of course makes little sense to them. Why would you build a bridge there when nearby there are portions of the river that are only one mile across as opposed to three miles at this location? With this realization students are then asked what reasons might account for the bridge being located there. Answers have included "maybe there were two cities there that needed to be connected",

or "perhaps there was an existing roadway that needed to be connected", or "maybe the land was for sale there." These are all interesting observations about that place. If they do not come up with the next set of factors on their own, it is up to the teacher to introduce the role of environmental conditions. Is the river shallow there? Is there something about the soil or the geology in that place that makes building it there easier or less costly? There are technologies that we can use, geographic technologies, to investigate questions related to soil or geology.

Figure 2. The Mario Cuomo Bridge (New York, USA) (shown in upper right) with distance measured from Liberty Island.



Source: Google Earth.

Students are then asked to open Google Earth and upload to files related to New York and New Jersey's geology (Figure 3). Functioning like a geographic information system, these two layers allow students to overlay the geology over the base imagery and click on the layer to reveal the types of rocks near the bridge. Students soon see that there is not much geologic variability at either the wide or the narrow points of the river. In other words, there does not appear to be a geologic advantage for any particular location. Soils might be another area to investigate, so students are shown an online GIS where they are able to see that concrete and steel corrosion is a problem in the area. The threat is not avoidable in any particular location, whether at a wide point or a narrow point. So here the students begin to see that while the environment can be important in terms of what humans do in a place, it does not seem to be the most important factor for this particular piece of infrastructure.

Figure 3. Geology Layers (bridge shown in center).

Source: Google Earth.

Still curious about the odd placement of this bridge, the students are encouraged to go back to Google Earth and zoom out further to see the greater New York City area. The teacher will need to have the students locate Liberty Island, the site of the Statue of Liberty in New York Harbor. Next, students will use the measuring tool in Google Earth to draw a line from Liberty Island to the Mario Cuomo Bridge (see again Figure 2). The line is approximately 25 miles long and this is crucially important. In the New York City area, the city is responsible for the bridges and tunnels over a territory that exists 25 miles around the Statue of Liberty. The Mario Cuomo Bridge is just outside that boundary meaning that the responsibility for and the toll monies acquired for that bridge are the responsibility of the state of New York. So, what students see here is that it is not environmental conditions that determined the location of this bridge, but rather it was money and politics and a desire to see that money and that control vested in one political body and not another. This highlights for students that there are some things that people construct in the environment that are not fully rational.

Teaching Environmental Geography – Like GIS (but not)

I have attempted to lay out here a series of issues that require our attention if we are going to achieve good environmental geography teaching. One of the first is to improve teacher training so that instruction is not siloed. Environmental geography, or simply just teaching about the environment broadly, requires an educator with familiarity of both human and physical Earth

systems. A well-trained geography teacher should be the best suited to engage with these issues. But the way we train teachers in America remains an impediment, as is the problem of focusing solely on human geography as part of broader social studies instruction. Further, if the environment is to be taught at all, academic standards must include the issues.

A final aspect that we must also consider is how we go about teaching environmental issues. I have tried to show through the rubber duck and bridge siting examples that a holistic view is necessary to capture both the human and Earth elements inherent in all study. Consider, for example, a geographic information system or GIS. Readers here will be familiar with how a GIS segments Earth into a variety of layers so that the user is able to query those different topics and analyze the relationships between them. This is a quite useful approach. However, approaching the teaching of environmental issues in this way is not useful as integration necessary. Treating the environment, or subsets of it like soil, flora, and climate, as simply another layer that does not interact with the human layers is an approach that ignores the complexity inherent in the environmental problems we seek to understand. Quality environmental geography teaching is possible in our schools with a holistic approach conducted by a well-trained teacher that is supported by an inclusive curriculum.

References

CARLE, E. **10 little rubber ducks**. New York: HarperCollins Publishers, 2005.

HANSON, S. Who are "we"? An important question for geography's future. **Annals of the Association of American Geographers**, London, v. 94, n. 4, p. 715-722, 2004.

HEFFRON, S. G.; DOWNS, R. M. (eds.). **Geography for life:** National Geography standards. 2. ed. Washington, D.C.: National Council for Geographic Education, 2012.

MITCHELL, J. T.; CANTRILL, J.; KEARSE, J. The "why" and "where" of the Tappan Zee Bridge: A lesson in site location, physical geography, and politics. **Social Education**, Sil Spring, v. 76, n. 4, p. 205-209, 2012.

MITCHELL, J. T.; HANCE, D. Map skills, ocean currents, pollution, and… a rubber duck? **The Geography Teacher**, London, v. 11, n. 3, p. 108-115, 2014.

TUAN, Y. A view of geography. **Geographical Review**, London, v. 81, n. 1, p. 99-107, 1991

Article editor

Sonia Castellar

Received: Oct. 21, 2024
Accepted: Feb. 27, 2025