Thin Layer Placement of Dredged Material

Website and Map-based Portal - Recognition and resources in a growing field of dredge material management

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Joint DOTS, EWN, RSM effort

Engineering With Nature

Outline

- Definition
- Project Need
- Project Objectives
- TLP Website
- TLP Map-based Portal
- Future Actions

What is thin layer placement?

- Purposeful placement of dredged material for functional/ecological benefit
- Thin layer thickness - centimeters vs. meters
- Definition depends on project objectives
- Many possibilities for environmental enhancement
  - Habitat Restoration
  - Marsh Restoration
  - Sediment Budgeting
  - Thin Layer Capping/Sediment Remediation

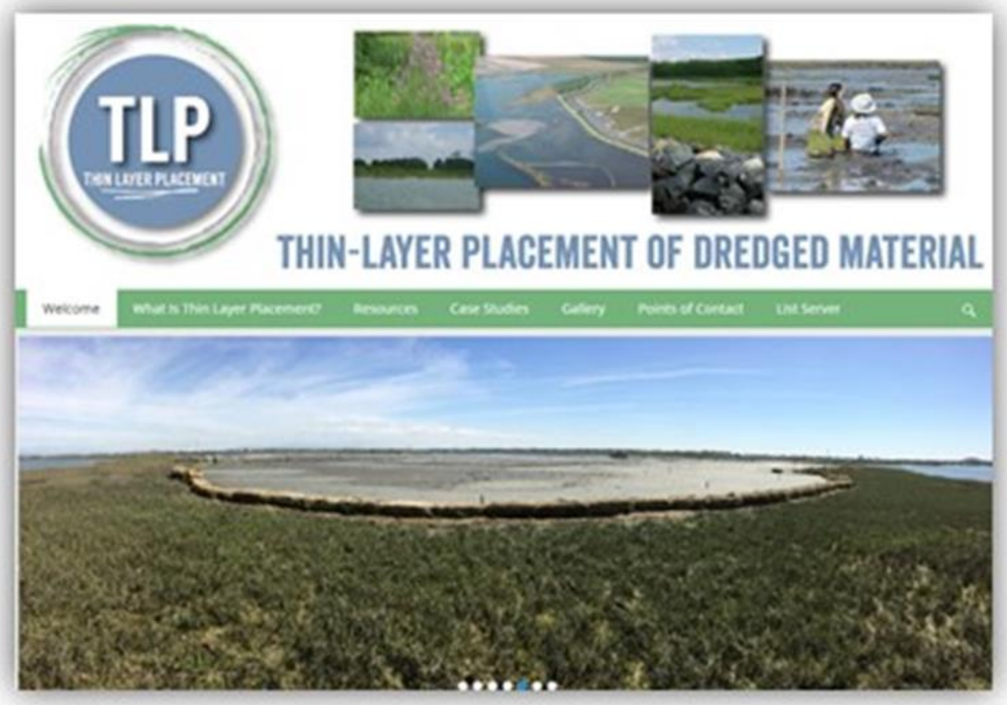
Photo from Kirk Gilligan, Seal Beach NWR Manager

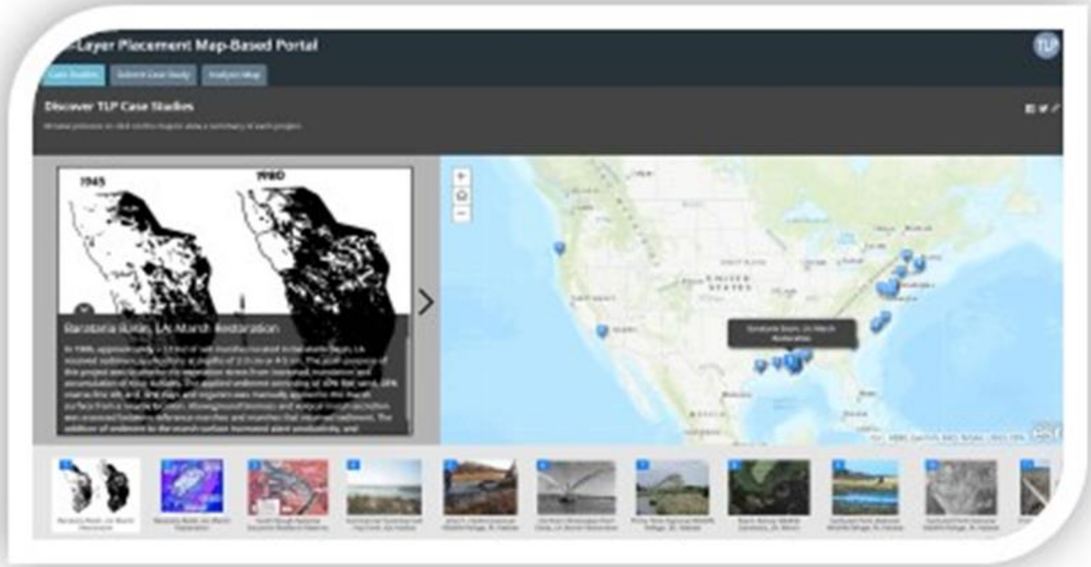
TLP Website and Map-based Portal Project Need

- Information and case studies for TLP not well documented
- Little or no technical guidance available for TLP design or implementation
- Multiple knowledge gaps
- An accessible, consolidated, living information resource is needed

Photo from Steve Miller Ellicott Dredges LLC

Website and Database Primary Objectives





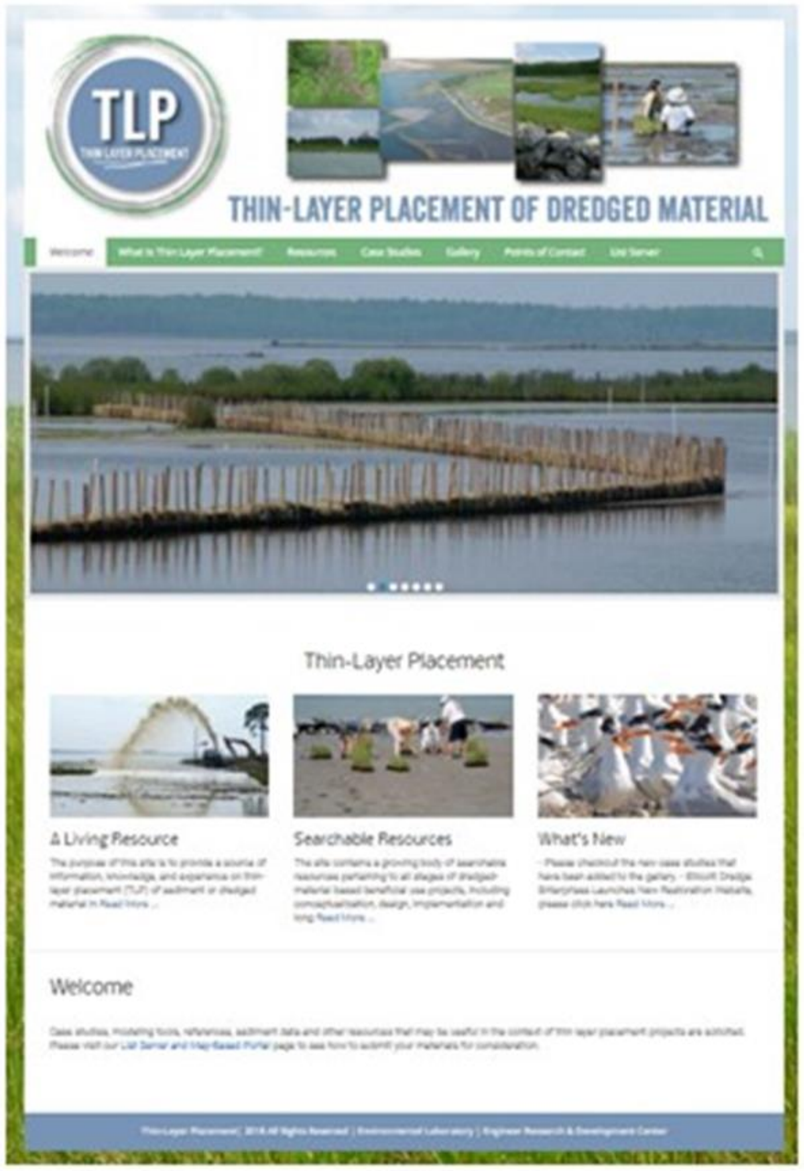
- Aggregate the current state of knowledge regarding thin layer placement of dredged material
- Consolidate literature/references pertaining to all project phases – from design to post-construction monitoring
- Provide centralized, accessible, and consolidated resource for case studies

