

A photograph of a forest path with several trees and green foliage. The image is decorated with numerous translucent bubble-like overlays of various sizes, some with thin black outlines, scattered across the scene. The text is centered over the path.

TRAIL LAYOUT & DESIGN 101

IAT-U: CROSS PLAINS INTERPRETIVE SITE

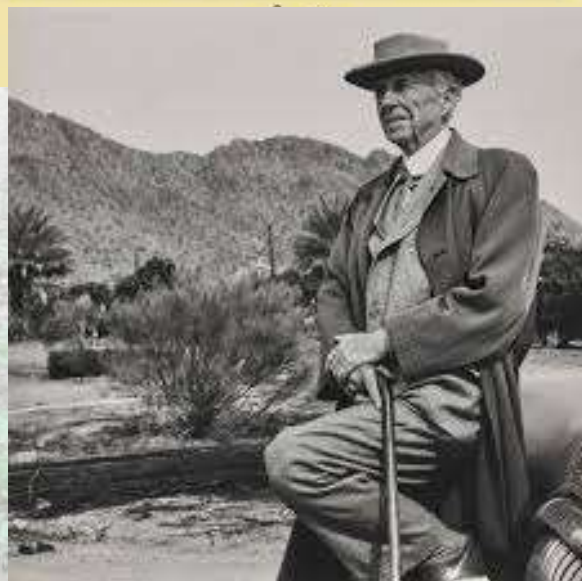
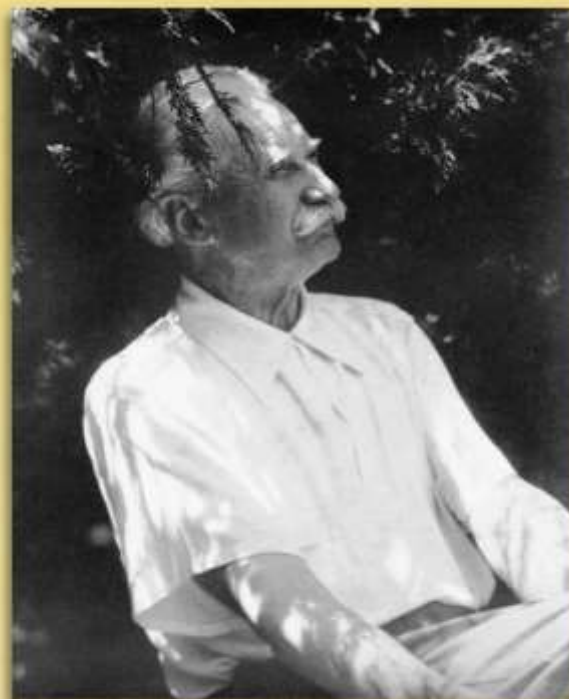
JUNE 28, 2018

A photograph of a dirt path winding through a forest. The path is light-colored and leads into the distance. The forest is filled with tall, thin trees and green foliage. The scene is misty or foggy, creating a soft, ethereal atmosphere. The text is overlaid on the center of the image.

HISTORICAL CONTEXT OF TRAIL LAYOUT & DESIGN

(TL&D)

OUISCONSING







MSC volunteers at the end of a weekend project.



MOBILE SKILLS CREW

Master Statement

DEFINITION

"More what is represented by an original idea, more regular, by 'original abstract'."
 — Hans Reichenbach

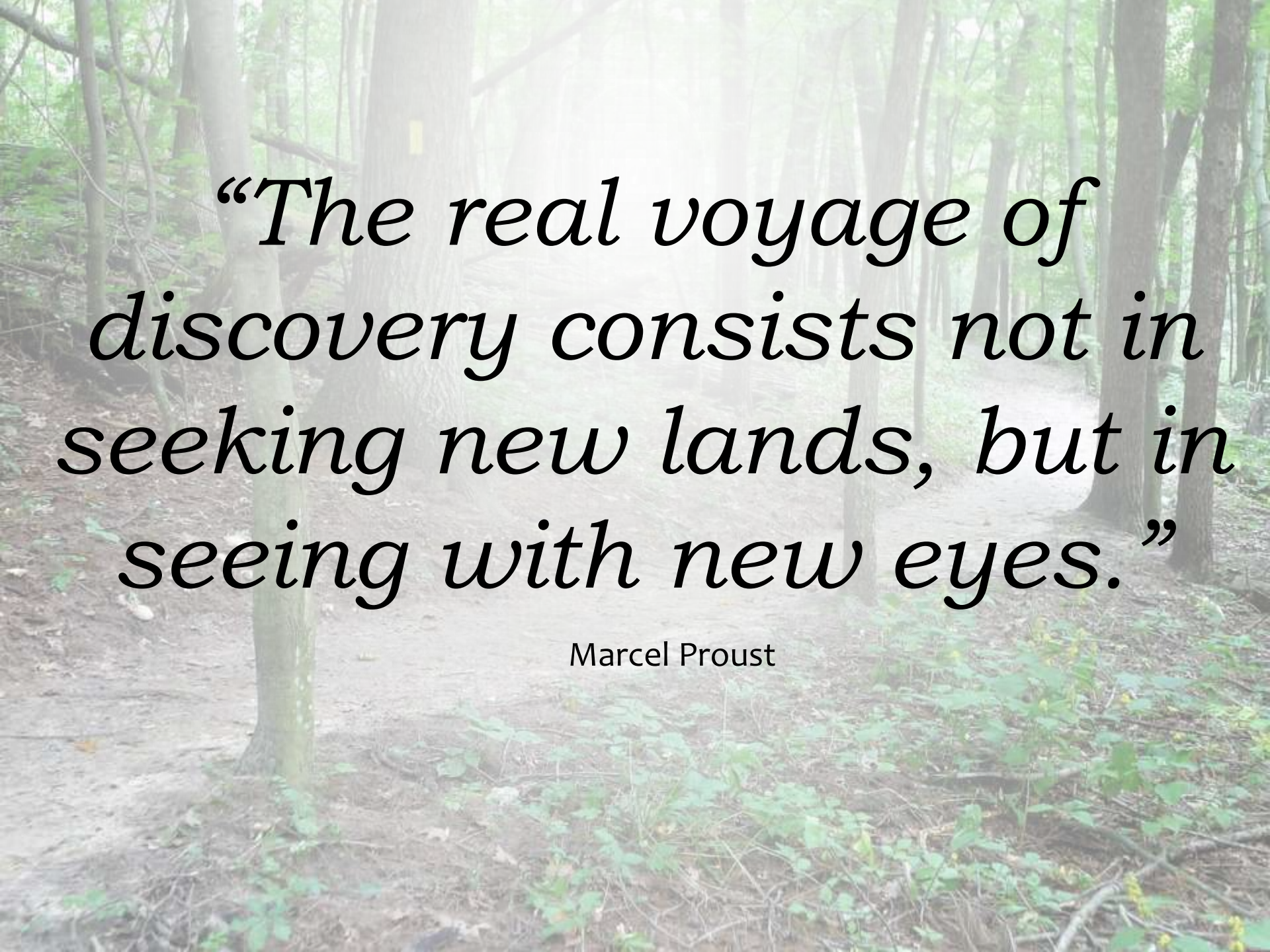
The following legislation that granted Richard Henry Trail status to the Ice Age Trail mandated that the Ice Age Trail be recognized as a cooperative outdoor recreational experience of national significance and as a national trail. "To preserve Wisconsin's Global Heritage for the education and enjoyment of present and future generations by creating, supporting, and granting continuous 1200 mile system of paths and trails have been ongoing since 1978. This project and future volunteer trail building from all walks of life have provided and will continue to participate in the enterprise, adding with them a unique relevance points to trail standards and construction techniques. This entry is knowledge and experience from volunteers working in the field for years and a lot of positive results in the field. These contributions can be used after a while to create value for and, at times, become more important being taken into living and building trail. One is the most giving and off-schedule character of this covering demands the task of actual trail construction as a trail corridor has been cleared. In order to make the Ice Age National Trail, the project is being trail instead of it is important for the trail. The trail is a high-quality and sustainable standard to provide that a new well-maintained experience and to maintain the trail for ongoing trail maintenance.

