

Turning landscape rambles  
into integrative, interdisciplinary, intergenerational  
field experiences

**Tim Lutz**  
**LeeAnn Srogi**

Earth & Space Sciences  
West Chester University

***“The major problems of the world are the result of the difference between how nature works and the way people think.” – Gregory Bateson***



# Naturalist Guided Walk

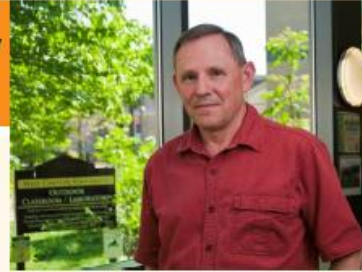
FALL 2015

**HARMONY HILL NATURE AREA hike led by  
GEOLOGIST TIM LUTZ, PH.D**

**SUNDAY, NOVEMBER 8, 2015**

**2:00 P.M.**

**HARMONY HILL NATURE AREA**  
1200 Skelp Level Road, Downingtown, 19335



Participants will enjoy a hike of approximately 1½ miles. The walk will begin at a high point near Skelp Level Road and descend roughly 200 feet down to the Brandywine Creek valley before returning to the starting point. The hike is of moderate difficulty.

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## REGISTRATION IS REQUIRED & SPACE IS LIMITED

### Fee:

- Individual: \$10
- Family (up to 4 participants): \$20

### Register by November 1, 2015:

- On line at: [www.runtheday.com/race/NaturalistWalk](http://www.runtheday.com/race/NaturalistWalk)
- Mail to:

East Bradford Township  
666 Copeland School Road, West Chester, PA 19380  
Checks made payable to East Bradford Township

November 2015 – Lutz (and Srogi) led a  
“Naturalist’s Walk” by E Bradford Township

November 2017 – Srogi (and Lutz) led a  
“Geologist’s Walk” for Natural Lands



# Naturalist Guided Walk

FALL 2015



[visit](#) [what we do](#) [events](#)

## Geology Rocks! – SOLD OUT

Fulshaw Craeg Preserve | Sat, November 04, 2017, 9:00am - 11:00am

**Event is SOLD OUT!** Check out our other events to plan your next adventure outside!

From ringing rocks to boulders once quarried for Philadelphia streets, Natural Lands' Fulshaw Craeg Preserve features an array of geological wonders. Steep, rocky slopes and a winding stream were natural limitations to agriculture and development, leaving this land virtually untouched by humans.

Expert geologists guide a fascinating exploration of this special spot in Montgomery County. We'll trek stony trails, examine outcroppings, and discuss natural and cultural facets.

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***What is a “Naturalist’s Walk?”***

***What is a “Geologist’s Walk?”***

### **Outline of this talk:**

- Conceptualization
- Preparation
- The Walks



# CONCEPTUALIZATION

## Audience expectations

### ***Naturalist's walk: nature***

birds, plants, trees, maybe soil, maybe streams

“we were surprised to have a geologist leading this walk!”

### ***Geologist's walk: geology***

rocks, minerals, rocks, maybe streams, maybe soils, rocks

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In the end both walks were more similar than they were different

The similarities came from our conceptualizations of nature and geology

The differences emerged from the different locations of the walks

## OUR CONCEPTUALIZATION – A SYSTEMS THINKING APPROACH

“The basic principles of ecology – interdependence, the cyclical nature of ecological processes, flexibility, diversity, etc. – are basic systemic properties of all living systems. This is why the systemic understanding of life [systems thinking] not only holds great intellectual fascination but is also tremendously important from a practical point of view. It is the cognitive foundation of our endeavor to move toward a sustainable future.”

Capra, F. & Luisi, P.L., 2016, The systems view of life: a unifying vision (Cambridge University Press)

***Systems Thinking*** – everything is connected so focus on relationships and interdependence not isolated parts

Human processes and effects are integrated into the interconnected, interdependent landscape so ***human history is part of the “naturalist’s” conceptualization***

## OUR CONCEPTUALIZATION – TIME TRAVEL

The landscape we live in is the landscape at one point in time.

It didn't always look like this!

Again, human history *is* part of the “naturalist's” conceptualization.

Geologists bring the ability to ***travel back before human time*** into deep time.

We can help everyone use clues in nature and their imaginations to “see” ancient landscapes change into the world around them today.



**The trail today was a trolley line until 1929**

## OUR CONCEPTUALIZATION

“The major problems of the world are the result of the difference between how nature works and the way people think.” – Gregory Bateson

The nature we talk about in the classroom and write about in reports is far different from nature experienced on a walk in the woods.

The classroom and the report reflect how people think. We apply a disciplinary and reductionist approach to develop and present the content in a linear manner. Each slide or section neatly separates one concept from the next; carefully chosen images illustrate each point in turn; everything is known in advance, from beginning to end.

### II. Natural Resources

Geology

Soils

Topography and Slopes

Hydrology

Plant Resources

Wildlife

Special Features

Stewardship Issues

### III. Cultural and Historic Resources

Historic and Archaeological Features

Existing Improvements

Public Use Facilities

### IV. Preserve Stewardship

Stewardship Units

Conservation Values and Priorities

Stewardship Goals



## OUR CONCEPTUALIZATION

On a walk in the woods, we are brought into contact with a world entirely whole and undivided.

Natural and human systems of all kinds and scales intertwine and interact.

Time is elastic, from the immediate murmur of a flowing stream, to the shape of its valley, to the age of the rocks that underlie it.

