

Preliminary Data Collection Results

Each of the 7 Federally maintained channels identified in the Preliminary Data Collection Survey have been dredged historically. Of the 7 municipalities responding to the survey, 3 reported that the most recent dredging events have not kept their respective navigation channels safe and navigable to boat traffic. Five of the 7 communities that participated in the Survey reported that they are in various stages of the ACOE Federal maintenance dredging process. All municipalities that anticipated the need for future maintenance dredging expected the majority of funding to come from a Federal source.

Reported hazards to navigation and public safety:

- City of Saco (last dredged 1992; ACOE maintenance underway 2018)
- Town of Kennebunkport (last dredged 1976)
- Town of Wells (last completed project 2014; maintenance project underway June 2018)

2018 ACOE maintenance dredging status:

- Town of Kennebunk (Beginning ACOE maintenance dredging process)
- Town of Scarborough (ACOE survey complete, awaiting ACOE scheduling)
- Town of Kennebunkport; Town of Wells (ACOE scheduling complete)
- City of Saco (ACOE maintenance project underway, completion 2018 – 2019)

Each of the 7 municipalities also reported on the general sediment characteristics and historic disposal practices within their respective waterways (Table 2). Historic disposal practices were generally dictated by sediment type: sandy and some silty materials were beneficially reused for beach nourishment (with some offshore and in-river disposal), while the majority of muddy and fine-grained materials were barged to offshore disposal sites.

Table 2. Reported sediment type and historic disposal practice within 7 Federal navigation channels in southern Maine.

Municipality	Scarborough, Saco, Wells	Kennebunk	Kennebunkport, Ogunquit, Kittery
Sediment Type	Sand, Muddy Sand	Sand, Mud, Silt	Mud
Disposal Practice	Beach Nourishment*; In-River; Offshore**	Beach Nourishment	Offshore

*Beach nourishment – refers to the placement of dredged material on the existing beach profile. In some cases, beach nourishment may extend below mean low water onto the submerged beach profile.

**Offshore – refers to the disposal of dredged material within an approved offshore site (Cape Arundel Disposal Site (CADS), or similar).

All municipalities surveyed reported busy commercial and recreational mooring fields and/or marinas accessed via the primary navigation channel. Six out of the 7 municipalities provided supplementary data on typical usage (Table 3). A total of 352 individual moorings requiring at least some maintenance dredging were reported in Scarborough, Kennebunk, Wells, and Ogunquit. Two public marinas in The City of Saco and Town of Wells, support an additional 288 boat slips, 3 boat ramps, and a public pier. At least 188 commercial fishing vessels and 56 charter fishing boats operate out of the 6 waterways, with Kennebunkport representing the largest fleet of approximately 50 boats. In addition to commercial and charter fishing boats, it was estimated that 770 recreational vessels regularly utilize the 6 waterways. The responding municipalities reported an average LOA of 30 feet and an average draft of just over 3.5 feet of vessels operating within their waterways.

Table 3. Moorings, commercial, and recreational use of public waterways in southern Maine.

	Moorings	Commercial Vessels	Charter Boats	Recreational Vessels
Scarborough	60	30	15	50
Kennebunkport	N/A	50	N/A	30
Kennebunk	68	18	12	300
Wells	150	25	15	150
Ogunquit	74	26	8	40
Kittery	N/A	39	6	200
Total	352	188	56	770

The Preliminary Data Collection Survey focused exclusively on commercial and recreational usage reliant on municipal resources, turning basins, mooring fields, marinas, etc. The Feasibility Study acknowledges the countless private entities, mooring fields, marinas, docks, piers, restaurants, etc. operating independently along each waterway, though it was beyond the scope of this preliminary study to gauge the impact of a navigable channel on their daily operations.

The Preliminary Data Collection Survey indicated that dredging is a near constant requirement in southern Maine, as evidenced by the 5 municipalities within the SMPDC region actively working to schedule, or actively engaged in maintenance dredging operations with the ACOE and the 3 municipalities reporting hazards to public safety and navigation within their respective channels. Chapter 3 quantifies historic dredging events in southern Maine, will be used to help forecast the quantities that a municipal dredge might be expected to dredge in a given year.

