


# Sense of place and place-based geoscience education and interpretation in the Colorado Plateau – Río Grande Rift region

Steven Semken, Arizona State University  
EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop

Sense of place and place-based geoscience education and interpretation  
in the Colorado Plateau – Río Grande Rift region



Tse'naashijii (Spider Rock), Canyon de Chelly National Monument, Navajo Nation, Arizona

Steve Semken


ASU SCHOOL OF EARTH & SPACE EXPLORATION ARIZONA STATE UNIVERSITY

earth scope

EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop

We teach Earth, environmental, and ecological sciences  
in *places*....localities given meaning by human experience\*

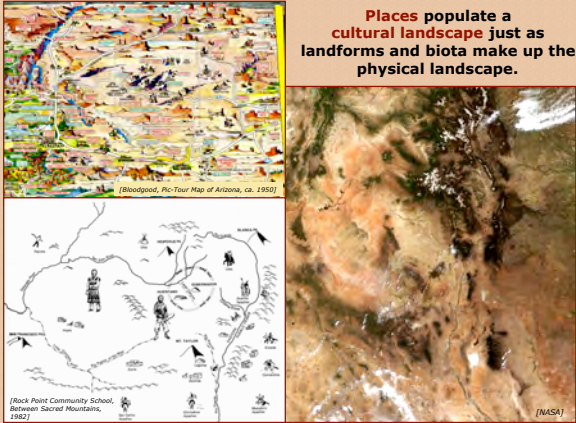
Our access to space and time is how they happen in a given place.  
Edward Casey, philosopher



[\*Relph 1976, Tuan 1977]

Source: from the National Geographic Society and Interpretive Center, Grand Canyon National Park, Arizona

Places populate a cultural landscape just as landforms and biota make up the physical landscape.

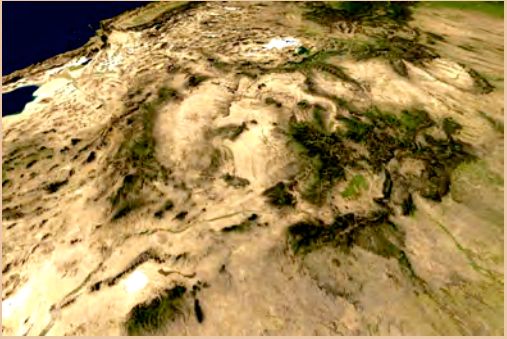


[Bloodgood, Pic-Tour Map of Arizona, ca. 1950]

[Rock Point Community School, Between Sacred Mountains, 1982]

Source of place and place-based geoscience education and interpretation in CP & RGR = 3

Think of a place on the Plateau or in the Rift that is meaningful to you. What meanings does it hold for you?

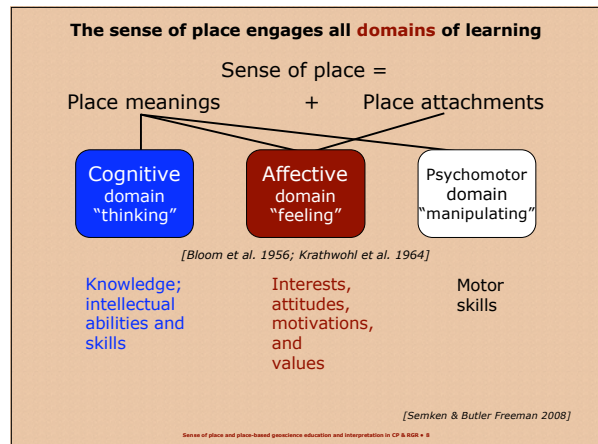
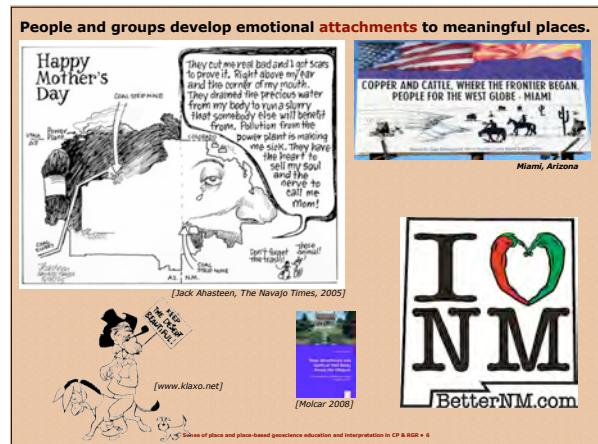


[W. Bowen, World Atlas of Panoramic Aerial Images, [http://geogdata.csun.edu/world\\_atlas/index.html](http://geogdata.csun.edu/world_atlas/index.html)]

Source of place and place-based geoscience education and interpretation in CP & RGR = 4

# Sense of place and place-based geoscience education and interpretation in the Colorado Plateau – Río Grande Rift region

Steven Semken, Arizona State University  
EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop





# Sense of place and place-based geoscience education and interpretation in the Colorado Plateau – Río Grande Rift region

Steven Semken, Arizona State University  
EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop

American Indian and long-rooted Mexican-American communities in the Southwest possess **rich, culturally-mediated** senses of place.

