Sediment Quality in the Atlantic Coastal Zone

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Introduction

This RSM white paper is intended to provide an overview of sediment quality in the New Jersey Atlantic Coastal Zone based on past sampling data to provide insight into sediment characterization with regard to the potential beneficial uses of dredged material. Dredged material has historically been managed in confined disposal facilities or at landfills for daily cover, at upland construction sites for fill/grading, or for beach nourishment when grain size (mostly sand) and content are appropriate. However, it is becoming clear through recent years that it is more desirable to keep dredged sediments in the coastal environment whenever possible to combat the negative effects of climate change, such as sea level rise. Formerly referred to as dredged 'spoils', *dredged material* is now considered a significant resource that can be beneficially used (where appropriate) in a variety of habitat restoration and coastal resiliency projects.

This assessment also provides information necessary to evaluate the available sediment data to (1) minimize the risk to aquatic/ecological receptors by informing best management practices during dredging operations; (2) provide information that can be used to help determine appropriate dredged material management alternatives; and (3) support the beneficial use of dredged material in the region.

For this assessment, sediment quality was evaluated by watershed (14 total along the Atlantic Coast – from south of Sandy Hook to the tip of Cape May) as discussed below. **Please be advised that this screening level analysis results in a broad characterization of sediment quality in the Atlantic Coastal Zone and should be generally used for dredging/project planning purposes only. Additional sampling is/may be equired for each proposed upland or aquatic placement site to ensure that there is no anticipated adverse effects to ecological receptors**

Contaminants of Concern

In many areas of New Jersey, sediment in waterbodies is contaminated with a variety of toxic substances as a result of discharges from industrial, municipal, and storm sewer sources, marina and boating operations, agriculture, and atmospheric deposition (NJ Dredge Manual, 1997). The fourteen (14) watersheds that comprise the Atlantic Coastal Zone have been impacted to a lesser degree by pollutant discharges in comparison to other industrialized and developed parts of the State. However, specific contaminants of concern (COCs) associated with historic and on-going land/water uses still pose a concern for sediment in the region. Some examples of the sources and associated contaminants in the region are:

- Polycyclic aromatic hydrocarbons (PAHs) found in fuel, and metals found in paint, associated with marinas/recreational boating;
- Arsenic associated with relic CCA (chromated copper arsenate) applied to in-water structures;
- Pesticides from agricultural practices; and
- Natural background concentrations of metals due to geological formations.

Contaminants can persist in sediment in-place for years until disturbed and resuspended through activities such as dredging, pile driving, and natural processes such as storm events. Sampling and best management practices are required to minimize potential contaminant impacts during the dredging and material placement period. The disturbance of sediment and potential for resuspension of contaminants during dredging is a temporary condition and can often be managed though best management practices. Sampling and best management practices are particularly important for new dredging, or the removal of sediments in areas not previously dredged or dredged to depths deeper than previously occurred as this type of dredging can release contaminants that had been buried in the sediment for decades and naturally capped over time due to the deposition of cleaner sediment. Maintenance dredging to maintain navigation is the periodic removal of sediment in the same area and to the same depth as previous dredging operations. This type of dredging may be of less concern for the release of contaminants as much of the contaminant-bound sediment has been removed from the aquatic system during prior dredge events.

However, it is important for sampling and best management practices to be implemented for maintenance dredging given that previously dredged areas can accumulate black muds high in clay and silt, detritus, and other organics which could pose a concern if contamination sources are still present. Such finer-grained and more organic (silt and clay) sediments bind contaminants more strongly than coarser-grained sediments (sand and gravel).

Sampling and best management practices are required because contaminants bound to sediments (as well as dissolved in water) can enter the aquatic food web and cause adverse effects to aquatic and terrestrial biota. Contaminant concentrations can increase as a result of biomagnification and bioaccumulation, ultimately resulting in impacts to human health as the result of the consumption of fish, crabs, and other seafood. Therefore, prior to dredging, the physical and chemical makeup of sediments are characterized and evaluated against promulgated standards/screening criteria to assess potential risks to human and ecological receptors during dredging operations and dredged material management activities. Best management practices are required to eliminate or minimize the potential for contamination. There is also consideration of where dredged material will be placed to ensure that dredged material is being placed in a location that has similar characteristics.

For this assessment, sediment quality was evaluated by watershed (14 total along the Atlantic Coast from Sandy Hook to the tip of Cape May) based on the following:

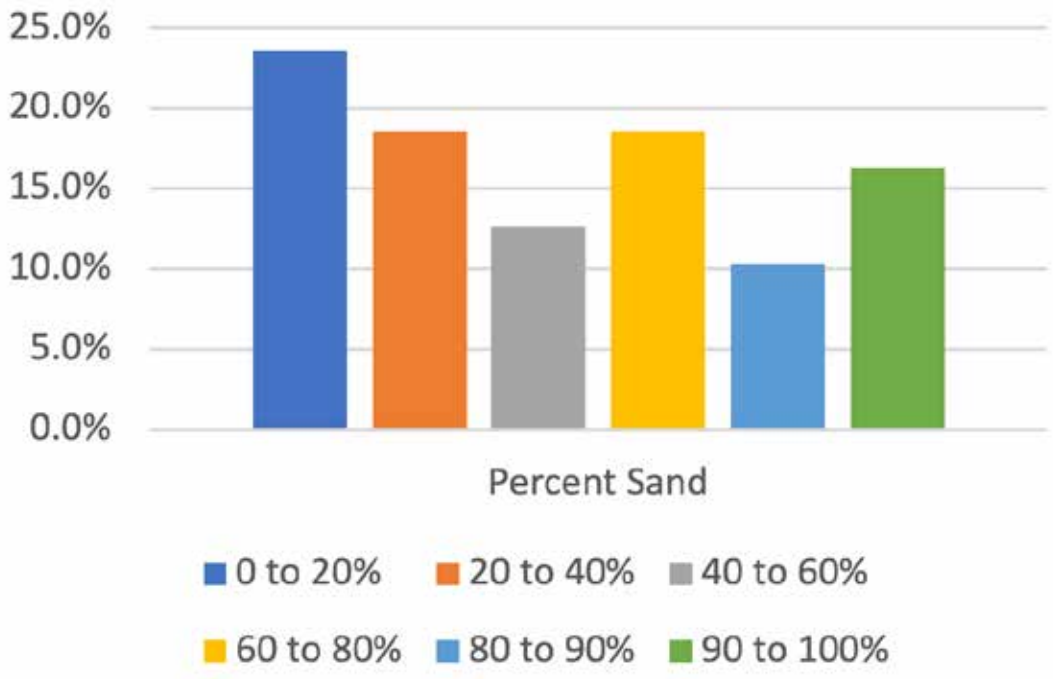
- A screening level analysis has been completed of 413 sediment chemistry samples collected between 2000 and 2015 to determine the nature and extent of contamination, and on 301 samples collected between 2000 and 2015 to determine the physical composition of the sediment.
- The screening level analyses evaluated a subset of contaminants of concern1 (COC) chosen based on their previous documented ties to contaminants in the region.
- The COC concentrations were compared to human health toxicity thresholds (2021 New Jersey Residential and Non-residential Ingestion/Dermal & Inhalation Soil Remediation Standards, N.J.A.C. 7:26D) to place the sediment samples in one of two categories:
  - Likely suitable for upland beneficial use (for example, agriculture, upland fill);
  - Potentially unsuitable for upland beneficial use (thus, disposal required).
- The COC concentrations were also compared to aquatic life toxicity thresholds (NJDEP 2009 Ecological Screening Criteria – Saline Water Effects Range Low (ER-L) and Effects Range Medium (ER-M)) to place the sediment samples in one of two categories:
  - Likely suitable for aquatic/habitat beneficial use (for example, marsh restoration, island creation, etc.);
  - Potentially unsuitable for aquatic/habitat beneficial use.

Please be advised that this screening level analysis results in a broad characterization of sediment quality in the Atlantic Coastal Zone and should be generally used for dredging/project planning purposes only. Additional sampling is/may be required for each proposed upland or aquatic placement site to ensure that there is no anticipated adverse effects to ecological receptors.

Sediment Grain Size Distribution

Sediment grain size distribution data are available for 301 of the samples used in this analysis. Sediments in the region were comprised of between 0% to 99.65% sand, with a mean of 51.4% sand. Figure 1 shows the percentage of the available Region 2 Database sediment samples that were comprised of various sand percentage quintile ranges (0-20%, 20-40%, etc.). Only 16.3% of the samples were comprised of greater than 90% sand, with 10-24% of the samples in each of the other percentage sand quintile ranges. This indicates that the physical characteristics of the sediment (and presumably dredged material) in the 14 watersheds that comprise the Atlantic Coastal Zone is quite variable.

Figure 1. Percentages of the Region 2 Database Sediments Samples That Were Comprised of Ranges of Percentage Sand



1 Contaminants of concern used in screening analysis were: mercury, arsenic, Metals - cadmium, copper and lead, Pesticides – dieldrin, 4,4'-DDT/DDD/DDE, chlordane (alpha & gamma), Polychlorinated biphenyls (PCBs) (total), and PAHs - benzo(a)pyrene.

Upland Beneficial Use Suitability Analysis

Upland beneficial uses of dredged material include structural and non-structural fill, cap material for remediation sites, topsoil amendment for agriculture, and beach nourishment. Any material that is not suitable for upland beneficial use must be disposed of at a facility that is authorized to accept such material, such as a confined disposal facility or landfill.