Website and Database Secondary Objectives

- Provide a vehicle for collection of case studies worldwide
- Create an engaging and user friendly product
- Create a database that was compatible with the USACE data integration initiative

TLP Website

https://tlp.el.erdc.dren.mil/

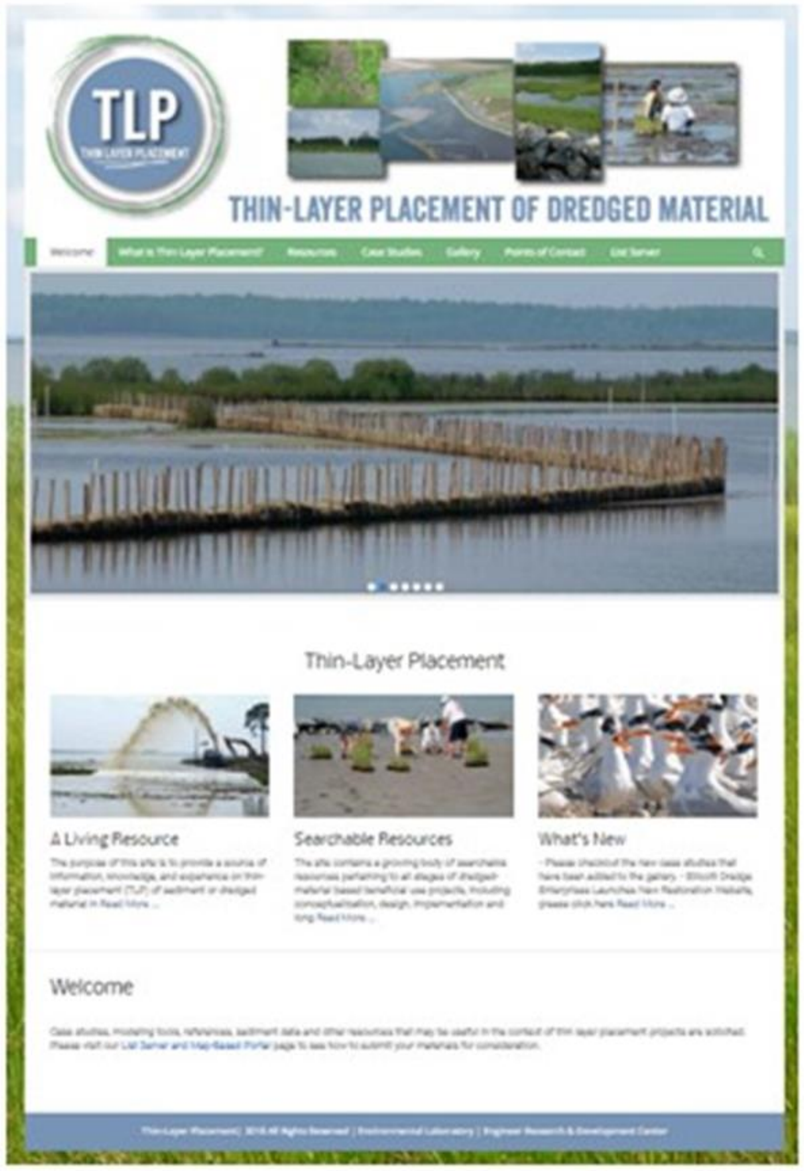


Current features:

- Relevant literature
- Case studies – fact sheets, photo galleries, project documentation/data
- Event tracker
- List server

TLP Website

https://tlp.el.erdc.dren.mil/



Future features:

- Ongoing literature and case study capture
- Other features being considered:
  - TLP project type definitions
  - ERDC TLP research projects
  - Future workshops, conferences, etc.
  - Newsletter
  - Online guidance tool
  - Forum