[Basso 1996; Cajete 1997, 2000; Alarcón 2002]



In spite of deep place attachment and familiarity with Earth systems...

they have long been **underrepresented in geoscience** and other natural sciences  
[Riggs & Semken 2001, NSF 2009]

Teaching that **contradicts or minimizes their senses of place** may deter these students from scientific study and careers.

[Kawagley et al. 1998, Aikenhead & Jegede 1999, Riggs 2005, Semken 2005]



Senses of place and place-based geoscience education and interpretation in CP & RGR • 9

Globalization, careerism, standards-based teaching, entertainment media, pop culture, etc., **divert people from meaningful engagement with places.**



**...with consequences** [Relph 1976]

Misunderstanding, fear, avoidance of nature [Sobel 1996]

Possible harm to physical and mental health [Louv 2005]

Obliviousness to the aesthetic, cultural, ecological value of the local [Orr 1992]

Acquiescence in environmental and social degradation of surroundings [Orr 1992, Meyrowitz 1985]

**Disinterest in geoscience** and other natural science studies and careers? [Levine et al. 2007]

Senses of place and place-based geoscience education and interpretation in CP & RGR • 10

Place offers a **meaningful** context for teaching and learning, whether formal or informal.

**Wisdom sits in places....You must remember everything about them.**

**You must learn their names.**

**You must remember what happened at them long ago.**

**You must think about it and keep thinking about it.**

Dudley Patterson, late Ndee (Western Apache) elder, in *Wisdom Sits in Places* (Basso 1996)

**[Experiences in places are] profoundly pedagogical [in] nature.**

Gruenewald 2003, *Foundations of Place-Conscious Education*

**Place supplies the context; disciplines the tools.**

Ault 2008, *Achieving Querencia*

**Place-based** teaching and learning are explicitly situated in place.



Sierra de la Cruz, Rio Grande Rift, east of Socorro, New Mexico

Senses of place and place-based geoscience education and interpretation in CP & RGR • 11

**In place-based teaching, sense of place defines the curriculum.**

**Local:** focused on surrounding natural and cultural environments

**Experiential:** inquiry in field and lab with local features and materials

**Trans-disciplinary:** synthesizes geology, geography, climatology, hydrology, ecology, anthropology, history, art

**Cross-cultural** (sometimes **multilingual**): Incorporates or acknowledges different cultural perspectives on places and processes under study

Promotes **environmental** and **cultural sustainability**

[Gruenewald 2003; Sobel 2004; Semken 2005]



[Grotzinger et al. 2007]

Senses of place and place-based geoscience education and interpretation in CP & RGR • 12

**Steven Semken, Arizona State University**  
**EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop**

Sense of place and place-based geoscience education and interpretation in CP &amp; RGR • 13

Sense of place and place-based geoscience education and interpretation in CP &amp; RGR • 14