Comparison of the sediment contaminant concentrations to the 2021 New Jersey Soil Remediation Standards (SRS) provides information concerning potential limitations on the upland beneficial use of dredged material. Limitations will result from contamination by a variety of COC greater than their respective New Jersey Residential and Non-residential Ingestion/Dermal & Inhalation Standards (N.J.A.C. 7:26D). For this analysis, the New Jersey Residential Ingestion/Dermal standards were used as this set of standards is the most conservative for the target set of COCs.

To determine upland suitability, the sediment samples were categorized as follows:

- Likely suitable for upland beneficial use (agriculture use, upland fill) – no COC in that sample had a concentration greater than its Residential Ingestion/Dermal Remediation Standard.
- Potentially unsuitable for upland beneficial use (disposal required) - at least one (1) COC in that sample had a concentration greater than its Residential Ingestion/Dermal Remediation Standard.

About 86% of the sediment samples appear to be likely suitable for upland beneficial use (see Figure 2). It appears that there is a very low probability that a sediment sample collected in the Atlantic Coastal Zone watersheds and comprised of greater than 90% sand will have a COC concentration greater than its respective NJ Residential Soil Remediation Standard (2021).

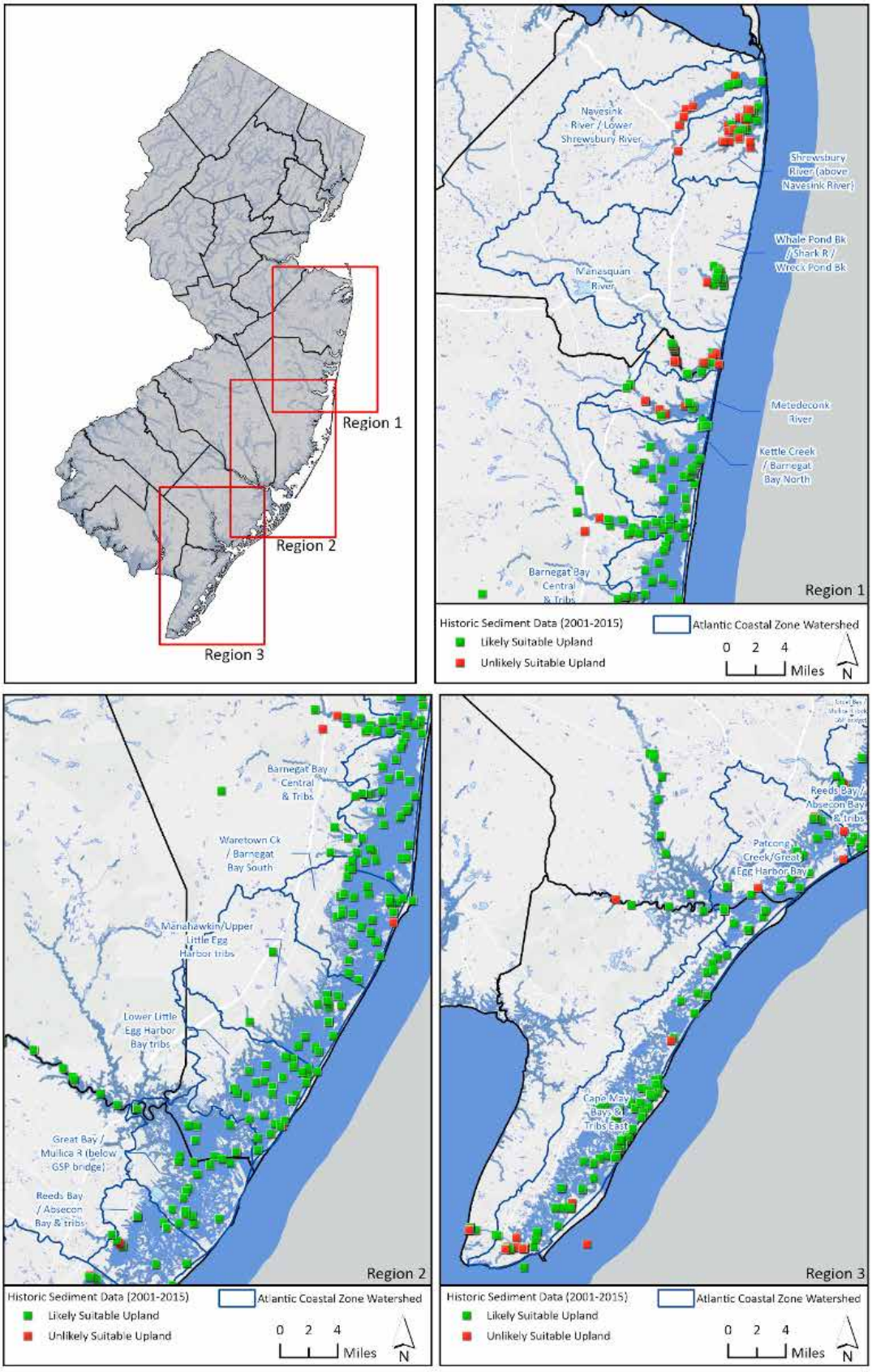
Trends - Upland Suitability

The primary COCs which appear to limit the upland beneficial use of dredged material are benzo(a)pyrene and arsenic, with PCBs of concern in some areas. It is likely that dredged material comprised of greater than 90% sand will be suitable for upland beneficial use.

The northern watersheds of the region (see Figure 2), including the Navesink River/Lower Shrewsbury River, Shrewsbury River (above the Navesink River), Whale Pond Bk/Shark River /Wreck Pond Bk, Manasquan River, and the Metedeconk Riverws are areas where sediment contamination could be potentially unsuitable for upland beneficial uses of dredged material. Suitability for placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization. Please be advised that this screening level analysis results in a broad characterization of sediment quality in the Atlantic Coastal Zone and should be generally used for planning purposes. Samples used in this screening level analysis are or are over a decade old. It is understood that dredging and placement of sediment from the areas identified as having some historical level of COC have been permitted and comply with current regulatory requirements.

1 Contaminants of concern used in this screening level analysis are total PCBs, DDT and metabolites (DDD and DDE), chlordane, dieldrin, benzo(a) pyrene, mercury, arsenic, cadmium, copper and lead.

Figure 2. Upland beneficial use suitability analyses results.



Aquatic/habitat Suitability Analysis

Aquatic/habitat beneficial use involves the placement of dredged material within the coastal environment (e.g. nearshore, wetland edge, wetland platform, etc.) to enhance/restore or create ecological habitat. Potential limitations on the aquatic/habitat beneficial use of dredged sediments from the Atlantic Coastal Zone watersheds will result from contamination by a variety of COC at levels greater than their Effects Range Low (ER-L) and Effects Range Medium (ER-M) toxicity thresholds (2009 Ecological Screening Criteria – Saline Water Criteria). The ER-L represents a concentration at which adverse impacts to benthic biota are found in ~10% of the studies evaluated, and a concentration greater than the ER-M value indicates adverse benthic impacts in more than ~50% of the case studies. These criteria are not promulgated standards but are used as screening values to assess potential ecological risk to inform the dredged material beneficial use decision-making process.

The analysis first divided the sediment samples into 3 categories:

- Category 0 – no COC in that sample had a concentration greater than its ER-L;
- Category 1 – at least one (1) COC in that sample had a concentration greater than its ER-L, but no COC in that sample had a concentration greater than its ER-M;
- Category 2 - at least one (1) COC in that sample had a concentration greater than its ER-M.

Exceedances of a COC ER-M value can indicate the dredged material is not suitable for aquatic/habitat beneficial use. However, these types of suitability determinations rely heavily on project-specific evaluations of the material to be dredged and an evaluation of the potential placement site. A like-on-like approach is used so that no new contaminants may be placed in an aquatic and/or terrestrial habitat other than those already determined to be present at similar concentrations. In addition, it is presumed that sediment dredged immediately adjacent to areas where it is being placed has a similar physical and chemical profile as that in the placement area.

Based on the above categories, the sediment samples were categorized as follows as a cursory screening method:

- Likely suitable for aquatic/habitat beneficial use (Categories 0 and 1).
- Potentially unsuitable for aquatic/habitat beneficial use (Categories 2).