The Mobile Skills Crew will be a team of dedicated, capable volunteers drawn from throughout the state. Mobile Skills volunteers will serve not only as skilled trail builders but also, with experience and training, as advanced research advocates in IATTP volunteer chapters. The MSC program is intended to support, act as a support, chapter trail building projects. The Mobile Skills Crew program will be ongoing and is expected to raise the level of effectiveness of the Ice Age Trail as being a premier hiking trail. Through volunteer education, vision, and for a long-term commitment and implementation of future trail building efforts, the mission of the Mobile Skills Crew is intended to achieve these and the following goals. The Mobile Skills Crew will help to:

- Create an elevated, consistent and recognizable standard by which the Ice Age National Science Trail is built and maintained.
- Educate and support Ice Age Park and Trail Foundation volunteers in trail construction techniques by providing specialized education and necessary equipment.
- Maintain the trail for ongoing trail maintenance by using construction techniques and materials designed for long-term and sustainable use and by using the materials as much as is applicable.
- Generate a higher awareness and acceptance of the trail's construction.
- Develop volunteer trail building awareness of safety concerns and their fire and response capability.


Search Contact First Office

411 East Main Street • Union, WI 53188 • Phone: 608/392-1411 • Fax: 608/392-1411 • Web: www.iceagetrail.org


A misty forest path with tall trees and green undergrowth. The path is a light-colored dirt trail winding through a dense forest. The trees are tall and thin, with green foliage visible in the background. The ground is covered with dry leaves and some green plants. The overall atmosphere is serene and quiet.

*“The real voyage of
discovery consists not in
seeking new lands, but in
seeing with new eyes.”*

Marcel Proust

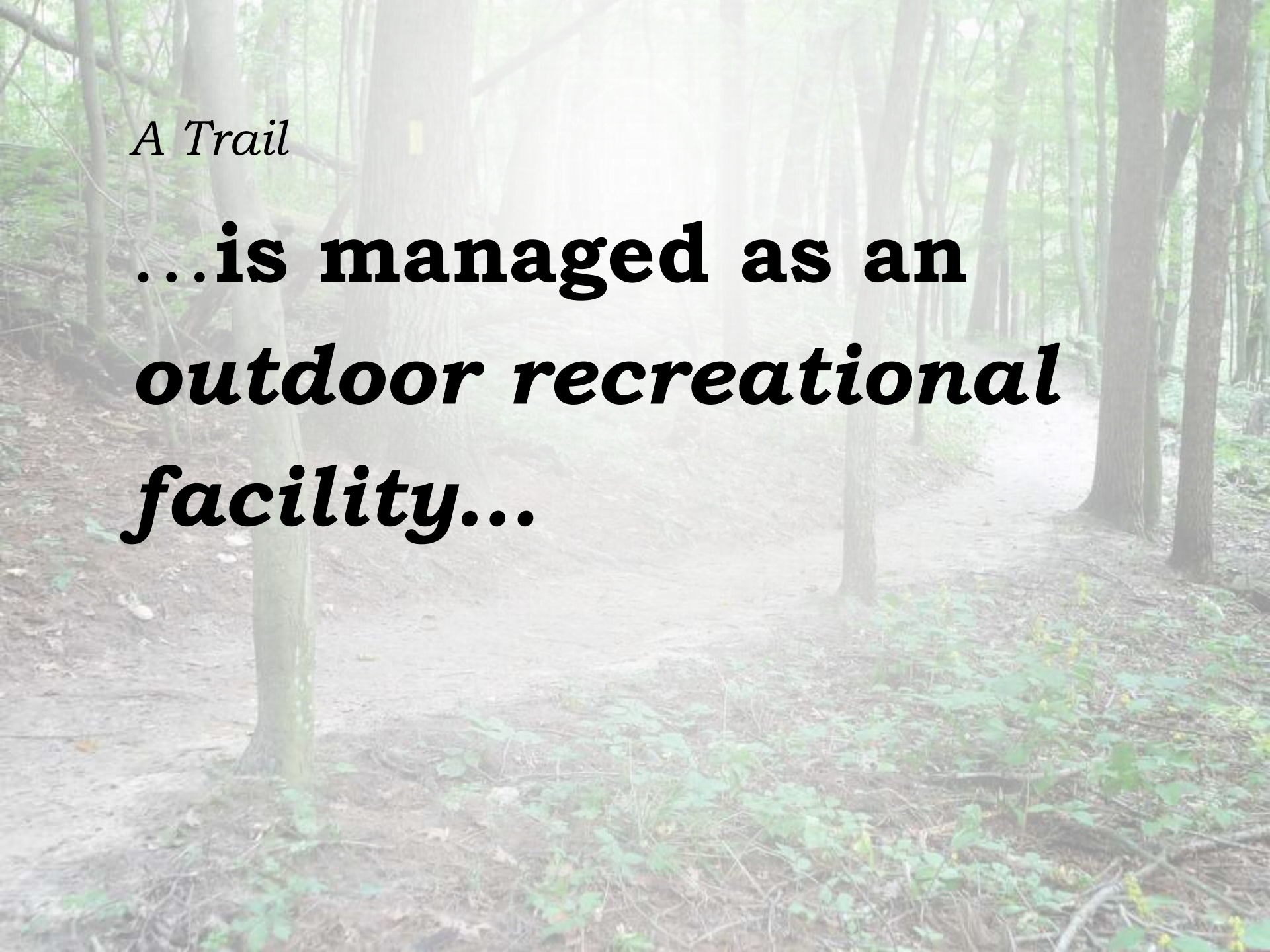
A photograph of a dirt trail winding through a forest. The trail is light-colored and leads into the distance. The forest is filled with tall, thin trees and green foliage. The ground is covered with dry leaves and some green plants. The text "What is a Trail?" is overlaid on the image in a large, black, serif font.

What is a
Trail?

A photograph of a dirt path winding through a forest. The path is covered in fallen leaves and branches. The trees are tall and thin, with green foliage in the background. The overall atmosphere is misty and serene.


A Trail

...is an *area of focused impact...*



A Trail

**...is managed as an
*outdoor recreational
facility...***

A photograph of a dirt path winding through a forest with many thin trees and green foliage. The scene is misty or foggy, creating a soft, ethereal atmosphere. The path leads from the foreground into the distance, disappearing into the trees.

A Trail

***...reacts to, and
interprets, the landscape.***

*A trail is an area of focused impact that is
managed as an outdoor recreational facility that
reacts to and interprets the landscape.*

The Three Disciplines of a Sustainable Trail

- **Physical** - Must adhere to established design elements
- **Environmental** - Do no harm (*Primum non nocere*)
- **Social** - If you build it (what they want),
They will come (and use it)!



Oldest Trails in the World

🌿 **The Long Trail, Vermont** - Built by the Green Mountain Club between 1910 and 1930, this 272 mile trail is the oldest long-distance hiking trail in the United States.



88 years



482 years

🌿 **Rennsteig Trail, Germany** – An historic boundary path in Central Germany, first mentioned in 1536, officially mapped in 1832.