TLP Website Demo

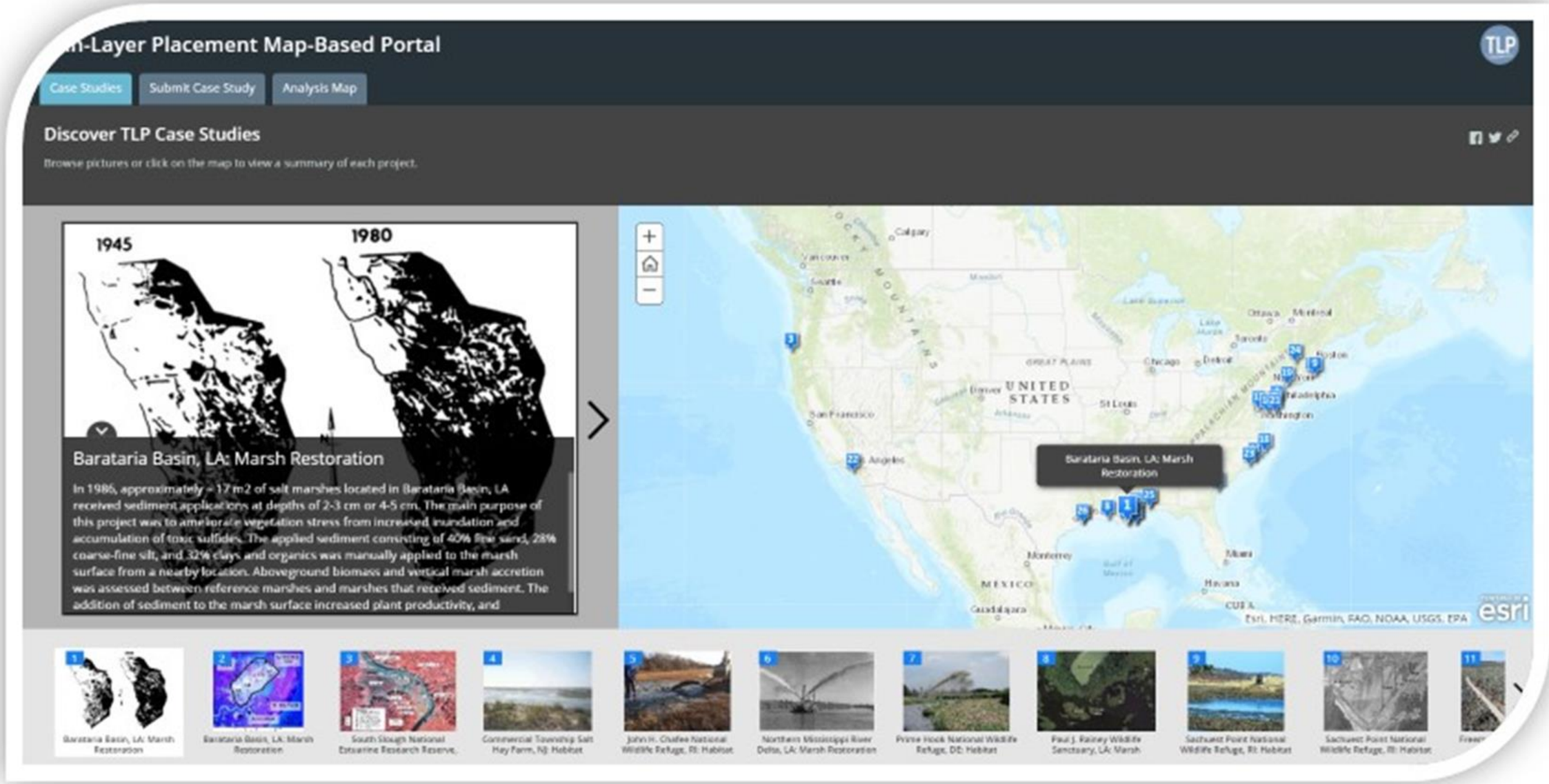
https://tlp.el.erdc.dren.mil/

TLP Map-based Portal

- https://usace.maps.arcgis.com/apps/MapSeries/index.html?appid=a731fd32f85c44109b9269e7c8d9c68f
- The map portal is a GIS-based tool for submittal of case studies and for displaying data and resources associated with each submitted case study.

TLP Map-based Portal Demo

- Access through website list server



TLP Map-based Portal

- Case study submission - How does it work?

Map-based Portal
- User submits new case study

Notification
- TLP managers receive notification

TLP Response
- TLP managers review user's submission and supplies TLP data collector spreadsheet

User's Response
- User fills out spreadsheet and returns case study packet to TLP managers

Map-based Portal
- TLP Managers review case study packet and upload into the Map-based portal

Summary

- Consolidates all available reference materials on a publicly accessible platform, supported by a map based database for collection of case studies and supporting data.
- The site will facilitate planning and design efforts, broaden the exchange of information between private and public sector.

How can I contribute to the site?

- Please share your case studies with us
  - Contribute with **factsheet** development
  - **Submit** your case studies through the **map portal**

  https://usace.maps.arcgis.com/apps/MapSeries/index.html?appid=a731fd32f85c44109b9269e7c8d9c68f
  - Fill out the **TLP Data Collector spreadsheet**
- TRs, TNs, JAs, models, construction methods and other relevant information that may be useful to practitioners are solicited.
- Sign up on our **List Server**

https://tlp.el.erdc.dren.mil/list-server-and-map-portal/

- Help us making these tools **better** - open for suggestions to improve our tools

Why should I contribute?

- Increase **visibility** of your projects
- Enhance **communication** across the community of practice
- **Learn** from other projects
- Increase **collaboration** and **contribution**
- **PROMOTE** successful TLP projects
- Help us **improve** our tools

TLP website statistics

April statistics	Visitors	Visits
Today	12	139
Yesterday	17	4,661
Last 7 days	149	5,368
Last 30 days	635	21,652
Last 365 days	11,202	958,597
Total	**11,875**	**1,010,179**

TLP website statistics

Rank	Flag	Country	Visitor Count
1		United States	8,524
2		Unknown	1,469
3		Netherlands	626
4		Singapore	341
5		Japan	294
6		China	121
7		Sweden	98
8		Germany	52
9		Canada	47
Rank	**Flag**	**Country**	**Visitor Count**

Please contact us!

- Website registration and contributions
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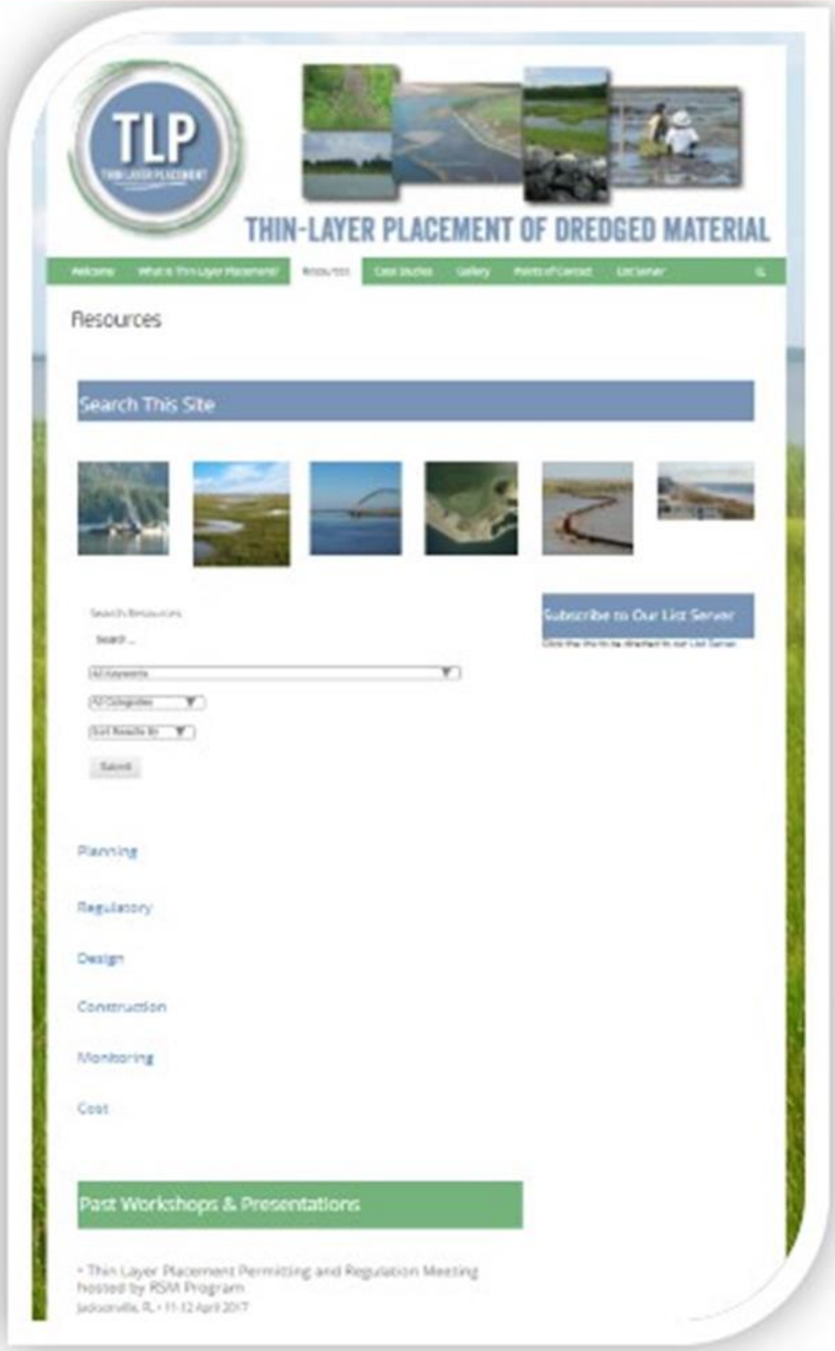
Questions

