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Hidden waters, big risks

A guide to ephemeral and intermittent streams.

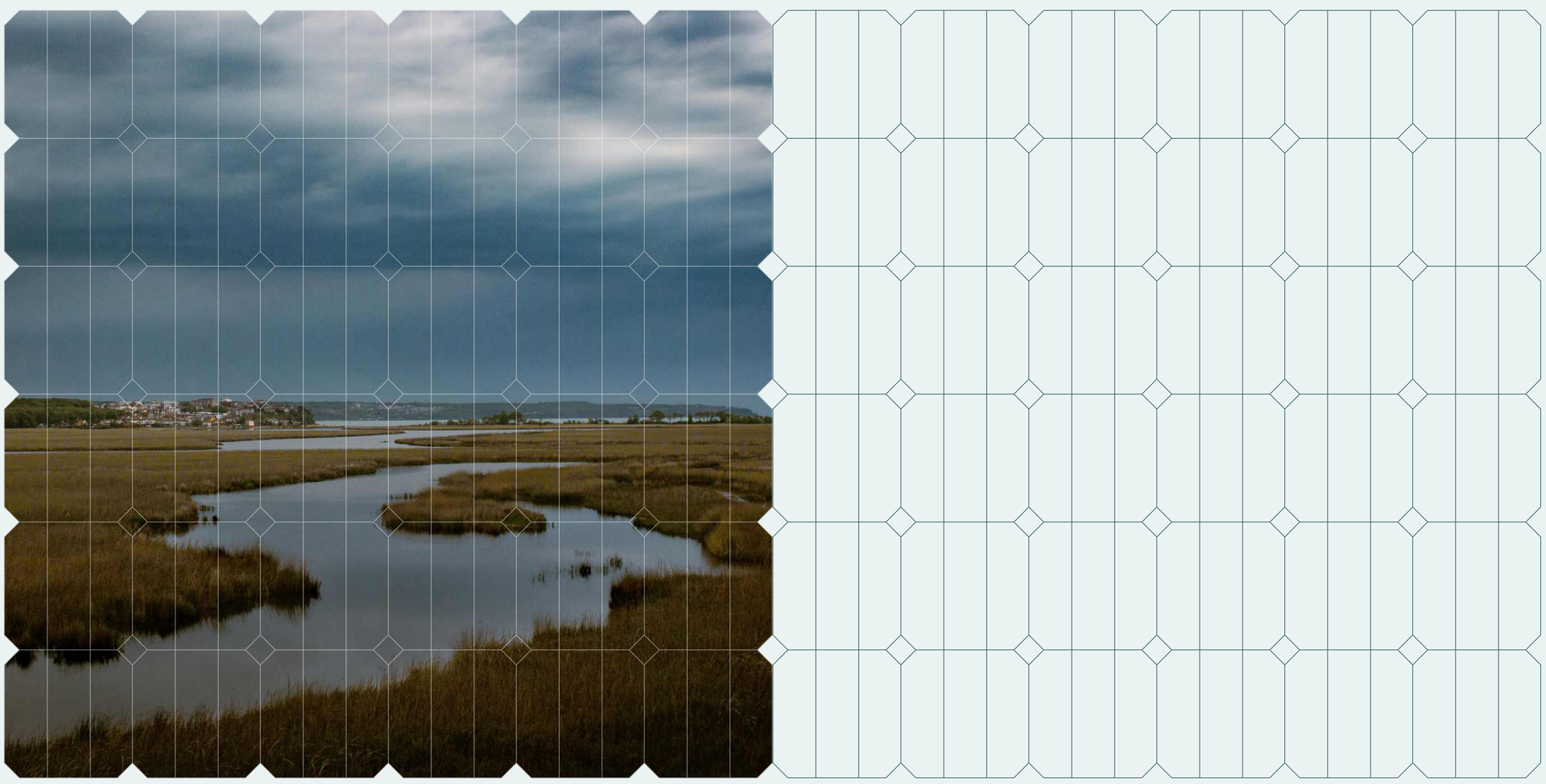
When most people hear the term "Ghost Waters," their thoughts might drift to eerie legends or unseen bodies of water. But for renewable energy developers, Ghost Waters is far from a myth. They're a very real challenge that can have serious consequences for solar, wind, and Battery Energy Storage System (BESS) projects.

