Is your benthic procurement strategy increasing costs, delays and risks?

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1 INTRODUCTION

Benthic surveys are often bundled into larger geophysical or geotechnical campaigns and treated as minor procurement decisions. But these “minor” choices can carry hidden consequences. Rigid, prescriptive approaches, especially those that default to conventional, extractive methods like sediment grabs, can introduce delays, drive up costs, and limit your flexibility downstream.

Traditional sediment grab sampling remains a valid and commonly accepted method for meeting environmental standards, but it has limitations when compared to modern image-based technologies. Grabs were not developed with today’s permitting pressures or Environmental, Social, and Governance (ESG) expectations in mind. They are slower to yield results, can be more environmentally intrusive, and often lack the contextual data needed for timely, informed decision-making. Critically, when procurement documents rigidly prescribe such methods, they can constrain innovation, locking developers into outdated workflows, increasing the risk of delays, and driving avoidable rework.

A better approach exists. Sediment Profile Imaging paired with Plan View drop-down camera photography (SPI/PV) is a non-extractive benthic assessment technique that, in soft sediment and mixed habitats, provides richer, more interpretable data at a lower cost and with faster data turnaround times. SPI/PV is a technological advancement in benthic sampling that enables real-time analysis, supports adaptive sampling, and generates ecological imagery that can be reused across the project lifecycle, for biodiversity net gain assessments, stakeholder engagement, and marine growth monitoring.

When benthic procurement is tied to performance goals, not specific methodologies, developers gain the flexibility to deploy modern tools that align with regulatory trends, reduce impact, and accelerate schedules. Thoughtful decisions at this early stage can de-risk your project in permitting, enhance ESG delivery, and prevent costly bottlenecks later on.

Choosing the right benthic approach isn’t just a technical detail, it’s a strategic move that can shape the trajectory of your project.

2 THE HIDDEN IMPACTS OF “BUSINESS AS USUAL”

Legacy Bias

For many offshore energy developers, sediment grabs remain the default method for benthic data collection. This default is not based on superior performance or ease/speed of data collection; it is based on inertia.[1] Often benthic survey work is packaged with much larger geophysical or geotechnical campaigns and is frequently treated as a low-value “add-on,” assigned to whichever vendor offers a compliant bid using the most familiar method. The assumption is that grab samples

[1] While most regulators are open to alternative approaches, current guidelines in a few jurisdictions explicitly require grab sampling, limiting flexibility until those standards are formally updated. However, even in these jurisdictions, supplementing sediment grabs with SPI/PV imaging can significantly de-risk project schedules and costs by accelerating data availability, improving site context, and reducing the likelihood of costly rework.

are “good enough,” they’ve been used before, they meet minimum requirements, and they seem simple to scope.

But that familiarity masks critical limitations. As permitting and ESG expectations evolve, the risks of relying on extractive legacy methods are growing, and they’re often overlooked until it’s too late.

The Risks of Over-Specification

Procurement documents that lock in sediment grabs or overly prescriptive sampling methods can unintentionally limit the quality, speed, and adaptability of your data increasing project costs, delays, and risk. Here’s how:

- **Narrow methods lead to narrow data.** Grab samples are typically used to collect information on species composition and grain size, but little else, often due to the labour intensive nature of obtaining information from grab samples.[2] Grab samplers cannot sample in mixed and hard bottom environments and the grain size distribution curves and taxonomic information reported are derived from homogenized samples and all contextual information related to these parameters is lost.[3] Contextual insight into sediment structure, disturbance gradients, or animal-sediment interactions is missed, yet these are exactly the kinds of insights that are increasingly important to regulators and stakeholders.
- **Lab work for grab samples is slow.** Lab-based analysis typically takes 2–3 months to return basic results (BCA and PSD). By contrast, non-extractive tools like SPI/PV provide high-resolution imagery in near-real time onboard, with baseline ecological interpretation available within a month. That speed can turbo-charge your timeline and provide earlier certainty for permitting decisions.
- **Grabs destroy critical context.** Grab sampling is inherently destructive. It cleaves away part of the seabed and it homogenizes the sediment, eliminating important cues about the seafloor environment, such as layering, burrow structures, vertical organism distribution, and bioturbation. These cues are essential for interpreting site health, projected impact recovery, and habitat suitability.
- **Limited reuse potential.** Because grab data are narrow in scope and disconnected from the broader ecological picture, it is difficult to reuse in later permitting stages or for emerging needs like biodiversity net gain, marine growth modelling, or ESG impact reporting. In contrast, image-based data provides visual evidence that can be used for varied project purposes again and again.
- **Regulatory flexibility is greater than many assume.** Most regulators will accept SPI/PV as an alternative to sediment grabs, especially when ecological function and habitat quality are the