What will be happening the day of the walk is unknown. The walk is an open-ended adventure.

# Fulshaw Craeg Preserve

## *Stewardship Plan*



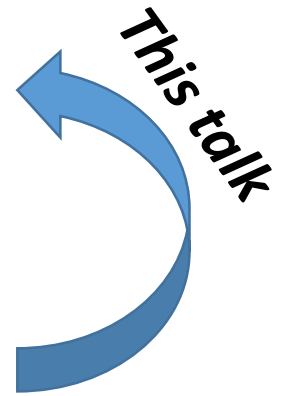
Montgomery County, PA

December 2008

## FROM CONCEPTUALIZATION TO PREPARATION

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## PREPARATION

Working with local government or organizations

Anticipating the audience – who will be the participants?



# Naturalist Guided Walk

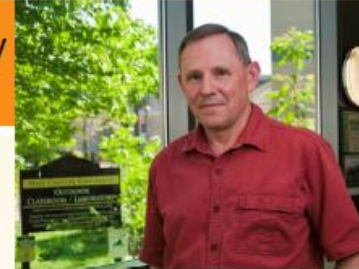
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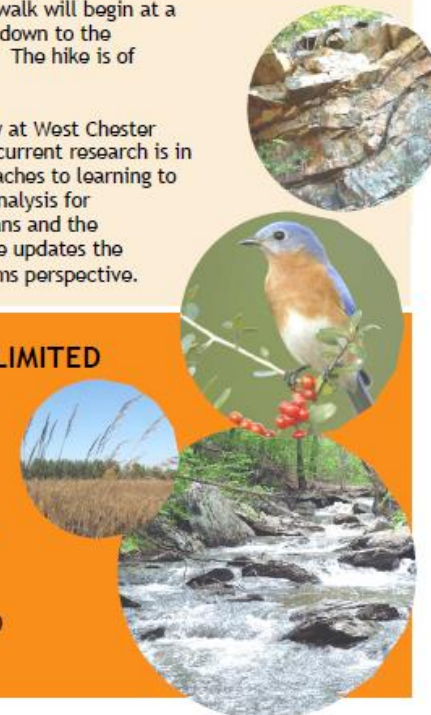
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## Registrant characteristics

Gender	Age
Male	4
Female	11
Female	15
Female	20
Male	33
Female	44
Male	45
Male	45
Male	48
Female	50
Male	52
Male	53
Female	57
Male	63
Male	63
Female	64
Female	64
Male	64
Female	65
Male	69
Female	71
Male	73
Male	78
Female	80



## PREPARATION –

### ANTICIPATING THE AUDIENCE

Though not employed overtly during the walks, values of nature provide a framework to help the guides acknowledge, engage and respond to values the participants express during the walk.

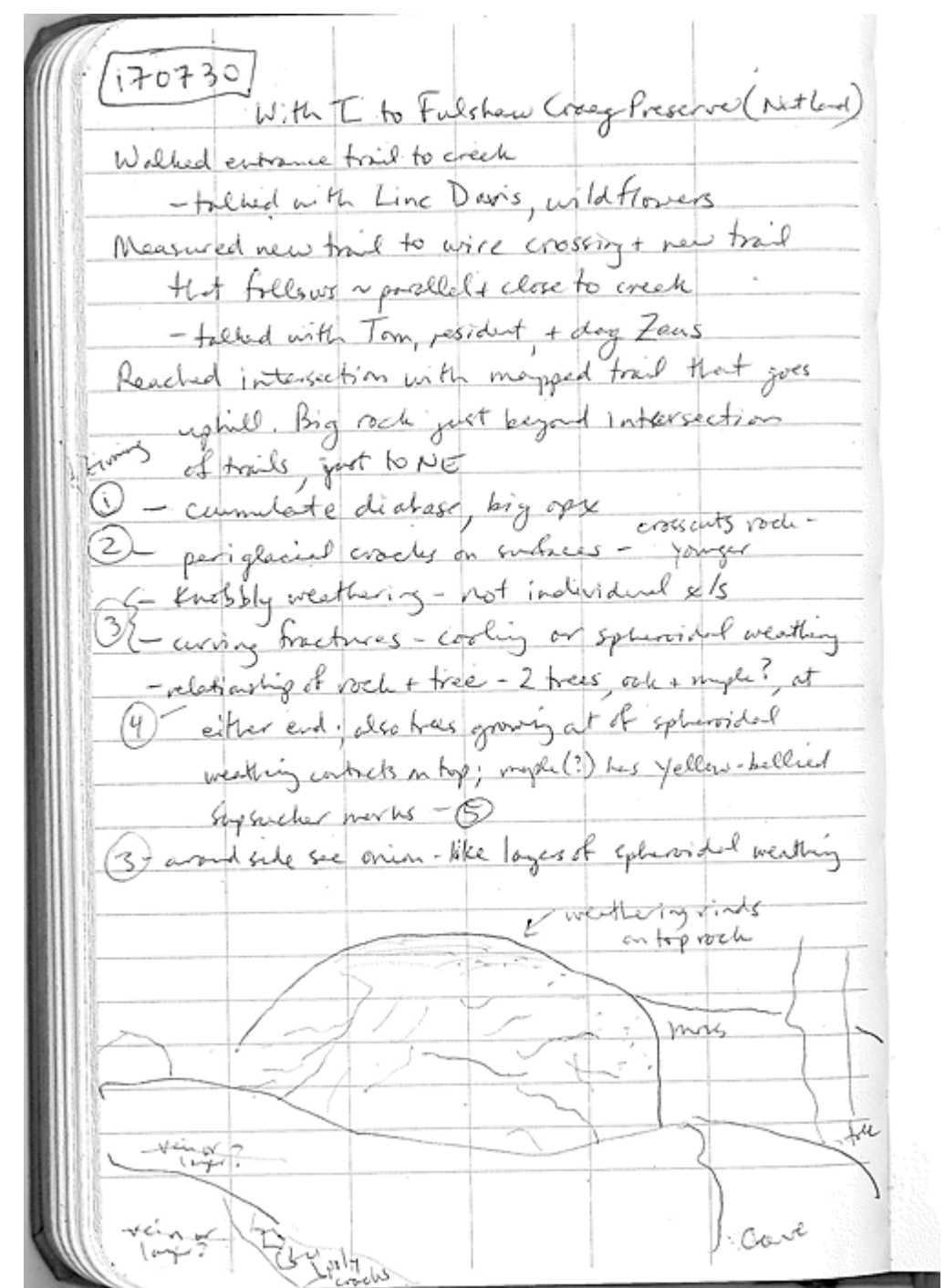
- Kellert, S.R., 1996, The value of life: biological diversity and human society (Island Press)
- Lutz, T. & Srogi, L., 2010, A values framework for students to develop thoughtful attitudes about citizenship and stewardship (Journal of Geoscience Education, v. 58, p. 14-20)