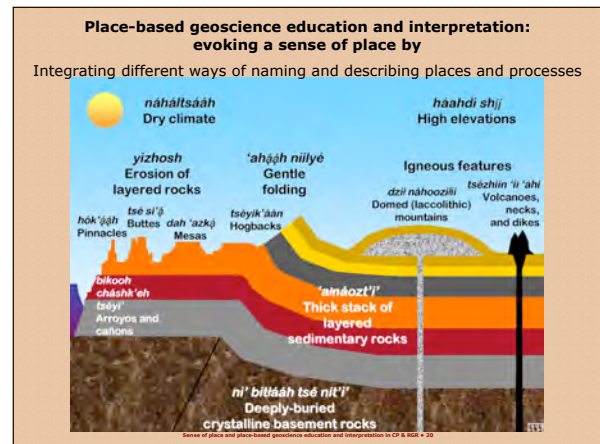
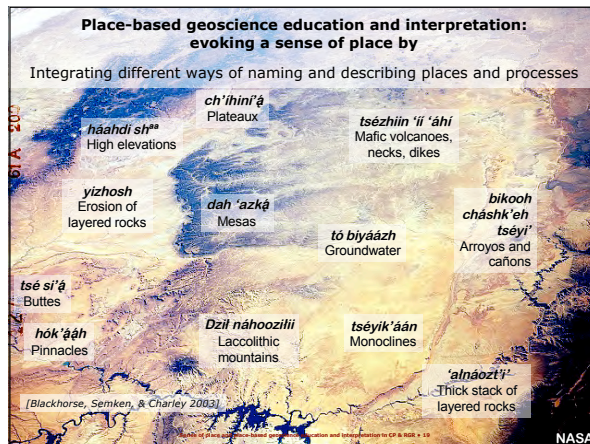
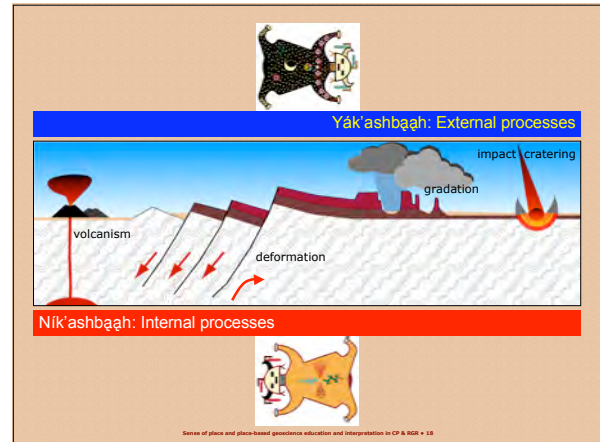
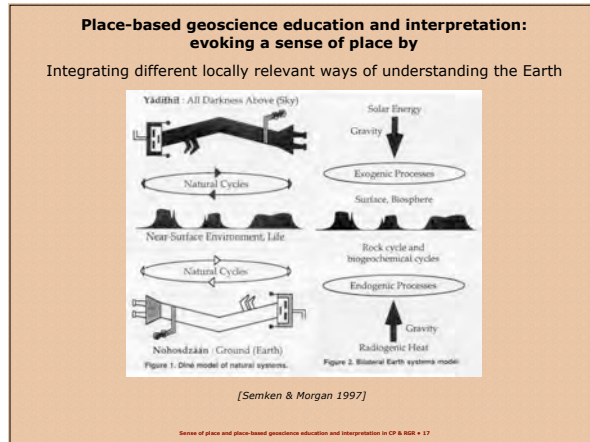
Sense of place and place-based geoscience education and interpretation in CP &amp; RGR • 15

Use of place and place-based geoscience education and interpretation in CP &amp; RGR • 16



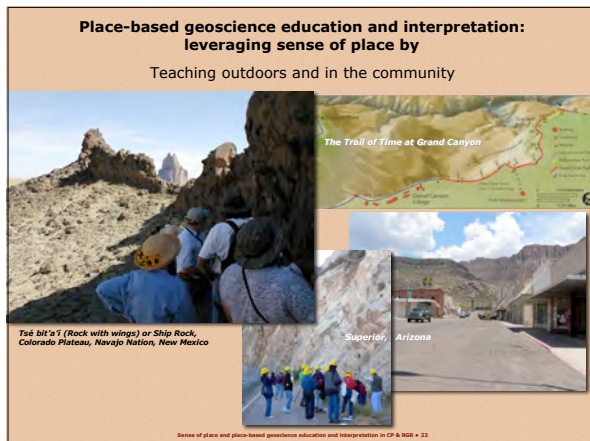
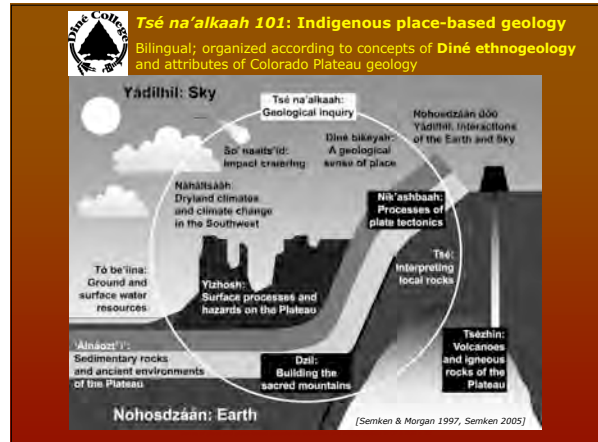
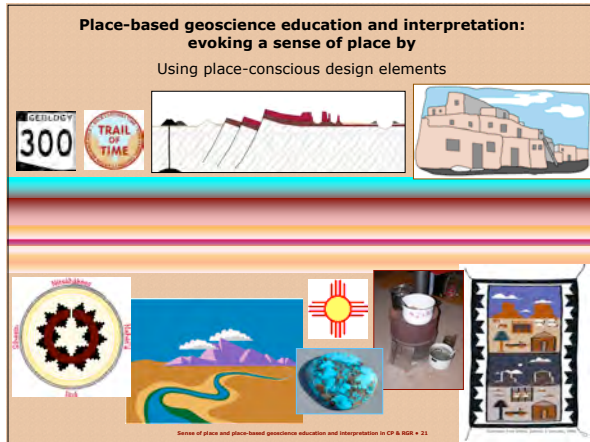
# Sense of place and place-based geoscience education and interpretation in the Colorado Plateau – Río Grande Rift region