[2] The “kill ‘em and count ‘em” approach is limited in that it only provides information on benthic community taxonomic composition (Reuscher et al. 2019). The shortcomings of using extractive methods as the sole means of benthic investigation have long been acknowledged, even by the investigators who used these techniques to form the basis of benthic ecology in the early 1900s (Petersen 1913). Since at least that 1960s, ecological insights in benthic ecology have been driven by the use of acoustic and optical imaging technologies that provide vital context about the sedimentary environment in which benthic taxa reside and the interactions between animals and sediment (Solan et al. 2003). The sediment profile imaging (SPI) camera, developed at Yale during this time period, provides a means of capturing an optically clear cross-sectional image of the seafloor in even the most turbid estuarine environments (Germano et al. 2011).

[3] For example, dynamics at play, such as river bedload, deposition from jet plowing, or erosion can be interpreted from the arrangement of sediment grains at the sediment-water interface visible in a SPI image but destroyed by a grab sampler. Similarly, information on the position of organisms within the sediment column, related to ecosystem function and recovery from disturbance, is eliminated by grab sampling and sieving and has to be inferred from species type (Solan et al. 2003).

primary objectives. Even where sediment grabs are explicitly required, for example, in Germany, to meet prescriptive regulatory standards, SPI/PV still adds significant value. When used in tandem, it supports adaptive sampling, reduces the need for subsequent re-survey, and provides a more complete and ecologically meaningful dataset. In these cases, reduced number of grab samples may be acceptable to regulator with full coverage provided by SPI/PV.

The result of an overly prescriptive, grabs-only approach? When procurement is overly prescriptive, it limits the ability of technical decision-makers to evaluate alternative approaches that may better protect the schedule, prevent delays, and enable more efficient execution of work. Over-specifying methods instead of desired performance outcomes can lock you out of better options, just when flexibility and speed matter most.

3 A BETTER APPROACH – SPI/PV AS THE MODERN DEFAULT

What is SPI/PV?

SPI/PV is a powerful, non-extractive imaging method that captures optical cores of the sediment column (SPI) and surface views of the seafloor (PV) in a single deployment, even in turbid or mixed-bottom environments.[4] The SPI component replaces grab sampling by using an optical profile camera to visualize subsurface sediment layering and bioturbation, while Plan View provides high-resolution drop camera images, all collected rapidly from any vessel of opportunity using minimal disturbance. Data are viewable onboard almost immediately, allowing for adaptive survey adjustments.

Performance Advantages

- **Comprehensive benthic insight:** As described in the table below, SPI/PV delivers equivalent or richer ecological and sediment data compared to grabs, such as sediment structure, infaunal presence, redox layering, and organism stratification, all at a lower cost with faster turnaround time.

Category	Variable	SPI/PV	Video	Sediment Grabs
Sediment Characteristics	Grain size range	Up to boulder	Low-res description	Up to pebble
	Particle distribution	Yes	No	Lab-analysed
	Layering / Deposits (natural/anthropogenic)	Yes	No	No
	Bedforms / Boundary roughness	Yes	Low-res	No

[4] SPI/PV has been used in research and commercial settings to assess anthropogenic impacts to the seafloor and map disturbance and recovery gradients across sectors ranging from dredged material management to oil and gas and offshore wind, among others (Germano et al. 2011). SPI provides information on benthic function that cannot be discerned from extractive sediment samples. For example, SPI mapped a more complete picture of benthic functional recovery following the Deepwater Horizon oil spill than results from sediment grab and core samples alone (Guarinello et al. 2022), helping to drive new insights into deep-sea benthic ecological functioning (Sturdivant et al. 2024).