Value	Brief definition
Ecologicistic/scientific	Systematic study of structure, function, and relationship in nature
Utilitarian	Practical and material exploitation of nature
Naturalistic	Direct experience and exploration of nature
Aesthetic	Physical appeal and beauty of nature
Symbolic	Use of nature for language and thought
Humanistic	Strong emotional attachment and love for aspects of nature
Moralistic	Spiritual reverence and ethical concern for nature
Dominionistic	Mastery, physical control, dominance of nature
Negativistic	Fear, aversion, alienation from nature
Theistic	Nature reflects the will of supernatural forces or deities

## PREPARATION – TO THE FIELD!

What features best illustrate Systems Thinking and Time Travel?

What will spark the participants' imaginations?





## **PREPARATION** – Maps and Images of Landscape

Currently this is a re-growth forest with a small river (East Branch of Brandywine Creek) and tributaries

Aerial photography: Delaware Valley Regional Planning Commission (2015)

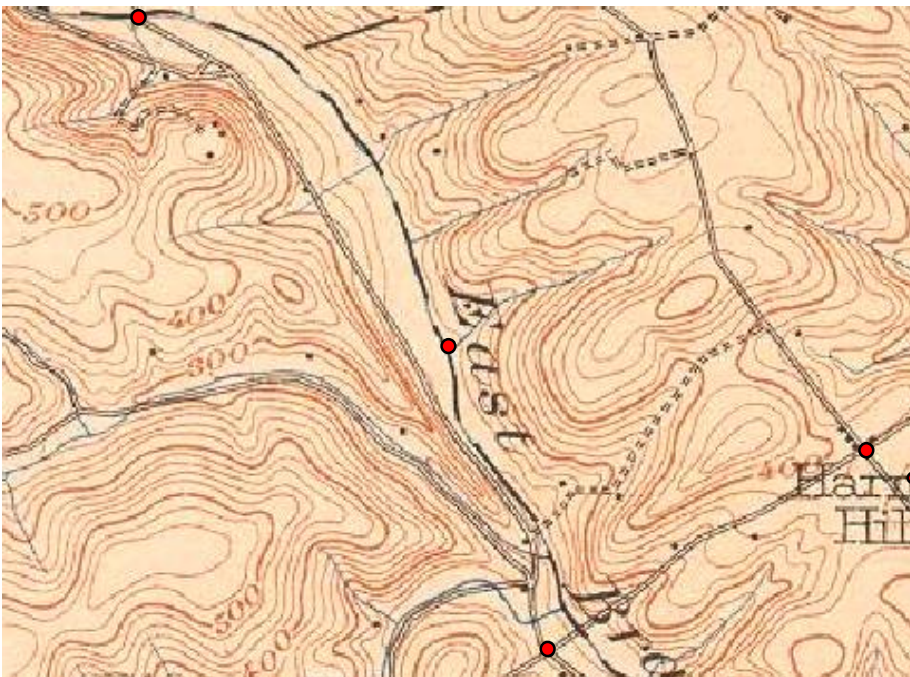
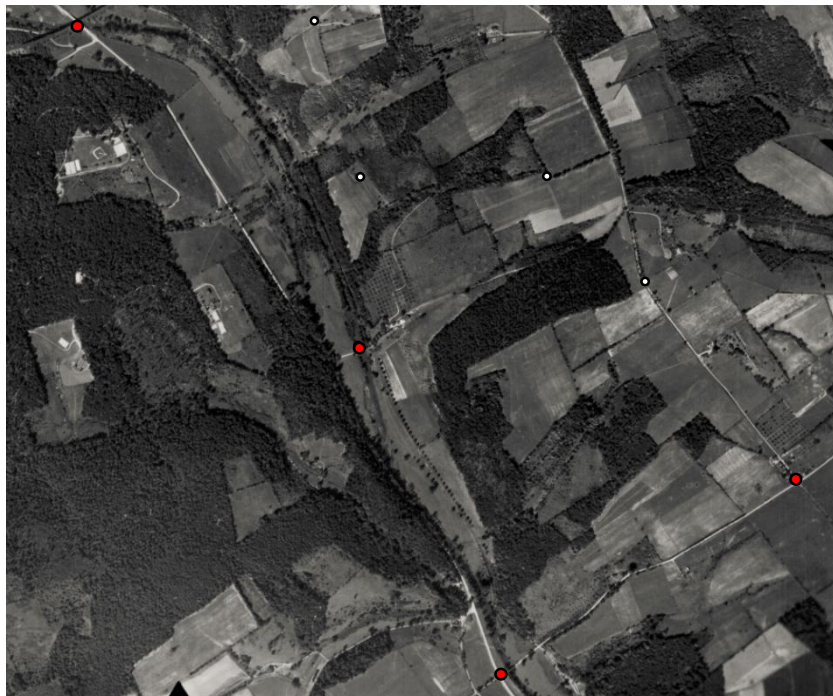
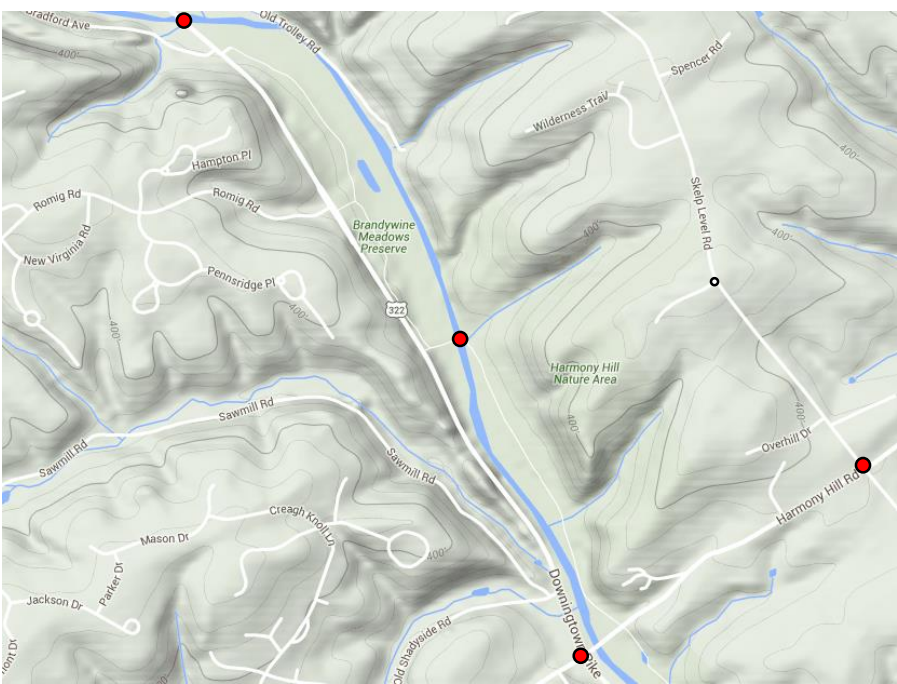




# PREPARATION

Exploring Maps and Images to Reveal Changing Landscapes over Human History

What is the best image to communicate changing landscape to our participants?





## Harmony Hill Natural Area trails on 1937 aerial photo

### PREPARATION

This is the map we provided to participants on the walk to connect modern trail system to human land uses in the past

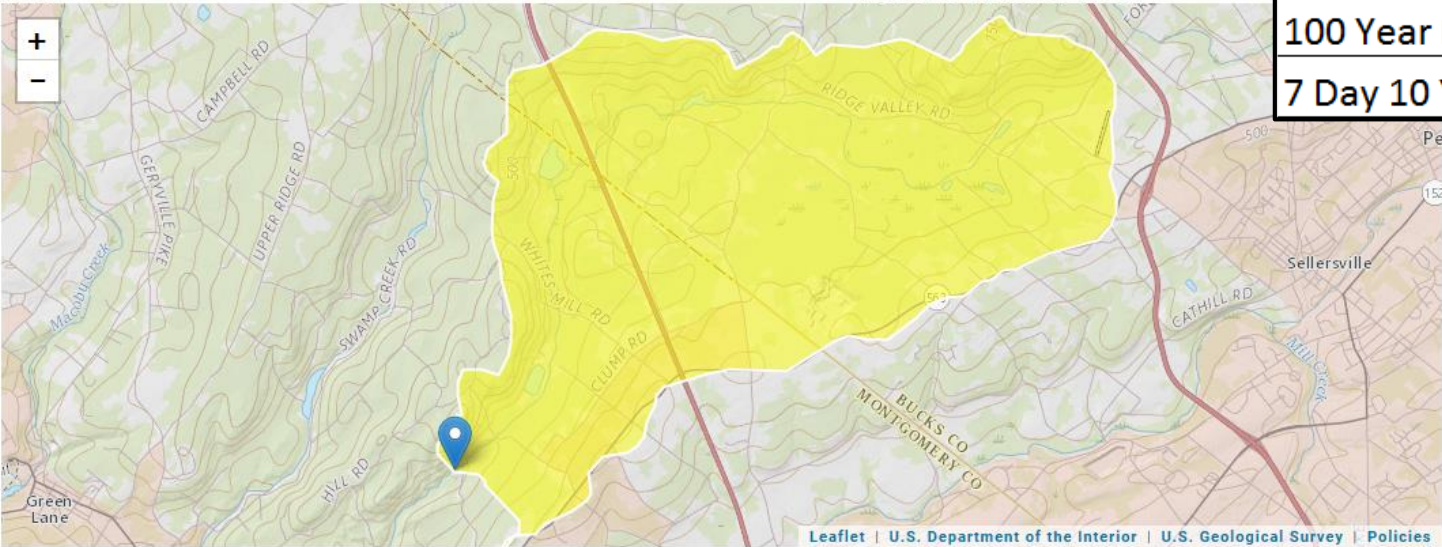


# PREPARATION – THE WATERSHED SYSTEM

## StreamStats Report for Fulshaw Craeg walk, November 2017

Region ID:  
Workspace ID:  
Clicked Point (Latitude, Longitude):  
Time:

PA  
PA20180311183744557000  
40.33998, -75.41876  
2018-03-11 14:38:00 -0400



Basin Characteristics		
Parameter Description	Value	Unit
Area that drains to a point on a stream	8.86	square miles
Percentage of area of carbonate rock	0	percent
Percentage of basin with urban development	2	percent
Mean basin slope measured in degrees	3	degrees
Depth to rock	4.9	feet
Mean Basin Elevation	493	feet
Mean Annual Precipitation	45	inches
Percentage of area covered by forest	83	percent
Mean Annual Flow	13.9	ft <sup>3</sup> /s
100 Year Peak Flood	4290	ft <sup>3</sup> /s
7 Day 10 Year Low Flow	0.49	ft <sup>3</sup> /s



# PREPARATION – THE WATERSHED SYSTEM

How best to convey to participants:

- the very large amounts of material moving
- the interdependence of landscape topography and stream water chemistry

	A	B	C	D	H	I	J
1	<b>Flux calculator</b>						
2	<b>Change any of the values in green</b>						
3		(cfs= cubic feet per second; <u>mg/L</u> = milligrams per liter; <u>tonne</u> = metric ton= T= 1000 kg)					
4		<u>lbs</u> = pounds; <u>tons</u> = 2000 lbs					
5							
6		Flow					
7		<b>13.9</b> cfs					
8					Area in <u>sq. mi.</u>		
9		Concentration			Area		
10		<b>200.0</b> mg/L (≈ppm)			<b>8.9</b> sq. mi.		
11							
12		Flux			Area flux		
13		<b>4.7</b> kg/min			<b>0.76</b> tonne/(mi <sup>2</sup> day)		
14		<b>6.8</b> tonne/day			<b>279.1</b> tonne/(mi <sup>2</sup> year)		
15		<b>2.5</b> kT/year			<b>107.8</b> g/(m <sup>2</sup> year)		
16		<b>10.4</b> lbs/min			<b>0.84</b> tons/(mi <sup>2</sup> day)		

***This is part of the handout provided to participants***

As you see E. Branch Brandywine Creek today, 8 November 2015, water is flowing at about

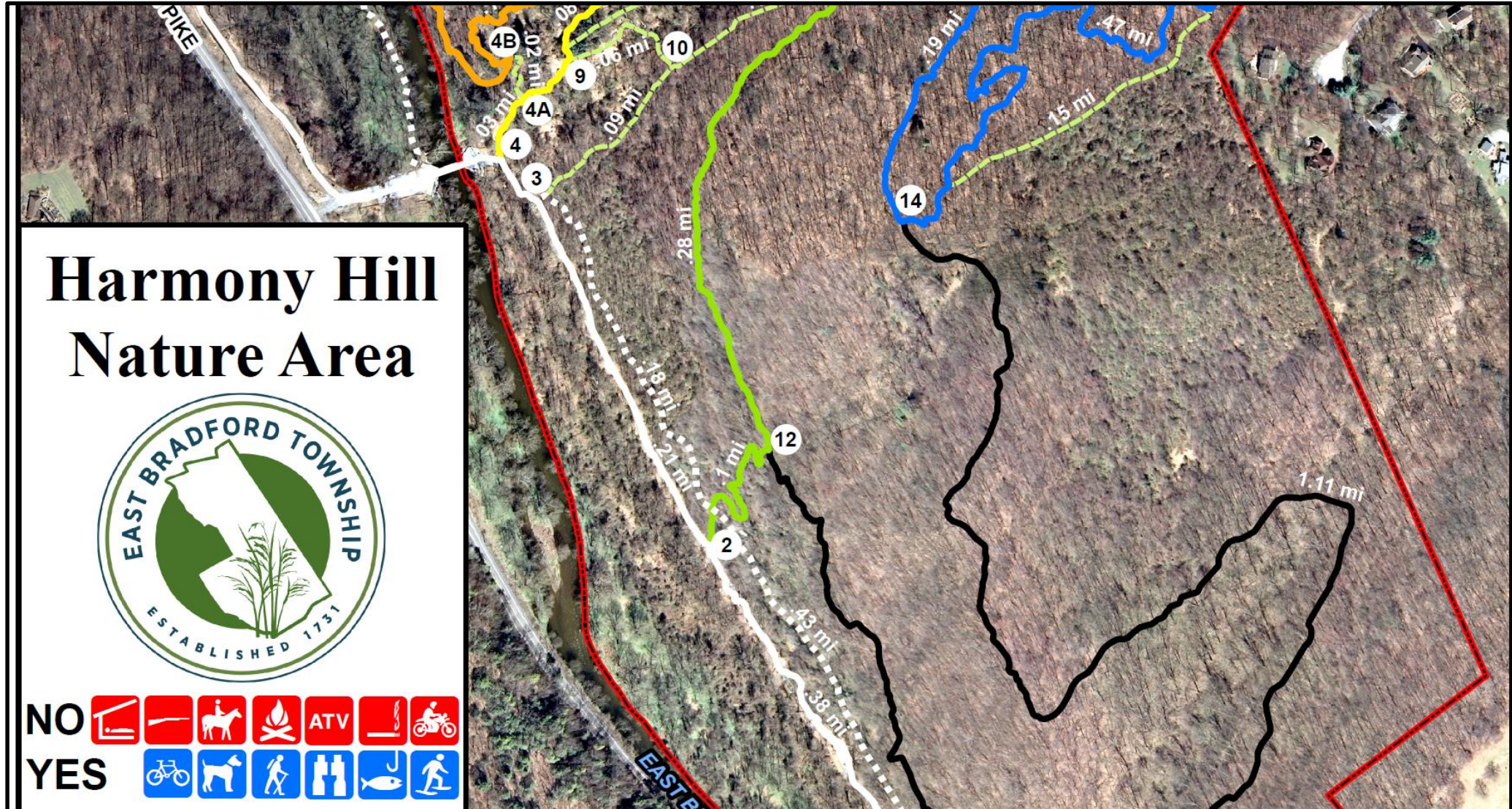
- 48 cubic feet per second, or
- 21500 gallons per minute.

