A Guide to Obtaining Pertinent Historical and Cultural Information for the Development of an Effective Dredged Material Management Plan

Image: DNREC (2022)

WEDA Eastern Chapter Meeting

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October 16, 2025

EA Engineering, Science, and Technology, Inc., PBC

Overview

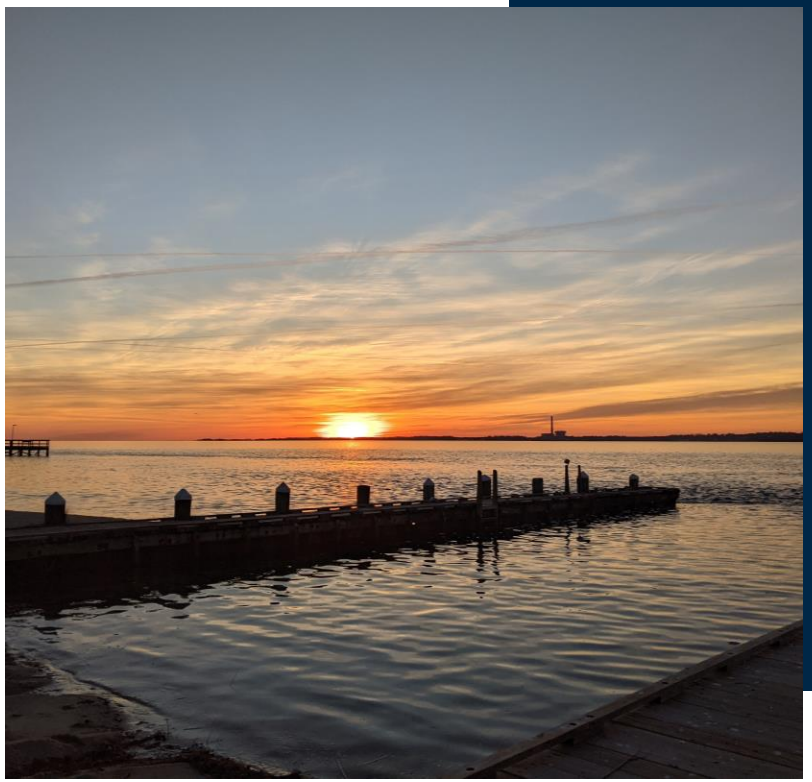
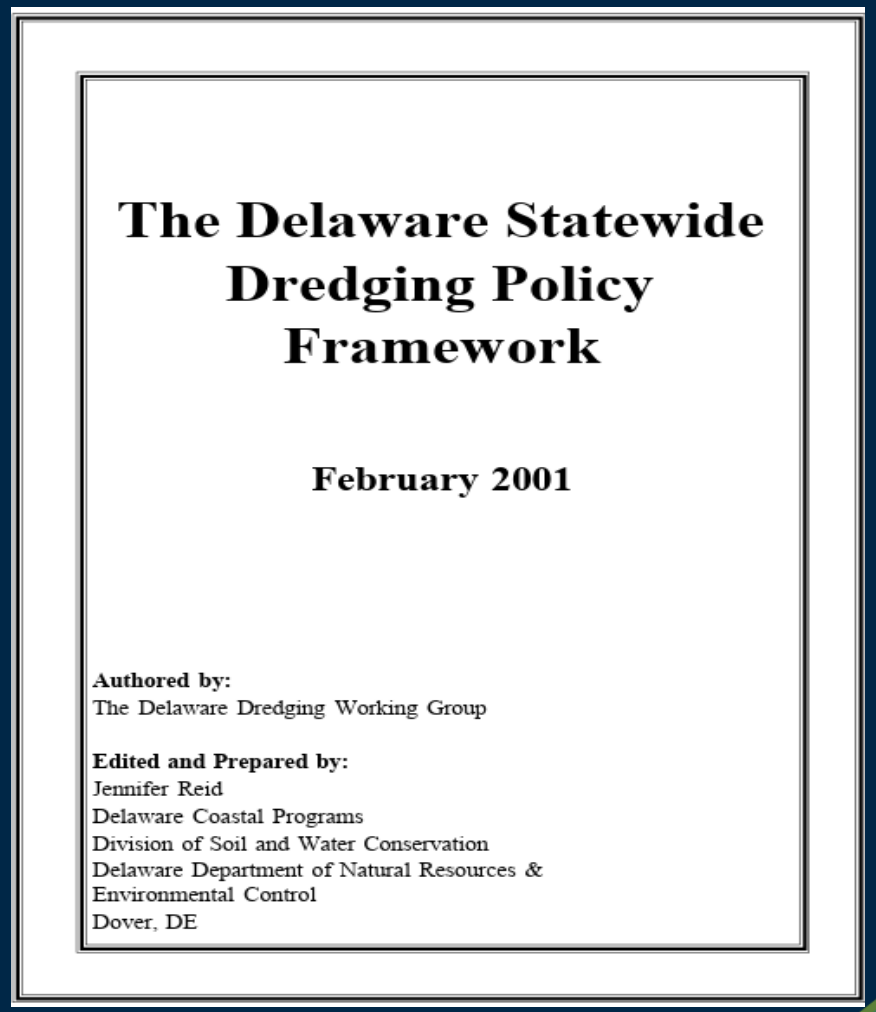


Image: EA (2021)

- What is a DMMP?
- Dredging in Delaware
- Phases for Delaware DMMP
- Phase 1 Process
- Data Organization
- Navigable Geodatabase
- Outcomes
- Lessons Learned
- Look Ahead

What is a DMMP?

