

Communicating Flood Risk in Patapsco Valley State Park



Kierstin Acuña, Jack Colbert, Christina Garvey, Briley Hebner, Katie Joy,
Jordan Plotkin, Christiana Wilhelm-Glab

Outline

Introduction

Methods

Findings

Deliverables

- ◆ Pamphlets
- ◆ Signs
- ◆ Video

Feedback



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Introduction/Background

Major contributions to increased flooding in the region

- ◆ Climate Change
- ◆ Development
- ◆ Deforestation

Reasons for increased risks in the Patapsco Valley State Park

- ◆ Accessible walking trails
- ◆ Inexperienced hikers/bikers/patrons
- ◆ Language barriers

What are the main needs established?

- ◆ Bilingual communication
- ◆ Clear communication of risks
 - Signs, education, videos, alerts, etc.

Deliverable Goals

1. Signage

- **Accessible**
- **Risk Communication**
- **Clear, Critical, & Concise**

- Identify flood-specific language for risk communication
- Incorporate best practices for designing safety-related signs
- Create Spanish translations of safety messages

2. Educational Materials

- **Accessible**
- **Interactive**
- **Engaging**
- **Informative**

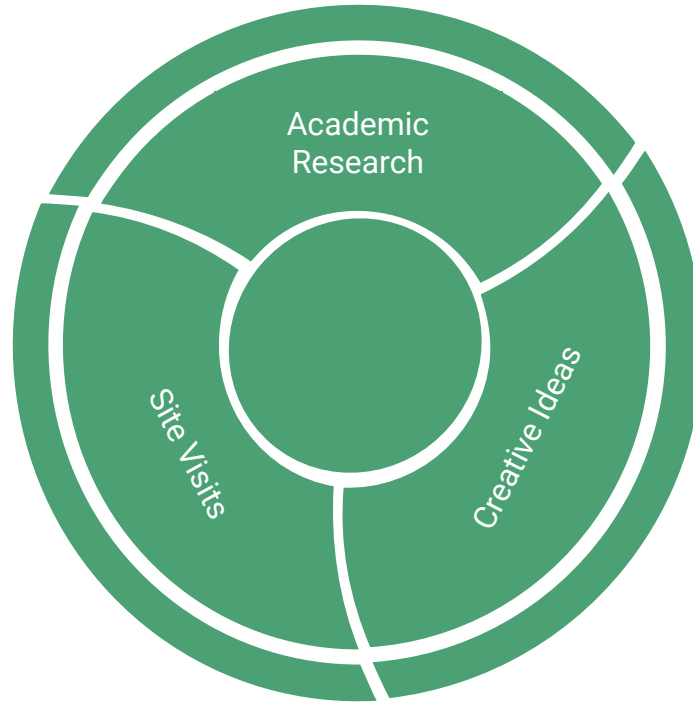
- Relate park visitors to the subject
- Create bilingual activities and materials
- Research best ways to educate across demographics
 - Age
 - Language
 - Culture

3. Video

- **Specific to MD DNR's Needs**
- **Engaging**
- **Informative**

- Not overly technical
- Brief
- Gear script to general audience who do not know much about flooding let alone flood risk safety
- Bilingual

Methods



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Pamphlets

- Reviewed academic journals and reputable sources
- Used Databases: Academic Search Ultimate and Google Scholar
- researched and applied “best practices”
- Reviewed government sources and case studies

Methods

Signage

- Literature review of scholarly sources. Search terms:
 - risk communication
 - effective signage in parks,
 - signage best practices
- Evaluated park's safety signage
- Brainstormed new signs and locations
- Created Spanish and English mock-ups of signs using Canva (online graphic design program)

Methods

Video Script

- Site visit
- Information from Patapsco State Park staff experiences
- Literature review of scholarly sources. Search terms:
 - “Flood risk safety”
 - “Latino community engagement”
 - Similar engagement projects- Zion National Park
- COVID-19 restrictions → no film
- Translation to Spanish

Best Ways to Communicate with the Latino Community

- Engagement through relationship-building, managers must listen to the interests, needs, and values of the community (Wills, 2012)
- More likely to engage as a family rather than as an individual (Wills, 2012)
- Disaster information travels further through social networks (Maldonado et al., 2015)



Best Practices for Risk Communication in Parks

Table 1

Best Practice Principles for on-site safety signs in national parks.