🌿 **Via Francigena, Europe** - An ancient road & pilgrimage route from Canterbury to Rome. First mentioned in writing as early as 725AD



1293 years

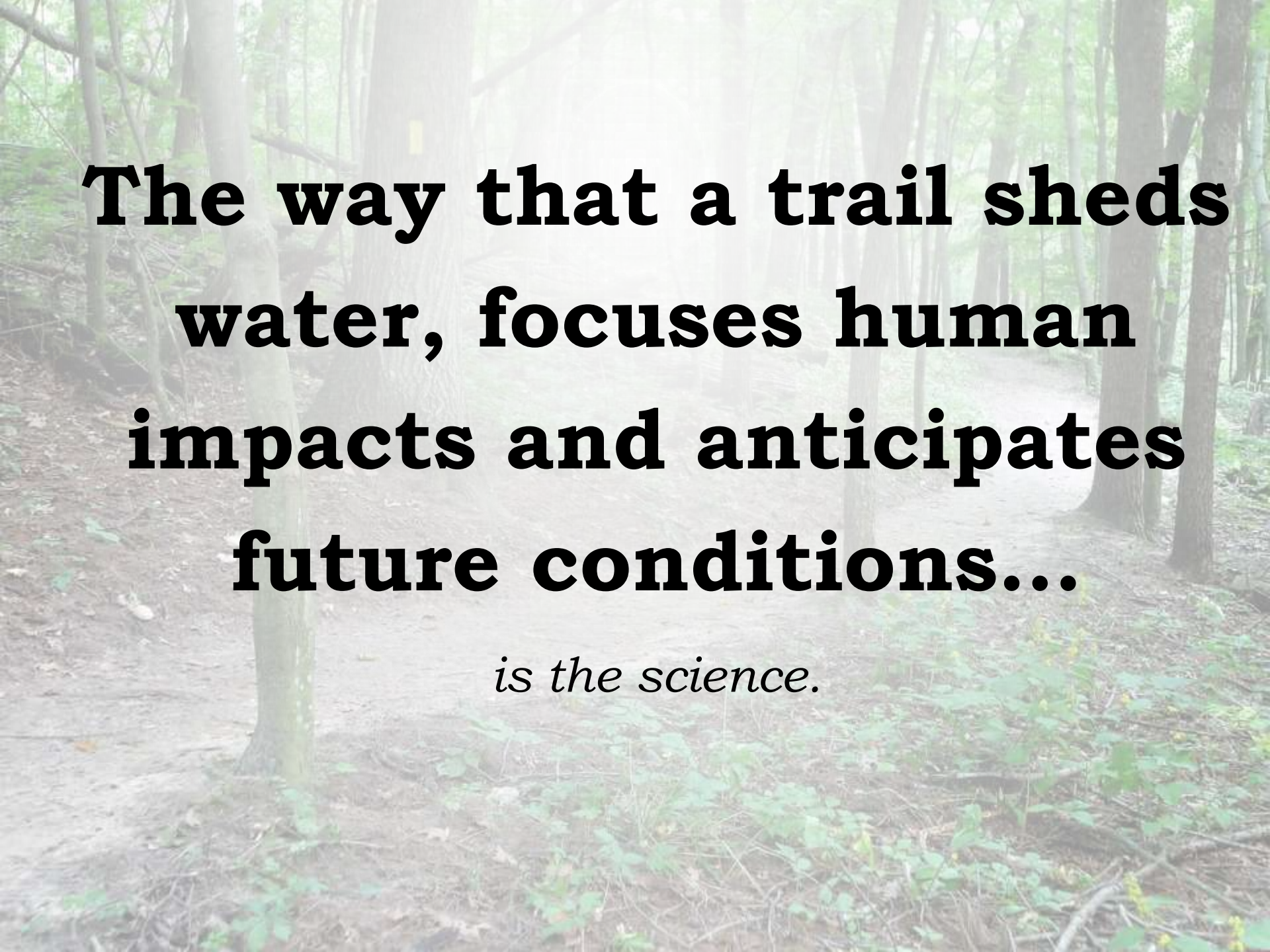
A photograph of a dirt path winding through a forest. The path is covered in fallen leaves and small plants. The trees are tall and thin, with green foliage in the background. The overall atmosphere is misty and serene.

Art & Science Why?

A photograph of a dirt path winding through a forest. The path is light-colored and leads into the distance. The forest is filled with tall, thin trees and lush green undergrowth. The scene is misty or foggy, creating a soft, ethereal atmosphere. The text is overlaid on the upper half of the image.

**The way a trail moves
through, reacts to and
interprets the landscape...**

is the art.

A photograph of a dirt path winding through a forest. The path is light brown and leads into the distance. On either side of the path are tall, thin trees with green leaves. The ground is covered with dry leaves and some green plants. The overall scene is a peaceful forest setting.

**The way that a trail sheds
water, focuses human
impacts and anticipates
future conditions...**

is the science.



MACRO ANALYSIS

Big picture

Natural & cultural features

Off site


On site

MIRCO ANALYSIS

Determines where, exactly, the trail
and trail infrastructure will be located

Shapes the User Experience

From ribbons to pin flags

A misty forest path with tall trees and green foliage. The path is light-colored and leads into the distance. The trees are thin and have green leaves. The ground is covered with dry leaves and some green plants.

Macro – off site

Review relevant materials




Find Address or Place



0 300

44.544538 -89.225226 Degrees

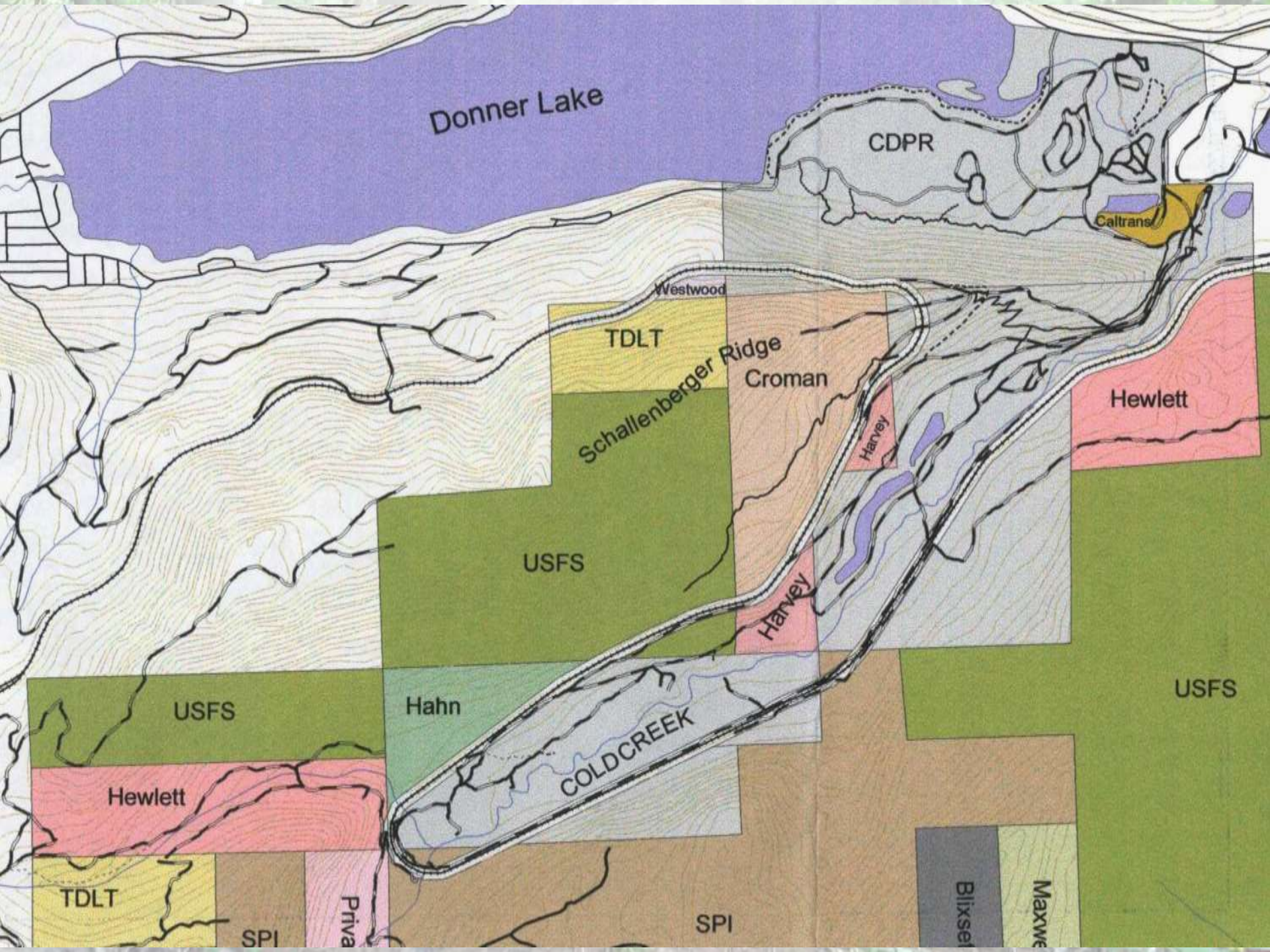
A misty forest path with tall trees and green foliage. The path is narrow and leads into the distance, surrounded by dense trees and undergrowth. The atmosphere is soft and ethereal due to the mist.