- Dredged Material Management Plan (DMMP):
  - Address dredging needs, disposal capabilities, placement areas capacities within a defined geographic area
  - Outlines environmental compliance requirements, potential for beneficial use of dredged material, and identification/evaluation of beneficial use sites over a specified timeframe



The Delaware Statewide Dredging Policy Framework

February 2001

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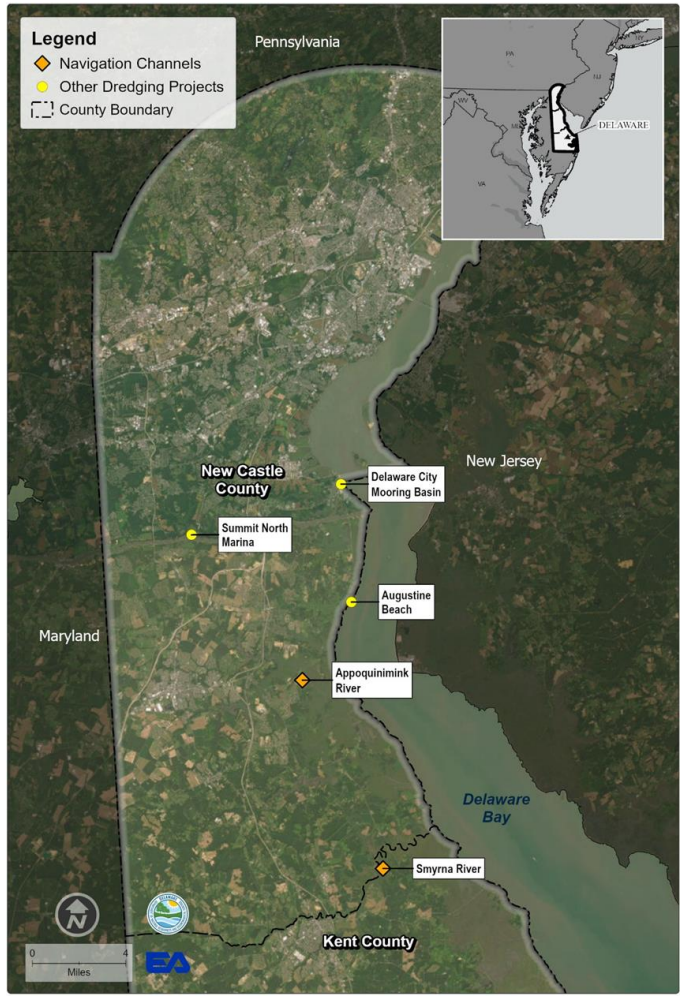
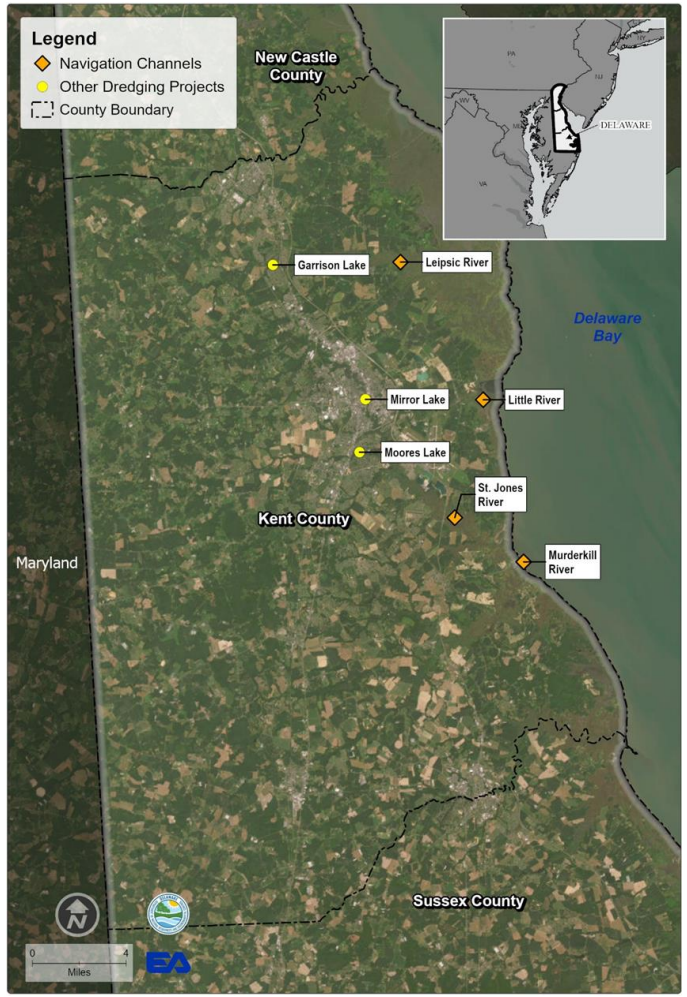
Dover, DE