Ephemeral and Intermittent Streams, or Ghost Waters™ are hidden hydrological features that can unexpectedly surface in response to rainfall or during wet times of the year. Researchers have modeled ephemeral stream contributions to the U.S. network of more than 20 million rivers, lakes, reservoirs, canals, and ditches.

Those who have experienced these streams know how quickly they can appear at times, even seemingly out of nowhere. As the state or federal jurisdiction is frequently unknown, it can disrupt the viability of a development site and potentially derail an entire project. The implications can range from short to significant delays or even complete failure.

In this guide, we'll explore the world of Ghost Waters: what they are, why they matter, and how you can protect your project from these unseen threats.

Why stop there? We will also expose other hidden risks that could threaten your land development and provide practical tools and strategies to help you avoid costly surprises.



Ghost Waters: definitions and risks

Ghost Waters, also known as ephemeral or intermittent streams, refer to areas that only temporarily hold water, either seasonally or after rainfall. These features may appear dry for much of the year but come to life with moisture after precipitation, creating streams or surface drainage channels that can disappear as quickly as they emerge.

These streams are not limited to natural environments. Man made features like ditches or canals can also fill with water during rainy periods. These temporary water bodies blur the lines of what is considered a stream or waterway, creating challenges when determining their status for environmental regulations.

The distinction between natural and man-made water bodies and when they qualify as regulated waterways has been debated.

For example

During the Obama administration, some landscaped residential swales were considered streams and regulated by the U.S. Army Corps of Engineers. While this policy has since changed, the question of what qualifies as a waterway in more natural or agricultural settings remains fuzzy.

Where does the “ghost” come in?

Ghost Waters gets its name from those spooky figures that appear and disappear randomly. While that sounds a bit mystical, the natural phenomenon behind Ephemeral and Intermittent Streams is just as unpredictable and, for renewable developers, scary as ghosts.

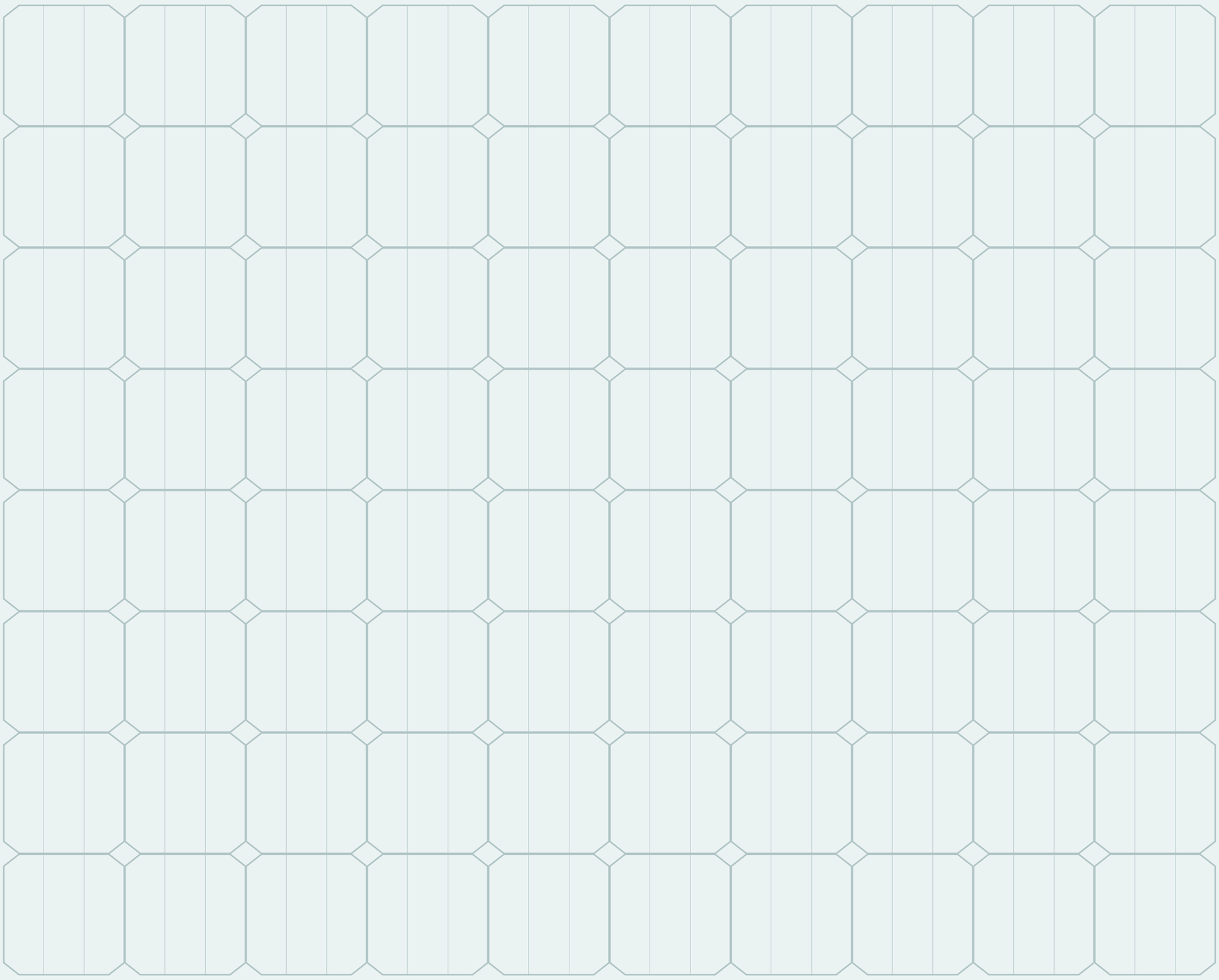
This issue has been debated since the definition of wetlands was adopted by the US Army Corps of Engineers in 1987. The definition itself goes back even longer and says that:

“Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

This definition leads to more questions:

- ☐ How do we define "saturation"?
- ☐ How often and long does it need to happen for a wetland designation?
- ☐ How much vegetation qualifies?
- ☐ What qualifies as "similar areas"?

It's no wonder regulating Ghost Waters is tricky, even wetlands, which last longer than ephemeral streams, are hard to pin down.



Ephemeral streams are even trickier. You may not even realize they're there for much of the year. These streams only flow after rainfall, seemingly appearing out of thin air without any visible channel during dry periods. Chances are, you've stepped over an ephemeral stream in the woods without realizing it had ever carried water.

But Ghost Waters don’t just disappear. They can be even sneakier. Have you ever noticed a stream suddenly vanish in the woods or over a gravel road? Only during particularly heavy rains might that channel reveal itself on the surface again.

Much like the subjective nature of wetland delineation, whether drawn on a map or marked in the field, the boundary between perennial, intermittent, and ephemeral streams is a matter of professional judgment. Let's dive into what those terms mean.

Perennial, intermittent, and ephemeral stream channels

Understanding the distinctions between these three types of waterways is essential for grasping the Ghost Waters.

Perennial Streams

These waterways flow year-round, whether at high or low levels. They consistently move through clearly defined channels, so you can always count on their presence.

Intermittent Streams

While the channels are well-defined, intermittent streams may dry up during certain times of the year. Despite this, you can still identify and account for them during planning and due diligence.

Ephemeral Streams

Unlike the others, ephemeral streams only appear after heavy rainfall and lack well-defined channels. These "ghost" streams remain hidden most of the year, revealing themselves only during storms.

What do all three have in common? If you guessed that they all contribute to and impact the water supply, ecology, and water quality, you’re right. However, while perennial streams are predictable enough to incorporate into your planning from the start, Ephemeral and Intermittent Streams differ. They can emerge unexpectedly, disrupting your project without warning.

The same unpredictability applies to wetlands and low-lying areas with hydric soils. These areas may seem dry for most of the year but can suddenly reappear, disregarding project boundaries or the permits you hold, potentially derailing your plans entirely.

Does it matter how a stream, wetland, or waterway is classified?

The answer? Well, it depends. This is a hotly debated topic, as the Clean Water Act (CWA) protects "Waters of the United States" (WOTUS).

Under the Obama administration, WOTUS extended protections to specific Ephemeral Streams and ditches. The Trump administration later rolled back these protections, focusing instead on intermittent and perennial waterways. In other words, ephemeral streams and wetlands are often temporary or invisible.