Macro – off site

Property rights

Permissions

Management objectives

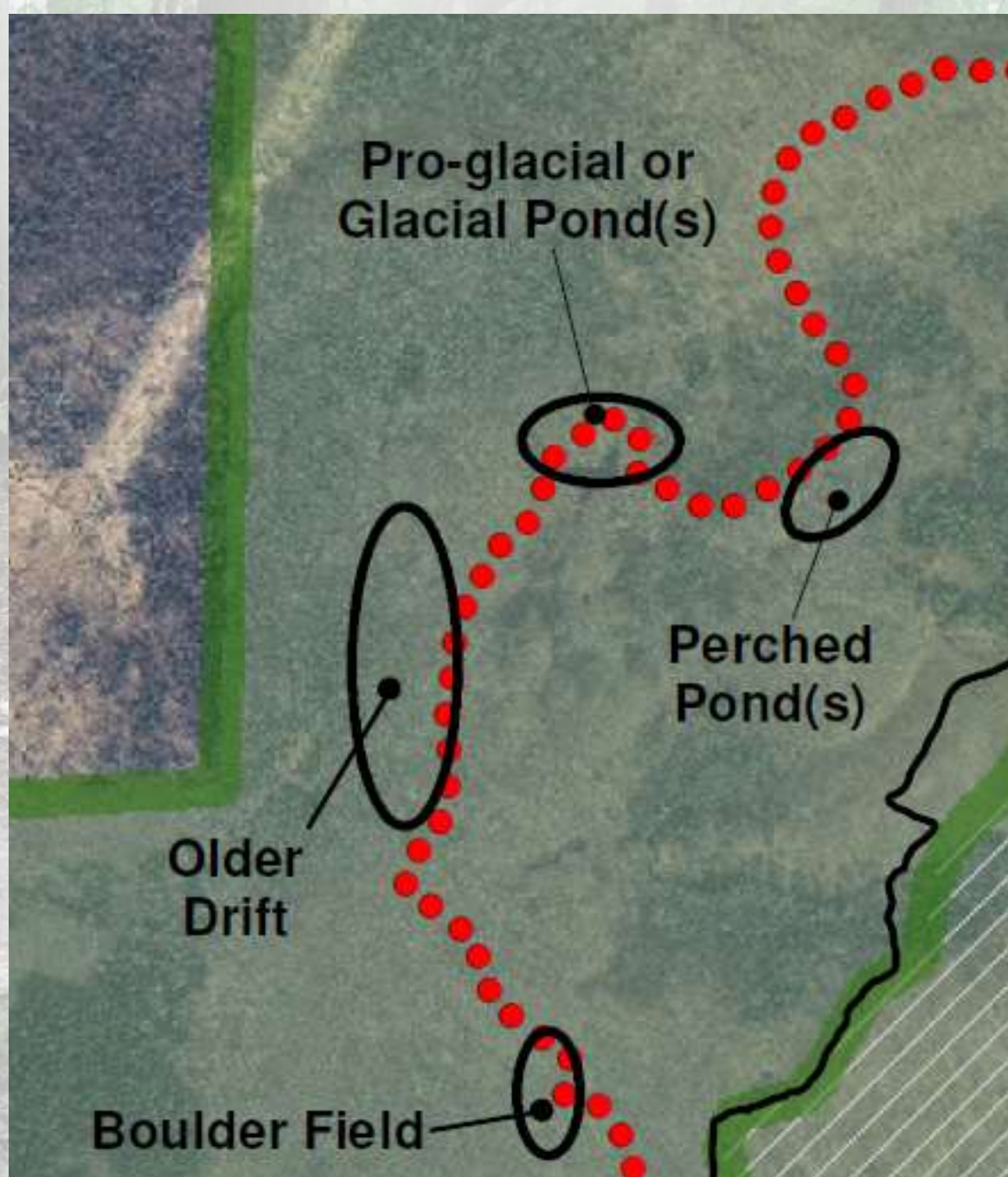




Macro – off and on site

**Broad thematic
framework.**

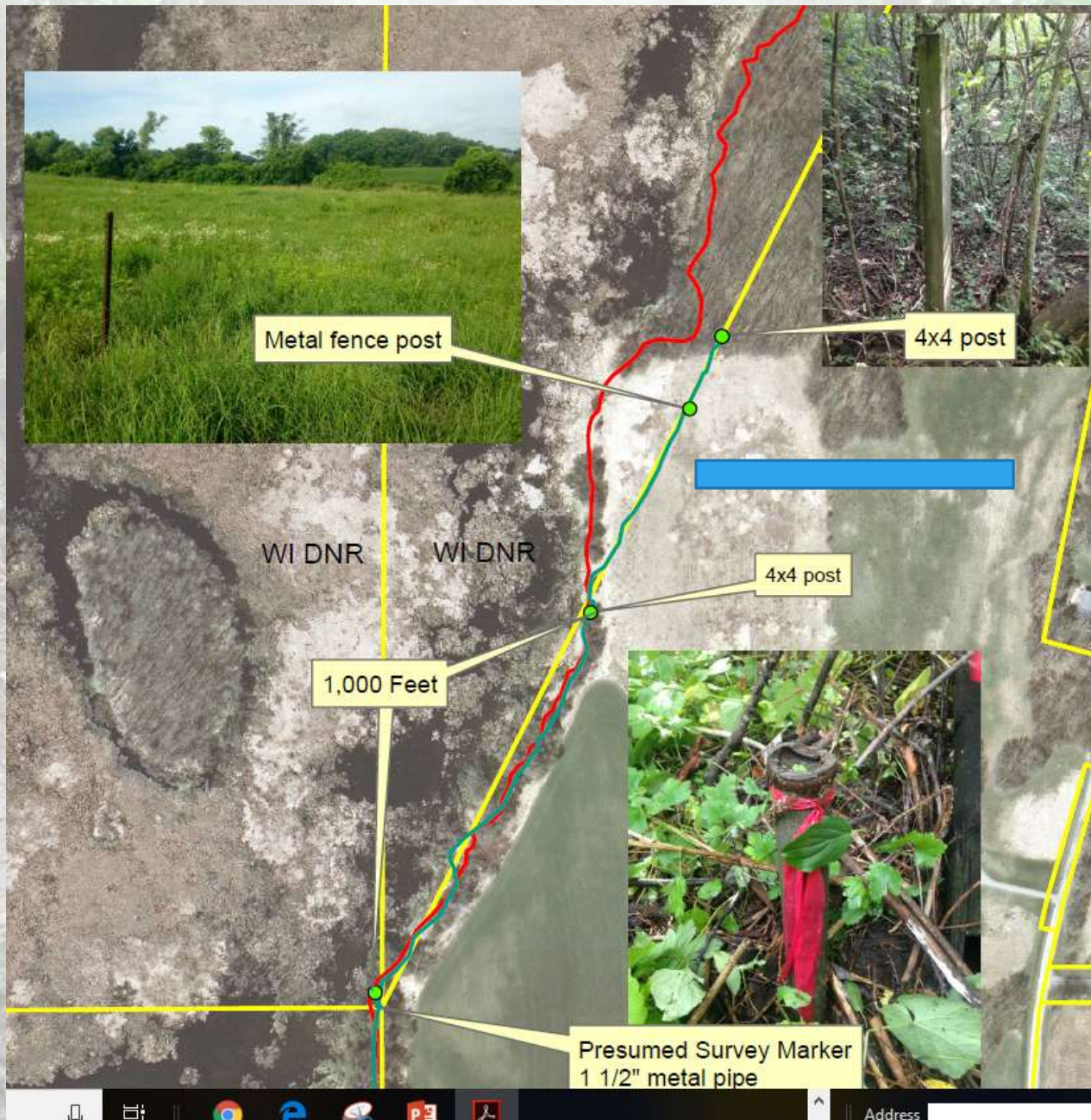
**What makes this
place unique?**



A photograph of a forest path, slightly misty or foggy, with many trees and green plants on the ground. The path leads into the distance. The text is overlaid on the image.