3.0 HISTORIC DREDGING AND DISPOSAL DATA COLLECTION

Historic Dredging Events in SMPDC Coastal Communities

To generate a database of historic dredging events in southern Maine, the Woods Hole Group called on a broad network of State and Federal Agency contacts, including representatives from the Maine Geological Survey and the United States Army Corps of Engineers New England District Office to provide historic dredge quantity data and forecasts of future dredging needs in Maine. To support these data requests, Woods Hole Group Coastal Scientists reviewed historic reports and analyzed public data sets to generate a comprehensive chronology of dredging events, both public and private from 1949 – 2018. These datasets included:

- The United States Army Corps of Engineers Dredged Material Management Study for Coastal Maine and New Hampshire (1994)
- The United States Army Corps of Engineers United States Waterway Database (2018)
- The United States Army Corps of Engineers Ocean Dredged Material Disposal Site Database (2018)

The historic data was used to identify project proponents, type of dredging event (initial improvement, improvement, maintenance), volume of material dredged (in cubic yards (c.y.)), dredged channel depth, characteristics of the material dredged, and protocol for the disposal of dredged material. Each of the sources were cross-referenced to ensure replicate events were only counted once. When available, actual volumes of dredged material were used in place of ACOE estimated quantities to be dredged. A summary of historic dredging events for each of the Federal navigation channels in southern Maine can be found in the following sections. Despite a comprehensive review of the available data, gaps still remained in many fields. Data gaps are symbolized by a (-) in the following Tables.

5.0 FORECASTING ANNUAL DREDGE VOLUMES

The Barnstable County Dredge Program relies on the availability of clean, beach compatible material within Federal and municipal navigation channels to maintain a busy production schedule and cost-effective dredging rate. Based on this model, Woods Hole Group developed an estimate of the volume of clean, beach compatible material (sand) that could be dredged from each of the 10 Federal navigation channels in the SMPDC region on an annual basis. To determine the approximate volume of sand that could be dredged annually, total dredged volumes from each waterway from 1949 – present (described in Chapter 3.0) were converted to annual volumes (since the date of the first dredging event). Sediment quality data (grain size, lithology) and historic disposal data from the ACOE and the National Oceanic and Atmospheric Administration (NOAA) were then used to determine the approximate percentage of the annual dredge volume made up of sandy sediments. Sediment quality data used to develop this estimate was drawn from:

- ACOE Sediment Data from Maine and New Hampshire
- NOAA Maine Sediment Grab Data (York Harbor; Wells Harbor)

Within the context of this report, “beach compatible” refers to uncontaminated, sandy material that may closely match the grain size and composition of regional beaches. For example, if a beach comprised of 90 – 95% medium to coarse sand with less than 10% gravel and less than 5% fine-grained material is identified as a possible nourishment site, any dredged material placed at the site should closely match these characteristics. In practice, it is rare for dredged material to exactly match native sand located at a beach nourishment project site, requiring evaluation on a case-by-case basis.

Woods Hole Group utilized a tiered-approach to assign percentages of presumed clean, beach compatible material within each waterway. If clear descriptions of sediment samples and sediment lithology existed in the literature and were indicative of predominantly sandy material, 100% of the annual volume for the respective waterway was counted towards the cumulative annual total. In waterways where less than 100% of the material was sandy, an estimate of the percentage of sandy material was developed based on a composite of all historic sediment samples taken within the waterway and counted towards the cumulative annual total. In waterways where the literature indicated that very little sandy material and high percentages of mud or fines were present, 0% of the annual volume was counted towards the scaled annual volume (Table 16). Appendix F includes a summary of sediment quality data used to estimate quantities of clean, beach compatible material within each waterway.

All Woods Hole Group estimates of sandy material were within 10% of the composite total sandy material within each waterway derived from the ACOE and NOAA sediment quality data (except Cape Porpoise Harbor, which was considered too muddy to be factored into the cumulative total). In the case of the Saco River, which contained no historic sediment quality data, the estimate was based on historic disposal practices (beach nourishment) for material dredged from the site.

Table 16. Estimated annual volume of beach compatible material in southern Maine waterways.

