DREDGEFEST CALIFORNIA
June 2016

Brett Milligan
Dredge Research Collaborative
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Mission and Purpose
Furthering the study of the manipulation and design of sedimentary and hydrogeological processes by:

- facilitating interdisciplinary relationships between designers, scientists, academics, corporate practitioners, and government agencies
- consulting on and coordinating real and speculative design projects
- producing and publishing literature and exhibits for different public audiences related to environmental and cultural issues of anthropogenic sedimentary practices and locations
- informing the public about the significance, impact, and value of anthropogenic sedimentary manipulation; and organizing public events.
An encounter between government agencies, corporate practitioners, designers, theorists, industry experts, and the public.
DREDGEFEST NYC
Symposium Free and open to the public, held at Studio-X NYC (Columbia University)

Presenters included:

- Lisa Baron, Project Manager with the **U.S. Army Corps of Engineers**
- Andrew Genn, Senior Vice President of the **Ports & Transportation Department** at NYCEDC
- Douglas Pabst, Chief of the Dredging, Sediments, and Oceans Section (DSOS) with the **U.S. Environmental Protection Agency**
- Kate Orff, founder of SCAPE Landscape Architecture
- Dave Avrin, Chief of Resources at Gateway National Recreation Area for the **National Parks Service**.
- Catherine Seavitt Nordenson, Principal of Catherine Seavitt Studio and Assistant Professor of Landscape Architecture at City College of New York

Total of 300 participants.

“...an inspiring forum that illuminated the practices of maintaining, expanding and protecting our maritime resources...” - Hans Hesselin, Gowanus Canal Conservancy

“...a diverse meeting of well-informed and passionate minds.” - Andrea Parker, Landscape Architect, Starr Whitehouse
DredgeFest Louisiana

January 11th – 17th 2014
Dredge Research Collaborative
From 1931 to 2010, the Mississippi Delta lost roughly a quarter of its landmass.
Anthropocene Geography
Eugene Turner, Distinguished Research Master and Shell Endowed Chair in Oceanography and Wetlands Studies, Louisiana State University

Constructing the Mississippi
Edward Creef, Environmental Operations Manager, US Army Corps of Engineers, New Orleans District
Paul Aucoin, Executive Director, Port of South Louisiana
Travis K. Bost, architectural designer and independent researcher (presenting)
Kees Lokman, Assistant Professor of Landscape Architecture, Washington University in St. Louis
Richard Hindle, Assistant Professor of Landscape Architecture, LSU
Justine Holzman, Lecturer in Landscape Architecture, LSU
Kees Lokman, Assistant Professor of Landscape Architecture, Washington University in St. Louis

Flow, Process, and Form
Clinton S. Willson, Professor, Department of Civil & Environmental Engineering, LSU
Ehab Meselhe, Director of Natural Systems Modeling & Monitoring, the Water Institute of the Gulf
Robert Twilley, Professor and Executive Director, Louisiana Sea Grant

4: Choreographing Sediments
Jeff Carney, Director, Coastal Sustainability Studio at Louisiana State University
Kyle Graham, Deputy Director, Coastal Protection and Restoration Authority
Derek Hoeferlin, Assistant Professor of Architecture, Washington University
Clinton S. Willson, Professor, Department of Civil & Environmental Engineering, Louisiana State University
DREDGEFEST LOUISIANA Symposium

*Landscapes of Dredge*
Matthew Coolidge, Founder and Director, Center for Land Use Interpretation
Susan Testroet-Bergeron, Public Outreach Coordinator, Coastal Wetlands Planning, Protection and Restoration Act
Charlie Hailey, Associate Professor of Architecture, University of Florida

*Instruments of Public Participation*
Windell Curole, General Manager, South LaFourche Levee District
Becki Chall, Development Manager, Public Lab
Scott Eustis, Coastal Wetland Specialist, Gulf Restoration Network and community organizer, Public Lab

