US Army Corps of Engineers®
Engineer Research and Development Center

National Regional Sediment Management Program Philadelphia District (NAP):

Bloomsbury Dam Removal: Phase 1 – Data Collection

Description

Bloomsbury Dam is scheduled for removal in FY21. NAP modeled the sediment impact of this removal and an FY19 RSM project improved USACE modeling capabilities to simulate these events better. The FY21 removal provides the opportunity to monitor the Bloomsbury Dam removal, for later use to evaluate the modeling, document best practices, and to inform further model enhancement. This FY21 RSM effort includes only the data collection portion, for later use in Phase 2.

Figure 1. Bloomsbury Dam Site Location

Issue/Challenge To Address

NAP developed a dam removal model of Bloomsbury dam to help guide the dam removal approach. This dam is scheduled for removal in FY21, providing an opportunity to evaluate model performance and formalize lessons learned for future modelers.

Sediment modeling is challenging enough, but dam removal sediment modeling is particularly challenging for two reasons. First, dam removals are novel system shocks, which means the modeler cannot calibrate the model to meaningful historical analogs. Second, dam removal models are evaluated immediately. While many sediment models simulate 50 year futures, and will not be fully evaluated until everyone involved retires, a dam removal predicts a 50 day future and either builds or erodes our agency's credibility in real time.

These two challenges make it critical to formalize best practices in our literature and models. Because we cannot calibrate new dam removals *a priori*, it is critical to evaluate dam removal models after the fact to build an inter-project learning loop that improves subsequent simulations. However, despite the importance of knowledge management in this particular field, dam removals are seldom monitored and the models are rarely revisited. There are two common obstacles to leveraging dam removals to improve future practice. First, dam removal budgets are usually thin and almost never include monitoring

National Regional Sediment Management Program
Philadelphia District (NAP):
Bloomsbury Dam Removal:
Phase 1 – Data Collection

or funds to evaluate predictions. Second, the stake holders are usually hesitant to evaluate their predictions because of the immediate and public nature of the result.

The Bloomsbury removal provides an opportunity to monitor a removal that the USACE modeled, and this RSM proposal leverages this learning-loop opportunity. By monitoring the removal and revisiting the model, we can improve best practices for these difficult projects in the future and improve agency credibly with future stakeholders.

Successes Lessons Learned

RSM FY19 efforts led to improvements within HEC-RAS, a Technical Note (TN) documenting best practices associated with downstream deposition biases, and presentation at the 2019 SEDHYD Federal Interagency conference. Lessons learned will be compiled throughout the duration of the RSM FY21 project.

Projected Benefits Cost Savings Value Added

Incorporating model enhancements to HEC-RAS and formalizing lessons learned from USACE dam removal experiences will help other districts evaluate dam removal impacts effectively and remove obsolete and/or unsafe structures more efficiently. Additionally, these tools will also be useful for reservoir flushing analyses which also send fine pulses downstream.

Expected Products

- Data collection during dam removal (Phase 1)
- Enhancement of HEC-RAS sediment transport functionality for dam removal applications (Phase 2)
- RSM Technical Note (Phase 2)
- Web video documentation for Dam Removal modeling best practices (Phase 2)

Stakeholders/Users

The project will engage the Musconetcong Watershed Association, which has actively monitored dam removals in the region, and specifically on this river, to monitor TSS during the removal. Users include other USACE Districts, as well as any outside users (e.g. other Federal agencies, consultants, etc.), engaged in dam removal assessment, using HEC-RAS sediment transport functions.

Leveraging Opportunities

This proposal will leverage project funds that will provide for downstream monitoring, which is sufficient for adaptive management decisions, but not to evaluate and update the modeling tools. It also leverages Flood and Coastal R&D which is funding HEC-RAS sediment development. ERDC-CHL/EL also has a parallel effort that is trying to develop dam removal modeling guidance. We have connected with this R&D team and have proposed a joint publication.

Points of Contact

Jacob Helminiak, CENAP-EC-EH
Hydraulic Engineer, Hydrology, Hydraulics, and Coastal Section
jacob.e.helminiak@usace.army.mil

Stanford Gibson, CEIWR-HEC-HH
Research Hydraulic Engineer, Hydrologic Engineering Center
stanford.gibson@usace.army.mil

Participating Partners

Musconetcong Watershed Association
NJDEP, Office of Natural Resource Restoration