Macro – on site

Property boundaries



A photograph of a forest path, slightly misty or foggy, with many trees and green plants on the ground. The path leads into the distance. The text is overlaid on the image.

Macro – on site

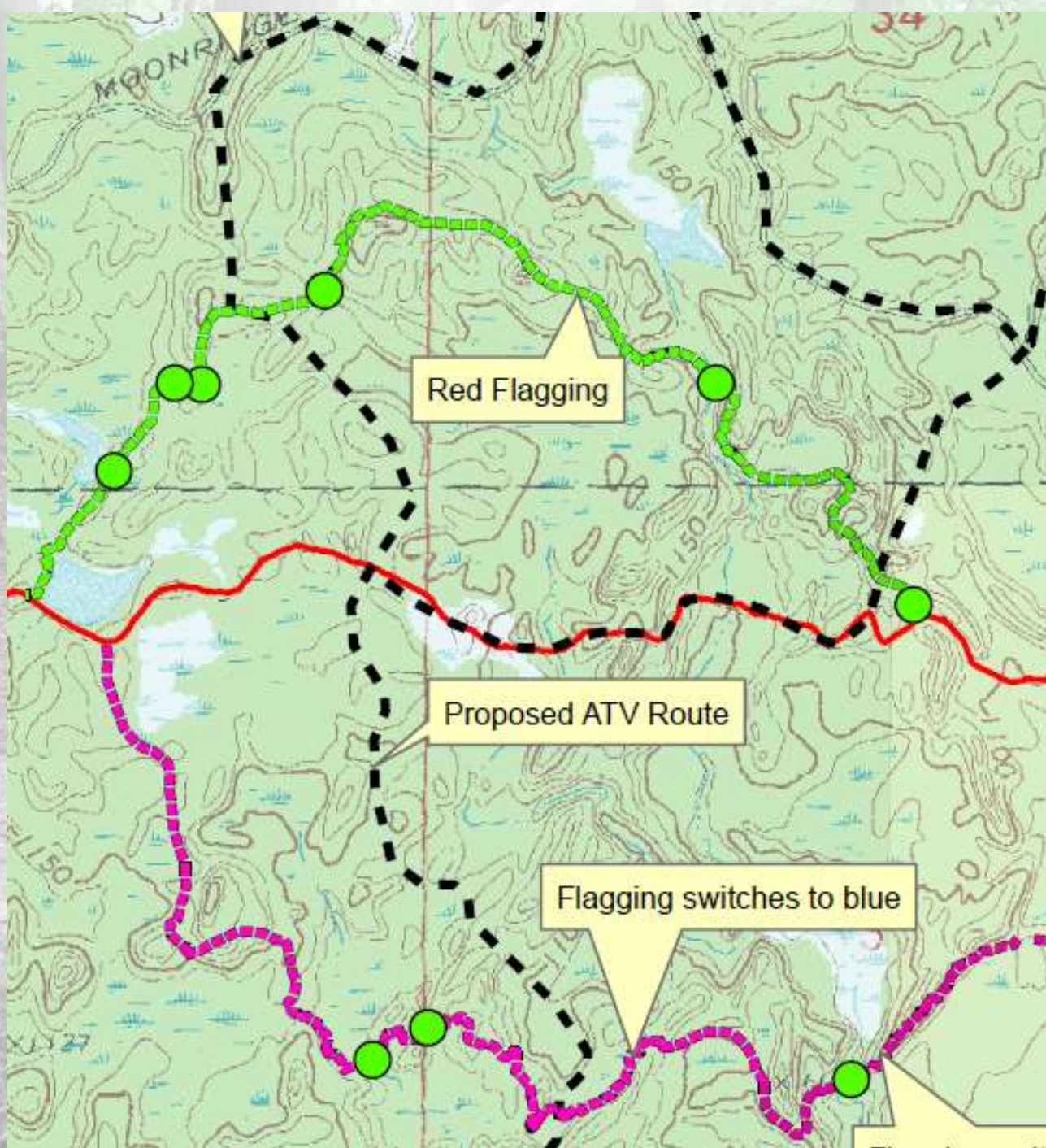
Identify control points



Macro – on site

Begin to identify **route *options***

(ribbon flagging)



Micro – off site

Communications Compliance

Ice Age Trail – Superior Lobe Chapter

Date: June 26, 2018
To: Tim Malzhan
From: Dan Brereton
Copy: Bob Held, Tim McRaith, Dale Cardwell
Subject: Final Approval

Tim, at the Superior Lobe Chapter monthly meeting held on June 19, 2018, the Chapter approved the purchase and construction the proposed bridge across “No Name Creek”. Attached are the documents and quote which were approved. I have not obtained the meeting minutes yet, however I can inquire about them and pass them on as well should you require them as evidence the motion has passed.

Up to today, the project timeline and events include:

February 16, 2018 – DNR opinion the stream is not navigable, no permit required.

February 28, 2018 – PRF submitted.

May 24, 2018 - Site visit = location and construction refined.

May 29, 2018 – Bridge location approval from John Cisek, Barron County Forestry Administrator.

May 31, 2018 – Finalized bridge diagram and materials list.

June 5, 2018 – Quote returned from Greeners Lumber, Birchwood.

June 19, 2018 – Submission and approval from Chapter.

Please let me know if you need anything further to make your decision. If approved, a rough construction timeline approved by the Chapter is below.

- **August/September** - Tree cutting and site prep.
- **September** - 1st partial order from Greeners = initial abutment pieces constructed off site.
- **September** - Work day on site to build and set abutments.
- **September** - 2nd partial order from Greeners = decking and joiners cut to size off site.
- **September/October** - 3rd partial order and delivery of 24' beams to site by Greeners.
- **September/October** - Work day on site = setting of bridge beams and joiners (decking if time).
- **October** - Work day on site to complete bridge, approach construction, etc.
- **October** - Work day (if needed) to finish any items left.
- **End of October** - Completion/Inspection

Note: Timeline flexible, goal is to get complete by snowfall

2018: PRF + TL&D/ARC + NHI + WaterRegs + WisDOT Tracking File by year

	PROJECT-Segment	County	PRF STATUS	ARC Phase 1 Needed Y/N?	TL&D COMPLETE BY	SOW MAP Needed by	ARC FIELD DATES	ARC Complete?	NHI status	Water Regs; Clearspan; RT/GP	WisDot
1	Walla Hi	Manitowoc	submitted	NO	NA	NA	NA	YES	ER Log#16-188 Follow Up Required	WP-GP-NE-2018-36-X04- 17T08-53-16	NA
2	Cross Plains Conservancy	Dane	submitted	Yes	April	NA	NA	YES	ERR Log #16-819	NA	Need
3	Old RR	Langlade	submitted	No	8/8	7/18	TBD	NO	ER Log #18-094 1 Recommended action	submit by 8/1/18	Need
4	Holy Hill (Waterford Rd-south)	Washington	submitted	Yes	4/1/17	4/1/17	7/1/17	YES	ER Log# 17-168 No required actions	WP-GP-SE-2018-67-X04- 17T09-05-27	NA
	Valley View (Timber Lane)	Dane	in progress	TBD	11/1	TBD	TBD	TBD	ER Log# 17-297 No required actions	NA	NA
	Cross Plains Complex	Dane	submitted	Yes	10/1/17	4/1/17	10/1/17	Done 4/2018	ER Log# 17-298 No required actions	NA	NA
	Harwood Lakes	Chippewa	submitted	No	NA	NA	NA	YES	ER Log# 18-067 Recommended actions	WP-GP-WC-2018-9-X04- 11T13-00-49	NA