Category	Variable	SPI/PV	Video	Sediment Grabs
	Redox (oxygenation depth)	Yes	No	No
Environmental Indicators	Organic enrichment / load bearing capacity	Yes	Low-res	No
	Methane / Hydrocarbons	Yes	No	No
Biological Function	Biological mixing & bioturbation depth	Yes	No	No
	Lebensspuren (e.g., tracks, tubes, voids)	Yes	Low-res	No
Habitat Assessment	Macrohabitat classification	Yes	Low-res	No
Species Composition	Taxonomic ID (low level)	Some taxa	Some taxa	Yes
	Species richness / diversity / biomass	No	No	Yes
	Epifauna (mobile/sessile)	Yes	Low-res	No
	Sensitive & non-native taxa	Yes	Low-res	No
Vegetation & Substrate Cover	Seagrass / macroflora presence	Yes	Low-res	No
	Attached & emergent fauna cover	Yes	Low-res	No

- **Speed and responsiveness**: Initial results from these image-based approaches can be reviewed by scientists on the vessel in near-real time, preliminary data summaries and reviews can be provided within 2 weeks, and baseline information on sediment type and benthic community function status can be delivered within 1 month. In contrast, laboratories often require 2 to 3 months to return comparable baseline data from sediment grab samples.
- **Adaptive sampling & micro-siting:** Onboard insights allow teams to pivot mid-campaign to collect samples delineating the boundaries of potential siting constraints, ensuring all necessary data is acquired in a single campaign, saving the time and money associated with a second survey.
- **ESG alignment & habitat protection:** Non-extractive deployment reduces seabed disturbance, aligning directly with nature-positive and minimal-impact policies.
- **Multi-stage reuse:** Rich visual datasets support later stages like Biodiversity Net Gain, marine growth assessments, stakeholder briefings, and monitoring, without requiring repeat sampling.
- **Cost and cost-effectiveness**: Not only is SPI/PV typically less expensive than traditional grab sampling, but it is also more cost-effective across the project lifecycle. By collecting more ecological parameters in a single pass and reducing the likelihood of resampling or supplemental campaigns, SPI/PV lowers total spend while increasing data utility and long-term value

SPI/PV is not just a replacement for grabs, it's a transformational tool that integrates deep ecological insight, flexibility, and regulatory readiness into benthic procurement.

4 SPI/PV POSITIONS PROJECTS FOR REGULATORY AND MARKET SHIFTS

Environmental regulation and investor expectations are rapidly evolving, especially around biodiversity, ESG disclosure, and sustainable development. While offshore energy developers have traditionally relied on prescriptive, extractive methods for environmental data collection, these approaches may no longer meet the needs, or the expectations, of today's regulatory and financial ecosystems.

Policy Trends

Across jurisdictions, a clear trend is emerging: nature-positive development is no longer optional, it's becoming mandatory.

- **United Kingdom – Biodiversity Net Gain (BNG):** Under the Environment Act 2021, developers in England are now required to demonstrate a minimum 10% biodiversity net gain for any onshore or offshore development. This means not only avoiding harm to marine habitats but also quantifying and proving positive ecological outcomes through measurable, repeatable methods. Tools like SPI/PV, which capture visual habitat condition and functional benthic indicators, provide a critical evidentiary foundation for meeting these obligations.
- **European Union – Nature Restoration Law:** The EU's Nature Restoration Law, adopted in 2024, sets legally binding targets for the restoration of at least 30% of degraded marine habitats by 2030. Offshore energy projects, especially in sensitive benthic zones, are now under greater scrutiny to assess, minimize, and restore ecological impact. Non-extractive methods like SPI/PV help meet these expectations by reducing disturbance while offering clear insight into habitat function and recovery over time.
- **Broader ESG Mandates – Sustainable Finance Disclosure Regulation (SFDR) and Nature-Positive Finance:** The Sustainable Finance Disclosure Regulation (SFDR) and other emerging standards require developers and their investors to disclose impacts on biodiversity and demonstrate alignment with sustainable practices. As access to capital increasingly depends on ESG performance, developers are under pressure to generate transparent, decision-grade environmental data. Image-based, repeatable tools like SPI/PV offer a practical solution for meeting these reporting demands, while building trust with regulators, lenders, and the public.