*Devices, Machines, and the Future of Dredge*
Karen Westphal, National Audubon Society Louisiana Coastal Initiative and the Paul J Rainey Wildlife Refuge
Sarah Cowles, Assistant Professor of Landscape Architecture, The Ohio State University
Stephen Hall, Associate Professor of Biological and Agricultural Engineering, Louisiana State University
Bradley Cantrell, Associate Professor and Director of the Robert Reich School of Landscape Architecture, Louisiana State University
DredgeFest Great Lakes is a symposium, field expedition, and speculative design workshop about the human manipulation of sediments. It is an encounter between government agencies, designers, theorists, academics, corporate practitioners, industry experts, students, and the public. DredgeFest Great Lakes is run by the Dredge Research Collaborative and hosted by the University of Minnesota. This is a great opportunity to engage with others as well as obtain Continuing Education Credits from AIA / ASLA for participation at the event.

Find out more at: dredgeresearchcollaborative.org/dredgefest/

Space is limited. Tickets are available now at: http://dfgl.brownapartickets.com/

DredgeFest  Great Lakes

SYMPOSIUM // Friday, Aug 14 - Saturday August 15, University of Minnesota, Minneapolis

The symposium at DredgeFest Great Lakes will bring together a broad mix of disciplines, corporations, public agencies and organizations in live public conversation and will investigate the conference theme of “Shifting Baselines” across five topics: Freshwater Basins, Chartographing Sediments, Landscapes of Dredge, New Economies, and Participation and Engagement.

WORKSHOP // Sunday August 16 - Friday August 21, University of Minnesota, Minneapolis

DredgeFest offers fast-paced and speculative small-group design workshops on the theme of dredge futures: future scenescapes related to the dredge cycle and will be led by local and international designers, including Mark Smout (Smout Allen/Bartlelli Bob, UK), Kristi Cheramie (Ohio State University, US), Matthew Spremulli (University of Waterloo, CA/formerly with Lalonde Office), and Fiona Byrne (University of Toronto, CA/coverning Kelty fellow at the Harvard GSD).

TOUR // Monday, August 17th, Duluth

A four hour tour of dredge landscapes in Duluth will be led by the Dredge Research Collaborative, the Duluth Port Authority, and the City of Duluth. The tour will take place via bus and boat and will focus on dredge use and habitat creation.

dredgeresearchcollaborative.org
DREDGEFEST SPONSORS

Great Lakes Dredge and Dock
Bay West
City of Duluth
Duluth Seaway Port Authority
University of Minnesota
Landscape Architecture Magazine
Bush Foundation
AIA Minnesota
AIA Northern Minnesota
Robert Reich School of Landscape Architecture at Louisiana State University
The Coastal Sustainability Studio at Louisiana State University
Arcadis
Tencate
UC Berkeley
Columbia University
Bill Murphy (e4sciences): Geophysical Imaging for Sustainable Engineering – NY Harbor Deepening
FIELD EXPEDITIONS
NEW YORK HARBOR TOUR

Lisa Baron, Project Manager with the U.S. Army Corps of Engineers

Dave Avrin, Chief of Resources at Gateway National Recreation Area for the National Parks Service
FIELD EXPEDITIONS
LANDSCAPES (Alexander Robinson/Richard Hindle)
ADAPTIVE DEVICES (Bradley Cantrell/Justine Holzman)
Exploring near-future technological change—including sensing, monitoring, automation, and robotics—to reshape human influences within sedimentary processes.
Figure 6  Suspended-Sediment Discharge

c. 1700
- Arkansas River
- Red River
- Ohio R.

1980-1990
- Burlington
- St. Louis
- Ohio River
- Missouri R.
- Arkansas R.
- Red River

Gulf of Mexico

Suspended-sediment discharge, in millions of metric tons per year
Annual Sediment Trapped Behind Dams

- Fort Peck Lake + Dam: 21,833,000 Mt
- Lake Sakakawea: 31,947,000 Mt
- Lake Oahe: 24,423,000 Mt
- Lake Sakakawea: 6,537,000 Mt
- Lake Francis Case: 22,699,000 Mt
- Lake Fort Union: 3,207,000 Mt
- Annual Mississippi Dredged Sediment: 29,700,000 Mt