Identify the Trail User



Micro – On Site

**Figure 1: Ice Age Trail Construction Design Standards**

Standards (desired)	ROS CLASS		
	Urban	Rural & Roaded Natural	Semiprimitive
<u>Tread Width</u> Hiking Segments Accessible Segments	48" 60"	24" 36"	18" 28"
<u>Clearing Width</u> (each side of tread)	24"	12" (WIDNR-24")	12"
<u>Clearing Height</u> (minimum)	10'	8' (WIDNR-10')	8'
<u>Slope (max. sustained)</u> Hiking Segments Accessible Segments	10% 5%	10% 5%	15% 12%
<u>Slope (max.)</u> Hiking Segments Accessible Segments	15% for 100' 8% for 100'	20% for 100' 10% for 50'	30% for 100' 10% for 50'
<u>Cross Slope (max.)</u>	3%	5%	8%
<u>Accessible Segment Standards</u> Passing Spot Int.-max. Rest Area Interval-max.	N/A 1,200'	600' 1,200'	1,200' 1/2 mile
<u>Surfaces</u>	Asphalt, concrete, stabilized aggregate, screening ⁽¹⁾ , wood chip, sod.	Native, wood chip ⁽²⁾ , stabilized aggregate, screening ⁽¹⁾	Native
<u>Accessible Surfaces</u>	Asphalt, concrete, stabilized aggregate.	Asphalt, stabilized aggregate.	Native, stabilized aggregate



Previsualization


Is a conscious process

Anticipates desired end results

Recognizes intermediate steps

Seeks an understanding of craft and
sequence

Is the basis of composition

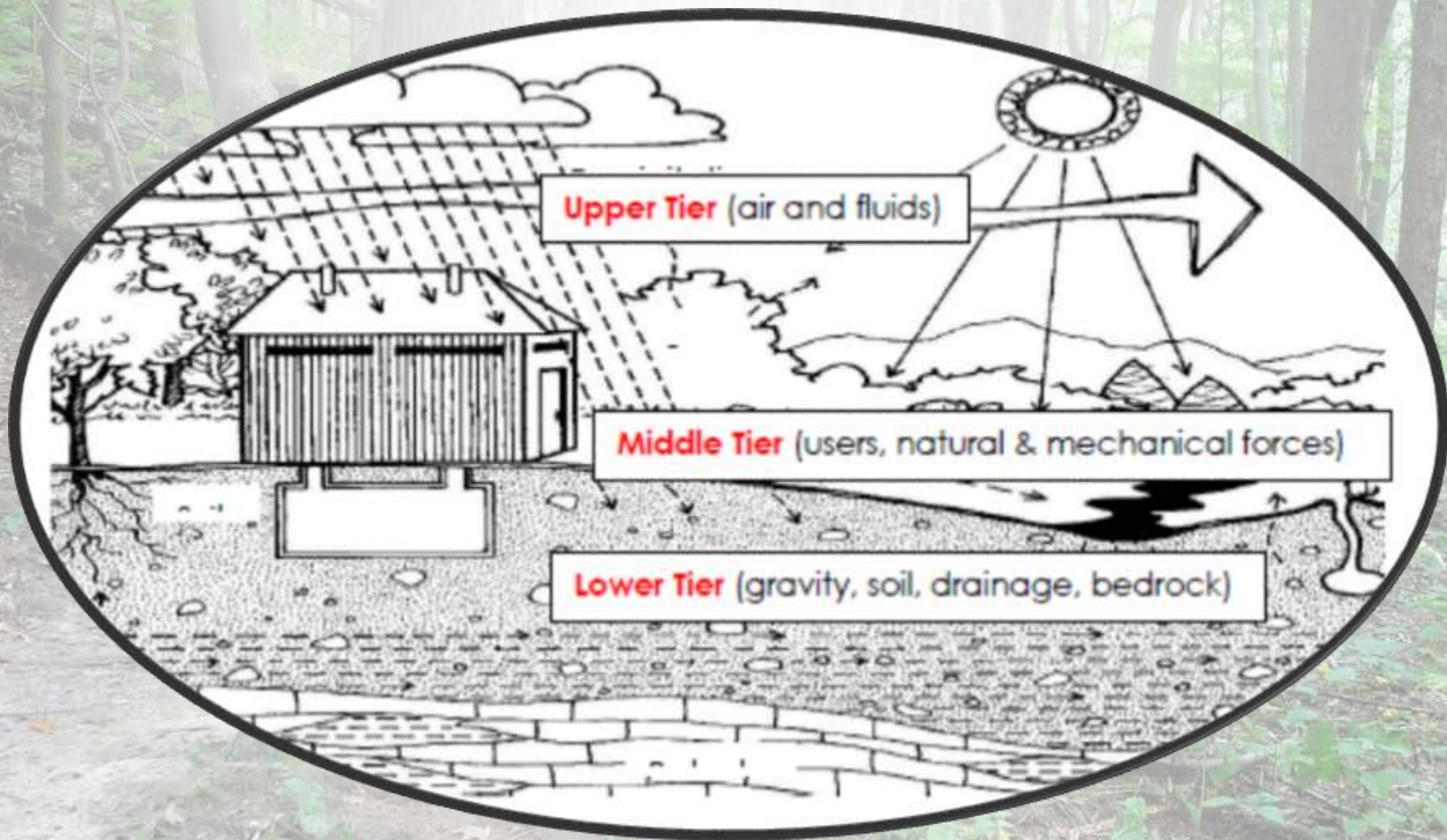
A photograph of a forest path with tall, thin trees and green foliage. The path is slightly curved and leads into the distance. The overall atmosphere is misty and serene.

Micro – on site


Rooms

Flow

Tiers






A photograph of a forest path, slightly misty or foggy, with many trees and green plants on the ground. The path leads into the distance. The text is overlaid on the upper part of the image.

Micro – on site


Aesthetics



A photograph of a forest path, slightly misty or foggy, with many trees and green plants on the ground. The path leads into the distance. The text is overlaid on the upper part of the image.

