Primary Goals of Dredging Plan

- Reduction of existing nutrients within the lake
  - Phosphorous

- Management of nuisance aquatic vegetation
  - Eurasian Water-Milfoil
  - Carolina Fanwort
  - Pondweed

- Increase in Capacity
  - Nearly 200 Million Gallons
Primary Goals of Dredging Plan

- Improvements in Navigation
  - Increase in depth of main channels

- Facilitation of ongoing lake management activities
  - Draw-downs
Dredging Locations

- Browns Point/Belcher Creek Area
- Outlet Dam
- Rocky Cove
- Unnamed Cove
- Fox Island
- Storms Island
Browns Point/Belcher Creek

- Primary Candidate for Dredging

- Average water depth is 5-6 feet
  - 3 feet at waters edge and Creek entrance
  - Creek is 6 feet at center & 2 feet at edges

- Known significant source of nutrients
  - Contains organic-rich sediments
Browns Point/Belcher Creek

- Ongoing Aquatic Vegetation Impacts

- Known Navigation Issues
  - Shallow depths & Aquatic Vegetation

- Largest Candidate Area
  - Would result in significant capacity increase
Outlet Dam

- Ranked Priority 2
- Outlet to Wanaque River
- Depths between 6-10 feet
  - 2-4 feet in closer proximity to dam
Outlet Dam

- Dam is critical for control of lake levels during draw-downs
  - Water Level Management
  - Drawdown activities benefit entire lake community

- Boating activity is greater than other coves
Rocky Cove

- Ranked Priority 3
- Average depth of 5-6 feet
  - 3-4 feet at edge of cove
  - 6 foot depth at entrance to cove
- Impacted by Aquatic Vegetation
  - Contributes to Sediment Accumulation
  - Increase in organic material due to weed die-offs
Unnamed Cove

- Ranked Priority 4
- Directly North of Rocky Cove
- Depths of 5-6 feet at entrance
  - 2.5 – 3 foot depths at shoreline
- Impacted by Aquatic Vegetation
  - Contributes to Sediment Accumulation
  - Increase in organic material due to weed die-offs
Fox Island Channel

- Ranked Priority Number 5

- Second Largest Area surveyed

- Depths range from 6 – 8 feet
  - 5 foot depths near shore
  - Deep hole in middle of channel between 10 – 14 feet
Fox Island Channel

- Dredging would result in improvements in existing navigation depths
- Increased Lake Capacity
Storms Island Channel

- Ranked Priority 6
- Most Northern Area Studied
- Depths between 6-7 feet at center and entrance
  - 2 – 3 feet at edge of island and shore
- Dredging would result in improvements in existing navigation depths
- Increased Lake Capacity
Proposed Methods of Dredging
Mechanical Dredging

- Recommended Method

- Use of Clamshell Bucket

- Allows dredging to occur in limited access areas

- Multiple transportation and re-handling options
Mechanical Dredging

- Equipment would be transferred to sites through use of a Flexi-Float work platform system
- Material will be placed into 20-30yd cubic scows for transport to lakefront area
  - Direct transfer to trucks or roll-off container
Hydraulic Dredging

- Not Recommended
- Requires access to a pipeline route
  - 2 road crossings
  - 6 private driveway crossings
  - 3 miles
- Requires access to near-shore facility
  - Tilcon Quarry is only suitable location
    - Long distance is required
Hydraulic Dredging

- Safety Concerns
  - Pipe breakage on private and public property
  - Pipe clogging
- Handling Issues and Costs
  - Risk of Claims from general public & contractor
  - Associated costs would be prohibitive
Dredging in the Dry

- Not Recommended
- Temporary Reinforcement Fingers
  - Material must be brought in and transported to sites
  - Costly & Labor Intensive
Dredging in the Dry

- **Weather**
  - Temperature is unpredictable
    - Equipment loss & Longer project duration
- **Subsurface Conditions**
  - Must occur during winter when lake drawdown is greatest
  - Uneven lake bottom
  - Several deep holes would not be fully dry
Materials Management
Processing/Drying/Stabilization

- Geotubes
  - Insufficient Space
  - Cost Prohibitive
- Near-Shore Drying Beds
  - Insufficient Space
- Pug-Mill Stabilization
  - Multiple Handling of Material
- Direct Transfer to off-site Location
  - Recommended
Disposal/Management/Reuse

- Upland Disposal
- Beneficial Reuse
- Land Reclamation
- Habitat Creation
Upland Disposal

- Disposal outside limits of lake

- Water in material would naturally evaporate or percolate into surrounding soils

- Location would be several acres
  - Near shore of Lake
Beneficial Re-Use

- Defined as Using Material for environmental enhancement or a product to be sold
- Blending the material with yard compost to develop a material suitable for use by the municipality or residents
- Hauling material to neighboring farms located in Sussex County, New Jersey and Orange County, New York for use as a soil amendment
Beneficial Re-Use

- Use of material by surrounding municipalities, such as the prior use of dredged material from the New York portion of the lake for fill to create new athletic fields.