42% Head of Passes to E. Jetty
Sediment Transport in the Missouri River Basin

- Pre-1800: 56 Mt/yr
- 121 Mt/yr
- 63 Mt/yr
- 81 Mt/yr

Missouri River Basin

- 284 Mt/yr
- 1362 Mt Fort Randall
- 1927 Mt Garrison
- 136 Mt Oahe
- 1266 Mt Fort Peck
- 1135 Mt Big Bend

Sediment Trapped Behind Missouri River Dams

- 144 Mt/yr
- 85 Mt/yr
- 57 Mt/yr

Deltaic Plain

Atchafalaya Distributary

Ohio River Basin

- 40 Mt/yr

Upper Mississippi

- 21 Mt/yr

Arkansas/Red River/Lower Mississippi

- 27 Mt/yr
## Sediment Harvesting

<table>
<thead>
<tr>
<th>Method</th>
<th>Dredge + Suspend Reservoir</th>
<th>Dredge + Barge</th>
<th>Sediment Diversion Upper Watershed</th>
<th>Dam Removal</th>
<th>Dredge + Suspend Bed Lower Watershed</th>
<th>Sediment Diversion Delta</th>
<th>Rewilding Lower Missouri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Cost (per MT)</td>
<td>$13M/MT</td>
<td>$31M/MT</td>
<td>$5M/MT</td>
<td>$10M/MT</td>
<td>$13M/MT</td>
<td>$13M/MT</td>
<td>$1.14M/MT</td>
</tr>
<tr>
<td>Loss Potential</td>
<td>Very High</td>
<td>Very Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Very High</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Total Sediment Yield 35 Years (MT)</td>
<td>15,750 MT</td>
<td>15,750 MT</td>
<td>3,150 MT</td>
<td>1,260 MT</td>
<td>510 MT</td>
<td>8 MT</td>
<td>175 MT</td>
</tr>
<tr>
<td>Potential Annual Sed. Delivery (% of Current)</td>
<td>300%</td>
<td>300%</td>
<td>60%</td>
<td>24%</td>
<td>22%</td>
<td>.2%</td>
<td>3%</td>
</tr>
<tr>
<td>Potential Cost Over 35 Years</td>
<td>$204B</td>
<td>$488B</td>
<td>$318M</td>
<td>$6B</td>
<td>$6.6B</td>
<td>$106M</td>
<td>$200M</td>
</tr>
</tbody>
</table>

**Goal:**
600 MT/yr x 35 yrs = 21 BILLION TONS
CARTOGRAPHY AND MAPPING

Bay-delta dredging operations: 2000-2013
From 1931 to 2010, the Mississippi Delta lost roughly a quarter of its landmass.
YELLOW BAR
HASSOCK
RECLAIMED
DREDGE + SALT
MARSH CREATION
USACE Maintained Channels + Dredging, 2009-2013
Lake Michigan
DREDGEFEST
CALIFORNIA
2016
PULSES, SINKS AND SHORTFALLS

History of sediment supply in the Bay-Delta

Ganju et al. (2008)
Projected sea level rise – 150cm
“Innovative thinking about sediment sources, transport and delivery to the Estuary is now an urgent priority. Re-storing processes of sediment movement in the watershed and creating methods to deliver sediment (such as reusing channel dredged material) are both valuable approaches for restoring this fundamental physical driver. Like fresh water, sediment is a precious resource that is essential for keeping the Estuary healthy.”
BAY-DELTA DREDGING OPERATIONS: 2000-2013
CHOREOGRAPHING SEDIMENTARY FUTURES

Integrating industrial entities, governmental agencies, local stakeholders and the public, welded together through design and transdisciplinary collaborations, generates the possibility to forge new futures in sediment management that are inspired, generative and equitable.
HOW TO PARTICIPATE IN DREDGEFEST CALIFORNIA?

Research Partnerships
- Pre-event scenario planning
  - Identifying key drivers and questions to be explored
- Design workshops
- Event speakers

Public Outreach
- Field tours
- Exhibition

Event Sponsorship
- Public tours/symposium
- Design workshops
- Post event exhibition and report
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