Micro – on site

Human Feelings

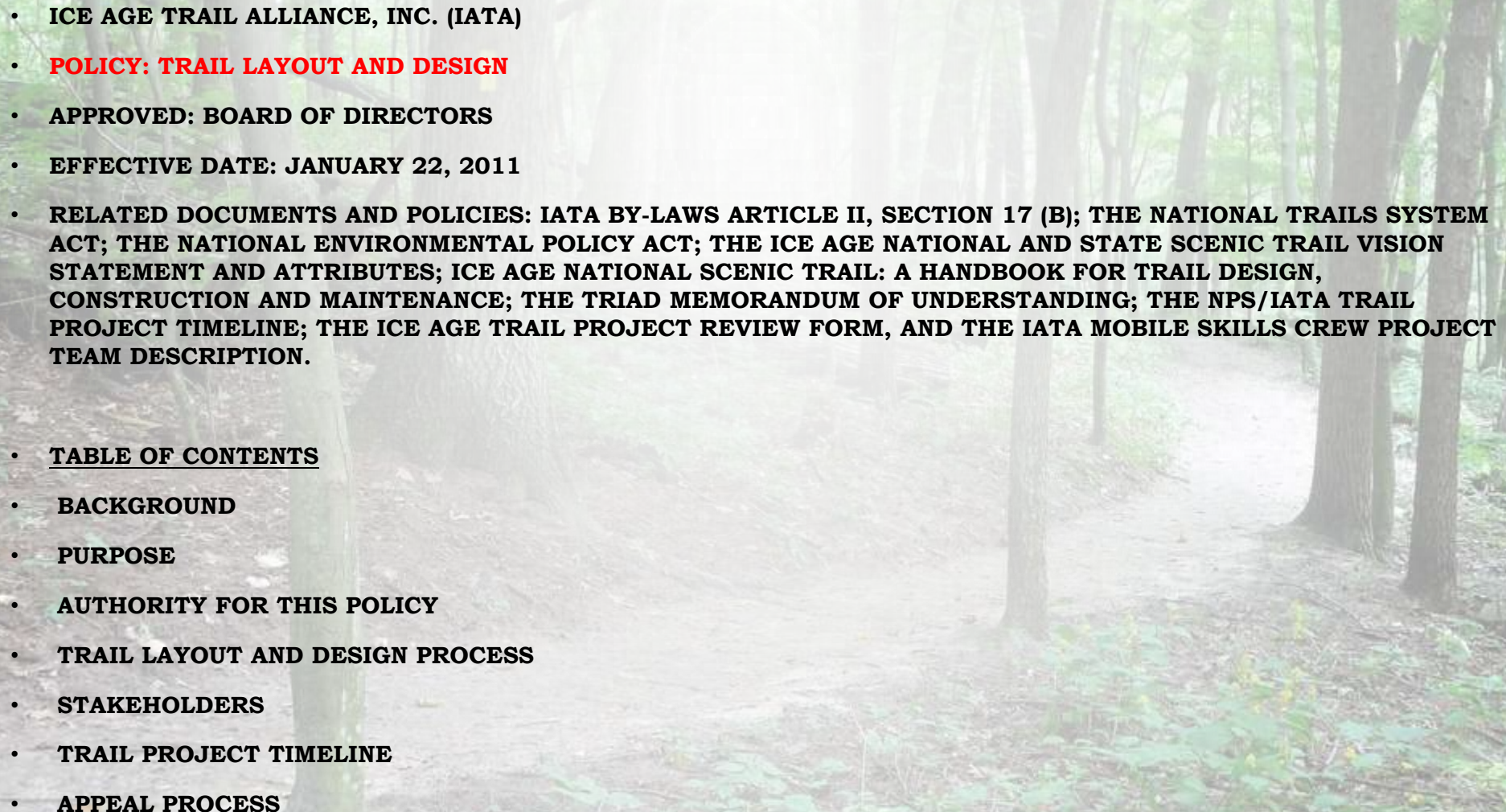
A photograph of a forest path, slightly misty or foggy, with tall, thin trees and green foliage. The path leads into the distance. The text is overlaid on this image.

Micro – on site

Opinions

Emotions

Motivations

- 
- A misty forest path with tall trees and green undergrowth. The path is narrow and leads into the distance, surrounded by dense foliage and trees. The atmosphere is serene and slightly hazy.
- ICE AGE TRAIL ALLIANCE, INC. (IATA)
 - **POLICY: TRAIL LAYOUT AND DESIGN**
 - APPROVED: BOARD OF DIRECTORS
 - EFFECTIVE DATE: JANUARY 22, 2011
 - RELATED DOCUMENTS AND POLICIES: IATA BY-LAWS ARTICLE II, SECTION 17 (B); THE NATIONAL TRAILS SYSTEM ACT; THE NATIONAL ENVIRONMENTAL POLICY ACT; THE ICE AGE NATIONAL AND STATE SCENIC TRAIL VISION STATEMENT AND ATTRIBUTES; ICE AGE NATIONAL SCENIC TRAIL: A HANDBOOK FOR TRAIL DESIGN, CONSTRUCTION AND MAINTENANCE; THE TRIAD MEMORANDUM OF UNDERSTANDING; THE NPS/IATA TRAIL PROJECT TIMELINE; THE ICE AGE TRAIL PROJECT REVIEW FORM, AND THE IATA MOBILE SKILLS CREW PROJECT TEAM DESCRIPTION.
 - TABLE OF CONTENTS
 - BACKGROUND
 - PURPOSE
 - AUTHORITY FOR THIS POLICY
 - TRAIL LAYOUT AND DESIGN PROCESS
 - STAKEHOLDERS
 - TRAIL PROJECT TIMELINE
 - APPEAL PROCESS


“ IF YOU WANT TO BUILD A SHIP...

Don't drum up the men to gather wood, divide the work & give orders.

INSTEAD...

TEACH THEM TO YEARN FOR THE
VAST AND ENDLESS SEA.

ANTOINE DE SAINT-EXUPÉRY

A photograph of a forest path, slightly misty or foggy, with many thin tree trunks and green foliage. The path is light-colored and leads into the distance.

Micro – on site

Accommodating Erosion

Micro – on site

Water > Wind > Gravity

Ice > Snow > Use

Avoid the Fall Line!



Volume + Velocity = Damage


Hydrologically Invisible

Befriend the one over three rule



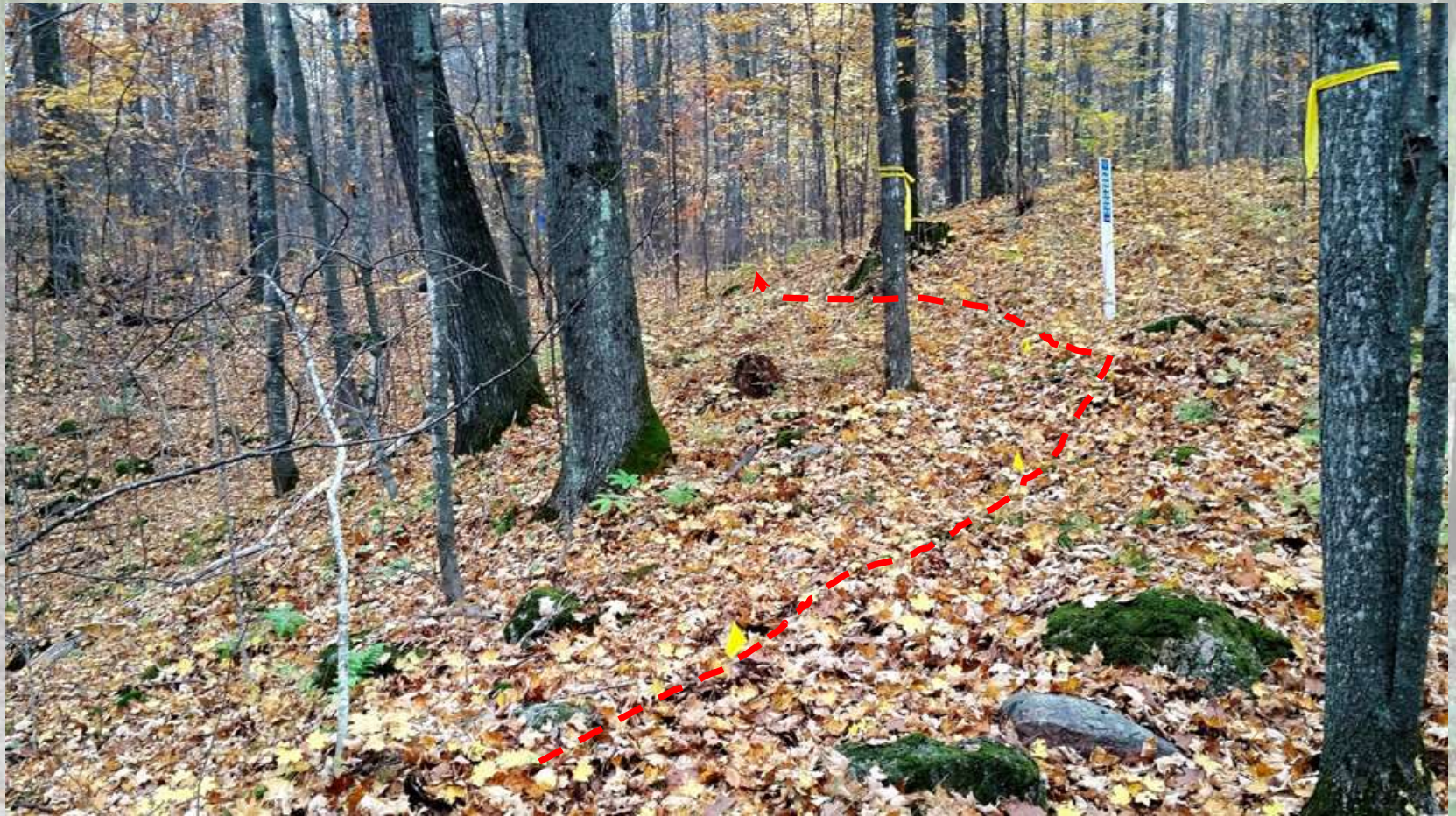
Generally, the shape of the *trail alignment* influences trail outcomes more than any other factor




A photograph of a forest path, slightly misty or foggy, with many trees and green plants on the ground. The path leads into the distance. The text is overlaid on this image.