Component	Guidelines
Noticeability	<p>To be noticed, safety signs should be:</p> <p>1a) Of a shape, size and colour that contrasts with surroundings and attracts attention;</p> <p>1b) Separated from surrounding information;</p> <p>1c) Located close to the centre of vision as visitors approach;</p> <p>1d) Orientated perpendicular (rather than parallel) to major visitor pathways.</p>
Encoding	<p>To be readily translated into an internal representation, safety information should include:</p> <p>1e) A graphic visual demonstration of the hazard;</p> <p>1f) Short, familiar words including signal words (DANGER, WARNING, CAUTION) denoting the level of hazard;</p> <p>1g) Large and well-spaced text which can be read from a comfortable viewing distance, with a mixture of upper and lower case in easily read fonts (such as Helvetica or Times). Signal words should be larger than text, and in colour;</p> <p>1h) Languages in addition to English where appropriate.</p>
Comprehension	<p>To ensure comprehension, safety signs must have four key elements:</p> <p>1i) The signal word DANGER, WARNING or CAUTION, highlighted in specific colours to denote the level of hazard. Red and yellow are standard risk level indicator colours which should be used consistently;</p> <p>1j) A statement of the hazard (with symbol if possible). Messages should be limited to a small number of issues, perhaps as few as two;</p> <p>1k) An example of the possible consequences. The potential severity of outcomes is critical to risk perception;</p> <p>1l) Simple instructions on how to avoid the hazard. Use injunctive (ought) or proscriptive (do not) messages.</p>
Compliance	<p>To encourage compliance, safety signs should:</p> <p>1m) Be located near the site of the hazard;</p> <p>1n) Be authorised by a credible source;</p> <p>1o) Include circle slash negation symbols, however these must not conceal critical features of symbols with the slash;</p> <p>1p) Describe the intended behavioural response.</p>

Table of best practices for safety signs, which we used to evaluate current signs at Patapsco Valley State Park (Saunders et al., 2019)

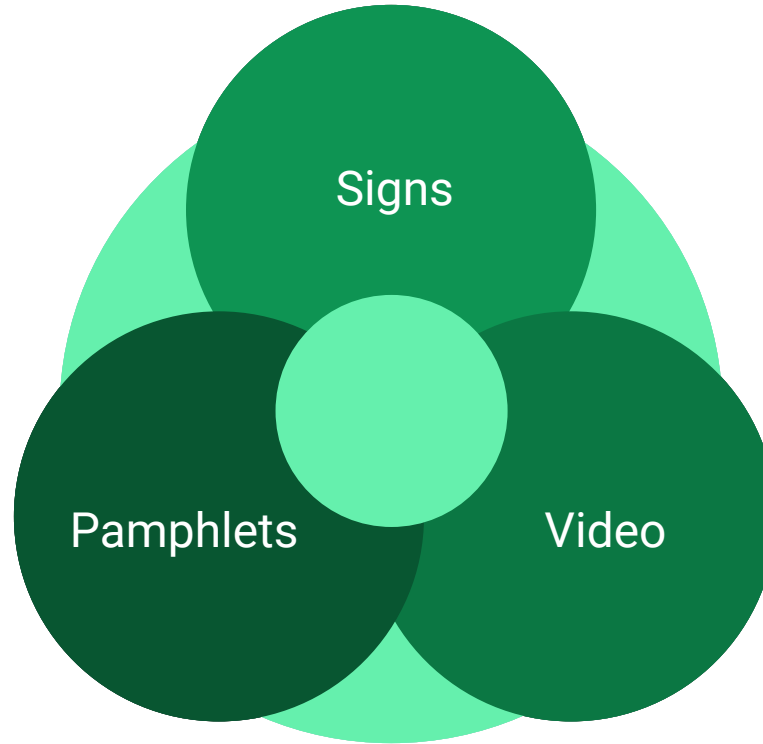
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Best practices for educating the public

- Visual, audio, and tactile learning styles (Csapo & Hayen, 2006)
- “Hands on minds on” approach (Meredith et al., 2000)
- Continued education allows people to remember and reflect information being taught (LaFrance, 2017)
- Incorporating group work and community engagement has proven to be effective in public education (Stern et al., 2014)



Deliverables



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Pamphlets

Engage

The pamphlets will be eye-catching and interesting.

