The Future of NYS Ferry System

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Current NYS Ferries System
Magnitude & Demand

• Historically one of the largest ferry system in nation;
• Largest annual ridership in nation;
• One of the largest number of ferry operators, ferry landings/terminals, routes and number of boats in service;
• Three major routes with interstate highway connections with significant vehicular traffic;
• Ferry spreads across all NYS:
  - NYC Harbor;
  - Long Island;
  - Hudson Valley;
  - Upstate North;
  - Upstate West
NYS Ferry System: LI/ Hudson Valley/ Lake Champlain
### NYC Harbor Statistics
(Well-known operators)

<table>
<thead>
<tr>
<th>Operator</th>
<th>Ridership 2014</th>
<th>Ridership 2015</th>
<th>NYS Trip origin 2015</th>
<th>Other States origin</th>
<th># of Routes* (*NCFO designation)</th>
<th># of NYS Landings/Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYCDOT Staten Island ferry</td>
<td>21,911,536</td>
<td>23,066,963</td>
<td>23,066,963</td>
<td>none</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>NYWaterway &amp; Billy Bey (w/o East River)</td>
<td>7,121,466</td>
<td>7,065,511</td>
<td>3,532,756</td>
<td>3,532,756</td>
<td>34</td>
<td>3 (WFC, Pier 11, W39th Str.)</td>
</tr>
<tr>
<td>NYWaterway (East River)</td>
<td>1,284,632</td>
<td>1,467,860</td>
<td>1,467,860</td>
<td>none</td>
<td>12</td>
<td>7*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*6 new</td>
</tr>
<tr>
<td>Seastreak</td>
<td>878,955</td>
<td>935,693</td>
<td>467,846</td>
<td>467,846</td>
<td>6</td>
<td>2*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*0 new</td>
</tr>
<tr>
<td>Liberty Water Taxi</td>
<td>232,171</td>
<td>224,402</td>
<td>112,201</td>
<td>112,201</td>
<td>2</td>
<td>1*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*0 new</td>
</tr>
<tr>
<td>NY Water Taxi</td>
<td>645,065</td>
<td>626,306</td>
<td>626,306</td>
<td>none</td>
<td>12</td>
<td>8*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*6 new</td>
</tr>
</tbody>
</table>
# NYC Harbor Statistics
(additional operators)

<table>
<thead>
<tr>
<th>Operator</th>
<th>Ridership 2014</th>
<th>Ridership 2015</th>
<th>NYS Trip origin 2015</th>
<th>Other States origin</th>
<th># of Routes</th>
<th># of NYS Landings/Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPS (Liberty/ Ellis Island)</td>
<td>12,596,499</td>
<td>12,837,060</td>
<td>10,574,217</td>
<td>2,262,843</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Governors Island</td>
<td>576,897</td>
<td>576,788</td>
<td>576,788</td>
<td>none</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total NYC Harbor</td>
<td>45,247,221</td>
<td>45,247,221</td>
<td>40,424,937</td>
<td>6,375,646</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>
## Long Island Ferry System (intrastate)

<table>
<thead>
<tr>
<th>Operator</th>
<th>Ridership 2013</th>
<th>Ridership 2014</th>
<th>NYS Trip origin 2013</th>
<th>Other States origin 2013</th>
<th># of Routes* (*NCFO designation)</th>
<th># of NYS Landings/Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Island Ferries, Inc.</td>
<td>1,800,000</td>
<td>1,800,000</td>
<td>none</td>
<td></td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Fire Island Ferries, Water Taxi</td>
<td>84,149</td>
<td>80,214</td>
<td>84,149</td>
<td>none</td>
<td>14</td>
<td>8*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*0 new</td>
<td></td>
</tr>
<tr>
<td>Sayville Ferry Service</td>
<td>434,388</td>
<td>434,388</td>
<td>none</td>
<td></td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Davis Park Ferry, Co.</td>
<td>56,950</td>
<td>56,950</td>
<td>none</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Bay Point Navigation Corp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Ferry Company, Inc.</td>
<td>1,345,288</td>
<td>1,345,288</td>
<td>732,234 (auto)</td>
<td>732,234 (auto)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>South Ferry, Inc.</td>
<td>1,142,884</td>
<td>1,142,884</td>
<td>719,302 (auto)</td>
<td>719,302 (auto)</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
# Long Island Ferry System (interstate)