Steven Semken, Arizona State University  
EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop



# Sense of place and place-based geoscience education and interpretation in the Colorado Plateau – Río Grande Rift region

Steven Semken, Arizona State University  
EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop



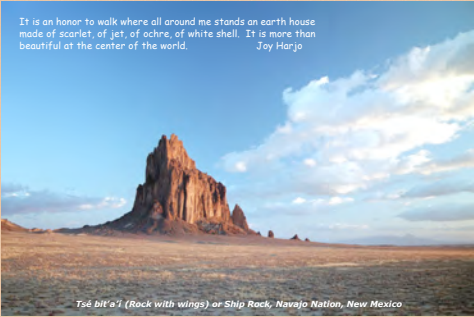
# Sense of place and place-based geoscience education and interpretation in the Colorado Plateau – Río Grande Rift region

Steven Semken, Arizona State University  
EarthScope Colorado Plateau-Río Grande Rift Interpretative Workshop

**Place-based geoscience education and interpretation:  
leveraging sense of place by**

Acknowledging the **beauty** of geologically important places.


It is an honor to walk where all around me stands an earth house  
made of scarlet, of jet, of ochre, of white shell. It is more than  
beautiful at the center of the world. Joy Harjo



*Tsé bit'a'i (Rock with wings) or Ship Rock, Navajo Nation, New Mexico*

Sense of place and place-based geoscience education and interpretation in CP & RGR • 25

**Place-based geoscience education and interpretation:  
assessing effects on sense of place**




*[Williams & Semken, in prep.]*


Ecologically important	Exotic
Important to preserve	Remote
Educational	Unspoiled
Unique	Authentic
Scientifically important	Adventurous
Fragile	Unusual
Interesting	Important for Native culture
A privilege to visit	Historical
A privilege to live here	Ancient
Tranquil	Spiritually valuable
Scenic	Overdeveloped
Relaxing	Dangerous
Wilderness	Crowded
Beautiful	Threatened

*[Semken & Butler Freeman 2008]*

*[Williams & Semken, in prep.]*



*[Johnson & Reynolds 2005]*



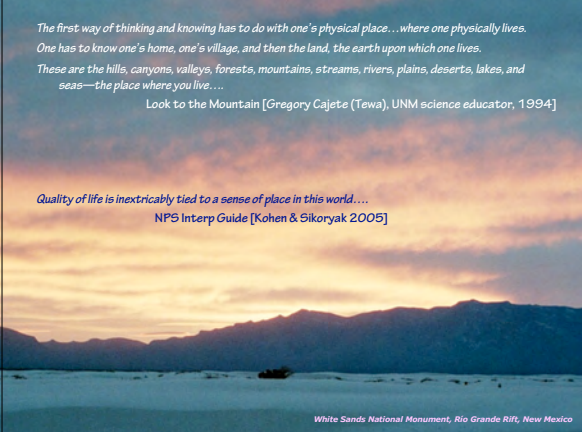
Sense of place and place-based geoscience education and interpretation in CP & RGR • 26

*The first way of thinking and knowing has to do with one's physical place...where one physically lives.  
One has to know one's home, one's village, and then the land, the earth upon which one lives.  
These are the hills, canyons, valleys, forests, mountains, streams, rivers, plains, deserts, lakes, and  
seas—the place where you live....*

Look to the Mountain [Gregory Cajete (Tewa), UNM science educator, 1994]

*Quality of life is inextricably tied to a sense of place in this world....*

NPS Interp Guide [Kohen & Sikoryak 2005]



*White Sands National Monument, Rio Grande Rift, New Mexico*