Although much of Trump-era environmental policy has since been revised, the exact status of these Ghost Waters still needs to be determined. This ambiguity means ensuring your permits comply with all regulations that could apply to any hydrological disturbances on potential development land is essential.

Recent developments have made the situation even more complex. In 2023, the U.S. Supreme Court ruled in Sackett v. EPA, further narrowing the definition of WOTUS: The ruling specifically limited the inclusion of wetlands that do not have a continuous surface connection to larger water bodies, so certain wetlands that may have previously been protected now face a different regulatory landscape.

As a result, staying informed on these evolving definitions is crucial for land developers and environmental compliance professionals. Ensuring your permits adhere to the most current interpretation of WOTUS can help avoid complications or legal issues when disturbing hydrological features during development.

Why does this matter for renewable developers?

Here’s where it gets serious. Ghost Waters pose several risks to your development, including but not limited to:

Invisibility in public data	Ghost Waters are often absent from public datasets because they are typically unmapped.
Significant presence	Up to 70% of stream channels in any given watershed may qualify as Ghost Waters.
Downstream impact	Ghost Waters flow downstream like other waterways, potentially disrupting ecosystems and drinking water supplies.
Limited evaluations	Environmental consultants may take a conservative approach when identifying Ghost Waters, leading to incomplete assessments.
State-specific regulations	Many Ghost Waters have riparian buffers managed by states, where disturbances require specific authorization.
Unseen expenses	Overlooking Ghost Waters can lead to costly project delays, requiring you to invest time, energy, and resources to fix the oversight.
Strict penalties	Even if you’re unaware of their presence, ignorance is no excuse, and you could still face steep penalties.

Imagine you've found the perfect piece of land for your next solar installation or wind farm project. The size, climate, and geology are ideal. You do your due diligence, whether by hiring a consultant or using a sophisticated desktop tool, and everything checks out.

Then the rain hits.

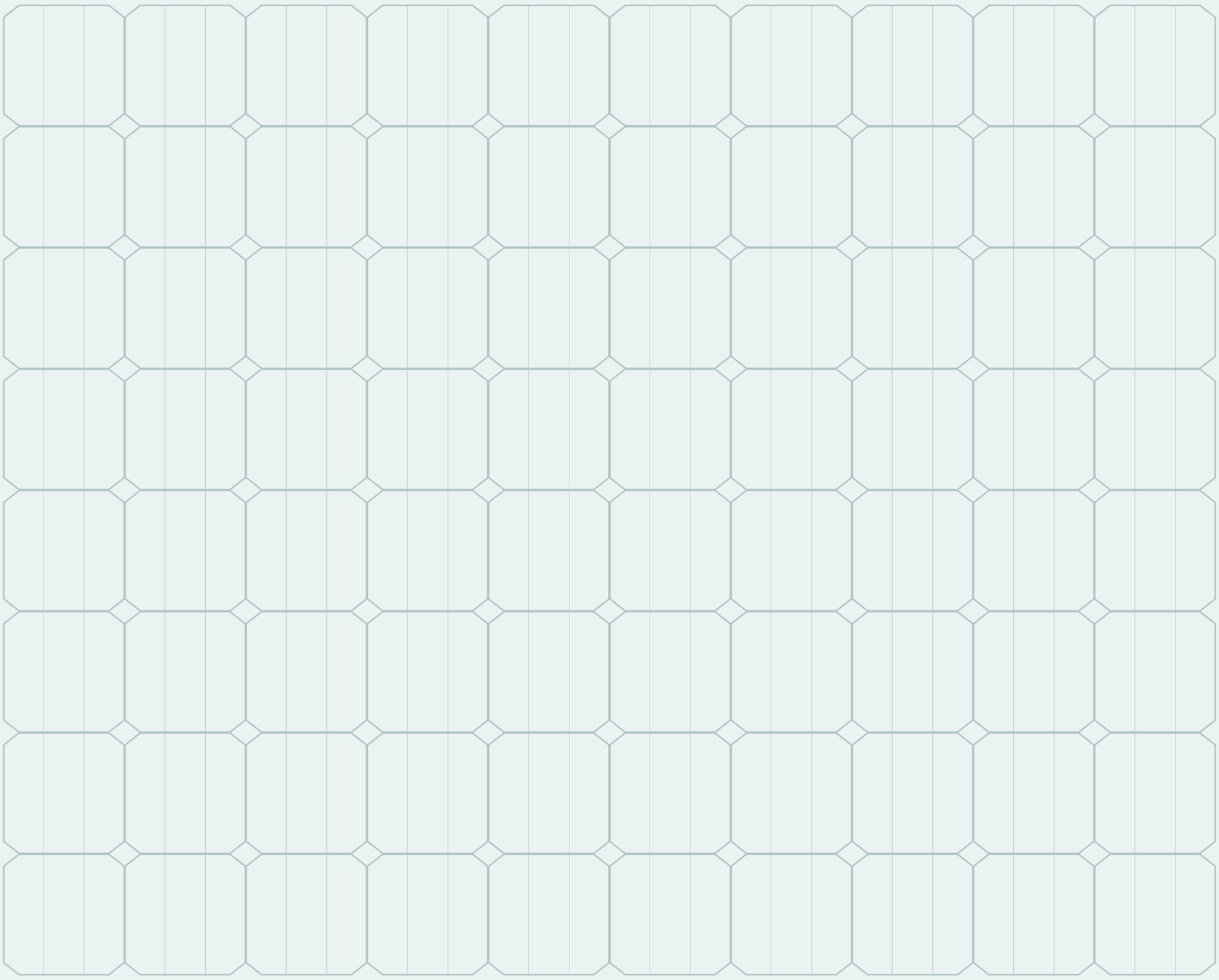
Suddenly, you've got a stream running through your site, one you hadn't planned for. It doesn't matter that this water will disappear in a few days. While there, it carries debris, pollutants, and contaminants across your land, and now you have big worries that it could seep into the permanent water supply.