<table>
<thead>
<tr>
<th>Operator</th>
<th>Ridership 2013</th>
<th>Ridership 2014</th>
<th>NYS Trip origin 2013</th>
<th>Other States origin 2013</th>
<th># of Routes* (*NCFO designation)</th>
<th># of NYS Landings/Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Sound Ferry Services Inc.</td>
<td>1,099,820</td>
<td>1,126,000</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>425,000 (auto)</td>
<td>462,000 (auto)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridgeport Port Jefferson Steamboat Co.</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>426,000 (auto)</td>
<td>426,000 (auto)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishers Island Ferry District</td>
<td>125,398</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>38,610 (auto)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viking Superstar*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total LI</td>
<td>7,088,877</td>
<td></td>
<td></td>
<td></td>
<td>27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,341,146 (auto)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* NYS trip origin includes trips originating from New York State, and Other States trip origin includes trips originating from states other than New York. The table includes the number of routes with NCFO designation and the number of New York State landings/terminals for each operator. The total ridership for Cross Sound Ferry Services Inc. includes 1,099,820 for 2013 and 1,126,000 for 2014. Bridgeport Port Jefferson Steamboat Co. has 1,000,000 riders in 2013 and 1,000,000 in 2014. Fishers Island Ferry District has 125,398 riders in 2013 and 38,610 in 2014. Viking Superstar* has 7,088,877 riders in total. The total ridership for Long Island (LI) is 7,088,877 with 2,341,146 in 2013 and 1,896,341 in 2014. The table also shows the number of New York State landings/terminals for each operator, with a total of 27.
## Hudson Valley & Upstate Ferry System

<table>
<thead>
<tr>
<th>Operator</th>
<th>Ridership 2013</th>
<th>Ridership 2014</th>
<th>NYS Trip origin 2013</th>
<th>Other States origin 2013</th>
<th># of Routes* (*NCFO designation)</th>
<th># of NYS Landings/ Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY Waterway (Haverstraw-Ossining &amp; Newburgh-Beacon)</td>
<td>194,001</td>
<td>194,001</td>
<td>none</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Lake Champlain Transportation Co.* (*est.)</td>
<td>1,700,000</td>
<td>850,000</td>
<td>850,000</td>
<td></td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1,060,000</td>
<td>530,000</td>
<td>530,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(auto)</td>
<td>(auto)</td>
<td>(auto)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fort Ti Ferry* (*est.)</td>
<td>25,000</td>
<td>12,500</td>
<td>12,500</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>15,000</td>
<td>7,500</td>
<td>7,500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horne's Ferry, Ltd.* (*est.)</td>
<td>60,000</td>
<td>30,000</td>
<td>30,000</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>20,000</td>
<td>10,000</td>
<td>10,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chautauqua Lake Historic Vessel, Co.</td>
<td>20,400</td>
<td>20,400</td>
<td>none</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5,000</td>
<td>5,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queen City Bike Ferry (Canalside-Outer harbor)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>55,000 (New in 2015)</td>
</tr>
</tbody>
</table>
Summary: Current NYS Ferry System in Numbers

- Annual number of passengers trips generated in NYS (around): **47.5M**
  - 40.425M (NYC) + 6.0M (LI) + 1.1M (upstate)
- Annual number of vehicles auto trips generated in NYS (around): **2.5M**
  - 13.8K (NYC) + 1,900K (LI) + 560K (upstate)
- Number of ferry operators: **24**
- Number of landings/ terminals: **62**
  - 22 (NYC) + 27 (LI) + 13 (upstate)
- Number of boats (about): **140**

What’s upcoming:
- Glen Cove ferry;
- Lewiston/ Youngstown to Niagara on the Lake, Canada
Current NYS Ferries System
Workforce Supply & Outcome

NYS traditionally provides strong supply of workforce for maritime industry:

Maritime institutions:
- USMMA, Kings Point
- SUNY Maritime, Bronx, NYC
- Webb Institute, Glen Cove

Major engineering institutions:
- SUNY Buffalo;
- Cornell/ Clarkson/ RPI/ Columbia, Cooper Union

Outcome:
- Number of boats built in NYS in latest decades (SIF, NY Waterway, Seastreak, Hornblower NPS, Hornblower citywide ferries): 0
- Number of shipyards in NYS: 1 (new construction- Derecktor) & 2 (dry dock & repair)
Future of the Ferries & Future of Maritime Job Market for NYS