Inform

The pamphlets will include accurate and relevant information.

Access

The pamphlets will be accessible in both English and Spanish, and will be free of jargon.

Flooding Pamphlet (front)

- Gives helpful and informative details while also adding elements of engagement
- Provides an action piece for community members to engage them in the issue (Audubon Naturalist Society; U.S. Environmental Protection Agency, 2020)



"Water is the driving force of all nature."
- Leonardo da Vinci

DO YOUR PART

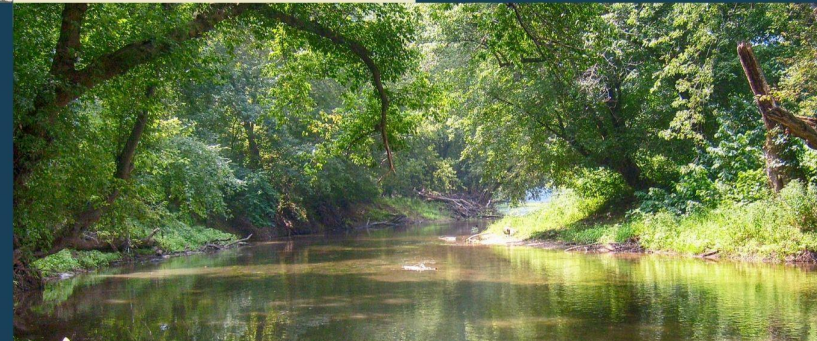
While we can't control the weather we can do our part to help protect our streams and watershed. By making better choices you can be a clean stream hero! Here's how you can help:

1. Reduce the amount of fertilizer you put on your lawn
2. Never litter and always trying to pick up trash that was improperly disposed of
3. Plant a rain garden
4. Limit the amount of impervious surfaces on your property

By doing these 4 things Y-O-U can help prevent harmful stormwater runoff!

FLOODING AND FLOOD RISK

In Patapsco Valley State Park



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Flooding Pamphlet (back)

- Informs the public how powerful the water can become
- Informs the visitors how to notice the signs of flooding and flood preparedness (U.S. National Park Service, 2019)
- Informs readers of negative side effects of flooding (U.S. Geological Survey)



THE POWER OF WATER

Water is stronger and more dangerous than many of us realize. During flooding events in the past the rushing waters that went through Patapsco Valley State Park were strong enough to carry bicycles, a petroleum tank and manhole covers that were ripped from the ground. In addition the rocks in the bottoms of the streams can become very slippery and cause an individual to lose their footing and get swept away by the current. While the beauty of water is here to be appreciated it should not be enjoyed during a flooding event.

FLOODING WARNING SIGNS

1. Consider if it has been raining all day or rained heavily the day before. Flash floods can even occur on a sunny day if it had rained heavily the day before!
2. Use your senses! Does the water look more brown in color? Is there debris in the water? Is the water loud and roaring? These are all signs you need to leave the area immediately and move to a safer location.
3. Look to the sky. Are there lots of clouds overhead? This could mean that heavy rain is on its way.

WHAT HAPPENS TO OUR STREAMS WHEN FLOODING OCCURS?

When flooding occurs we aren't the only ones that are affected by it! As rainwater washes over surfaces like roads and sidewalks it carries all the trash and chemicals with it. The now polluted rain water is called "runoff" and it not only makes our drinking water polluted, but it negatively affects the whole ecosystem!



ALWAYS BE PREPARED AND BE AWARE!

As you enter the park you should always take note of the signs that are posted near you related to flooding. Always pay attention to your current surroundings and have an emergency plan prepared before you need to use!