Trends - Aquatic/habitat Suitability

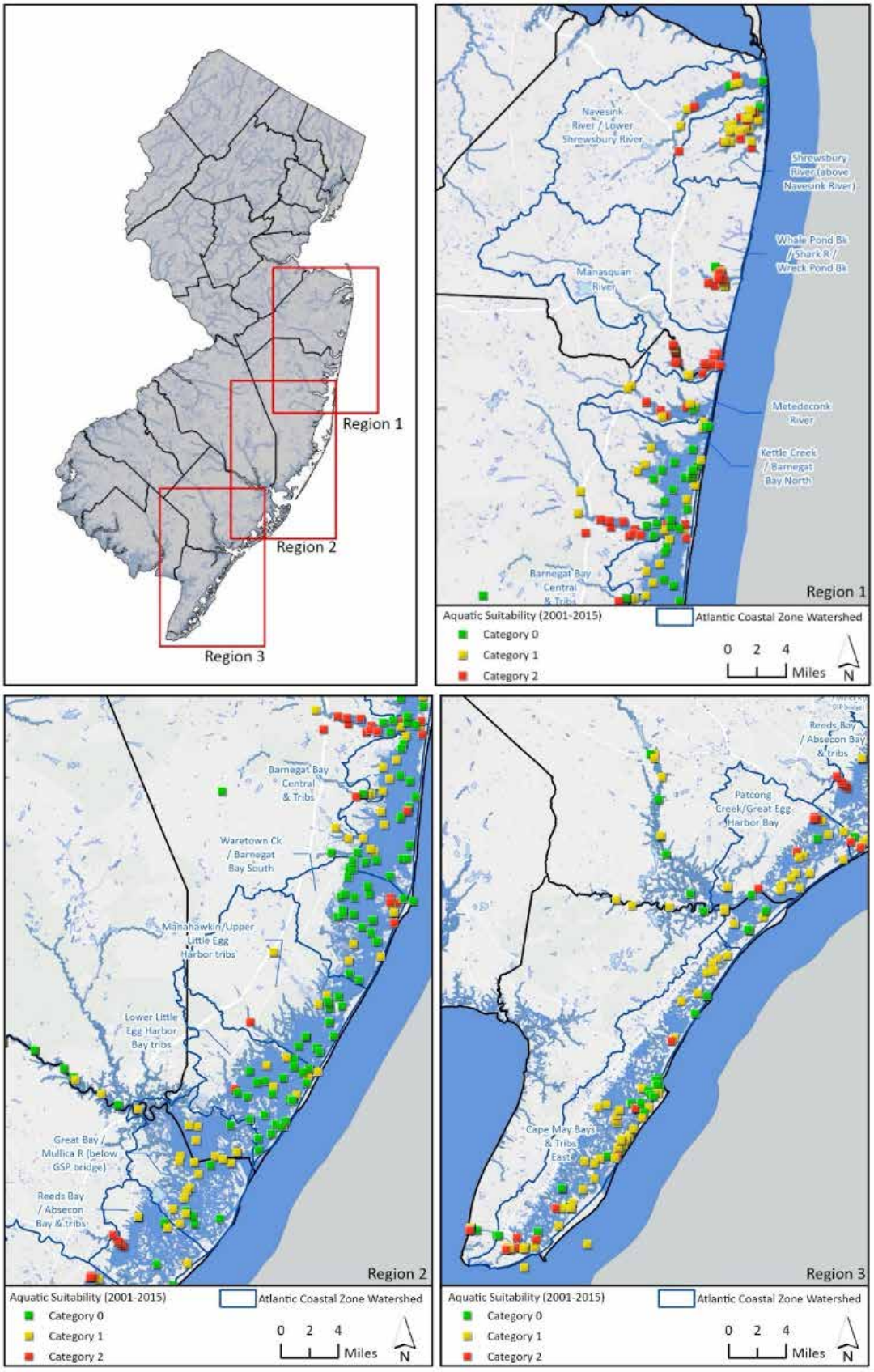
Approximately 81% of the samples are indicative of sediment that is likely suitable for aquatic habitat restoration projects in the Atlantic Coastal Zone (see Figure 3). Sediments comprised of greater than 90% sand in any of these watersheds are not expected to be contaminated at levels of concern that would limit dredged material aquatic/habitat beneficial uses.

Not all but some of the sediment in the Metedeconk River watershed and all watersheds to the north may have sediments that are potentially unsuitable for aquatic/habitat beneficial use. Suitability for placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization. Comparatively, Kettle Creek/Barnegat Bay North and all watersheds to the south appear to have sediments that are likely suitable for aquatic/habitat beneficial use, aside from specific locations like marinas or lagoon systems.

Please be advised that this screening level analysis results in a broad characterization of sediment quality in the Atlantic Coastal Zone and should be generally used for dredging/project planning purposes only. Additional sampling is/may be required for each proposed upland or aquatic placement site to ensure that there is no anticipated adverse effects to ecological receptors.

1 Contaminants of concern used in this screening level analysis are total PCBs, DDT and metabolites (DDD and DDE), chlordane, dieldrin, benzo(a) pyrene, mercury, arsenic, cadmium, copper and lead.

Figure 3. Aquatic/habitat suitability analysis results.



Watershed Analysis

This analysis focuses on the navigable tidal waterbodies within each of the fourteen (14) watersheds that comprise the Atlantic Coastal Zone, beginning at the Navesink River/Lower Shrewsbury River watershed and ending at the Cape May Bays & Tribs East watershed at the southern tip of New Jersey.

This screening level analysis serves as a broad characterization of sediment quality in the Atlantic Coastal Zone and can be used to inform potential limitations on dredged material beneficial uses for planning purposes. **This screening level analysis is not comprehensive and shall not be used in lieu of location-specific sediment data or to make regulatory decisions.** The COC evaluated in this screening level analysis are total PCBs, DDT and its metabolites (DDD and DDE), chlordane, dieldrin, benzo(a) pyrene, mercury, arsenic, cadmium, copper and lead. Where a COC was reported as "not detected" in a sample, one-half the laboratory method detection limit (MDL) was used as the COC concentration for that sample. Two (2) corresponding GIS layers called 'Historic Sediment Data (2001-2015)' and 'Aquatic Suitability (2001-2015)' (available only to NJDEP at this time) were created to view the data spatially. The GIS layers contain specific data on the grain size distribution and contaminant concentrations with a comparison to its respective standard or screening criteria for each data point. The GIS layers are being expanded and are intended to be publicly available in the future. Note that the locations of a few of the data points depicted on the following maps may be visually skewed due to errors in the location data. Lastly, the following maps depict each watershed in its entirety which caused many of the data points to visually overlap, therefore the GIS layers should be referred to if the suitability analysis does not align with its respective map.

This analysis has limitations that result in variable and unknown levels of uncertainty in its conclusions due to the following overall data gaps or the scope of the analysis:

- The data used for this analysis is from 2001-2015 and thus does not include more recent sediment data.
- This analysis did not evaluate all potential COC for which regulatory or screening criteria exist.
- There are spatial gaps in sediment data for many of the watersheds where sampling has yet to occur. Thus, sediment contamination at levels of concern in these watersheds may/may not be present in those areas that have not been sampled.
- Single point samples may not be representative of larger areas. Thus, additional characterization of areas known to have COC at high concentrations is needed to better delineate the extent of the contamination observed.
- There is uncertainty of how reflective the data are of conditions pre- and post-Superstorm Sandy.
- Most of the data – unless associated with a dredging project – are from surface grab samples. This limits the conclusions that can be made about sediment quality at depth.

Navesink River/Lower Shrewsbury River (1)

Upland Suitability:

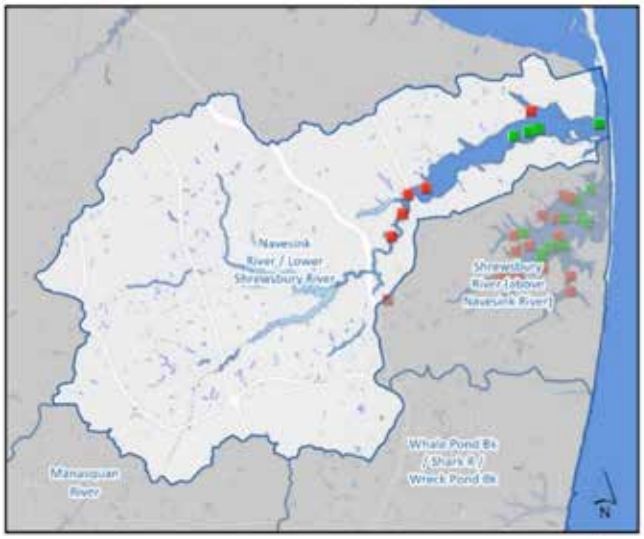
The sediments in the southwestern portion of the watershed within the Swimming River and the NJDOT Upper Navesink River channel may require additional sampling on a case by case basis to make a final determination of suitability for upland beneficial use. This area may contain levels of arsenic that will render the dredged material potentially unsuitable for upland beneficial use. The sediments in the Swimming River may also contain levels of benzo(a) pyrene that will render the dredged material unlikely to be suitable for upland beneficial use. The remaining portions of the watershed, including the main channel of the Navesink River, appear to have sediments that are likely suitable for upland beneficial use.

Aquatic Suitability:

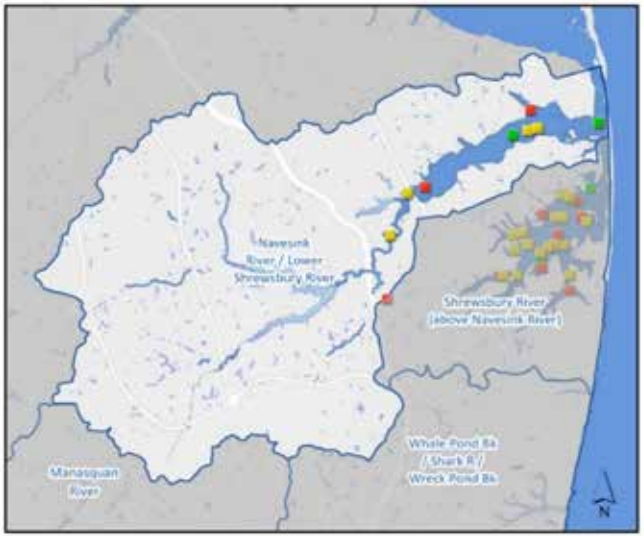
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

The sediments in the western part of the watershed, south of the Route 35 bridge (in Red Bank Borough) within the Swimming River appear to contain levels of 4,4'-DDD that make the dredged material potentially unsuitable for aquatic/habitat beneficial use projects, therefore, additional sampling may be required for confirmation. Sediments to the north of the Route 35 bridge (along the main navigation channel) and in Claypit Creek appear to contain levels of mercury that make the dredged material unlikely to be suitable for aquatic/habitat beneficial use projects and may require additional sampling. The remaining portions of the watershed, including the main navigation channel of the Navesink River, appear to have sediments that are likely suitable for aquatic/habitat beneficial use projects.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Shrewsbury River (Above Navesink River) (2)

