Ecosystem recovery of Tampa bay following the 2021 release of phosphate mine wastewater from the Piney Point facility

Marcus W Beck1,✉, and Edward T Sherwood1

1 Tampa Bay Estuary Program, 263 13th Ave S., Suite 350, St. Petersburg, Florida 33701 USA

✉ Correspondence: [Marcus W Beck <mbeck@tbep.org>](mailto:mbeck@tbep.org)

## Abstract (150-250 words)

Mining activities can support local and global economies, yet also impose significant consequences for the natural environment. Fertilizer mining in central Florida has been ongoing for decades and many facilities present risks to freshwater and coastal aquatic environments in the state. In 2021, a breach in the liner of a wastewater containment stack at Piney Point, a legacy phosphate mining facility, resulted in the emergency discharge of ~815 million liters of highly acidic and nutrient-laden process water into Tampa Bay. A multi-agency, event-response monitoring program resulted and documented water quality and ecosystem impacts within several months of the event. Short-term declines in water quality were observed, with a notable red tide event and substantial fish kills occurring three months after the initial wastewater release. The long-term recovery of Tampa Bay over the last 30 years has demonstrated that coordination among public and private entities can lead to improved water quality and seagrass growth. Acute spill events like the 2021 emergency release from Piney Point threaten past successes in bay management and efforts to mitigate and prevent these negative outcomes in the future are ongoing. This chapter will provide an updated, longer-term view of the ecosystem recovery that has occurred 3-4 years after the initial emergency discharge event, while also considering the historical context of long-term bay recovery.

## 1 Introduction (500-1500 words)

Provide background for the instructor that helps integrate the case study into disciplinary material and, if possible, relate the case study to ABET General Criteria (Student Outcomes 1-7), Program Criteria for Civil Engineering and Environmental Engineering, and general definitions and statements (e.g., ABET’s Statement on Implementing DEI Concepts into Program Criteria). The references in this section should focus on pedagogical aspects of the case study. As Section Editor, I can assist with the latter.

## 2 Background (1000-2000 words)

Provide background information for the study that relates to the events, design process, etc. Make sure to include sufficient information (including pictures, figures, graphs, etc.) so that a novice (i.e., student) can understand the case study. Include references to the events that allow for the reader to investigate further.

## 3 Student Activities (500-1000 words)

### 3.1 Classroom discussion questions

Include at least 3 discussion questions based on the case study that can be used in a classroom situation.

### 3.2 Individual student responses

Include at least 3 questions/prompts based on the case study that can be used in a homework assignment or on an exam. These could include further reading (be sure to provide references to readily available materials) or personal reflections.

## 4 Conclusion (500-1000 words)

Include a discussion of key take-aways.

## References