Chemicals (ions) dissolved in the water from rock weathering are moving at

- 0.8 pounds per second, or
- 48.5 pounds per minute, or
- 1.45 tons per hour, or
- 35 tons per day.



# THE WALK!





# THE WALK BEGINS

LOOK UP!





# THE WALK BEGINS

LOOK DOWN!

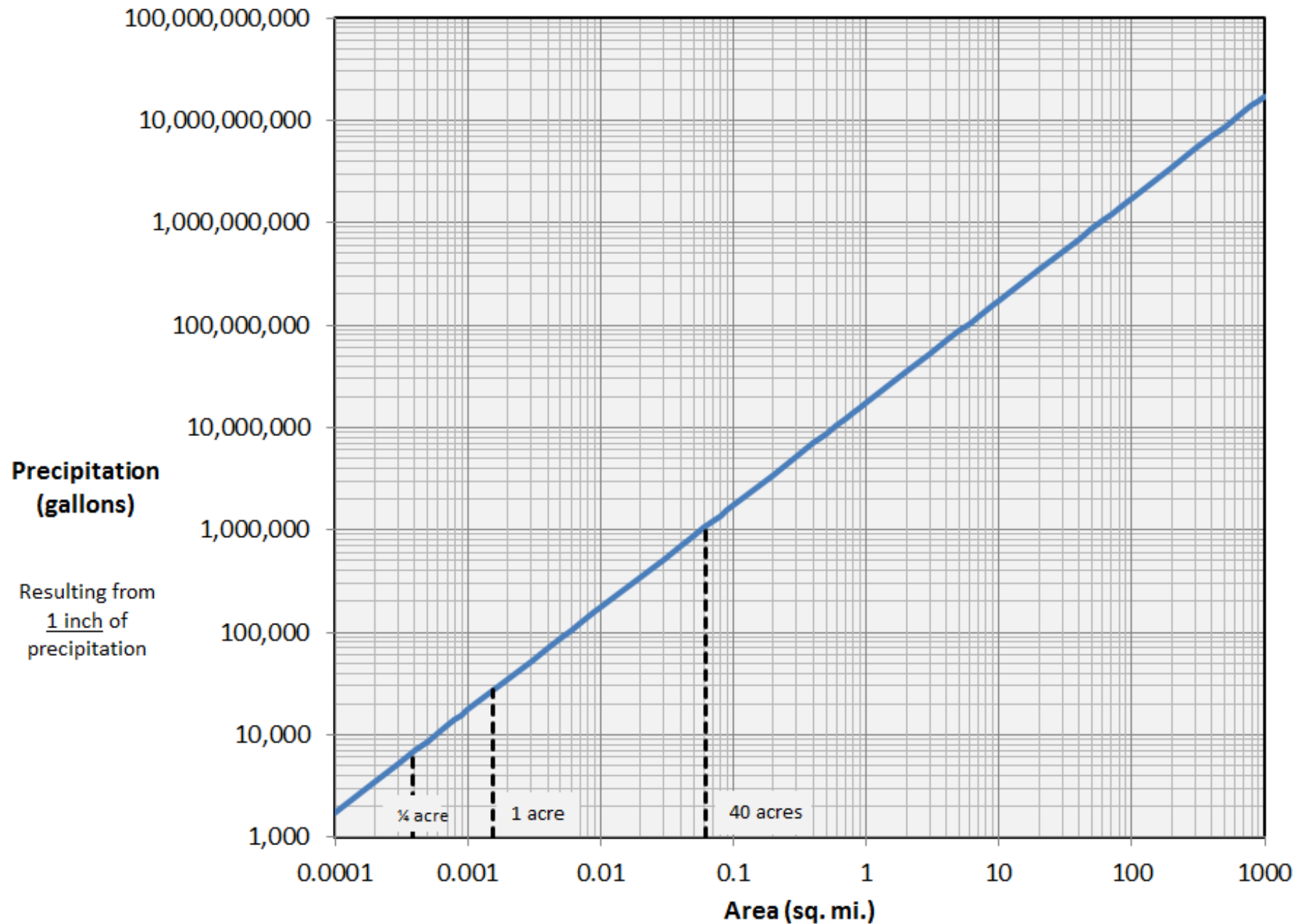




# THE WALK BEGINS

THINK BIG!