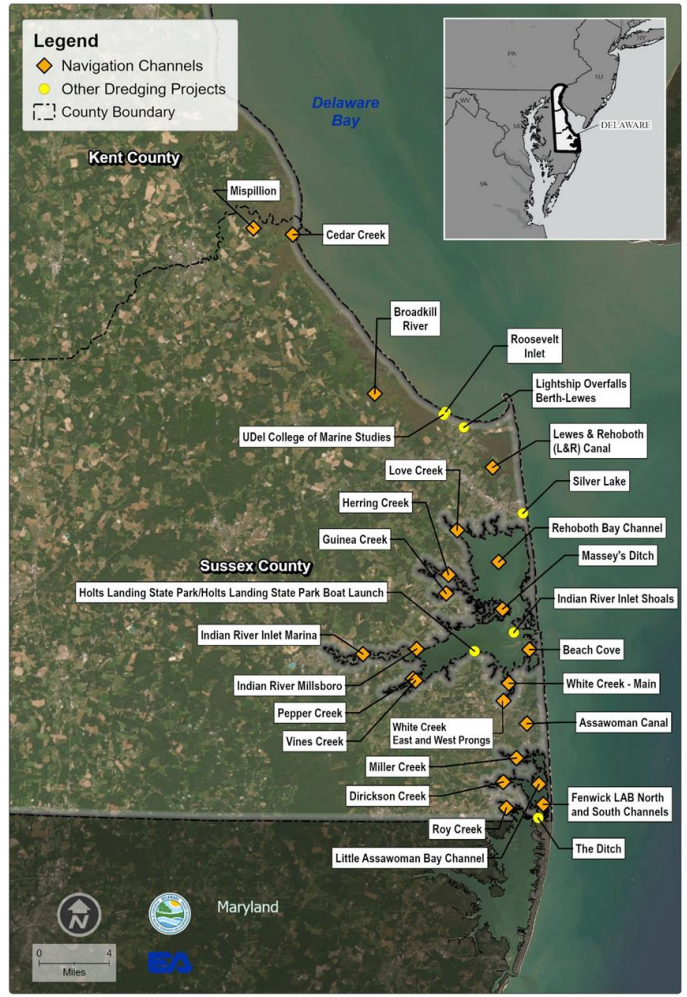
Dredging in Delaware

- Dredging maintained by DNREC SWMS
  - Management Office created in 2015 specifically for dredging activities
  - Part of the Division of Watershed Stewardship
- Delaware is responsible for 40 navigable waterways
  - 27 navigable channels
    - 11 maintained by USACE Philadelphia District
  - 13 other dredging projects (lakes, boat ramps, etc.)

Delaware's Navigable Waterways







Phases for DMMP Writing Process

Phase 1

- Review and Synthesis of Existing Data

Phase 2

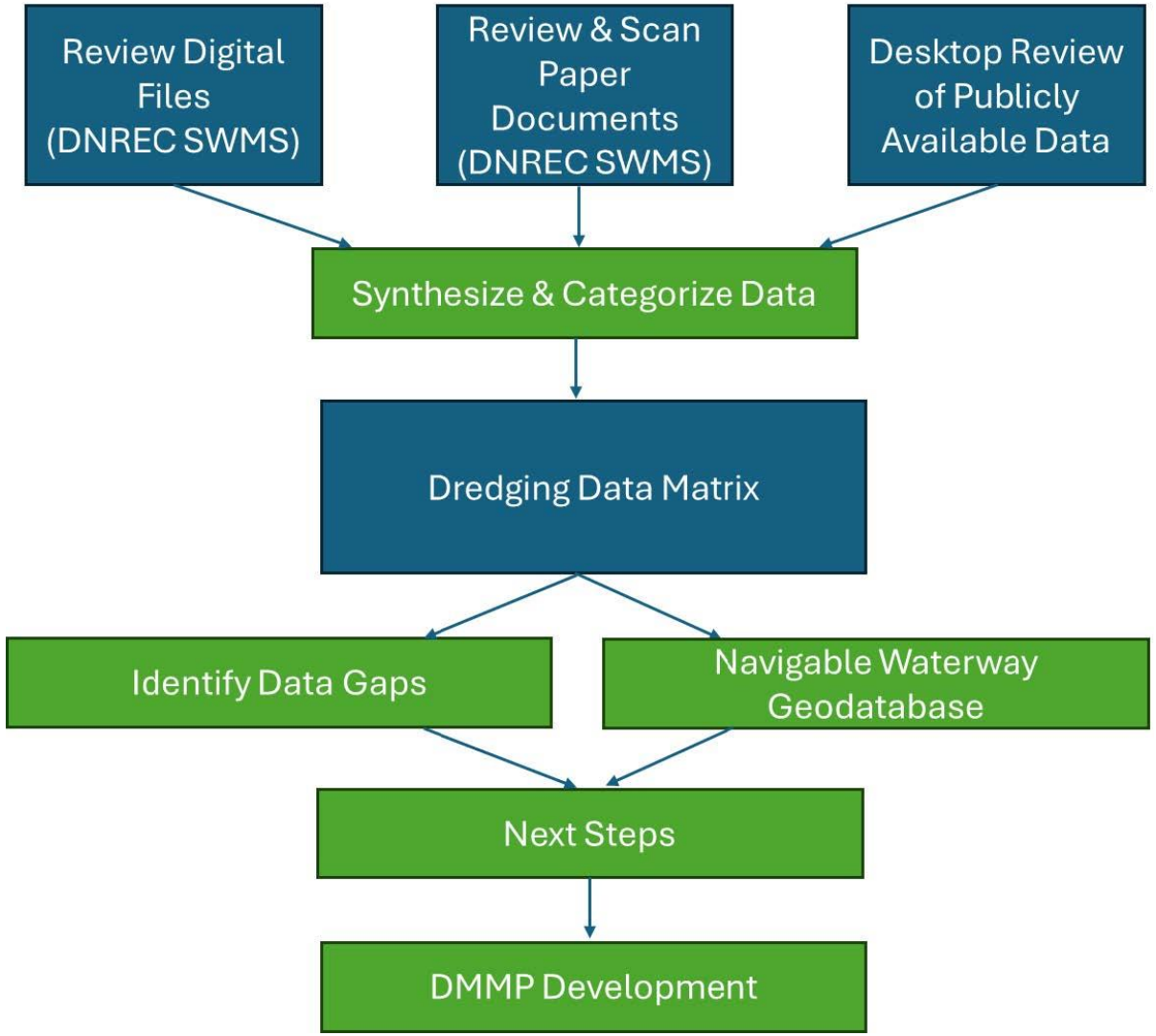
- Field Data Collection and Agency Coordination