Upland Suitability:

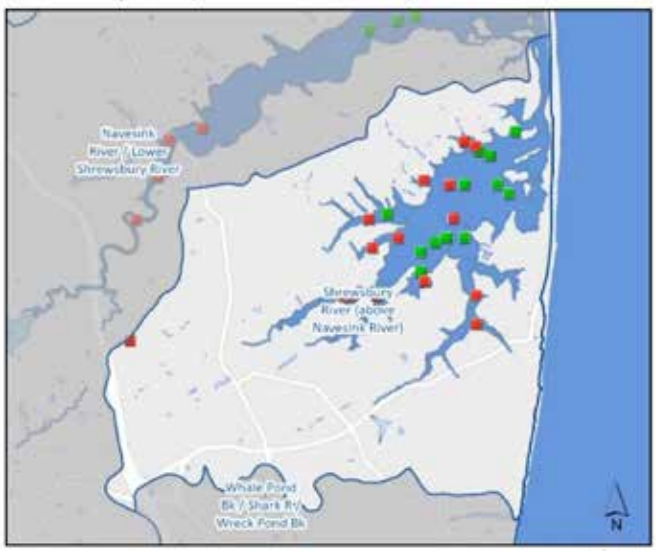
The sediments along the shoreline of this watershed (where data is available), and within the southern half of the USACE-maintained federal channel, will likely need additional sampling as they appear to contain levels of arsenic that could make the dredged material potentially unsuitable for upland beneficial use.

Aquatic Suitability:

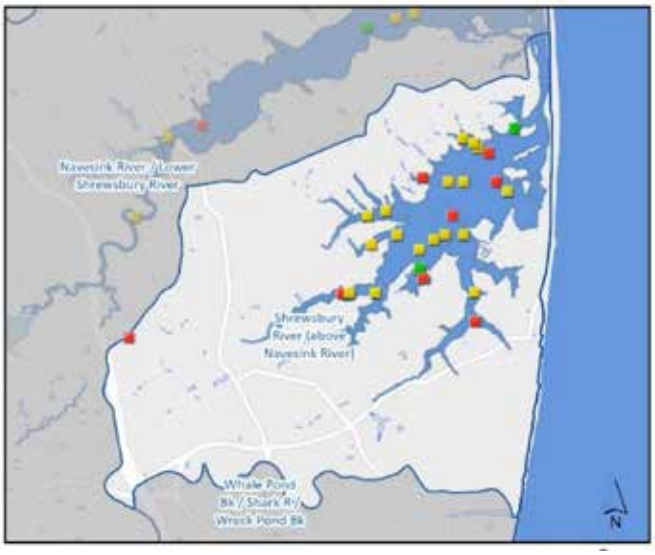
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

The sediments in the southern waterbodies - Parkers Creek Branch (mercury and PCBs), Blackberry Creek (PCBs), and Troutmans Creek/Branchport Creek (lead) - as well as those within the north-central Shrewsbury River tributary (mercury; adjacent to the Rumson Country Club) - appear to contain metals and PCBs at levels that will make the dredged material potentially unsuitable for aquatic/habitat beneficial use. Additional sampling will be required to make this detemination. The remaining portions of the watershed, including the main channel of the Shrewsbury River and its associated tributaries, appear to have sediments that are likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Whale Pond Bk/Shark R/Wreck Pond Bk (3)

Upland Suitability:

The sediments in the southwest portion of the Shark River appear to contain levels of arsenic that are potentially unsuitable for upland beneficial use and therefore will likely require additional sampling prior to a determination. In addition, marina sediments in the southeast portion of the watershed appear to contain levels of benzo(a)pyrene that are potentially unsuitable for upland beneficial use. The remaining portions of the watershed appear to have sediments that are likely suitable for upland beneficial use.

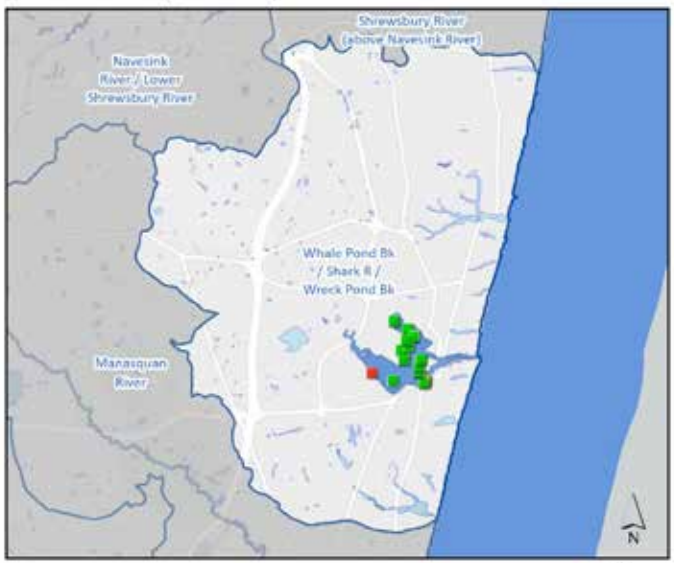
Aquatic Suitability:

Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

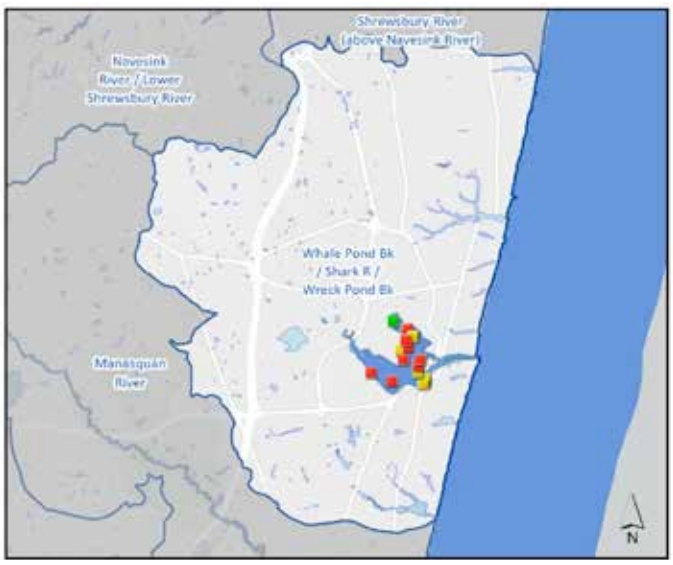
The sediments across a majority of the watershed appear to contain mercury at levels that would be potentially unsuitable for aquatic/habitat beneficial use. In addition, sediments within the NJDOT Shark River Channel appear to contain the pesticide 4,4'-DDT that would make the dredged material unlikely to be suitable for aquatic/habitat beneficial use. Additional sampling will likely be required for these contaminates in this area.

It appears that sediments in the northernmost portion of the watershed, within Musquash Brook, are likely suitable for aquatic habitat use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Manasquan River (4)

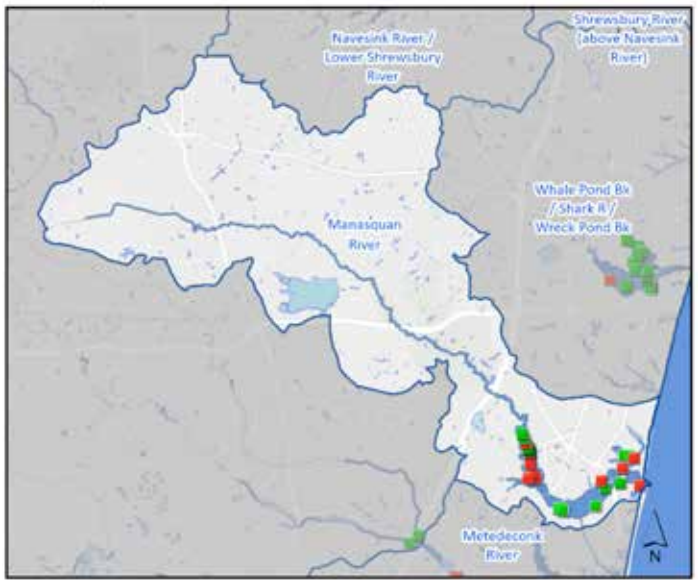
Upland Suitability:

Sediments within the NJDOT Upper Manasquan River channel and the lagoon system south of Watsons Creek (NJDOT Shermans Creek channel) contain levels of arsenic at concentrations that will make the dredged material potentially unsuitable for upland beneficial use. The sediments within the northeast portion of the watershed - NJDOT Manasquan Yacht Club, Crabtown Creek and Shermans Creek channels, the southeast portion of the watershed (NJDOT Cooks Creek channel), and the southern reach of the NJDOT Upper Manasquan River channel - may contain levels of dieldrin (due to elevated detection levels in the samples) that may make the dredged material potentially unsuitable for upland beneficial use. Additional sampling will likely be required. Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