Supplemental Slides

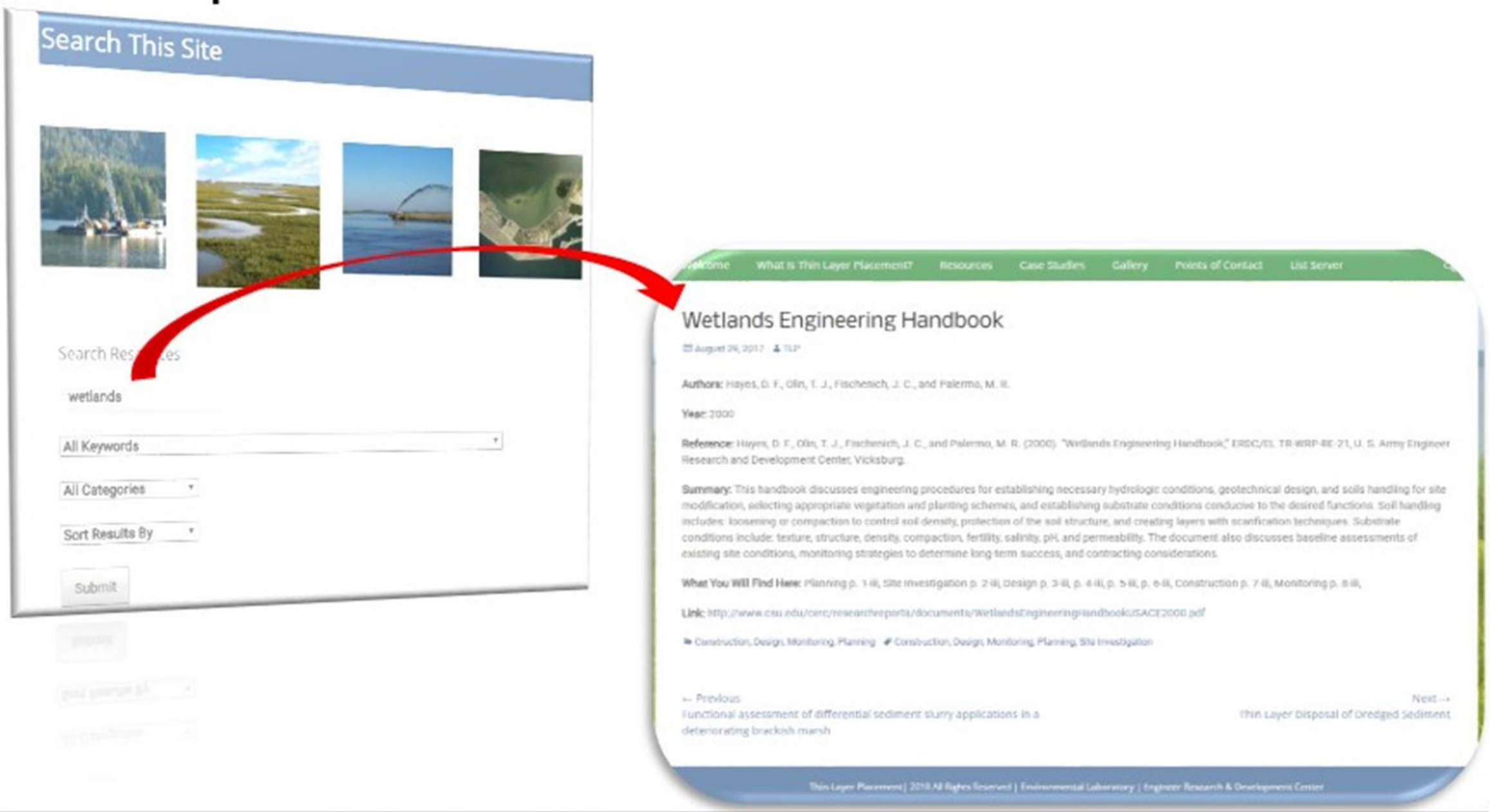
TLP Website - Resources

- ~240 resources (40% summarized)
- Resources summaries
  - How does it apply to TLP?
- Search feature
  - Keywords, literature category, sort results
- Quick category searches
  - Organized by different categories
- Past workshops and presentations