Phase 3

- Feasibility Study and DMMP Development

Phase 1 Process

Data Review/ Organization



Data Review/Organization

- General Information
- Most Recent Dredging Data
- Historical Dredging Data
- Sediment Characterization Data
- Time of Year Restrictions/Species of Concern
- Placement Options (Upland and Beneficial Use)
- Real Estate Easements (Placement or Access)
- Cultural Resources (SHPO)
- Historic Districts

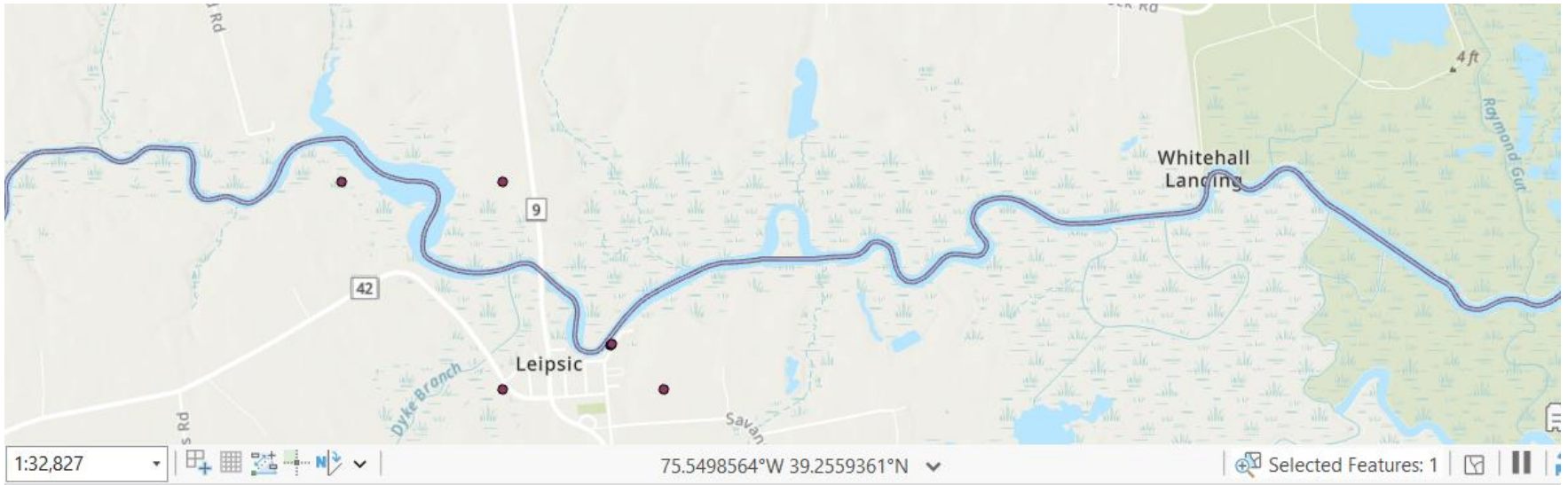
Data Organization: Data Matrix

General Channel Information	Most Recent and Historical Dredging Data	Sediment Characterization	Time of Year Restrictions	Placement Options	Real Estate Easements	Cultural Resources	Historic Districts
• Channel Location (County and Water Body) • Authorization Status • Authorization Year • Authorized Channel Dimensions • Maintenance Status • Deepening and Widening (Dimensions and Year) • Most Recent Survey • Controlling Depth • Shoaling Rate	• Year(s) Dredged • Dredging Rationale • Cubic Yardage • Partial/Full Dredging • Dredging Contractor • Dredge Type • Cost Per Cubic Yard • Total Contract Cost	• Sample Year • Precent Gravel/Sand/Silt /Clay • Analytical Results (Y/N) • Exceeded Contaminants • Historical Sample Years and Data	• Restriction (Y/N) • Identified Species • Dates	• Upland or Beneficial Use • Site Acreage • Recurring Site (Y/N) • Cubic Yardage Beneficially Used • Distance from Channel (Miles) • Ownership	• Easement Identified • Owner • Easement End Date	• Cultural Resource Survey (CSR) Number • Parcel ID Number • Property Name • Property Type • Status and Secondary Status • Historic Name • Coordinates	• Historic District Name