Micro – on site

**Anticipate future
conditions**



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The form that a Trail
takes... becomes an
expression of cultural
priorities

Resistant Durable Trails

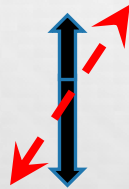


Resistant Alignments

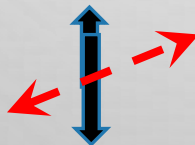
Trail Alignment Angle to the Prevailing Slope







Low alignment angle



High alignment angle



TRAIL ALIGNMENT ANGLES

0-22 degrees	Bad – very difficult to drain water, will erode except on low trail grades	
23-45 degrees	Poor –requires tread manipulation/structures to drain water, will erode on steep trail grades	
46-67 degrees	Good – easy to create positive drainage points while still gaining elevation	
68-90 degrees	Excellent - easy to drain water, but trail doesn't gain elevation very fast	

A background image of a forest path with several trees and green foliage. The image is overlaid with several decorative, semi-transparent bubbles of various sizes, some of which contain small, indistinct images. The text is centered on the left side of the image.

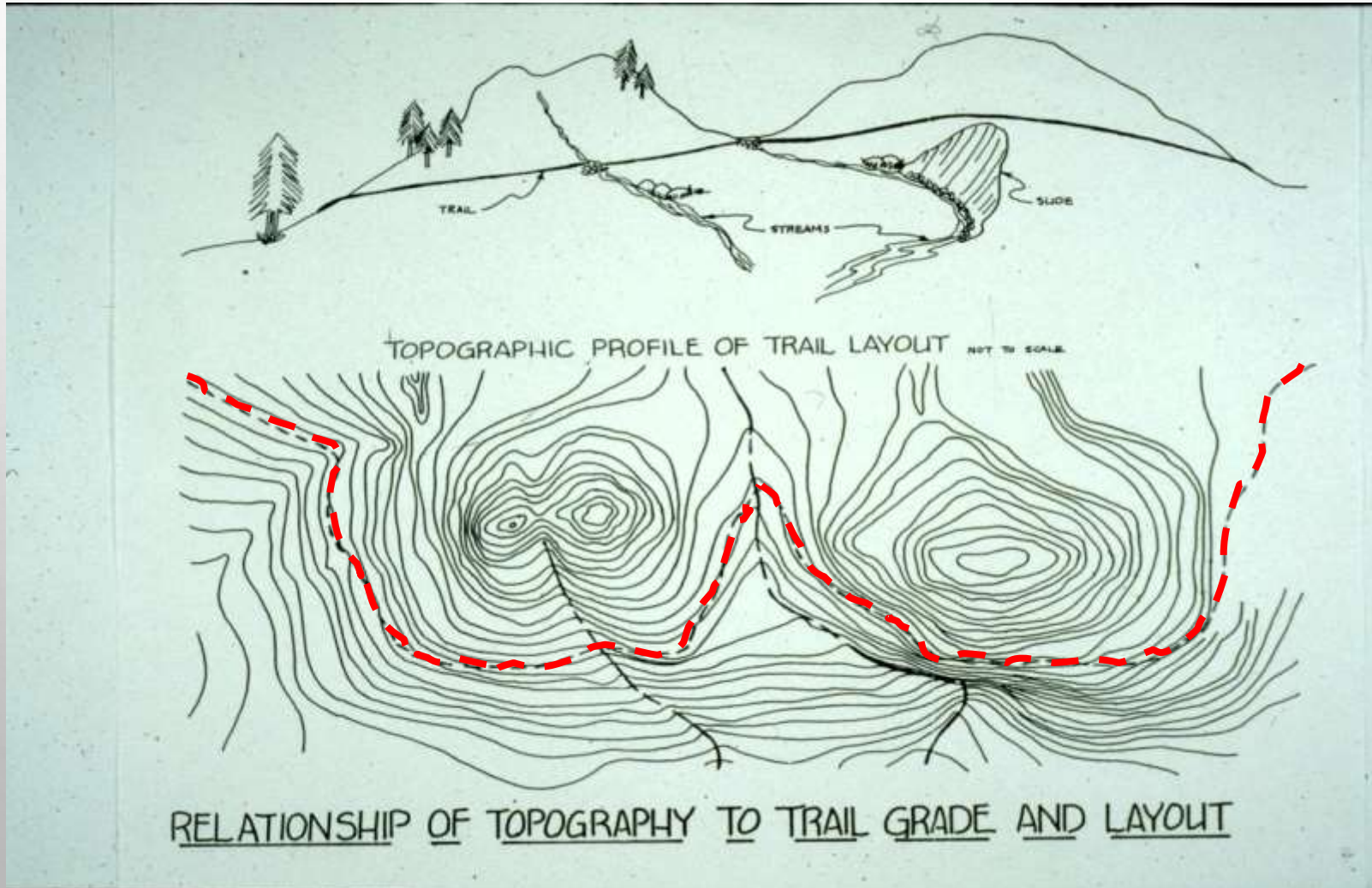
SOILS: *from least to most durable*

Sand, Silt
Loam, Clay
Gravel
Shale, Rock

WATER WINS...



Following the Contour of the Land Facilitates Sheet Drainage



Sheet Drainage (Laminar Flow)



Rise \div Run =

Trail Grade

Example:

1000' Elevation Change

\div

10,000 Ft. Linear Run

=

10% Average Grade

Trail Slope Alignment	Study Area	Trail Grade				Totals
		0-2%	3-10%	11-20%	>20%	
0-30°	BSF	2.3	10.1	6.6	0.3	19.3
	HNF	8.9	7.5	3.5	0	19.9
	ANP	6.9	22.9	16.7	1.1	47.6
31-60°	BSF	6.0	17.9	8.4	0	32.3
	HNF	5.4	8.2	2.3	0.2	16.1
	ANP	2.4	8.7	6.0	0.4	17.4
61-90°	BSF	14.2	28.1	6.2	0	48.5
	HNF	42.6	17.9	3.5	0	64.0
	ANP	12.9	17.3	4.7	0	34.9
Totals	BSF	22.4	56.0	21.3	0.3	100
	HNF	56.9	33.6	9.4	0.2	100
	ANP	22.1	48.9	27.4	1.6	100
		Trail Sustainability Ratings				
		Good	Neutral	Poor	Very Poor	
	BSF	45.9	22.5	24.7	6.9	
	HNF	26.1	56.9	13.3	3.7	
	ANP	26.0	22.1	33.6	18.3	

TOOLS

Clinometer, Compass, topographic & aerial maps

Weather-resistant notebook, pens, fine point
sharpies

Ribbon and wire-stake (pin) flagging

STHL folding saw; 100' measuring tape, camera

Appropriate / layered clothing for the terrain

Sturdy footwear – boots are preferred

Water, food, cell phone

First aid supplies

RECAP

Identify the user types and know the design standard for the setting

Factor 100 hours per mile for design time

Obtain permissions & communicate up

Allow at least 4 seasons field time

THANK YOU!!