Now you've got a problem.

This unexpected water flow can lead to delays, added costs for new permits, or, worse, the loss of your ideal development site.

A thorough assessment should include an on-site survey within 48 hours after rainfall, performed by an expert trained to identify ephemeral waterways, those temporary, ghost-like streams that only appear after rain. When that doesn't happen? Well, you're left with a frustrating (and costly) oversight.

So how can you avoid this?



Get ahead of the next ghostly appearance

Identifying Ghost Waters on your property early on is crucial, just like any other environmental risk factor. Wetlands and ephemeral or intermittent waterways can often be hidden from plain sight, so using the right tools and consulting experts for your due diligence is essential.

If you catch these features early, you can adapt your plans or pivot before it's too late, safeguarding your project timelines, capital, and investor interests.

So, don’t stress over the process; focus on getting the information.

Here’s what we recommend:

01.

Start your due diligence early

It shouldn’t be an afterthought. Do not treat it as the final checkbox. It should be your first priority. Identifying issues upfront allows you to move forward quickly or reassess and avoid costly delays if the site isn't viable.

02.

Check at all regulatory levels

Don’t assume regulations apply only at the federal or state level. Local and regional jurisdictions often have permitting requirements for Ephemeral and Intermittent Streams, which can be just as impactful on your green energy development. Many municipalities also enforce protective buffers around transitional areas, making understanding the rules at every level vital. Ensure you’re equipped with tools to help you navigate these regulations.

03.

Add remote sensing and spatial data to your toolkit

Modern tools like remote sensing technology and digital elevation data can help to identify Ghost Waters. Experts can verify findings using vegetation patterns and other indicators, helping you anticipate where water might flow after the next big rain.

With Transect, renewable energy developers can:

- ☐ Discover and evaluate sites in minutes. Find land that meets your criteria and generate reports from your desktop.
- ☐ Confirm the buildable area of a project. Assess floodplains, topography, species, protected areas, and other factors that can constrain buildability.
- ☐ Be aware of required permits. Get a detailed inventory of federal, state, and local permits required for your site.
- ☐ Uncover community sentiment. Evaluate the risk of community opposition in your project area that may affect your siting decision.

Developing land comes with inherent risks. One of the most effective ways to minimize these risks is to ensure that unexpected waterways or wetlands on your site do not blindside you.

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With Transect, you can mitigate these risks, keeping your project compliant and on track.

Ready to discover how Transect can help you find the best sites and avoid Ghost Waters?

Schedule a demo