Data Organization: Data Matrix

Placement Site Name	Channel Name	Category	Upland Placement	Upland Placement Acreage	Recurring Upland Location	Beneficial Use Location	Recurring Beneficial Use Location	Cubic Yardage Beneficially Used	Placement Site Distance from Channel (mi.)	Notes
CDF #2	Assawoman Canal	Navigational Channel	Yes	7 acres	--	No	--	--	0.38	--
Muddy Neck Thin Layer Placement Complex Cell 1			No	16	--	Yes	Yes	--	0.2	State-owned, 2024 dredging
Muddy Neck Thin Layer Placement Complex Cell 2			No	42	--	Yes	Yes	--	0.3	State-owned with a privately owned parcel within its extents, 2024 dredging
Muddy Neck Thin Layer Placement Complex Cell 3			No	53	--	Yes	Yes	--	0.6	State-owned, 2024 dredging
Augustine Beach - Beach Renourishment	Augustine Beach	Other Dredging Project	No	--	--	Yes	Yes	1,500	0.05	--
Broadkill River Subaqueous Placement	Broadkill River	Navigational Channel	No	--	--	Yes	No	--	--	68k CY placed (1987 dredging event), ~7 acres in size
Slaughter Beach Marsh Creation	Cedar Creek	Navigational Channel	No	--	--	Yes	Yes	--	--	Unknown acreage, 32,000 CY placed (1980 dredging event)
CDF A	Delaware City Mooring Basin	Other Dredging Project	Yes	10	Yes	No	--	--	0.85	--
Winding Creek Village - Covered by Developement	Guinea Creek	Navigational Channel	Yes	--	--	--	--	--	--	--
Unknown Cleared Upland Location	Herring Creek	Navigational Channel	Yes	--	--	--	--	--	--	Cleared land for upland site, 1978 dredging event
Unknown Upland Location			Yes	--	--	--	--	--	--	Most likely covered by developments, 1981 dredging event
Holts Landing State Park Beach Nourishment	Holts Landing State Park (Boat Ramp)	Other Dredging Project	No	--	--	Yes	--	3,780	0.23	Location just west of boat ramp (used existing rocks for protection)
Indian River Upland Placement Site	Indian River (Inlet Marina)	Navigational Channel	Yes	--	--	No	--	--	0.25	Unknown acreage and CY placed
Bottom Hill Drain			No	--	--	Yes	Yes	15,000	--	--
Carlisle Drive CDF	Indian River (Millsboro)	Navigational Channel	Yes	5	Yes	No	--	--	2	--
Wetland Restoration and TLP			No	6	--	Yes	--	32,000	0.2	2024 dredging event, owned by Commissioners of Millsboro (c/o Jamie Burk and Sheldon Hudson)
Indian River Inlet Shoal - Upland Placement	Indian River Inlet Shoals	Other Dredging Project	Yes	5	Yes	No	--	--	1.5	--
Indian River Inlet Shoal - Beach Nourishment			No	--	Yes	Yes	Yes	--	2.3	--
Upland Placement Site	Lightship Overfalls Berth - Lewes	Other Dredging Project	Yes	6	--	--	--	--	0.4	--
Little River Wildlife Area	Little River	Navigational Channel	No	110	--	Yes	No	79,000	0.5	--
Helen S. Simpler (Shockley Heirs)	Love Creek	Navigational Channel	Yes	1.9	--	No	No	--	--	Unknown location, acreage, CY placed
John G. Townsend Jr. Inc.			Yes	5.5	--	No	No	--	--	Unknown location, acreage, CY placed
Harry B. Ash			Yes	7	--	No	No	--	--	Unknown location, acreage, CY placed
State of Delaware			Yes	20	--	No	No	--	--	Unknown location, acreage, CY placed
Atlantic Ocean Beach - Delaware Seashore State Park (Northside Beach)	Massey's Ditch	Navigational Channel	No	0.2	--	Yes	Yes	140,000	3	--
Middle Island			No	0.2	--	Yes	--	--	24.7	Designed but never constructed
Bottom Hill Beach Renourishment			No	0.2	--	Yes	--	--	--	--
Isaac Branch LLC property	Moores Lake	Other Dredging Project	Yes	10	--	No	--	--	--	--
South Bowers Beach Nourishment	Murderkill River	Navigational Channel	No	--	--	Yes	Yes	23,905	0.71	Unknown acreage
Offshore Placement			No	--	--	Yes	Yes	27,661	0.71	Unknown acreage
South Bowers Beach Nourishment			No	--	--	Yes	Yes	34,000	--	Unknown acreage
CDF A	Pepper Creek	Navigational Channel	Yes	5	Yes	No	--	--	--	--
CDF B			Yes	6.5	--	No	--	--	--	--
Piney Point Marsh			No	--	--	Yes	--	10,000	--	21 acres; Dredged material placed with hydraulic nozzle.
Subaqueous Trench Filling	Rehoboth Bay Channel	Navigation Channel	No	--	--	Yes	No	166,035	1	--
Lewes Beach	Roosevelt Inlet	Other Dredging Project	--	--	--	--	--	--	--	Used for nearshore federal designated beach nourishment