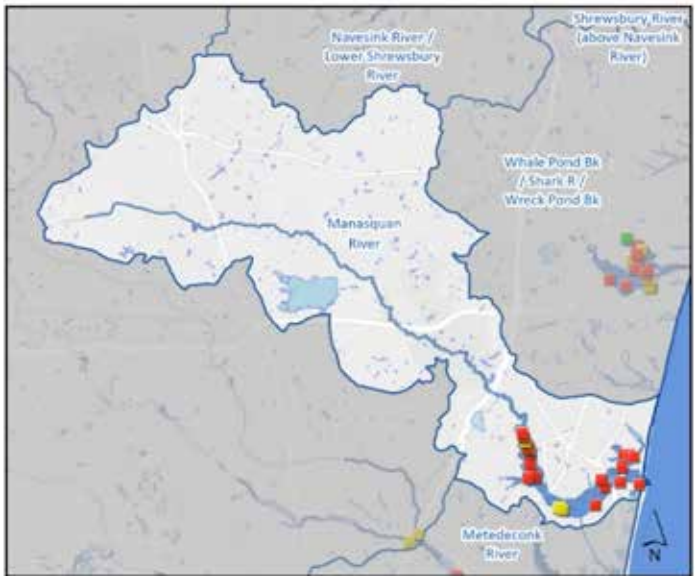
Aquatic Suitability:

The sediments in the northeast portion of the watershed, within Watsons Creek and Robert Swamp Brook, contain mercury at levels that will render the dredged material potentially unsuitable for aquatic/habitat beneficial use. It also appears that sediments within the entire watershed contain levels of 4,4′-DDT and its metabolites (4,4′-DDD and 4,4′-DDE) at concentrations that will make the dredged material potentially unsuitable for aquatic/habitat beneficial use. Additional sampling will likely be required.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Metedeconk River (5)

Upland Suitability:

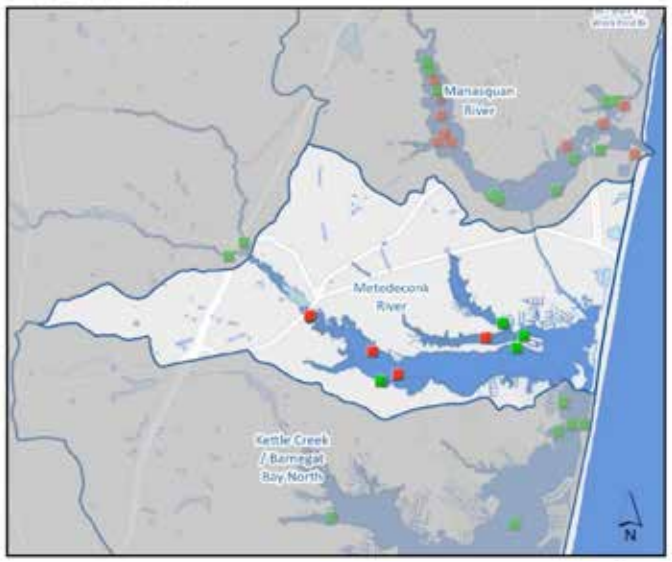
Very large spatial data gaps limit the conclusions that can be made in this watershed. The sediments within the upper northwest reaches of the Metedeconk River appear to contain benzo(a)pyrene at levels that will make the dredged material potentially unsuitable for upland beneficial use. Marina sediments in the southwest reaches of the Metedeconk River appear to contain arsenic at levels that will make the dredged material potentially unsuitable for upland beneficial use but this will need to be determined through additional sampling as appropriate. In addition, sediments within Beaverdam Creek appear to contain levels of PCBs are potentially unsuitable for upland beneficial use.

Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

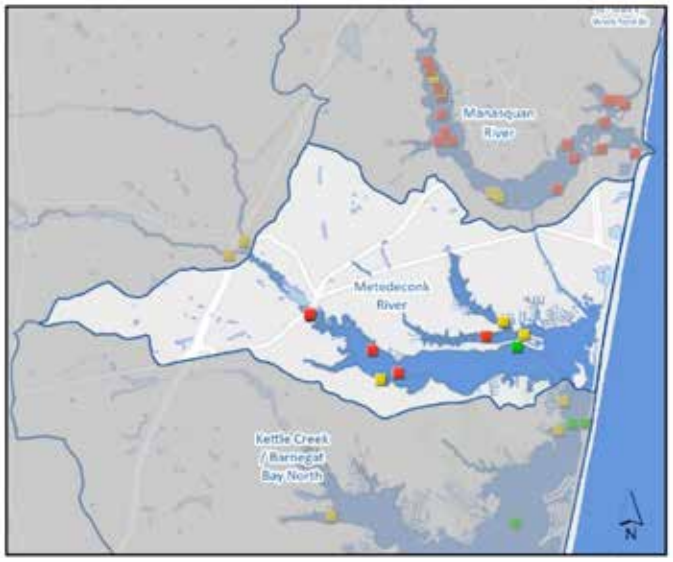
Aquatic Suitability:

The sediments in the northwest and marina sediments in the southwest reaches of the Metedeconk River do appear to contain levels of 4,4′-DDT and its metabolites (4,4′-DDD and 4,4′-DDE) at concentrations that are potentially unsuitable for aquatic/habitat beneficial use likely triggering additional sampling requirements. In addition, sediments within Beaverdam Creek and marina sediments in the southwest reaches of the Metedeconk River appear to contain levels of PCBs that are potentially unsuitable for aquatic/habitat beneficial use. There also appears to be mercury at levels potentially unsuitable for aquatic/habitat beneficial use from marina sediments in the southwest portion of the Metedeconk. Additional sampling will likely be required for these contaminates in this area.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Kettle Creek/Barnegat Bay North (6)

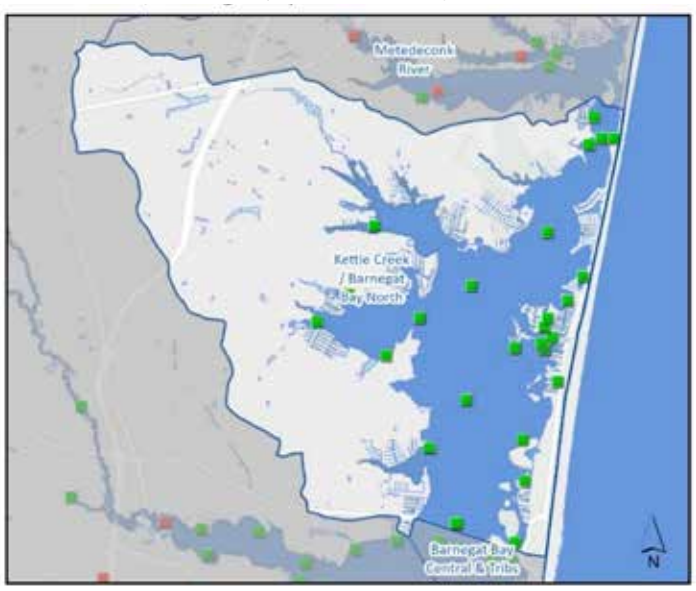
Upland Suitability:

Sediments within this watershed appear to be likely suitable for upland beneficial use, except for those in/near marinas (due to PAH contamination).

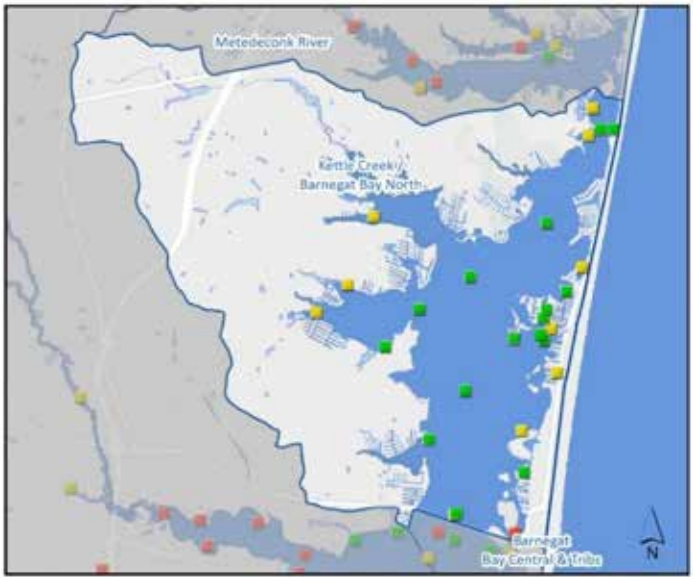
Aquatic Suitability:

Sediments within this watershed appear to be likely suitable for aquatic/habitat beneficial use, except for marina sediments near the southeast portion of the Lavallette Beach NJDOT Channel that appear to contain levels of 4,4'-DDT that will make the dredged material potentially unsuitable for aquatic/habitat beneficial use depending on results of additional sampling that may be required and the characterization of sediments at the placement location.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Barnegat Bay Central & Tribs (7)

Upland Suitability:

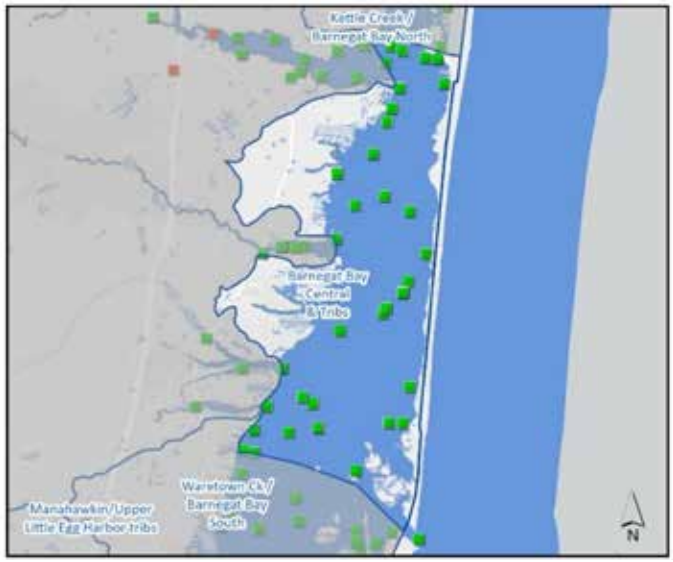
Sediments within this watershed appear to be likely suitable for upland beneficial use.