Climate Change Pamphlet (front)

- And, But, Therefore structure (Olson, 2018)
- Combination of information and action items (Strife, 2012)

Climate change refers to the gradual change in average conditions around the globe.



- This can include:
- Global warming
 - Rising sea levels
 - Changes in precipitation
 - Increase in extreme weather events

How does this impact me?

Climate change impacts everyone.

- Increases in temperature will result in increases in cooling costs.
- Waterfront cities like Baltimore will experience more flooding, and may eventually be submerged under the ocean.



What can I do about it?

Even small actions can help reduce climate change!

- Recycle
- Avoid single-use plastics
- Use public transportation when possible
- Contact your local representatives to express your support for green initiatives

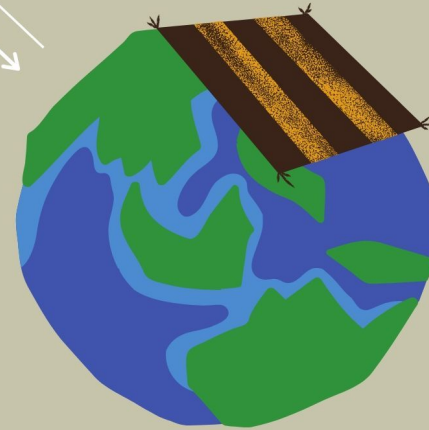
What is Climate Change?

Patapsco Valley State Park
Maryland DNR

Climate Change Pamphlet (back)

- Provides visual and textual information
- Informative, yet easy to digest

Energy from the sun is the most important driver of life on Earth! The Earth must reflect and radiate some of that energy to maintain its temperature.



When too many greenhouse gases build up in the atmosphere, they essentially place a blanket over the Earth; they prevent the Earth from radiating energy.

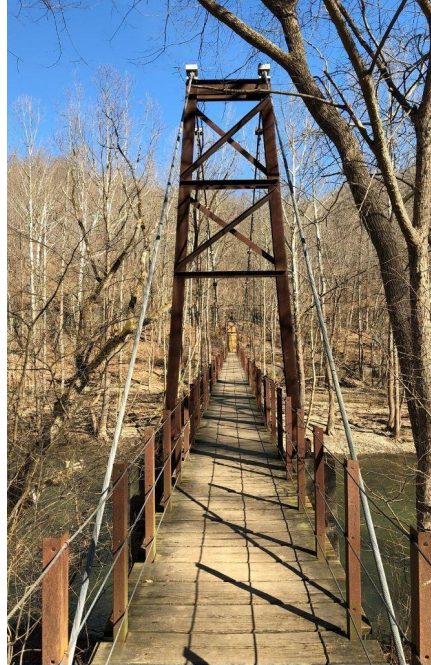
But, when we drive a car or fly on a plane, we emit greenhouse gases.



This blanket, or "greenhouse" effect, causes the Earth's temperature to rise.

Children's Pamphlet (front)

- Provides children a fun fact about Patapsco Valley State Park
- Includes a word search to help children start to think about flood and words associated with flooding