Using graphical  
handouts to help  
participants  
connect the  
surrounding  
landscape to  
large-scale  
processes





The precipitation makes the  
tributary stream ...  
which makes a valley ...



The tributary stream feeds the  
river ...

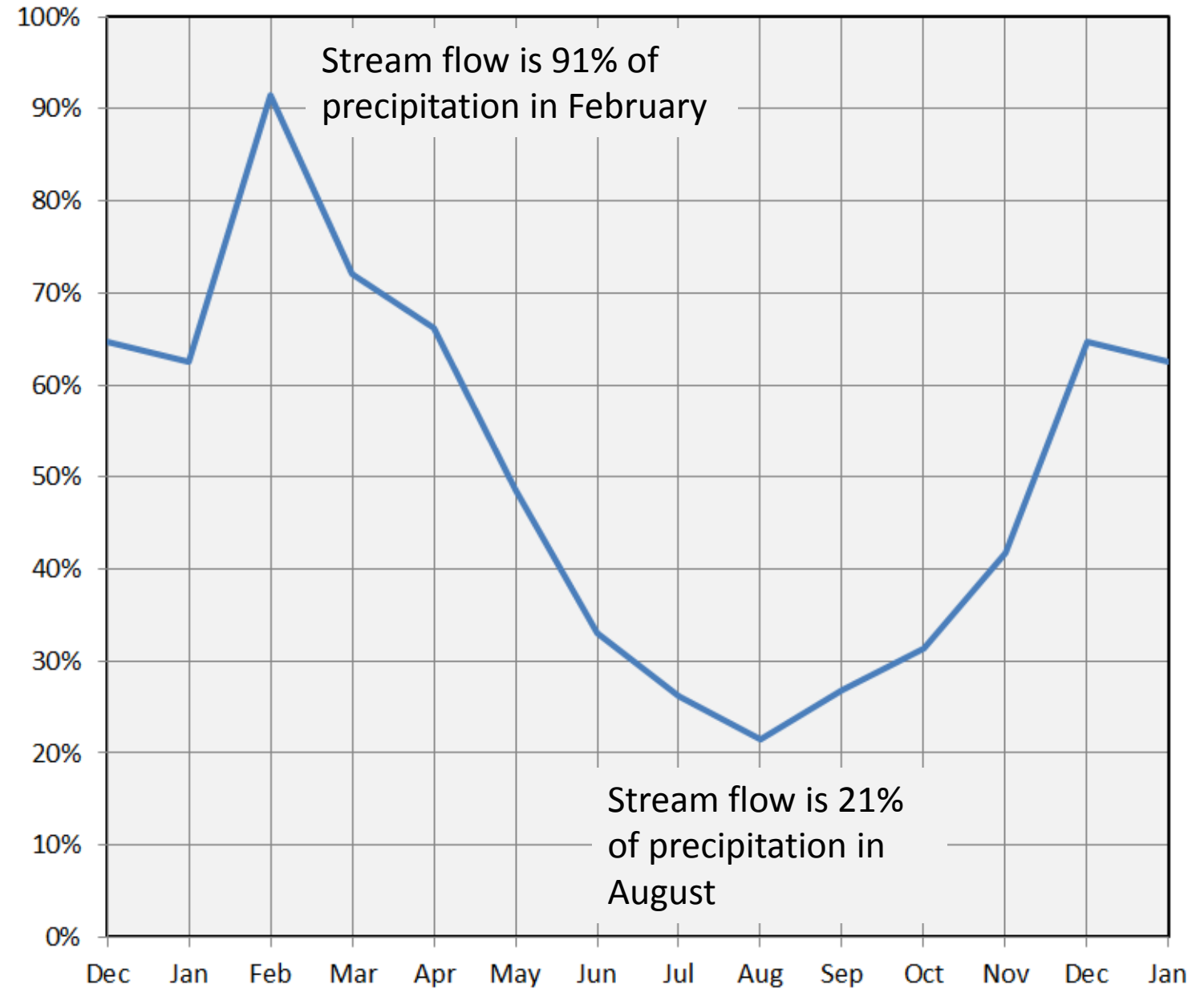




And vegetation is linked (by transpiration) to precipitation and stream flow



Flow of stream compared with precipitation





There is a long history of human habitation in the Harmony Hill area



These old buildings are being incorporated into the evolving landscape





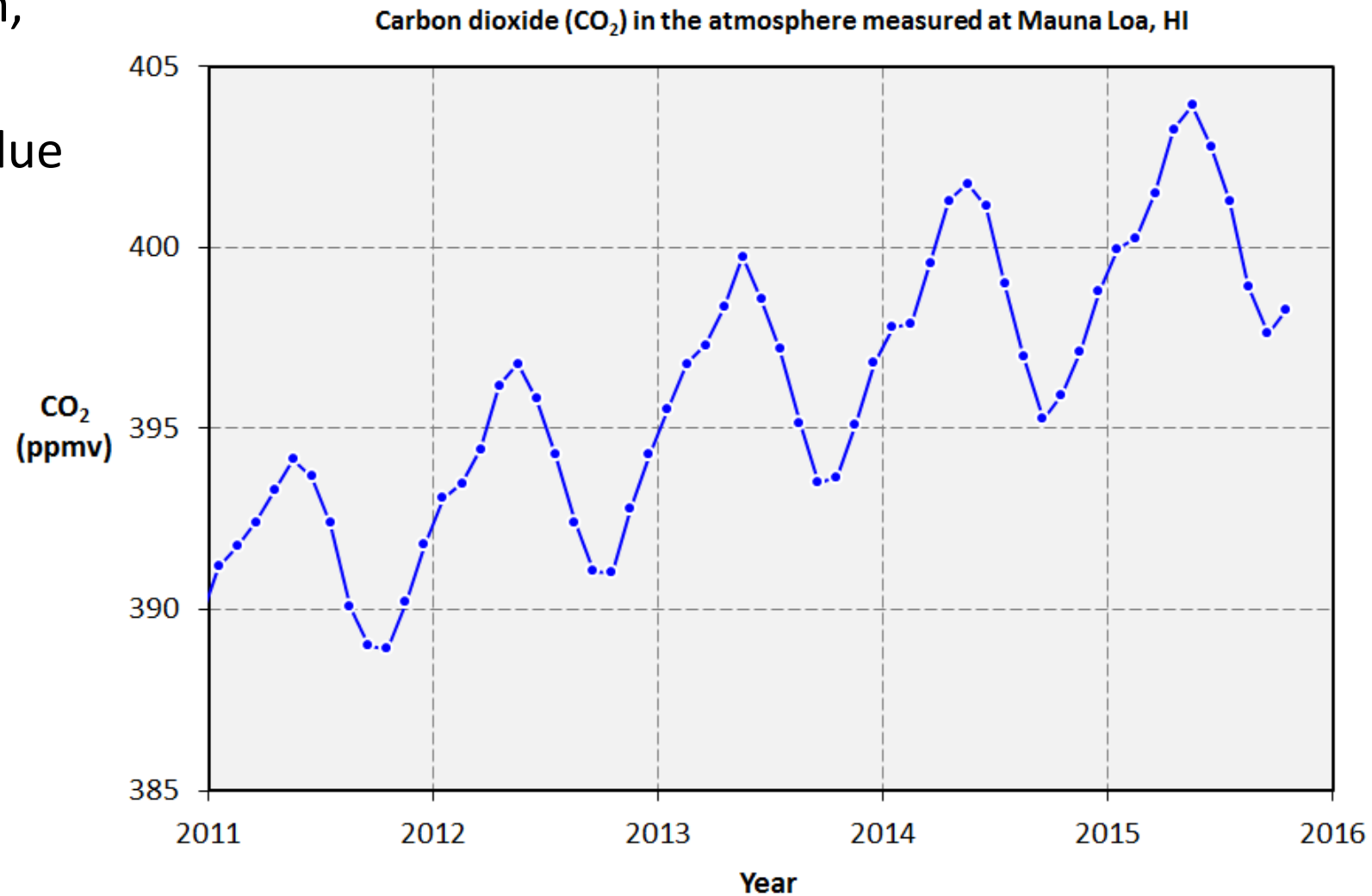
This is a re-growth forest very different from the indigenous forest

Forest and atmosphere are linked through photosynthesis, respiration, and decomposition

Overall increase in carbon dioxide due to human activities



The Carbon Cycle graph was provided to visualize ***human change*** to the Earth System at a global scale





# THE WALK DRAWS TO A CLOSE

## TIME TRAVEL

Introducing  
participants to  
the pre-human  
geologic history  
of Harmony Hill





# THE WALK!



[visit](#) [what we do](#) [ev](#)

## Geology Rocks! – SOLD OUT

Fulshaw Craeg Preserve | Sat, November 04, 2017, 9:00am -  
11:00am

# Fulshaw Craeg Preserve

## *Stewardship Plan*



Montgomery County, PA

# THE WALK BEGINS – TIME TRAVEL

Stand and look around and imagine traveling back in time

Introducing the *Geologic Map*

- Useful
- Easy to comprehend