Aquatic Suitability:

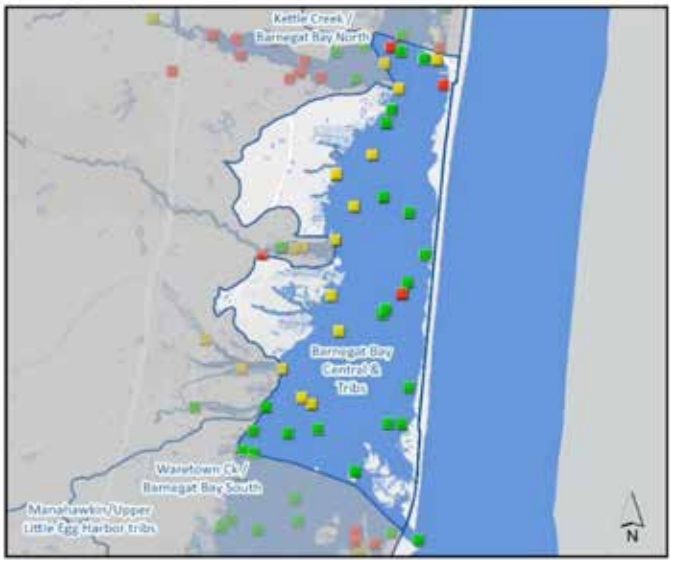
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

The sediments in the most northern portion of the watershed appear to contain levels of mercury and 4,4′-DDT that will require additional sampling to determine whether the dredged material is potentially unsuitable for aquatic/habitat beneficial use. In addition, sediments in the east-central portion of the watershed, in an area known as the Prior Channel, appear to contain levels of mercury that are potentially unsuitable for aquatic/habitat beneficial use that will likely require additional sampling. The remaining areas of the watershed appear to contain sediments that are likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Waretown Ck/Barnegat Bay South (8)

Upland Suitability:

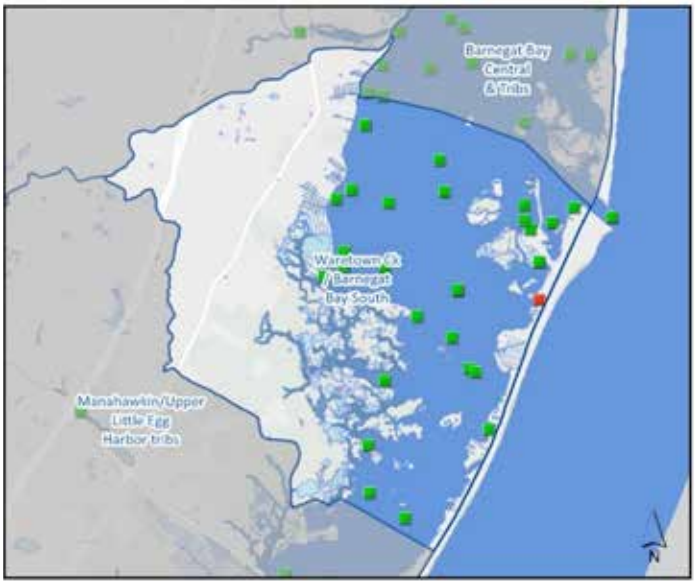
All sediments within this watershed appear to be likely suitable for upland beneficial use, except for sediments in lagoon outfalls in Loveladies which may contain levels of PCBs (due to elevated detection limits) that may make the dredged material potentially unsuitable for upland beneficial use.

Aquatic Suitability:

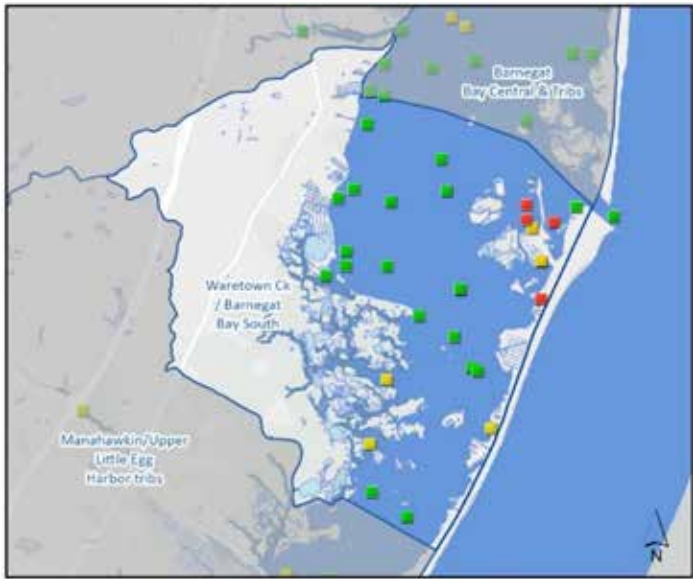
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

The sediments in the northeast portion of the watershed may contain levels of 4,4'-DDT that are potentially unsuitable for aquatic/habitat beneficial use (due to elevated detection limits in most of the samples). Sediments in the lagoon outfalls located in Loveladies appear to contain levels of PCBs that will make the dredged material potentially unsuitable for aquatic/habitat beneficial use. The remaining portions of the watershed appear to contain sediments that are likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Manahawkin/Upper Little Egg Harbor Tribs (9)

Upland Suitability:

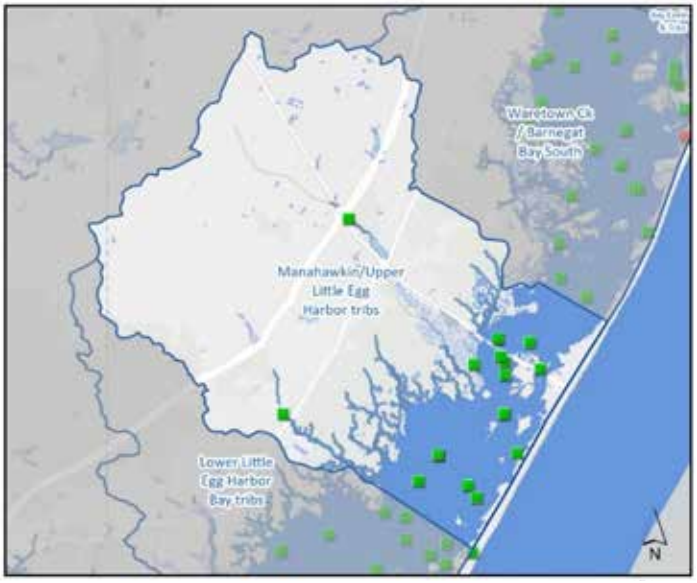
Sediments within this watershed appear to be likely suitable for upland beneficial use.

Aquatic Suitability:

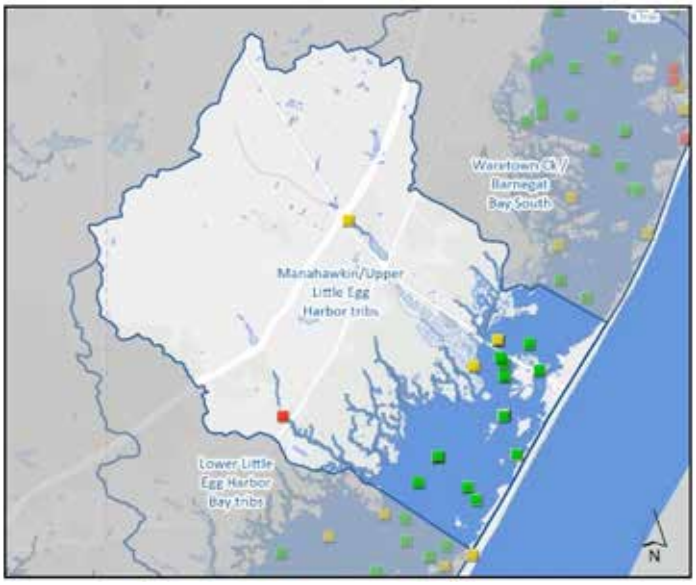
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

The sediments within the upper reaches of Westecunk Creek appear to contain levels of 4,4′-DDT and its metabolites (4,4′-DDD and 4,4′-DDE) at concentrations that will make the dredged material potentially unsuitable for aquatic/habitat beneficial use. The remaining portions of the watershed appear to contain sediments that are likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Lower Little Egg Harbor Bay Tribs (10)

Upland Suitability:

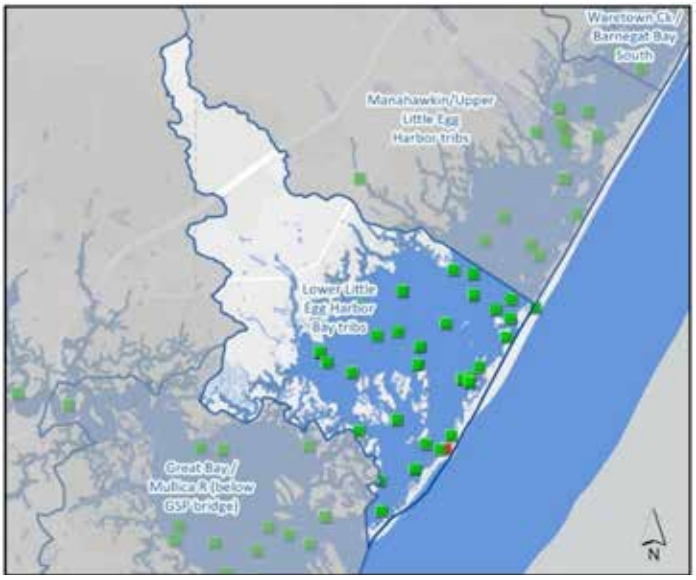
Sediments within this watershed appear to be likely suitable for upland beneficial use, except for marina sediments in the southeast portion of the watershed that appear to contain levels of benzo(a)pyrene that are potentially unsuitable for upland beneficial use and will require additional sampling.