Navigable Channel Geodatabase



SHPO Sites

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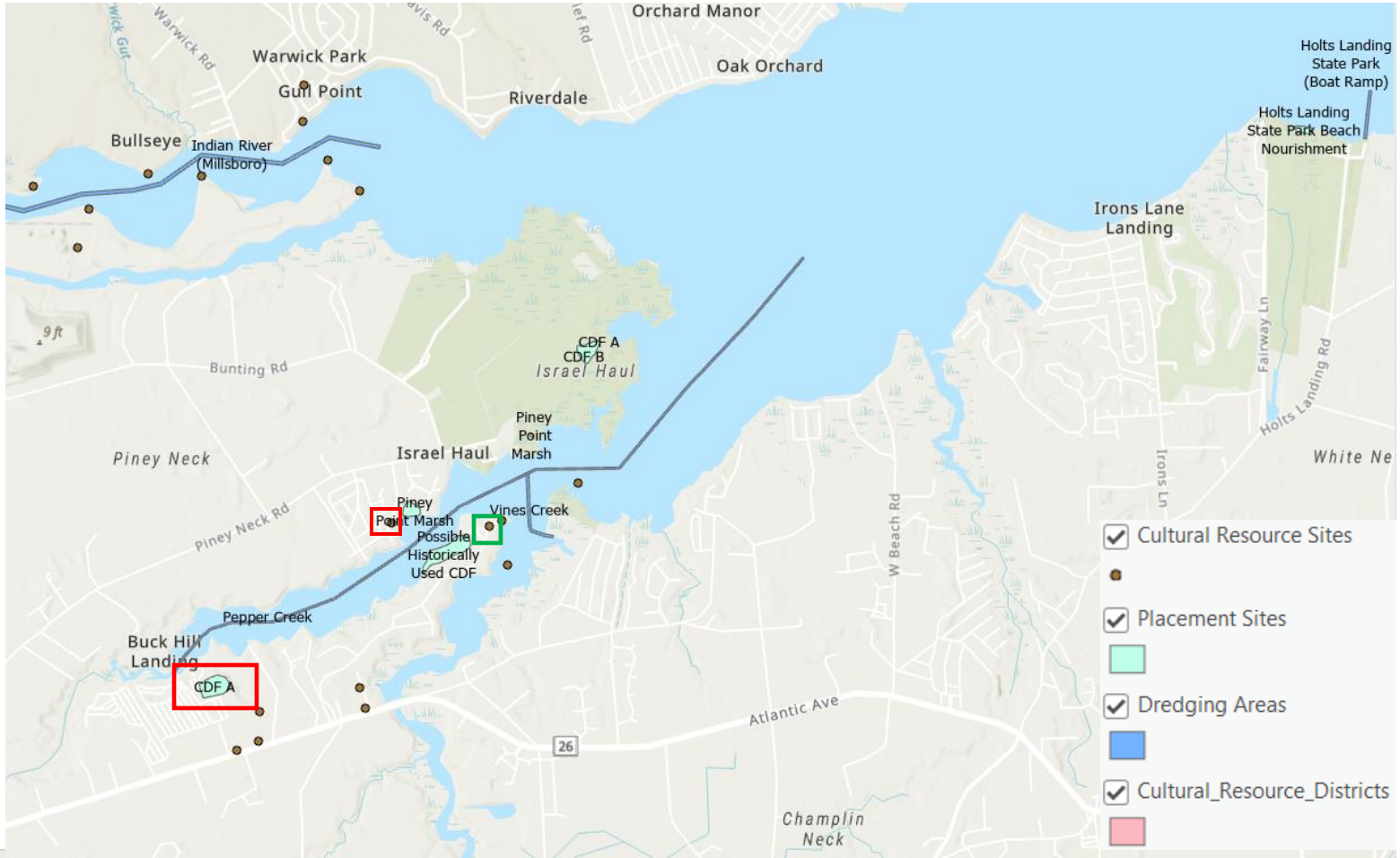
	OBJECTID *	SHAPE *	DredgeArea_GUID *	Dredge Area Name	Cultural Resource Su...	Multiple Property CR...	Parcel ID Number	Prop
1	1	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N00122		1400700003	Noxon
2	2	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N05898	N13268	2305800001	Hill Isl
3	3	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N12643			Bridge
4	4	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N01507		2400600008	Janua
5	5	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N00126.119		2400600009	Unimp
6	6	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N00126.120		2400600020	Unimp
7	7	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N06240	N13268	1400300013	Green
8	8	Point	{EEBABCD2-7373-4852-A739-C03CD5ECA261}	Appoquinimink River	N06239		1400300013	Dwelli

McCORMICK TAYLOR



OBJECTID *	SHAPE *	GlobalID *	Placement Site Name	Upland Placement	Upland Placement Ac...	Recurring Upland Location	Beneficial Use Location	Recurring Beneficial Use Locat
2	Polygon	{806D64BC-	CDF #2	Yes	7 acres	Yes	--	--
4	Polygon	{88CD86F2-	Augustine Beach - Beac...	No	--	--	Yes	Yes
6	Polygon	{9518D813-	Approximate Location o...	--	--	--	Yes	Yes
7	Polygon	{86476CB3-	CDF A	Yes	10	Yes	--	--
8	Polygon	{AFC5B231-	Holts Landing State Par...	Yes	--	--	Yes	--
9	Polygon	{663426F0-	Bottom Hill Drain	--	--	--	Yes	Yes
10	Polygon	{77B6DB1B-	Indian River Upland Pla...	--	--	--	Yes	Yes
12	Polygon	{F4D140E2-	Indian River Inlet Shoal...	No	--	Yes	Yes	Yes
13	Polygon	{58060FA8-	Little River Wildlife Area	Yes	110	--	Yes	No
14	Polygon	{844B69DF-	Helen S. Simpler (Shockl...	Yes	1.9	--	No	No
15	Polygon	{1EBB1BB2-	Atlantic Ocean Beach -...	Yes	0.2	--	Yes	Yes

OBJECTID *	SHAPE *	DredgeA...	Dredge Area Name	Cultural Resource Surve...	Multiple Property CR...	Parcel ID Number	Property Name	Property Type
194	Point	{924C15B0-	Murderkill River	K08036			Dwelling	Building
195	Point	{924C15B0-	Murderkill River	K08035			Dwelling Complex	Building
219	Point	{2F7FF512-(	Vines Creek	S04455			Agricultural Complex	Building
220	Point	{EBA06DCF-	Pepper Creek	S04409			S. Collins & Bro. S.S. Mil...	Building
241	Point	{D1F0D4FD-	Smyrna River	N00134		1502300009	The Shoals	Building
242	Point	{D1F0D4FD-	Smyrna River	K04006			House	Building
243	Point	{D1F0D4FD-	Smyrna River	N00135		1502300008	Old Brick Store	Building
244	Point	{D1F0D4FD-	Smyrna River	K04005			House	Building
245	Point	{D1F0D4FD-	Smyrna River	K02033			Cemetery	Site
246	Point	{D1F0D4FD-	Smyrna River	N00137		1501700008	Eagle Nest Hunt Club	Building
247	Point	{D1F0D4FD-	Smyrna River	N00420		1501700009	Thoroughfare Canal	Structure

Outcomes

- Methods and Findings Report
- Maps/Figures
- Updatable Geodatabase
- Waterways Removed for Phase 2
- Focus for Phase 2

Little River Environmental Windows

January	February	March	April	May	June	July	August	September	October	November	December
		Osprey Environmental Window Closed									
		Horseshoe Crab Environmental Window Closed									
Winter Flounder Environmental Window Closed											