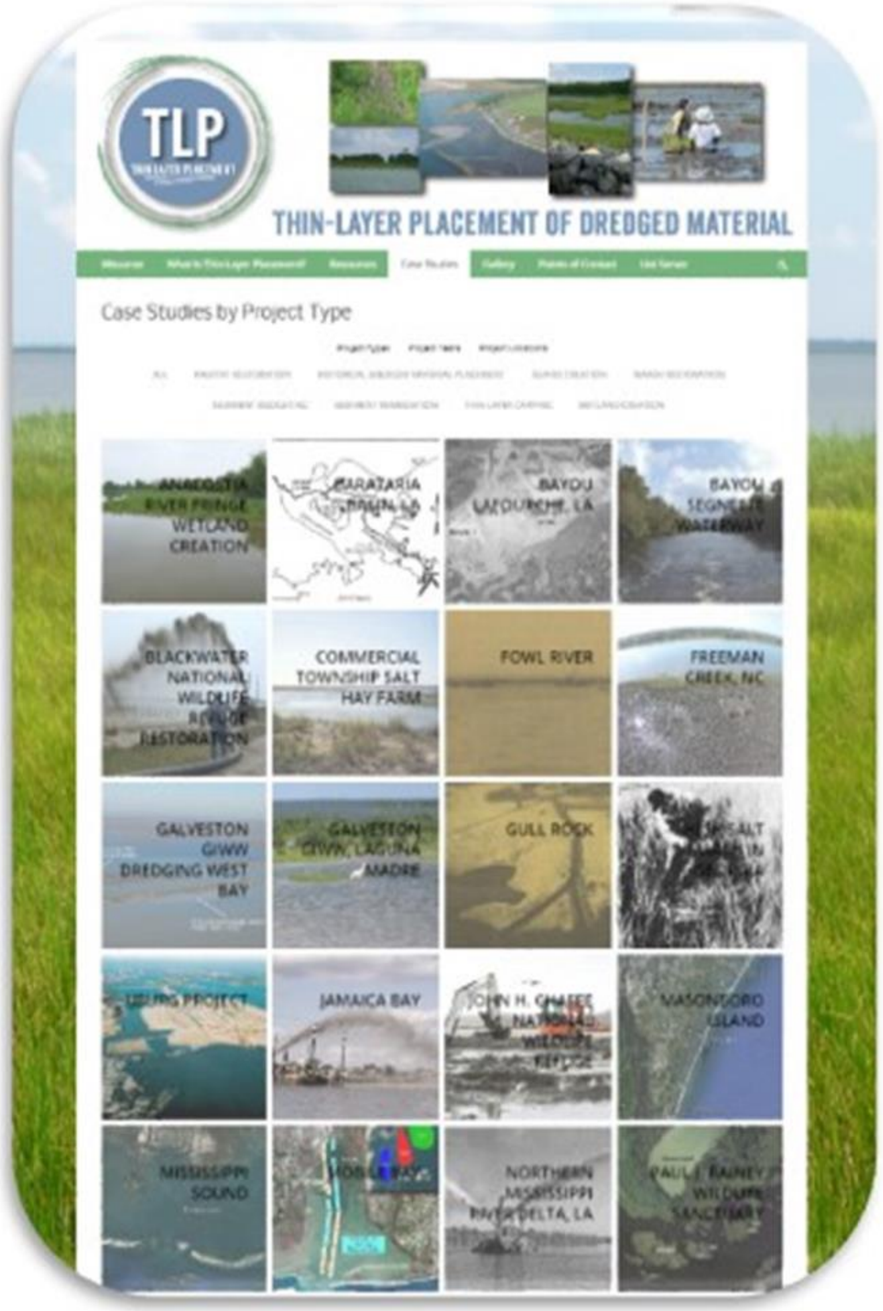
TLP Website - Resources

- Example:

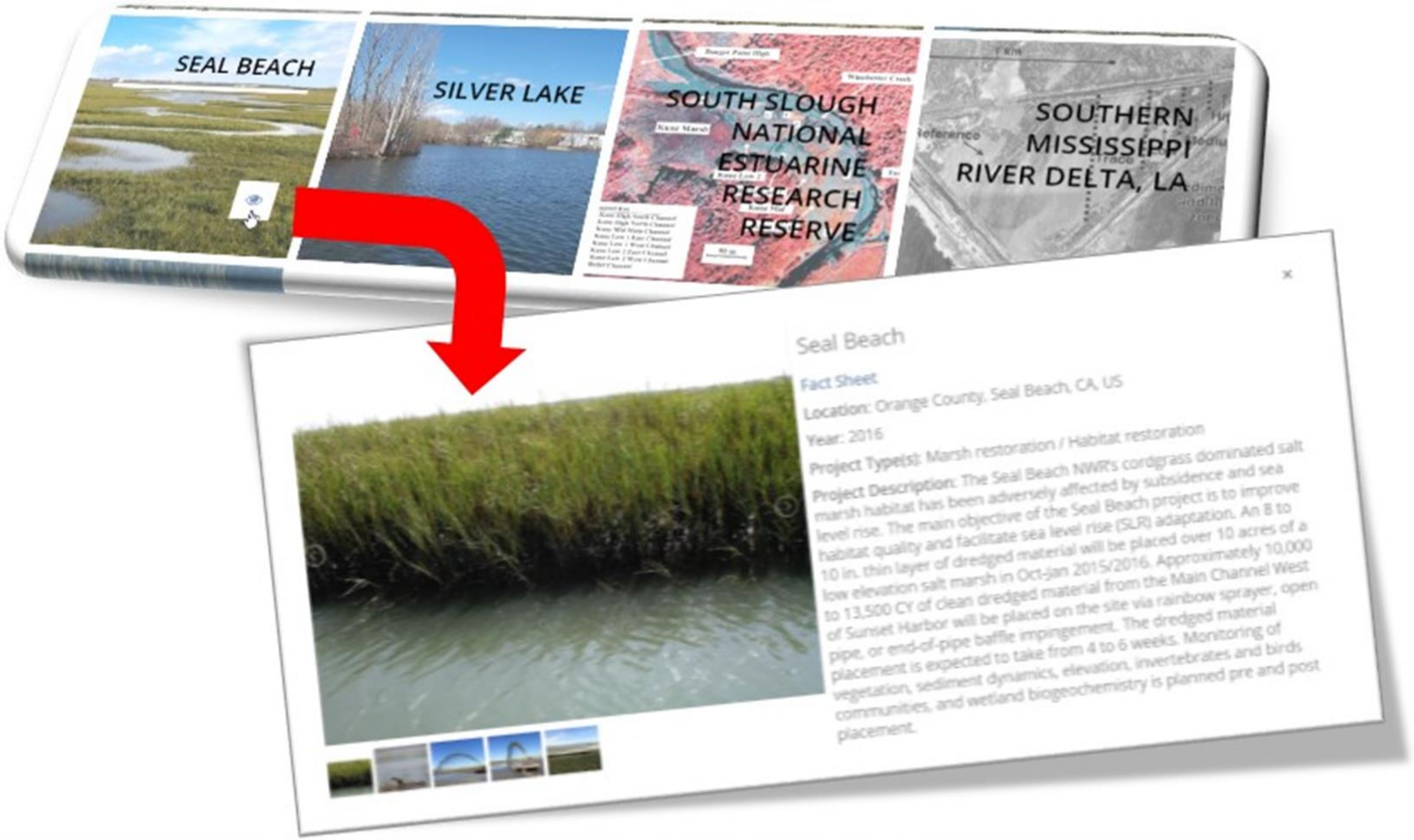


TLP Website – Case Studies

- Filter by project type, year and location
- ~28 case studies
- Factsheets
  - Background
  - Project Description
  - Findings
  - References
  - Add your agency/company logo and authorship
- Project Gallery



TLP Website – Case Studies



TLP Website – Case Studies

THIN-LAYER PLACEMENT FACTSHEET

Seal Beach National Wildlife Refuge

August 2016

Location: Seal Beach National Wildlife Refuge

Type: Habitat restoration

Area: 8 acres of TLP plus 8 acres of "buffer" in a 965-acre marsh site

City: Seal Beach

County: Orange

Main Agencies: USFWS, OC Parks, CA Dept. of Fish and Wildlife, California Coastal Conservancy, USACE, Naval Weapons Station Seal Beach, CA State Lands Commission, , UCLA, USGS, CSULB, Chapman University

State/Province: California

Country: United States

Taken from USFWS presentation

Background

The Seal Beach National Wildlife Refuge (NWR) is administered by the U.S. Fish and Wildlife Service as part of the National Wildlife Refuge System and is collocated within the boundaries of Naval Weapons Station Seal Beach. This 965-acre refuge is dominated by tidal salt marsh that supports the third largest breeding population of the federally endangered light-footed Ridgway's rail.

The thin-layer Salt Marsh Sediment Augmentation Pilot Project encompasses an area of 8 acres of low salt marsh in the center of the refuge. It is the first known application of TLP on the west coast of the US (Coastal Conservancy 2014). The site's cordgrass-dominated salt marsh habitat has been adversely affected by subsidence, sea level rise, and alteration of natural sediment inputs. The site is experiencing a relative sea level rise (SLR) of 6.23 mm/yr, a rate three times higher than that of similar southern California marshes not affected by subsidence. The main objective of the project is to improve habitat quality by Rising the marsh elevation and improving cordgrass heights, and to determine the effectiveness of TLP as a regional SLR adaptation strategy.