Waterbody	Total C.Y. Dredged 1949-present	Annual Volume (C.Y.)*	Estimated Percent Sand**	Estimated Annual Volume Sand (C.Y.)
Scarborough River - Pine Point Harbor	782,969	13,499	100	13,499
Saco River - Camp Ellis Harbor	457,719	16,953	100	16,953
Wood Island Harbor - Biddeford Pool	138,966	3,860	85	3,281
Cape Porpoise Harbor	207,402	7,977	0	0
Kennebunk River	442,796	6,609	75	4,957
Wells Harbor	867,522	16,683	100	16,683
Josias River - Perkins Cove	68,084	1,621	50	811
York Harbor	281,847	6,127	70	4,289
Piscataqua River (Maine Shore)	260,530	4,342	50	2,171
Pepperrell Cove	0	0	0	0
Total	3,507,835	77,672	-	62,644

*Since first recorded dredging event

**Scaled, based on available ACOE, NOAA sediment quality data

Two additional estimates of the annual volume of sandy sediment that could be dredged from southern Maine waterways were also included for consideration and were based on:

- ACOE Dredge Forecast Data from the 1994 Dredged Material Management Study and;
- 2017 ACOE Dredge Forecast Data for select Federal projects in northern Massachusetts, New Hampshire, and southern Maine (including Cape Porpoise Harbor, Kennebunk River, Wells Harbor, Josias River – Perkins Cove and the Piscataqua River (Maine Shore).

Total forecasted quantities from each dataset were scaled to the 25-year period from 2019 – 2044. Total forecasted quantities were used to develop annual dredge volumes for each waterway and were factored against the estimated percent sand within each waterway described in the previous section. Estimated annual volumes of beach compatible material in southern Maine waterways based on the 1994 ACOE forecasted dredge quantities are summarized in Table 17. Table 17 contains several waterbodies where the ACOE determined that “0” c.y. of material would need to be dredged from 2019 – 2044. Estimates were made based on the availability of

dredge forecast data and may not reflect dredging projects that have (or have not) occurred within each waterbody since the report was released in 1994 and may not reflect the current need for dredging.

Estimated annual volumes of beach compatible material in southern Maine waterways based on the 2017 ACOE forecasted dredge quantities are summarized in Table 18. The 2017 ACOE forecasted dredge quantities were developed as the ACOE considered the development of a new long-term disposal site for dredged material. Waterbodies located north of Cape Porpoise Harbor were located outside the ACOE draw area and were assigned a “(-)”. Waterbodies located inside the ACOE draw area that did not receive a ACOE forecasted quantity were assigned “0” (c.y.). Estimates were made based on the availability of dredge forecast data and may not reflect dredging projects that have (or have not) occurred within each waterbody and may not reflect the current need for dredging.

Table 17. Estimated annual volume of beach compatible material in southern Maine waterways 2019-2044 based on 1994 ACOE dredge forecast data.

Waterbody	Forecasted Quantity 2019-2044 (C.Y.)	Annual Volume (C.Y.)*	Estimated Percent Sand**	Estimated Annual Volume Sand (C.Y.)
Pine Point Harbor (Scarborough River)	575,000	23,000	100	23,000
Saco River - Camp Ellis Harbor	222,000	8,880	100	8,880
Wood Island Harbor - Biddeford Pool	33,000	1,320	85	1,122
Cape Porpoise Harbor	0	0	0	0
Kennebunk River	100,000	4,000	75	3,000
Wells Harbor	0	0	100	0
Perkins Cove - Josias River	60,000	2,400	50	1,200
York Harbor	60,000	2,400	70	1,680
Piscataqua River (Maine Shore)	0	0	50	0
Pepperrell Cove	0	0	0	0
Total	1,050,000	42,000	-	38,882

*Based on 25-year period 2019-2044

**Scaled, based on available ACOE, NOAA sediment quality data

Table 18. Estimated annual volume of beach compatible material in southern Maine waterways 2019-2044 based on 2017 ACOE dredge forecast data

Waterbody	Forecasted Quantity 2019-2044 C.Y.	Annual Volume (C.Y.)*	Estimated Percent Sand**	Estimated Annual Volume Sand (C.Y.)
Pine Point Harbor (Scarborough River)	-	-	100	-
Saco River - Camp Ellis Harbor	-	-	100	-
Wood Island Harbor - Biddeford Pool	-	-	85	-
Cape Porpoise Harbor	25,000	1,000	0	0
Kennebunk River	16,300	652	75	489
Wells Harbor	248,000	9,920	100	9,920
Perkins Cove - Josias River	8,500	340	50	170
York Harbor	0	0	70	0
Piscataqua River (Maine Shore)	753,800	30,152	50	15,076
Pepperrell Cove	0	0	0	0
Total	1,051,600	42,064	-	25,655

*Based on 25-year period 2019-2044

**Scaled, based on available ACOE, NOAA sediment quality data