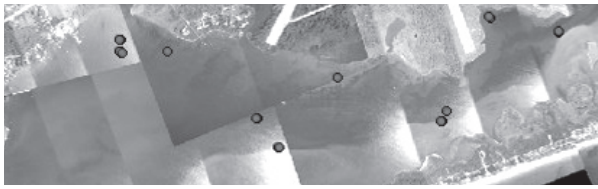

Spying on the Ecosystem

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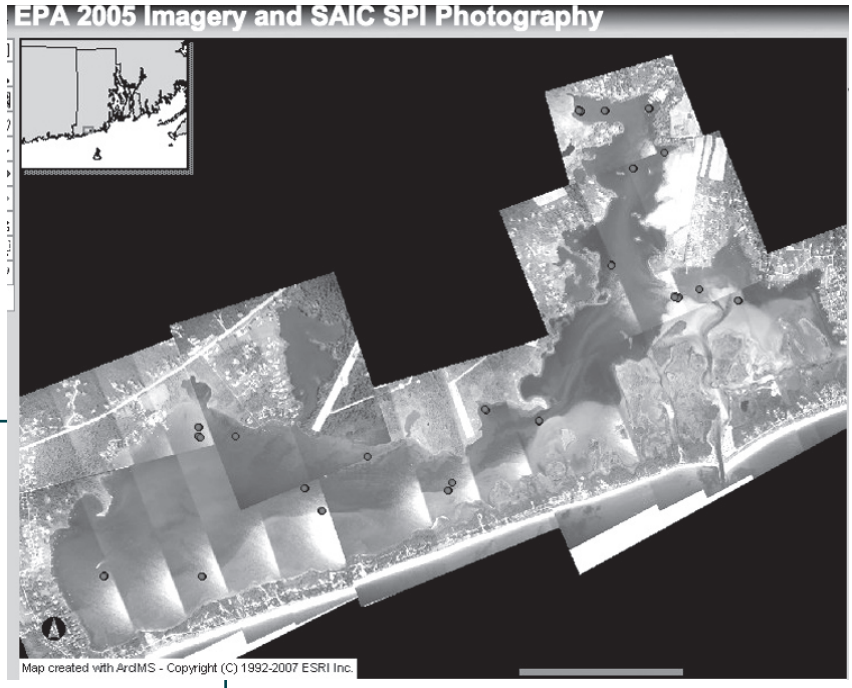
If you ever played with the kiddie toy that uses a mirror to let you look around corners, or been to a golf tournament and used the same sort of device to watch the action from far back in the gallery over other spectators' heads, you have a rough idea of the workings of sediment profile imagery (SPI). SPI (pronounced "spy") cameras are lowered to the Bay floor, where a prism containing a mirror is forced into the mud. Through the prism window, a digital camera takes a picture of a slice of the sediment. The most useful images capture the sediment-water interface and any creatures living on or in the mud.

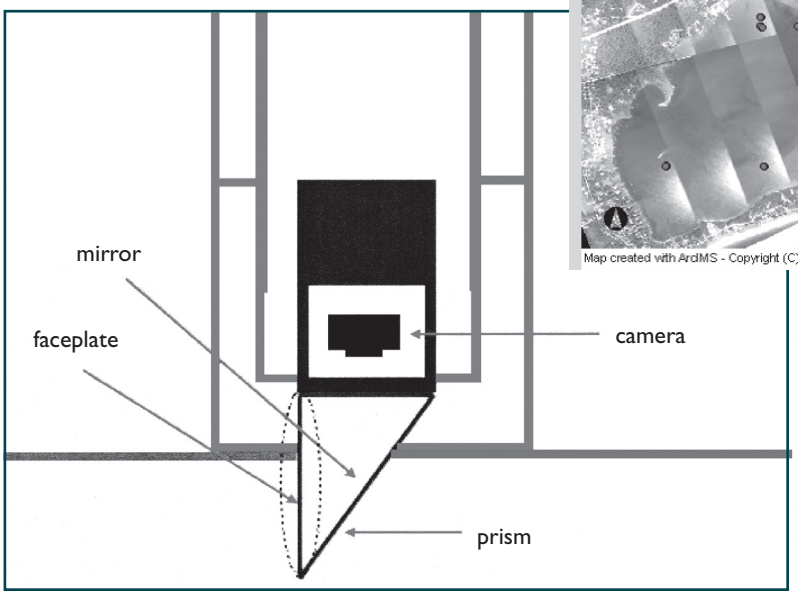
SPI allows MapCoast researchers to obtain high-resolution digital images of the soil surface layers, provides data on the amount of sand, gravel, and clay (grain size) to determine bottom type, is used to identify bottom-dwelling marine life and plants (e.g., eelgrass), and can capture evidence of low oxygen (hypoxic) conditions.

One of the key value-added traits of SPI is that it brings together geological and biological information in a rapid and quantitative way, which can aid in the overall assessment of environmental conditions. Historically, the difficulty of simultaneously collecting data on the geological, physical, and biological characteristics of the seafloor made it difficult to quickly characterize benthic habitats. SPI is able to rapidly capture a representation of bottom conditions, including indicators of nutrient pollution, chemical pollution, and other disturbances from human activities.

SPI also provides a visual tool to identify areas in which ecosystem function has been altered, information that can be used to guide future management and/or protection. For example, SPI has been used to monitor the biological recovery of recently dredged areas on both coasts of the United States and in Europe, providing accountability for financing of such initiatives and allowing for adaptive management since the scenario may change. SPI has also been used in the United States and in Europe for studies involving low oxygen, fish farms, trawling, dumping, and mapping of drill cuttings around oil platforms, as well as for benthic monitoring programs.

The ability to evaluate ecosystem health quantitatively not only contributes to scientific research, but also effectively informs management decisions. Information on Bay ecosystem status is being gleaned from sediment profile images in numerous areas in Rhode Island and contributes to the overall understanding of the interaction between physical, chemical, geological, and biological conditions throughout the Bay.





Above: Map of locations of SPI imagery available for download on the *www.mapcoast.org* website. *Left:* Schematic drawing showing how a SPI camera works.