- Beautiful!





## TIME TRAVEL

Go back 200 million years to a magma chamber 4 kilometers underground

Move forward in time to this day standing together in the preserve





The landscape is  
the focus of  
attention





Drawing on experience, expertise, and sense of place of the participants

**Ann F. Rhoads**, Morris Arboretum, co-author of The Plants of Pennsylvania: An Illustrated Guide and Trees of Pennsylvania: A Complete Reference Guide.





# THE WALK ENDS

## RINGING ROCKS AT LAST!

What makes the rocks  
ring?

Engaging participants to  
explore possible  
answers

A community of curious  
travelers connecting  
with the landscape





# thank you.



...for joining Natural Lands on a beautiful morning geology walk at the boulder strewn Fulshaw Craeg Preserve.

Special thanks to Dr. LeeAnn Srogi and Dr. Tim Lutz for guiding an interesting and enlightening walk. Natural Lands' Fulshaw Craeg Preserve features an array of geological wonders, including steep, rocky slopes and a winding stream. These natural characteristics limited agriculture and development, leaving this land virtually unmarred by humans. From the informative introduction to the ringing of the boulders, we enjoyed a wonderful geological experience at the preserve!



Thanks to our Force of Nature volunteers for dedicated event assistance.

Thanks to Mandy Cantlin at East Bradford Township, PA, and Martha Moore and volunteers at Natural Lands