Project Description

A 10 inch (plus/minus and average of 2 inches) thin layer of dredged material was placed over 8 acres of low elevation salt marsh from Dec 2015 to Mar 2016. This site has the lowest mean elevation (1.34 m relative to NAVD88) and mean elevation relative to MHW (0.01 m relative to NAVD88) of 8 CA marshes where survey-grade elevations were conducted by USGS (Takekawa et al. 2013). Approximately 17,000 CY of clean dredged material from the Main Channel West of Sunset/Huntington Harbour was placed on the site via rainbow sprayer, and end-of-pipe baffle impingement. A hay bale barrier and a 6-acre vegetated buffer was maintained between the TLP site and adjacent channels in order to reduce

sediment runoff and avoid impacts to marine species including eelgrass beds and marine mammals. A control site within the refugewas established as part of the experimental design. The cost of project construction and long term biological and physical monitoring is $3,305,554, which was obtained from the following agencies: Orange County Parks, CA Dept. of Fish & Wildlife, CA Coastal Conservancy, USFWS, and USACE-ERDC. Monitoring is an essential component of this project since TLP has not been used in this area. Pre- and post-construction monitoring on the project site and control site includes assessing the plant and benthic inverlebrate communities and associated abiotic parameters (e.g., temperature, porewater salinity, redox); conducting monthly bird surveys and directed surveys for light-footed Ridgway's rail; measuring the thickness and bulk density of added sediment in the augmented area over time; assessing the morphology of tidal creeks following TLP; assessing net sediment accretion rates and the carbon accumulation rate; evaluating sediment flux; and measuring seasonal emissions of CO_2, CH_4 and N_2O. Pre-construction monitoring was completed in December 2015. Post-construction monitoring started immediately following dredged material placement and will continue over a time period of 5 years. Mitigation measures were incorporated as part of this project to address potential impacts associated with biological resources and water quality.

Findings

Please visit the Seal Beach NWR Thin-layer Salt Marsh Sediment Augmentation web site which is updated regularly with quarterly reports, annual reports, lessons learned documents, and time lapse videos of construction and recovery:https://www.fws.gov/refuge/seal_beach/what_we_do/resource_management/Sediment_Pilot_Project.html

References

California State Coastal Conservancy and U.S. Fish and Wildlife (2014) Memorandum of Agreement Between the State Coastal Conservancy, Orange County and the U.S. Fish and Wildlife Service Regarding the Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project.

California State Coastal Conservancy and U.S. Fish and Wildlife (2014) Final Mitigated Negative Declaration for the Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project (Orange County, California).

Coastal Conservancy (2014) Seal Beach National Wildlife Refuge Thin-Layer Salt Marsh Sediment Augmentation Pilot Project, Staff recommendation.

Takekawa, J.Y., K. M. Thorne, K. J. Buffington, C. M. Freeman, and G. Block. 2013. Downscaling climate change models to local site conditions: San Diego National Wildlife Refuge Complex. Unpubl. Data Summary Report, U.S. Geological Survey, Western Ecological Research Center, Vallejo, CA.

U.S. Department of the Interior Fish and Wildlife Service (2014) Finding of No Significant Impact (FONSI) for the Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project Orange County, California.

Points of Contact

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Or

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Main Agencies:

Funding for this project has been provided by:

U.S. Fish & Wildlife Service - 2015 Cooperative Recovery Initiative Grant
California Coastal Conservancy Grant
Orange County, OC Parks - Sediment and Application Contract
California Department of Fish and Wildlife - Greenhouse Gas Reduction Program
U.S. Army Corps of Engineers - Ecosystem Management & Restoration Research Program

Information on thin layer placement (TLP) case studies has been compiled as part of a DOTS/EWN project to provide a source of information, knowledge, and experience on TLP of sediment or dredged material in aquatic environments. The Thin Layer Placement Website and Map-Portal are funded by the US Army Engineer Research and Development Center (ERDC). POCs for the Thin Layer Placement Website and Map-Portal are:

- Damarys Acevedo-Mackey, PE
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- Trudy J. Estes, Ph.D., PE
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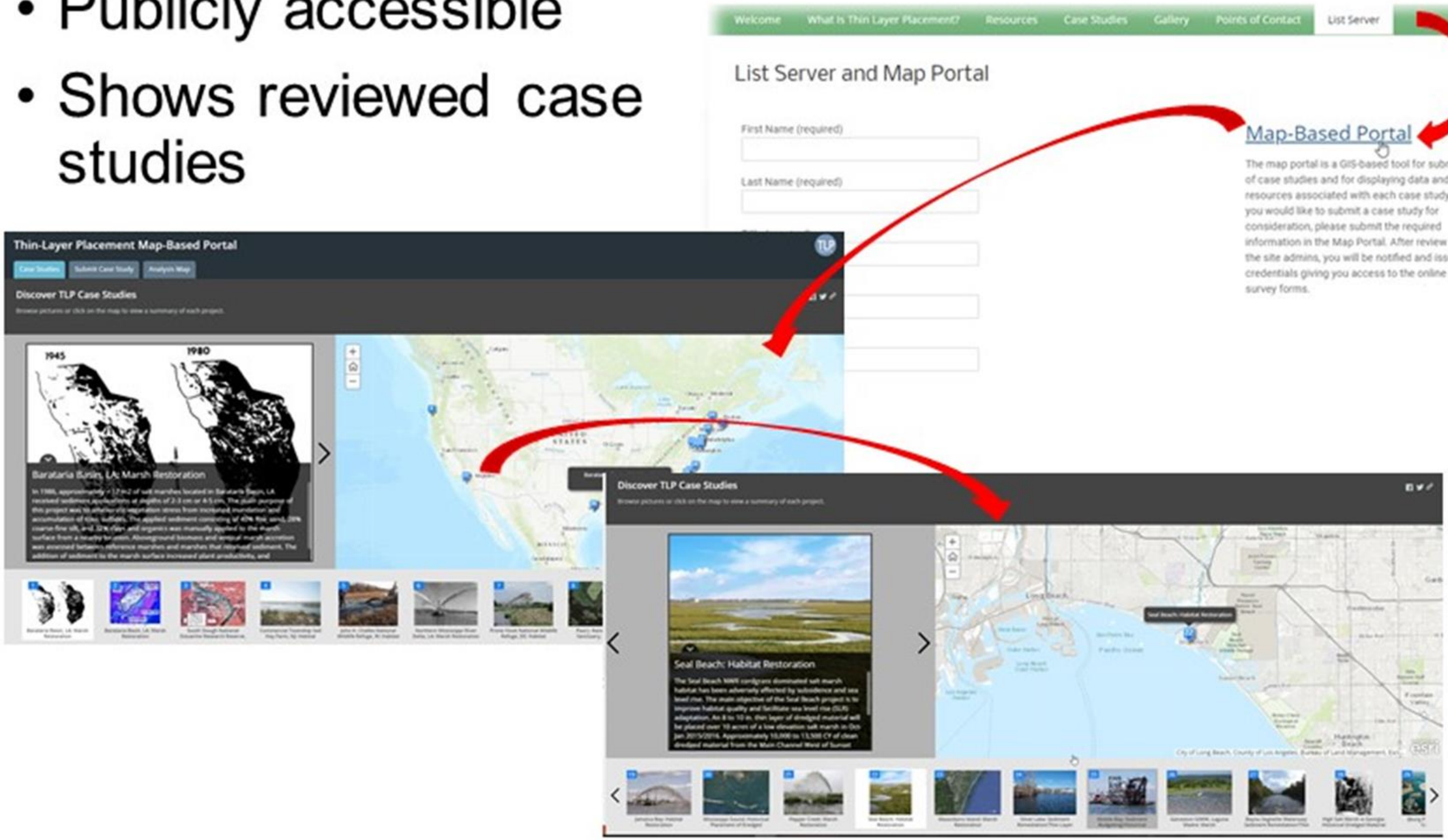
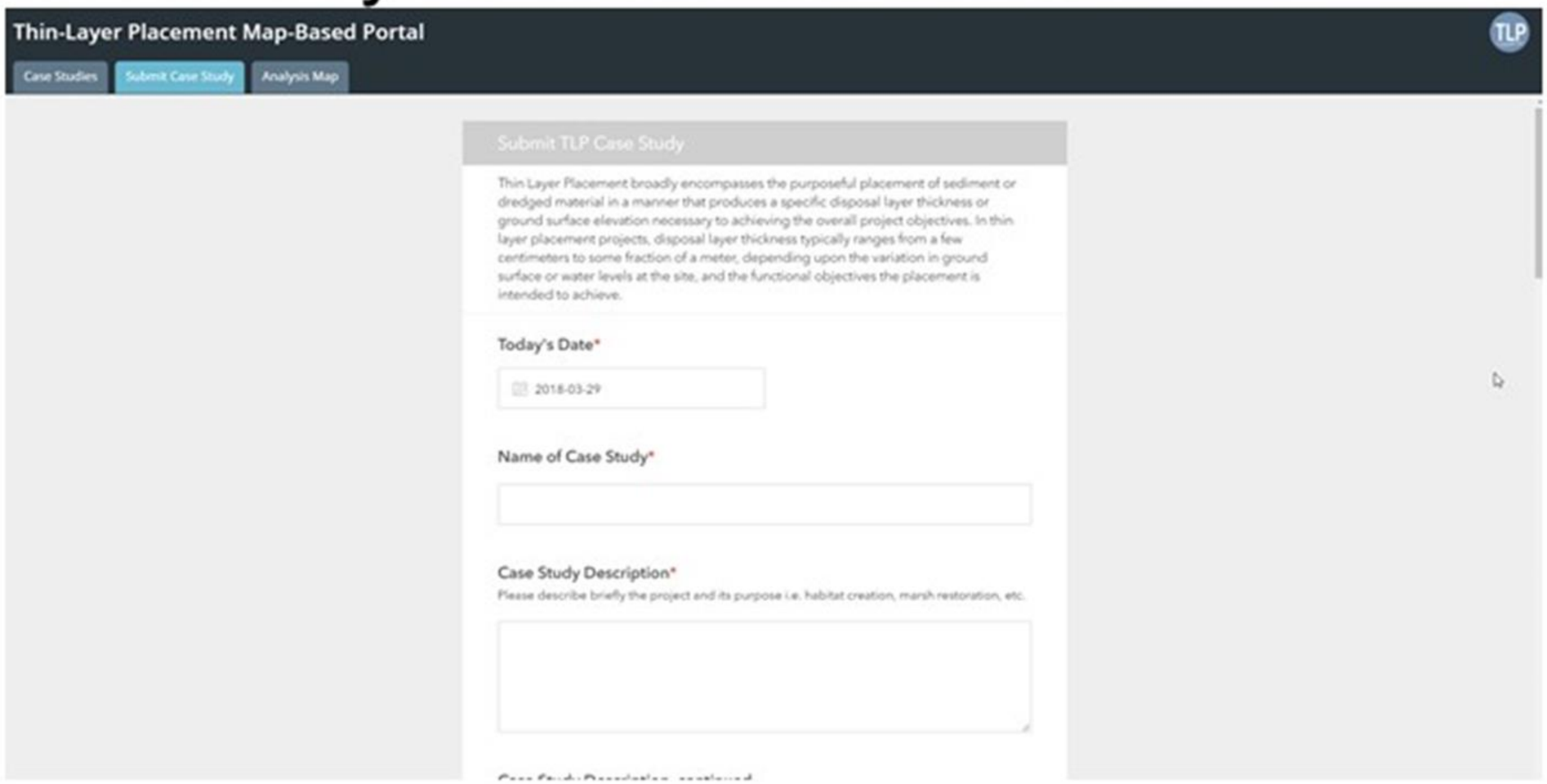
TLP Map-based Portal

- Publicly accessible
- Shows reviewed case studies



TLP Map-based Portal

- Any user can submit a new case study
- Case study submission form
- Please share your case studies with us!