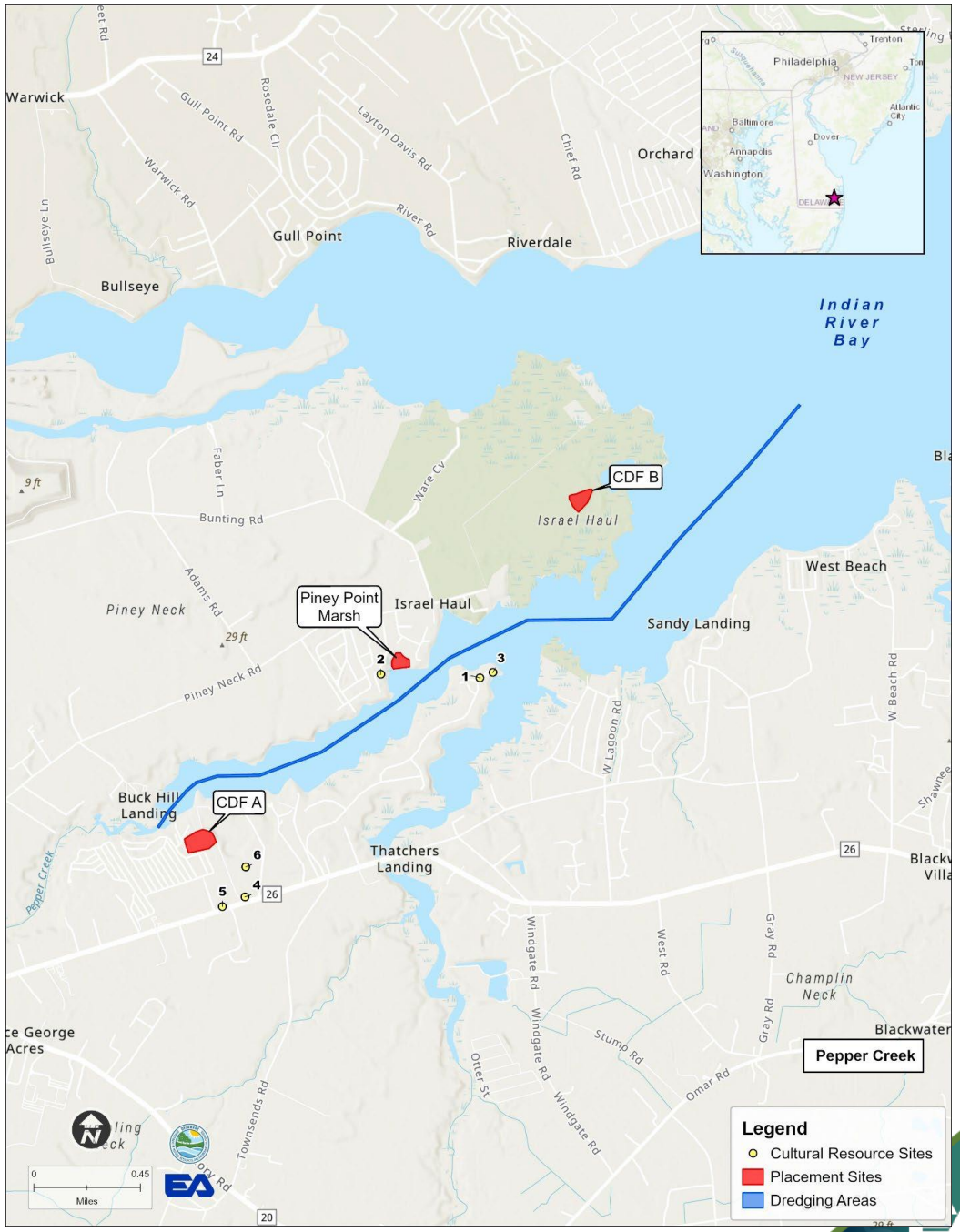


Image from Final Methods and Findings Report (2025)

Outcomes: Methods and Findings Report

4.20 PEPPER CREEK

The Pepper Creek Channel is located in Sussex County. A map of the Pepper Creek River Channel and any associated placement sites is provided in Figure 4-20.

4.20.1 Navigable Channels

The channel in Pepper Creek was authorized in 1963 and is state-maintained. The original channel was 3.9 miles long, 60 feet wide, and -6 feet MLLW. While the year of reauthorization was not found, the channel is now maintained at 3.5 miles long, 60 feet wide, and -4 feet MLW. The Pepper Creek Channel is mainly used for recreational boating, fishing, and other activities.

4.20.2 Dredging Activities

The most recent dredging identified for the Pepper Creek Channel is maintenance dredging of the full channel in 2015, totaling 25,000 CY. The dredging was completed by the DNREC Seidel hydraulic cutterhead dredge and pipeline. No costs associated with this dredge activity were found.

Table 4-27 shows dredging activities identified for the Pepper Creek Channel, including the CYs removed, year, and dredging contractor:

Table 4-27. Identified Pepper Creek Channel Dredging Activities

Dredged Volume	Year of Dredging	Dredge Contractor
25,000 CY	2015	DNREC – Seidel
52,000 CY	2013	--
5,000 CY	2013	DNREC - Mispillion
5,000 CY	2013	DNREC - Mispillion
60,000 CY	2011	Sussex County Conservation District
30,000 CY	1995	DNREC – Blue Hen
20,000 CY	1994	DNREC – Blue Hen
20,000 CY	1993	DNREC – Blue Hen
80,000 CY	1988	DNREC – Blue Hen
70,000 CY	1987	DNREC – Blue Hen
--	1964	--

Historical dredging of Pepper Creek Channel includes full maintenance dredging in 1987, 1988 and the 52,000 CY activity in 2013. The 2011 maintenance dredging was a partial dredging activity. All dredging activities where a contractor was identified were completed with a hydraulic cutterhead dredge and pipeline. The only cost data found was for the 2011 and 1964 dredging activities. The 2011 dredging activity had a total contract cost of $24,900.00 with a bid item price of $138.15 per CY. The total contract cost for the 1964 dredging activity was $137,094.00. No additional cost data related to historical dredging activities were found.