Aquatic Suitability:

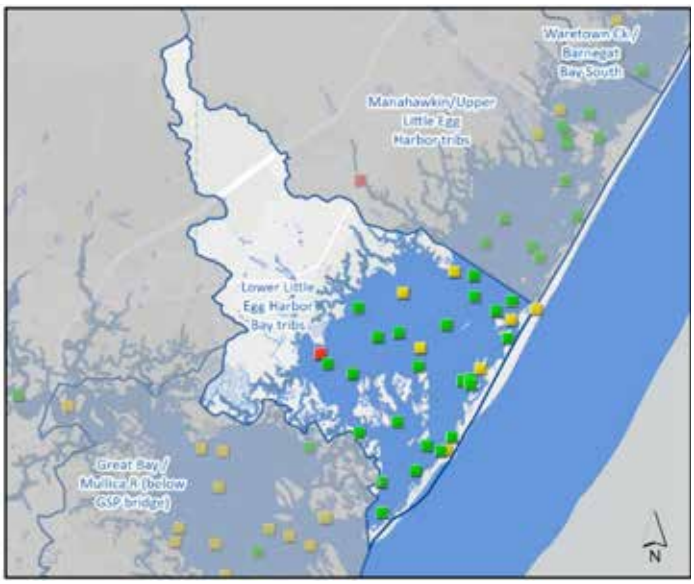
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

The sediments in the western portion of the watershed near Tuckerton Creek appear to contain levels of 4,4′-DDT at concentrations that will make the dredged material potentially unsuitable for aquatic/habitat beneficial use. The remaining portions of the watershed appear to contain sediments that are likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Great Bay/ Mullica R (Below Gsp Bridge) (11)

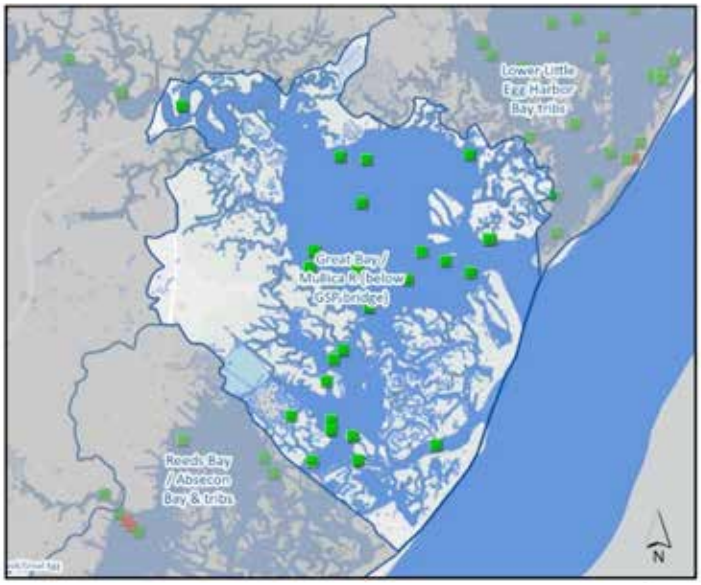
Upland Suitability:

Sediments within this watershed appear to be likely suitable for upland beneficial use.

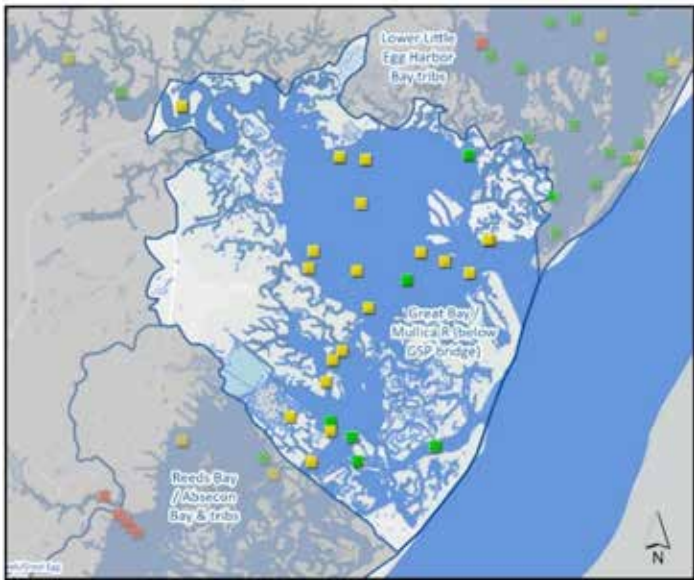
Aquatic Suitability:

Sediments within this watershed appear to be likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Reeds Bay/Absecon Bay & Tribs (12)

Upland Suitability:

The bay sediments in the NJDOT Absecon Creek channel appear to contain arsenic and PCBs (due to elevated detection limits in most of the samples) at levels that are potentially unsuitable for upland beneficial use. Sediments within Great Thorofare, around the Route 40 bridge, appear to contain benzo(a)pyrene at levels that are potentially unsuitable for upland beneficial use. Dredged material placement in these areas will likely required additional sampling.

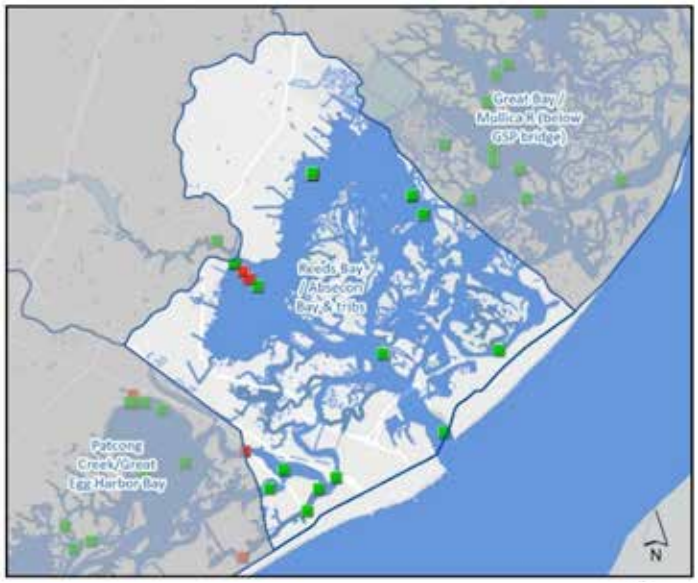
The remaining portions of the watershed appear to have sediments that are likely suitable for upland beneficial use.

Aquatic Suitability:

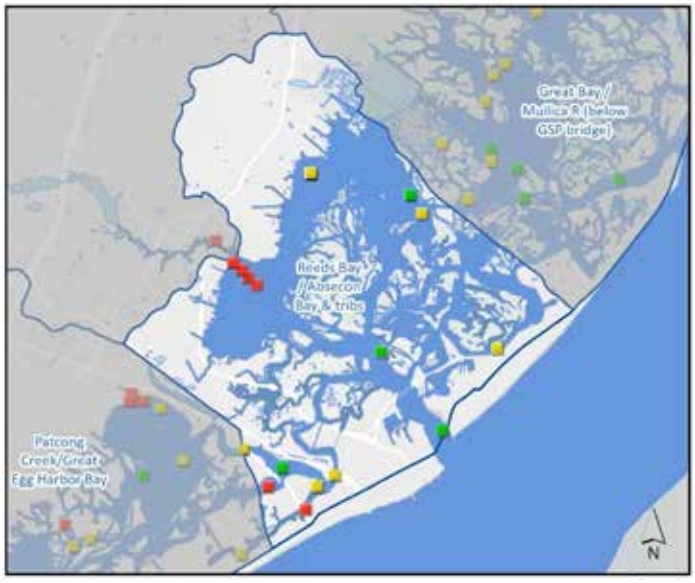
Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization. The sediments in Beach Thorofare appear to contain levels of cadmium that are potentially unsuitable for aquatic/habitat beneficial use. Additional sampling will likely be required.

The remaining sediments in this watershed are likely suitable for aquatic/habitat beneficial use.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

Patcong Creek/Great Egg Harbor Bay (13)

Upland Suitability:

Lagoon sediments within Inside Thorofare, located in the northeast portion of the watershed, appear to contain arsenic and benzo(a)pyrene at levels that are potentially unsuitable for upland beneficial use and will likely require additional sampling. Lagoon sediments adjacent to Beach Thorofare, located in the southeast portion of the watershed - and sediments in the southwest portion of the watershed, adjacent to the former B.L. England Generating Station - appear to contain arsenic at levels that are potentially unsuitable for upland beneficial use. The sediments within the NJDOT Tunis Basin channel, located in the northwest portion of the watershed, appear to have levels of PCBs - and may have levels of dieldrin (due to elevated detection limits) - that are potentially unsuitable for upland beneficial use. Marina sediments north of the NJDOT Ship channel, located east of the State Highway 52 bridge, may have levels of PCBs (due to elevated detection levels) that are potentially unsuitable for aquatic/habitat beneficial use.