Fun Fact: PVSP was founded in 1907 and is Maryland's Oldest State Park

WORD SEARCH

```
RUPAQXGSFDUVBFD
DTRZFLASHFLOODR
UJCHANNELZCTRDA
DYECFZTJDJEUOBI
FLOODZTCSFYVDFN
POLLUTIONZXQIYC
PNEHDJRIZLSKSSP
XQGMHKDRZDXFCOV
YVXKDWBVMLZFHJY
RXQXDRVJHBUXAVR
FMWWMUNRDBAZREU
ICLIMATECHANGEN
JSWSBBAVXNGPEXO
XCRQARRCAGNOERF
RUDVBEOBJJQKBI
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Key:

Flood channel rain
pollution discharge
runoff flashflood
climatechange



PATAPSCO VALLEY STATE PARK

Kids Guide



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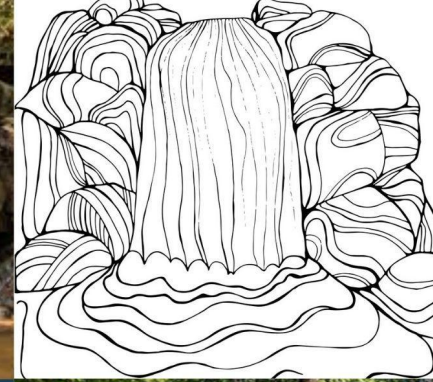
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Children's Pamphlet (back)

- Includes an activity that is fun and in a way visually and hands on represents flooding. Game ends in a debrief to talk about flooding and how it relates to real world scenarios
- More fun games and pictures to help children learn about flooding



UNSCRAMBLE THE LETTERS!

emcilaet gehnca
 hfals olofd
 cpttniipeora
 soptapac
 olodf agdnre

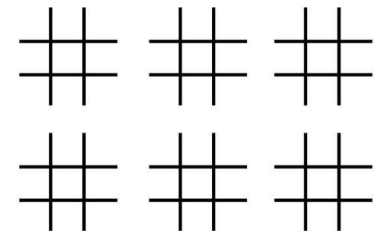
Active Key
 Create Change
 Lead Flood
 Prevention
 Flood Drinker

ACTIVITY TIME

With a group of family and/or friends, sit in a circle. One person will be 'it' and drip water on each persons head. When the 'it' person is ready, they will drop a bunch of water on someones head. That person then gets up and tries to chase the person around the circle and the "it" person either tags the individual and the person tagged becomes it or the individual sits in there seat without getting tagged and is safe. The purpose of this game is to represent that a flood happens very fast.



TIC TAC TOE



Spanish Translation



HAGA SU PARTE

Mientras no podemos controlar el clima, podemos hacer nuestra parte para ayudar a proteger nuestras corrientes y cuencas. ¡Al tomar mejores decisiones, usted puede ser un héroe de transmisión limpia! Aquí es cómo usted puede ayudar:

1. Reduzca la cantidad de fertilizante que pone en su césped
2. Nunca tire basura y siempre recoge la basura suelta
3. Plante un jardín de lluvia
4. Limite la cantidad de superficies impermeables en su propiedad

¡Al hacer estas 4 cosas, U-S-T-E-D puede ayudar evitar la escorrentía de aguas pluviales!

INUNDACIONES Y RIESGO DE INUNDACIÓN

en el Parque Estatal Patapsco