Strong market: “The country will need 70,000 more people to support the maritime fleet by 2022” March 2016 by Maritime Administrator;

1. Reconstruction of ferry infrastructures (landings, terminals, approaching roads, P&R areas, etc.) mostly built between 1950’s – 1970’s to accommodate current and future volume and new vehicle sizes and characteristics;
   • 5 routes with significant auto crossings

2. Environmental advancement and fuel economy (LNG):
   Meet Tier IV EPA goal: LNG or Liquefied natural gas, is natural gas in a liquid form that is clear, colorless, odorless, non-corrosive, and non-toxic;

Current production capacity for LNG engines in US is: 0
Lowered Exhaust Emissions

- CO₂
- NOₓ
- SOₓ
- Particulates

Natural Gas Engine: -99% reduction
Diesel Engine: -99% reduction

Source: NYCDOT SIR (2013)
Lowered Fuel Costs

(CFY ’16 ended June 30, 2016)

Source: NYCDOT SIR (2013)
Future of the Ferries & Future of Maritime Job Market for NYS

(continue)

3. Safety of navigation & landing
   - Electronic data devices for navigation and safe system monitoring to prevent water accidents or collisions
     (August 30, 2016 collision between NY Waterway & 10 kayakers near Pier 79)
   - Land based control system at major terminals and landings: remote boat control command system operation (engine, transmission, steering systems, etc., mechanical, electronic components);
     (July 23, 2016 NY Waterway hard landing at Jersey City Pier)

4. Operation optimization.
   - Reduce manual navigation or full autonomous navigation system (driverless boats).
• Today, transit passengers use mobile devices to plan trips.
• Expansion plans underway for ferry service.
• Future subway service disruptions for repairs.
• Need for new multi-modal translation software to harmonize the data to improve connectivity for transit riders.
Using a Data Science Approach

Application Programming Interfaces (APIs)
Data Scientists reweave data strands --

Transit Service Analytics

Transit Ridership
Instead of reading every word, you can get the answer instantly by caching!
Using Event-based Logging:
Whatever you hear – you write it down!
GTFS-R to SIRI API updates with new data every 30 seconds.
Essential Ingredients

• General Transit Feed Specifications (GTFS)
  o Scheduling data as a “backbone”

• General Transit Feed Specifications – Realtime (GTFS-R)
  o From the subway system

• Service Interface for Real Time Information (SIRI)
  o From the bus system

• A data feed from ferries
Adding Ferries to the Data Network

Challenges:

• Source of machine-generated data that can track and trace ferry traffic.
• Completeness of the data source.
• Cooperation across multiple agencies and private sector players.
GTFS for Staten Island Ferries

- GTFS (https://developers.google.com/transit/gtfs/) dataset
  - Information about the ferry terminal
  - All scheduled weekday, weekend, and holiday trips
- Schedules are adjusted for heavy weather or low visibility
- Available at https://data.cityofnewyork.us/Transportation/Staten-Island-Ferry-Schedule-GTFS-/mwxp-krtu/data
GTFS Analyst Tool to “Spatialize” Text Data

http://gtfs.availabs.org
GPS from ferry passenger traces

• Trace data generated from smart phones currently collected and distributed in aggregate formats.
• Special new data products that provide origins and destinations (e.g., INRIX).
• Identify water-constrained O/D data for identifying ferry traffic.
Automatic Identification Systems (AIS)

• Contains ship’s identity, type, position, course, speed, navigational status and other safety-related information.

• Required by Coast Guard for certain types of vessels.

• Automatically transmits and receives data from appropriately equipped shore stations and other ships.

• Can be accessed through an API (requires permission).
New Sources from Autonomous Ferries

• Operations data may be capable of providing complete or partial data streams in real-time.

• Could these sources provide ship’s identity, type, position, course, speed, navigational status and other safety-related information?

• Could be made accessible through a new API.

• Could be incorporated immediately into harmonized data network.
Next Steps

• Determine interest in the region for a multi-modal transit data harmonization strategy.

• Assess the need to develop new translation software.

• Develop research experiment to evaluate and incorporate ferry feeds into existing transit data network.

• Develop sustainable structure for maintaining multi-agency data network system for the NYC region.
USE NY STATE FERRIES!