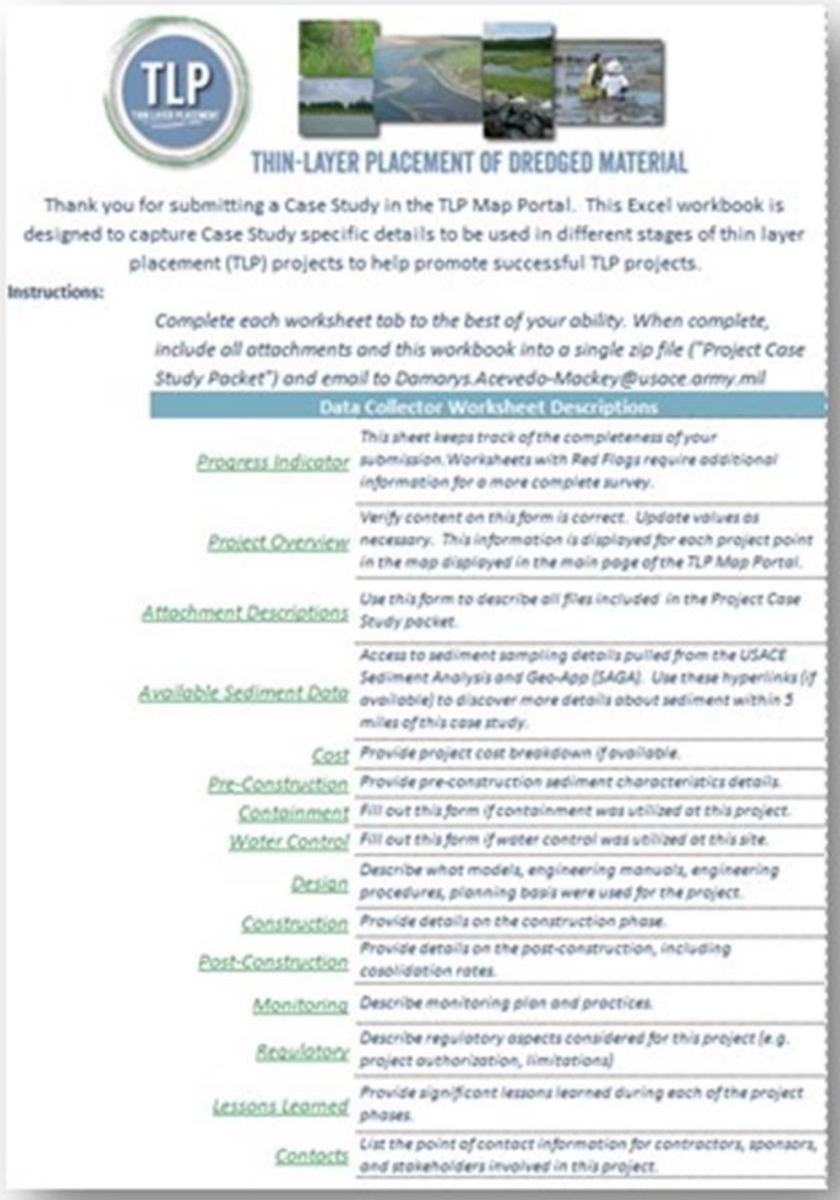


TLP Map-based Portal

- Comprehensive data collector – spreadsheet
- Shorter version

THIN-LAYER PLACEMENT OF DREDGED MATERIAL

	# of Fields	# Priority Fields	Fields Submitted
Project Overview	13	13	0
Attachment Description	4	0	1
Cost	13	1	0
Pre-Construction	66	30	0
Containment	5	5	0
Water Control	4	4	0
Design	4	4	0
Construction	23	23	0
Post-Construction	57	13	0
Monitoring	5	5	0
Regulatory	2	2	0
Lessons Learned	3	3	0
Contacts	5	0	0



THIN-LAYER PLACEMENT OF DREDGED MATERIAL

Thank you for submitting a Case Study in the TLP Map Portal. This Excel workbook is designed to capture Case Study specific details to be used in different stages of thin layer placement (TLP) projects to help promote successful TLP projects.

Instructions:

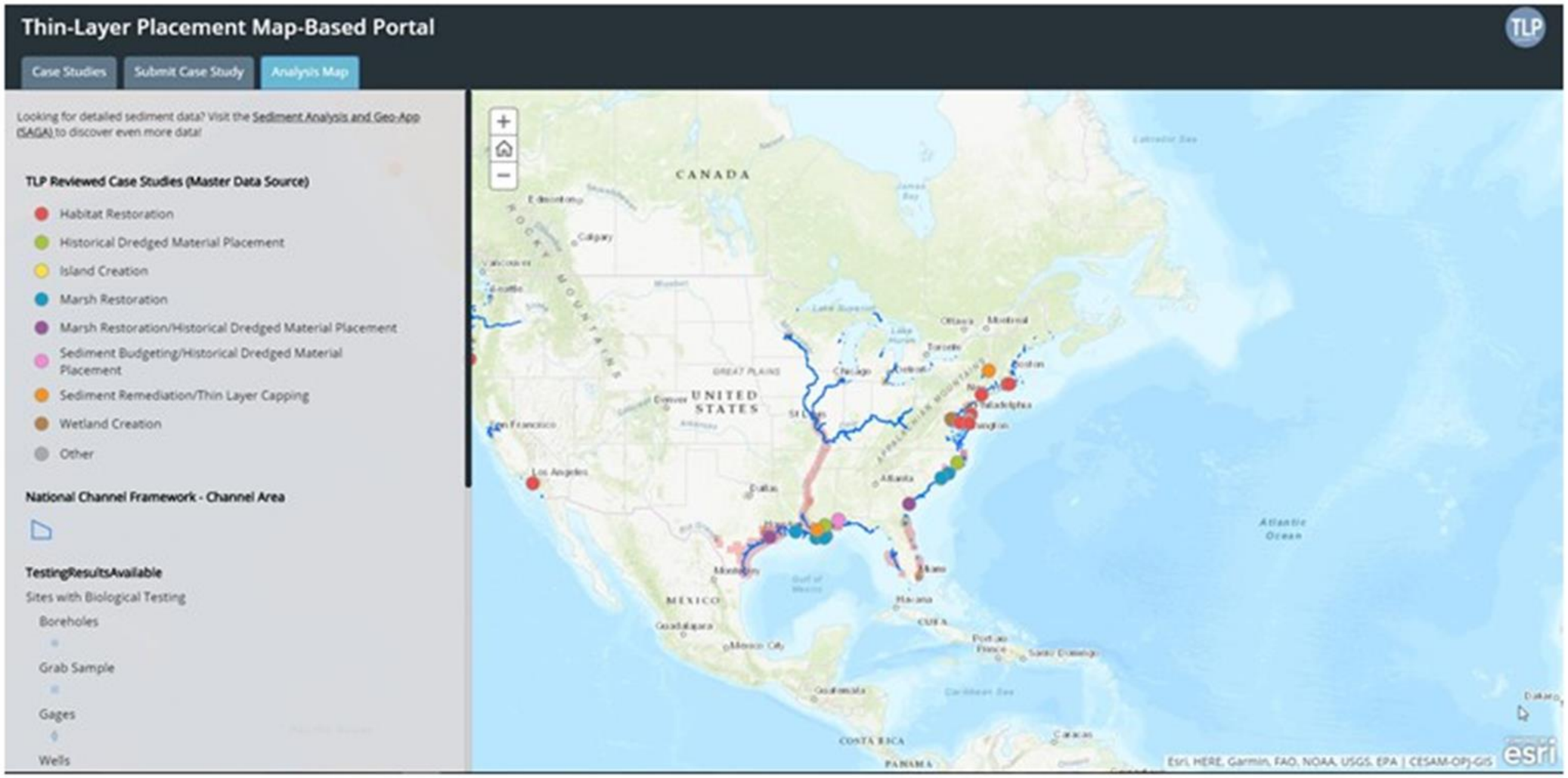
Complete each worksheet tab to the best of your ability. When complete, include all attachments and this workbook into a single zip file ("Project Case Study Packet") and email to Damarys.Acevedo-Mackey@usace.army.mil

Data Collector Worksheet Descriptions

Progress Indicator	*This sheet keeps track of the completeness of your submission. Worksheets with Red Flags require additional information for a more complete survey.*
Project Overview	*Verify content on this form is correct. Update values as necessary. This information is displayed for each project point in the map displayed in the main page of the TLP Map Portal.*
Attachment Descriptions	*Use this form to describe all files included in the Project Case Study packet.*
Available Sediment Data	*Access to sediment sampling details pulled from the USACE Sediment Analysis and Geo-App (SAGA). Use these hyperlinks (if available) to discover more details about sediment within 5 miles of this case study.*
Cost	*Provide project cost breakdown if available.*
Pre-Construction	*Provide pre-construction sediment characteristics details.*
Containment	*Fill out this form if containment was utilized at this project.*
Water Control	*Fill out this form if water control was utilized at this site.*
Design	*Describe what models, engineering manuals, engineering procedures, planning basis were used for the project.*
Construction	*Provide details on the construction phase.*
Post-Construction	*Provide details on the post-construction, including consolidation rates.*
Monitoring	*Describe monitoring plan and practices.*
Regulatory	*Describe regulatory aspects considered for this project (e.g. project authorization, limitations)*
Lessons Learned	*Provide significant lessons learned during each of the project phases.*
Contacts	*List the point of contact information for contractors, sponsors, and stakeholders involved in this project.*

TLP Map-based Portal

- Analysis map with multiple layers
  - Sediment Analysis and Geo-App - SAGA
  - National Channel Framework - NCF



TLP Map-based Portal

- Click on a case study
- View project detail
- Access case study packet
- Attachments
  - Photos
  - Figures
  - TR, JAs, TN
  - Links
  - TLP Data Collector