"El agua es la fuerza motriz de toda la naturaleza"
- Leonardo da Vinci



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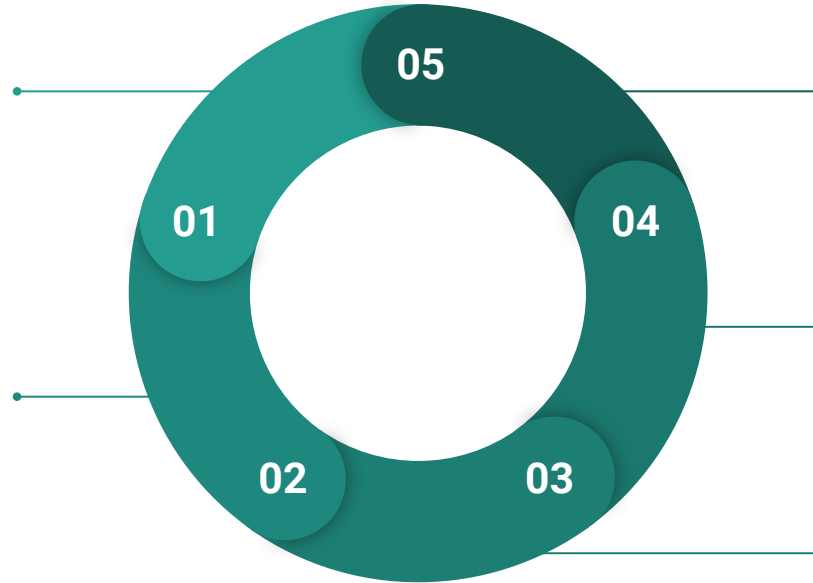
Overall Goals for Signage

Cohesiveness

- Same colors and format across all signage

Use graphics and colors to enhance messages

- Universal warning symbols
- Bold font, reds, blacks, and whites highlight the main messages



Separate Messages based on importance and content

- Improve comprehension
- Increase font size

Identify any areas that need additional signage

- Parking Lots

Identify Additional Safety Methods

- Seek Higher Ground
- Leave Valuables
- Avoid Returning to your cars

Trail Entrance Sign

Existing:



NOTICE: GRIST MILL TRAIL USERS

Bridges and paved trail are washed out in areas, resulting in STREAM CROSSINGS. Stream crossings can be slippery and subject to FLASH FLOODING.

PLEASE USE CAUTION!

DO NOT CROSS STREAMS WHEN FLOODING - **TURN AROUND** AND USE MARKED EXITS

Proposed:



NOTICE: GRIST MILL TRAIL USERS

CAUTION!

This stream crossing is subject to flash flooding. Do not cross when water is higher than ankle deep. It may be slippery and result in displacement or death.

DO NOT CROSS STREAMS WHEN FLOODING. TURN AROUND AND USE MARKED EXITS



AVISO: USUARIOS DEL SENDERO "GRIST MILL"

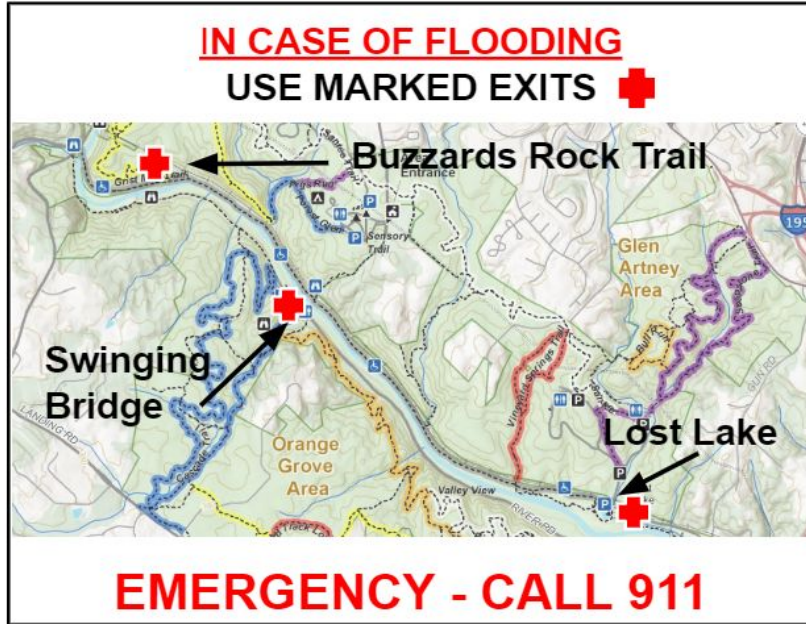
¡Precaución!

Este cruce de arroyo está sujeto a inundaciones repentinas. No cruce cuando el agua llega hasta la altura de los tobillos. Puede ser resbaladizo y provocar desplazamiento o la muerte.

NO CRUCE LOS ARROYOS CUANDO SE INUNDE. DATE LA VUELTA Y USA LAS SALIDAS MARCADAS.

Marked Turnaround Sites

Existing:



Proposed:



High Water Exit Signs

Existing:

IN EVENT OF HIGH WATER
TURN AROUND AND
EXIT TRAIL IMMEDIATELY



EMERGENCY - CALL 911

Proposed:

IN EVENT OF HIGH WATER

TURN AROUND
EXIT TRAIL AND SEEK HIGHER
GROUND IMMEDIATELY

EMERGENCY - CALL 911



EN CASO DE AGUA ALTA O
CRECIENTE

DATE LA VUELTA Y SALGA DEL
SENDERO INMEDIATAMENTEY BUSQUE
TIERRA MÁS ALTA

EMERGENCIA - LLAME AL 911

High Water Exit Signs

Existing:



Proposed:

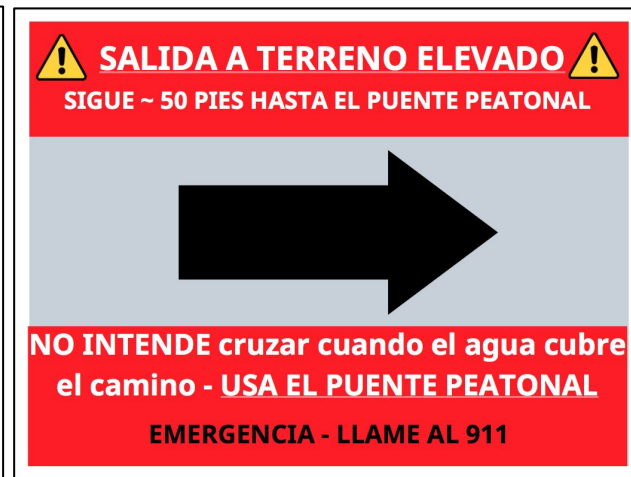


High Water Exit Signs

Existing:



Proposed:



High Water Bridge Signs

Existing:



Proposed:



Signs at Lost Lake

Existing:

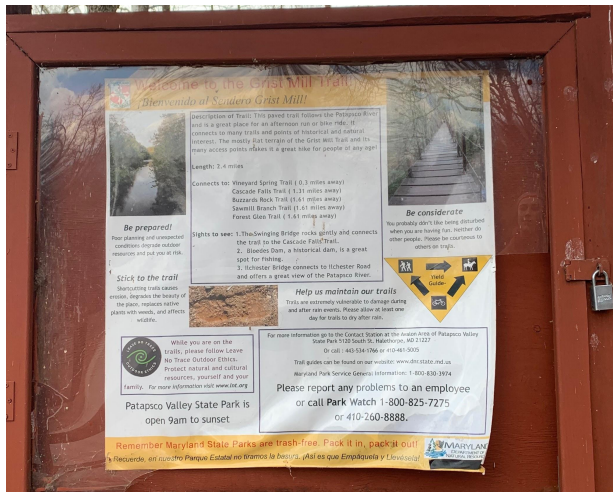


Proposed:




Trailhead Information

Existing:



Proposed:



Welcome to the Grist Mill Trail

¡Bienvenido al Sendero Grist Mill!

Trail Description: This paved trail follows the Patapsco River and is a great place for an afternoon run or bike ride. It connects to many trails and points of historical and natural interest. The mostly flat terrain of the Grist Mill Trail and its many access points makes it a great hike for people of any age!

Length: 2.4 miles

Connects to: Vineyard Spring Trail (0.3 miles away)
 Cascade Falls Trail (1.31 miles away)
 Buzzards Rock Trail (1.61 miles away)
 Sawmill Branch Trail (1.61 miles away)
 Forest Glen Trail (1.61 miles away)

Sights to See: 1. The Swinging Bridge rocks gently and connects the trail to the Cascade Falls Trail.
 2. Bloodes Dam, a historical dam, is a great spot for fishing.
 3. Ilchester Bridge connects to Ilchester Road and offers a great view of the Patapsco River.

PLEASE OBEY ALL SAFETY SIGNS ALONG THE TRAIL. IN THE EVENT OF AN EMERGENCY, SEEK HIGHER GROUND AND FOLLOW EXIT SIGNS

For more information go to the Contact Station at the Avalon Area of Patapsco Valley State Park 5120 South St., Halethorpe, MD 21227

Or call: 443-534-1766 or 410-461-5005

Patapsco Valley State Park is open **9am to sunset**


Trail guides can be found on our website: www.dnr.state.md.us


Maryland Park Service General Information: 1-800-830-3974

Please report any problems to an employee or call **Park Watch 1-800-825-7276 or 410-260-8888**

Remember Maryland State Parks are trash-free. Pack it in, pack it out!

Recuerde, en nuestro Parque Estatal no tiramos la basura. ¡Así es que Empaqueta y Llévesela!






While you are on the trails, please follow Leave No Trace Outdoor Ethics. Protect natural and cultural resources, yourself, and your family.

For more information, please visit www.lnt.org

<p>STICK TO THE TRAIL Shortcutting trails causes erosion, degrades the beauty of the place, replaces native plants with weeds, and affects wildlife.</p>	<p>BE PREPARED! Poor planning and unexpected conditions degrade outdoor resources and put you at risk.</p>	<p>BE CONSIDERATE You probably don't like being disturbed when you're having fun. Neither do other people. Please be courteous to others on the trails.</p>	<p>HELP US MAINTAIN OUR TRAILS Trails are extremely vulnerable to damage during and after rain events. Please allow at least one day for trails to dry after rain.</p>