Sediment characterization of the material in Pepper Creek Channel was completed in 2010, and the results of physical testing were as follows: silt ranged from 48.6 to 64.7 percent, clay ranged

from 26.9 to 40.1 percent, and sand ranged from 8.3 to 11.2 percent. Analytical analysis showed sediment did not exceed contaminant thresholds.

Sediment sampling was also completed in 2023 and composite grain size analysis showed that the sediment consists of 74 percent fine grained material.

4.20.3 Environmental Windows

The information reviewed for the Pepper Creek Channel does not identify any ToY restrictions. Records show that previous dredging activities had ToY restrictions from 1 September to 31 December, but no species were identified.

Available online databases such as the NOAA EFH Mapper (NOAA 2025) and USFWS IPaC (USFWS 2025) were referenced to fill this data gap. The NOAA EFH Mapper includes the adult sand tiger shark, neonate sandbar shark, adult skipjack tuna, juvenile sandbar shark, and all life stages of smoothhound shark (NOAA 2025). ToY restrictions occur from April to November for sandbar sharks and tiger sharks. It was not identified if or when ToY restrictions occur for the skipjack tuna or smoothhound shark. The USFWS IPaC does not identify any in-water resources of concern (USFWS 2025). Table 4-28 provides information on the ToY restrictions for the Pepper Creek Channel.

Table 4-28. Pepper Creek Environmental Windows

January	February	March	April	May	June	July	August	September	October	November	December
			Sandbar Sharks Environmental Window Closed								
			Tiger Sharks Environmental Window Closed								

4.20.4 Dredged Material Placement Sites

The Pepper Creek Channel placement sites include both upland placement sites and beneficial use sites. The upland placement sites include CDF A and CDF B. The CDF A site is a recurring placement site, is five acres in size, and owned by DNREC Fish and Wildlife. The CDF B site is 6.5 acres and owned by Mr. Wayne Cooper. These are recurring placement sites. It is unknown if CDF B is a recurring placement site. A "longstanding" easement is in place with DNREC.

The Piney Point Marsh is a non-recurring beneficial use site that has previously accepted 10,000 CY of material via hydraulic nozzle. The site is 21 acres. The year that the Piney Point Marsh site was used is unknown.

4.20.5 Cultural Resources

Information regarding cultural resources associated with the Pepper Creek Channel identified six locations of importance. Table 4-29 provides information on the CRS number, property name, property type, registration status, and historic names of the cultural resources found in the vicinity of the Pepper Creek Channel. The locations of the identified cultural resource properties

are presented in Figure 4-20 and are numbered as shown in the "Map Key" column in Table 4-29. These cultural resources are primarily located on property parcels adjacent to the channel within the viewshed. Additional information on the cultural resources in the vicinity of the Pepper Creek Channel can be found in Appendix A and on the Delaware Historical and Cultural Affairs CHRIS website.

Table 4-29. Pepper Creek Cultural Resources

Map Key	CRS Number	Property Name	Property Type	Status (Secondary Status)	Historic Name
1	S04455	Agricultural Complex	Building	--	--
2	S04409	S. Collins & Bro. S.S. Mill Dwelling Complex (Beers)	Building	--	--
3	S04429	Dwelling	Building	--	--
4	S10736	DERTGEO-463	Building	--	--
5	S10735	DERTGEO-462	Building	--	--
6	S04467	Agricultural Complex	Building	--	--

Image from Final Methods and Findings Report (2025)

Outcomes: Data Gap Identification

- Historical dredging costs
- Historical dredging placement locations
- Dredging contract costs
- Time of Year restrictions (species)
- Cultural resources

Lessons Learned

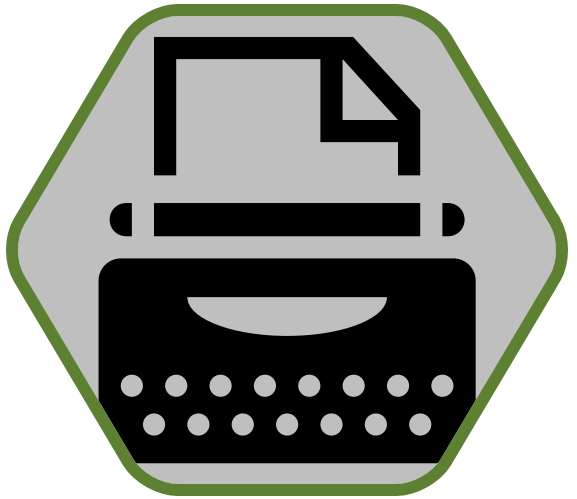
- Cultural Resources
  - Publicly available vs sensitive resources
- Personnel Interviews are critical for institutional knowledge
- Many historical records have been lost to time
  - Digital vs paper record keeping

Looking Ahead

Phase 2 –

Field Data Collection/Agency Coordination

- Prioritize collection of data to fill data gaps identified in Phase 1
  - Bathymetric Surveys
  - Sediment Sampling/Testing
  - Placement Site Identification
  - Cultural Resources



Phase 3 –

Feasibility Study/DMMP Development

- Compile data organized from Phase 1 and Phase 2
- Work with DNREC to establish placement options
- Prepare and finalize DMMP

QUESTIONS

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