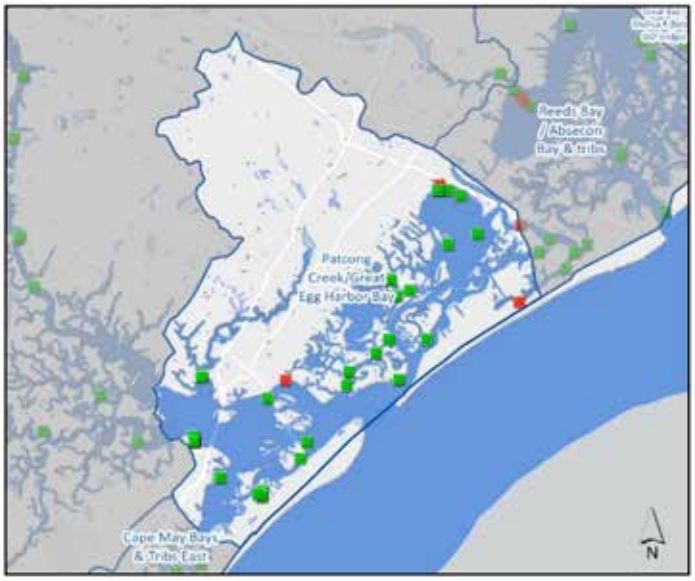
Aquatic Suitability:

Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization.

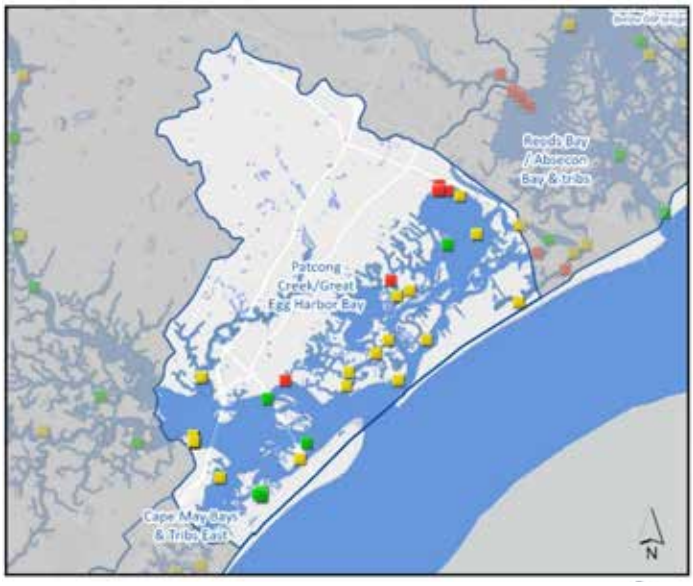
The sediments within the NJDOT Tunis Basin channel, located in the northern portion of the watershed, appear to have levels of PCBs and may have levels of 4,4'-DDT/DDE/DDD (due to elevated detection limits) that are potentially unsuitable for aquatic/habitat beneficial use. Marina sediments north of the NJDOT Ship channel, located east of the State Highway 52 bridge, contain levels of mercury and may contain levels of PCBs (due to elevated detection limits) that are potentially unsuitable for aquatic/habitat beneficial use.

Additional sampling will likely be required in these areas for these contaminates.

Upland Suitability



Aquatic Suitability



0 2 4 Miles

Historic Sediment Data (2001-2015)
Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)
Category 0 | Category 1 | Category 2

Cape May Bays & Tribs East (14)

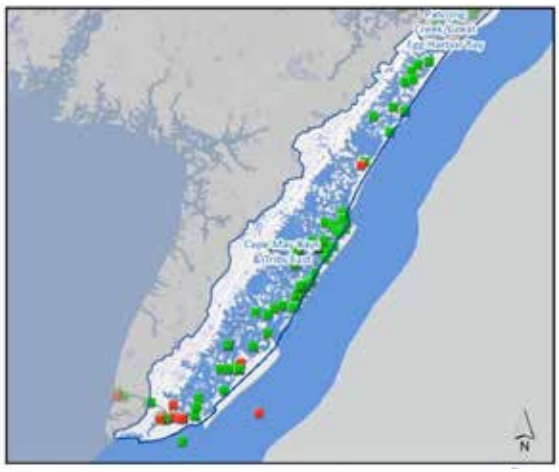
Upland Suitability:

Suitability for upland placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization. Sediments within the NJDOT Post Creek channel and near the USGS training center, located south of the Cape May inlet, appear to contain levels of arsenic that are potentially unsuitable for upland beneficial use. Marina sediments to the east of the NJ-109 Cape May Canal bridge and sediments near the USGS training center contain levels of benzo(a)pyrene that are potentially unsuitable for upland beneficial use. Sediments in the NJDOT Spicers Creek channel may contain levels of benzo(a)pyrene (due to elevated detection limits) that are potentially unsuitable for upland beneficial use. Marina sediments to the east of the NJ-109 Cape May Canal bridge may contain levels of dieldrin (due to elevated detection limits) that are potentially unsuitable for upland beneficial use. Marina sediments around the NJDOT Schellengers Creek-Cape Island Creek channel complexes, marina sediments to the east of the NJ-109 Cape May Canal bridge, and marina sediments adjacent to Ludlam Thorofare may contain levels of PCBs (due to elevated detection limits) that are potentially unsuitable for upland beneficial use.

Aquatic Suitability:

Suitability for aquatic placement of dredged material will be determined by project specific sampling, proposed best management practices and comparison of dredged material and placement location characterization. Sediments to the north of the Avalon Boulevard bridge are likely suitable for aquatic/habitat beneficial use, except for marina sediments adjacent to Ludlam Thorofare which may contain levels of PCBs (due to elevated detection limits). Marina sediments around the NJDOT Schellengers Creek-Cape Island Creek channel complexes and marina sediments to the east of the NJ-109 Cape May Canal bridge may contain levels of levels of PCBs (due to elevated detection limits) that are potentially unsuitable for aquatic/habitat beneficial use. Sediments within the NJDOT Whale Harbor-Gravens channel complex, located to the south of the Avalon Boulevard bridge, appear to have levels of 4,4′-DDT that are potentially unsuitable for aquatic/habitat beneficial use. Sediments within Stone Harbor Hole (Paradise Bay & Sanctuary Bay), south of the Stone Harbor Boulevard bridge, may have levels of 4,4′-DDT (due to elevated detection limits) that are potentially unsuitable for aquatic/habitat beneficial use. Marina sediments south of the Wildwood Boulevard Bridge may have levels of 4,4′-DDT/DDE/DDD (due to elevated detection limits) that are potentially unsuitable for aquatic/habitat beneficial use. Sediments within the NJDOT Middle Thorofare Lagoon appear to have levels of 4,4′-DDT that are potentially unsuitable for aquatic/ habitat use. Marina sediments around the NJDOT Schellengers Creek-Cape Island Creek channel complexes and marina sediments to the east of the NJ-109 Cape May Canal bridge Cape May Harbor may contain levels of 4,4′- DDT/DDE/DDD (due to elevated detection limits) that are potentially unsuitable for aquatic/habitat beneficial use.

Upland Suitability



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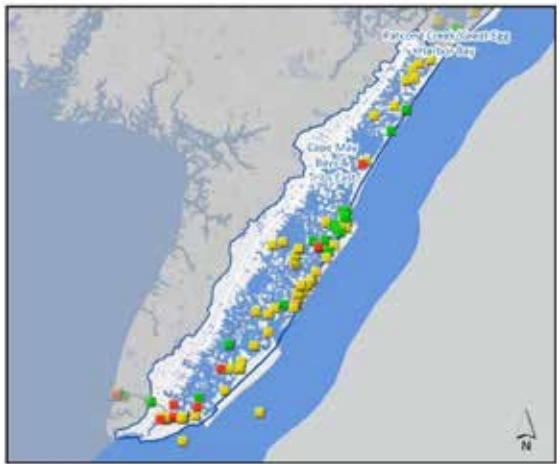

0 2 4 Miles

Historic Sediment Data (2001-2015)

Atlantic Coastal Zone Watershed | Likely Suitable Upland | Unlikely Suitable Upland

Aquatic Suitability (2001-2015)

Category 0 | Category 1 | Category 2

NJDEP Initiatives

Significant gaps were identified in the way sediment/water data for tidal dredging projects are submitted, processed, stored, and made available for regulatory and public use. We are actively working on the following short and long-term initiatives at the NJDEP:

- Modernization of the Sediment Sampling and Analysis (SSAP) form which is the starting point for all dredging projects. The SSAP is a Department-approved sampling scheme designed to adequately characterize the materials that are proposed to be dredged for a project.
- The creation of standardized tables for sediment data to ensure the format of the data is uniform and can be easily processed. Applicants will be strongly encouraged to use these standard tables, pending revisions to the regulations to make the use of standardized tables a requirement.
- The development of an electronic sediment database to manage, QA/QC, and store sediment data packages that can be easily accessed by regulators and the public.
- The creation of a publicly available GIS layer to spatially view sediment data for planning purposes. This layer is intended to be updated periodically with the sediment data submitted with permit applications to dredge. This tool can be used to match dredge sites with potential placement sites.

Sources

NJ DEP. (1997, October). *The Management and Regulation of Dredging Activities and Dredged Material Disposal in New Jersey's Tidal Waters.* NJ DEP Coastal Management Program. Retrieved June 2, 2021, from https://www.nj.gov/dep/cmp/analysis_dredging.pdf

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- https://www.nj.gov/drbc/library/documents/RSMPaug2013appendices.pdf
- NJDEP Ecological Screening Criteria
- NJ-GeoWeb