- Use of the materials for daily cover at local landfills
Land Reclamation

- Construction Purposes
  - Houses
  - Buildings
  - Highways
  - Golf Courses
  - Athletic Fields
Habitat Creation

- Sediment Can Be Used:
  - Riparian Areas
  - Segments of Tributaries and Streams
  - Shoreline Restoration and Stabilization
    - Improve Habitat Conditions
    - Reduce Erosion
    - Improve aesthetic quality
Habitat Creation

- Wetland Creation
  - Can Serve as filter to trap nutrients going into lake
  - Can help to elongate the overall benefits of dredging

- Upland Areas
  - Development of Jungle Habitat Site into a recreational Complex
Staging--Processing--Management Sites
Constraints

- Limited Waterfront Access
  - Developed
  - Occupied
  - Residential Homes
  - Marinas
  - Restaurants
- Roads
  - Run the length of Lake on both sides
- Elevation Changes
Sites Evaluated

- **Equipment Staging**
  - Locations that would be suitable for providing initial access into lake and/or the offloading of dredged material into trucks

- **Materials Processing**
  - Locations that may be suitable to the processing of dredged materials. (I.E – Drying / Stabilizing

- **Materials Management**
  - Potential end – use of materials
Site Requirements for Mechanical Dredging

- Deep Water Access (greater than 5 feet) to a sturdy bulkhead for tying off barges
- Access for multiple trucks entering and leaving site and ability to maneuver within property
- Safe Access onto roadways
Site Requirements for Mechanical Dredging

- Private Property Zoned for Commercial purposes
- Areas not located in wetlands or environmentally sensitive areas
- Areas located away from residential use due to noise and traffic associated with trucks and the loading and unloading of materials
## Potential Use of Proposed Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Staging</th>
<th>Processing</th>
<th>Material Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenwood Lake Marina</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Sportsman’s Marina</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Moosehead Marina</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Greenwood Small Craft Marina</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Shore Marina</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Browns Point Park</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tilcon Ringwood Quarry</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>West Milford Yard</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Waste Composting Facility</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Potential Use of Proposed Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Staging</th>
<th>Processing</th>
<th>Material Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evergreen Farms</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Wallich Estates</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Horse Farm</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Fox Island Landing</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm Island Landing</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Bowling Alley</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Vacant Parcel (Pinecliff Lake)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Belcher Creek Condos</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacDonald Road</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Primary Sites of Interest

- **Staging**
  - Greenwood Lake Marina
  - Sportsmans Marina
  - Moosehead Marina
  - South Shore Marina
  - Browns Point Park
Primary Sites of Interest

- Material Management
  - Tilcon Ringwood Quarry
  - Wallisch Estates
  - Evergreen Farms
  - Horse Farm on State Route 513 (Lakeside Road)
Environmental Permitting Requirements

- Federal & State Agencies
- United States Army Corps of Engineers (USACE)
- New Jersey Department of Environmental Protection (NJDEP)
- New York State Department of Environmental Conservation (NYSDEC)
United States Army Corps of Engineers

Section 10 Permit

- Section 10 Rivers and Harbors Act of 1899
- Construction Activities within Navigable Waters
- No Fees
- No Certification/Authorization Requirements
- Public Notice Required
United States Fish and Wildlife Service

Consultation Permit
- Section 7(a)(2) of the Endangered Species Act
- Required for proposed activities that may have an effect on threatened and/or endangered species
- No Certification/Authorization Requirements
- No Fees
- No Public Notice Required
New Jersey Department of Environmental Protection

- Highlands Applicability and Water Quality Management Plan Consistency Determination Permit
  - Highlands Water Protection and Planning Act (N.J.S.A. 13:20-1 et. seq.)
  - Required for all major Highlands Development in Preservation Area unless Exempt
  - Site plans must be certified by licensed NJ Professional Engineer
  - $100 for individual applicants proposing improvements costing $100,000 or less; or $750
  - Public Notice Required
New Jersey Department of Environmental Protection

Highlands Preservation Area Approval

- Required to undertake any activity in the Highlands Preservation Area
- Site plans must be certified by licensed NJ Professional Engineer; Notarized Permit Form
- Fee is dependent on alternatives selected
- Public Notice Required
New Jersey Department of Environmental Protection

- Flood Hazard Area Permit
  - Required for disturbance to land and vegetation within the flood hazard area of a regulated waterbody
  - Site plans must be certified by licensed NJ Professional Engineer; Notarized Permit Form
  - $1000 plus $100 for each 100 feet
  - Public Notice Required
New Jersey Department of Environmental Protection

- Green Acres Program Application
  - Required to preserve areas of open space for recreation and public use
  - No Certification/Authorization Requirements
  - No Fees
  - No Public Notice Required
New Jersey Department of Environmental Protection

- Dam Safety Permit
  - Required for all work conducted within 200 feet of a dam
  - Licensed NJ Professional Engineer must sign off on site plans and certify that dredging will not compromise safety of the dam
  - No Fees
  - No Public Notice Required
New Jersey Department of Environmental Protection

Acceptable Use Determination Permit

- Required for use or transfer of dredged material
- Site plans certified by licensed NJ professional Engineer; Approved sampling program
- No Fees
- No Public Notice Required
New Jersey Natural Heritage Program

- Consultation Permit
  - Required to determine the presence or absence of any rare, threatened, or endangered species
  - No Certification/Authorization Requirements
  - 70\$ per hour for review service
  - No Public Notice Required
New York State Department of Environmental Conservation

Beneficial Use Determination Permit

- New York State Solid Waste Management Regulations (6 NYCRR Part 360)
- Required to determine the suitability of dredged materials for re-use
- Description of proposed use and approved sediment/material sampling program required
- No Fees
- No Public Notice Required