Procurement Risk

As policy and ESG expectations shift, traditional procurement strategies are showing their age.

- **Method-locked RFPs may quickly become outdated:** Procurement documents that mandate extractive sampling methods, such as sediment grabs, risk becoming obsolete as biodiversity policies advance. Locking into outdated specifications at the tender stage can constrain a developer's ability to pivot, adapt, or meet new permit requirements later in the project lifecycle.
- **Prescriptive specifications limit innovation:** RFPs that define "how" instead of "what" often preclude the adoption of modern, adaptive tools like SPI/PV. By focusing on methods instead of performance outcomes (e.g., "document benthic habitat condition with minimal disturbance"), developers limit their own ability to deliver on regulatory, ESG, and schedule objectives.
- **Lab analysis required for traditional extractive sampling can lengthen project timelines:** Environmental studies that support Environmental Impact Assessments (EIAs) and consenting for projects often operate under aggressive schedules, and benthic assessments that depend on

sediment collection are constrained by laboratory processing times, which commonly take 2–3 months for results. In contrast, SPI/PV delivers more comprehensive data in a fraction of the time. Accelerating survey completion without compromising data quality is possible, but only if procurement documents allow flexibility, rather than prescribing rigid sampling methodologies.

The regulatory and market environment is shifting fast. Developers who continue to rely on prescriptive, extractive methods risk falling behind, not just with environmental optionality, but strategically and financially. SPI/PV offers a forward-looking alternative: one that supports compliance today while building the foundation for nature-positive, investor-ready development tomorrow.

5 RECOMMENDATIONS FOR SMARTER PROCUREMENT

Procurement Guidance

Procurement is often viewed as a tactical process, but when it comes to environmental data, it can set the strategic tone for an entire project. How survey requirements are framed in early scopes of work and RFPs can either open the door to innovation or unintentionally lock teams into outdated, inefficient methods. To future-proof your benthic data strategy, consider the following recommendations:

Avoid rigid method specifications too early in the process: Writing sediment grabs, or any single method, into RFPs as a fixed requirement limits flexibility and precludes more effective or efficient alternatives. This rigidity increases the risk of rework if regulatory expectations evolve or field conditions differ from initial assumptions.

Embrace performance-based specifications: Focus on what the survey must achieve (e.g., “characterize benthic habitat condition in support of permitting and ESG reporting”) rather than how it must be done. Performance-based language enables vendors to propose the most appropriate tools, such as SPI/PV, tailored to habitat type, data needs, and impact constraints.

Engage science, permitting, and ESG teams early: Early coordination across disciplines allows procurement language to reflect the full value of data throughout the project lifecycle. By aligning data collection with future regulatory filings, stakeholder communications, and ESG disclosures, you avoid duplication and maximize data reuse.

Prioritize tools that reduce impact and enhance interpretability: Methods that minimize disturbance while delivering rich, stakeholder-ready insights—like SPI/PV—support not only permitting success, but also ESG credibility and long-term ecological stewardship.

6 CONCLUSION

Benthic data procurement may seem like a small line item in a large capital project, but it can have outsized impacts. Method-locked strategies can increase rework, delay decisions, and constrain your ability to respond to evolving policy and stakeholder demands. In contrast, a flexible, performance-based approach gives developers the space to adopt modern tools like SPI/PV that deliver faster, more interpretable, and lower-impact results.

SPI/PV is more than just a technical upgrade; it is a strategic enabler. It supports regulatory confidence, ESG transparency, and operational efficiency from siting to post-construction monitoring. For developers who want to lead on sustainability without sacrificing speed or quality, it's time to rethink what "standard" should look like.

Modernize your toolkit. Let science drive specs - not legacy habits. By shifting your procurement strategy today, you can unlock a smarter, cleaner, and faster path to project success.

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www.venterra-group.com
info@venterra-group.com