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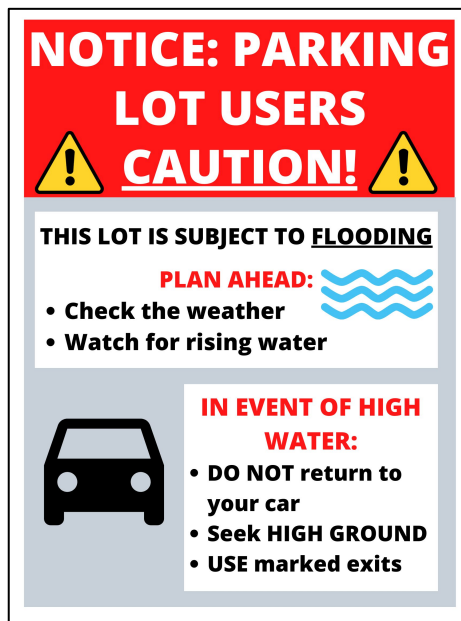
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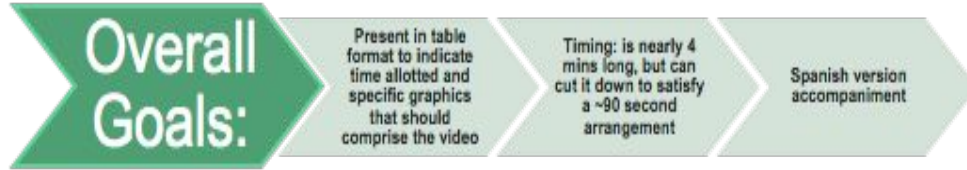
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New Sign Suggestion: Parking Lot Notice

- Address risks before trailhead
- Encourage preparedness
- Clarify exit strategies
- Area identified as at risk
- Use universal images to display message



Video Script



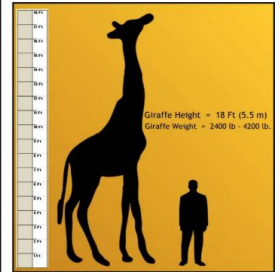
0:13- 1:00

BACKGROUND

Did you know that Patapsco Valley State Park has a long history of flooding? In 1868 water rose 20 feet, that is approximately the height of an adult giraffe! The powerful and relentless water wiped out an entire town that was located alongside the Patapsco River!

Unfortunately, many lives were lost. But the strangest thing is that it was not even raining! We will explain why later.

We have been experiencing a surge in flooding events and intensity with our most recent flooding events occurring in 2016 and 2018, leading the Washington Post to coin nearby Ellicott City “Flood City, USA.” This is why we want to communicate flooding guidelines to keep



(Image of Flood City, USA News article)

(Image of a family smiling in a park)

Recommendations: Building Community

- Create bilingual signage and educational materials
- Build social networks
 - Social Media
 - Community activities & meetings
 - Citizen Science
- Survey to evaluate effectiveness of communication
 - Success of new signs & educational materials



Source: <http://www.cdspg.org/events/2016/3/30/tweens-hiking-patapsco-valley-state-park>

Recommendations: Increasing Communication

- Design + Implement a Mascot
 - Connect patrons to the issue
- Utilize your website
 - USGS Flood Monitoring System
 - Showcase your bilingual educational materials
- Implement Audio Alerts in the Park



Sources: https://society6.com/product/diamondback-terrapin2072487_print
<https://guerillagraphix.com/products/smokey-bear-vinyl-sticker>

Questions?

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