

# *New Jersey Marine Channel Usage Research & Analysis*

*presented to*  
NJDOT Research Showcase

*presented by*  
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October 17, 2018

Think  Forward

# Abstract

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- *The NJDOT Office of Maritime Resources is looking to better assess the use and economic value of New Jersey's 214 marine channels and waterways in order to prioritize future investments in dredging and other related maintenance activities. This research developed and tests a methodology to count and classify vessels on New Jersey's Marine Transportation System.*

# *Purpose*

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- Development of a better understanding of New Jersey's marine channels
  - » How should dredging investments be applied?
  - » How is marine traffic affected by different variables?
  - » Can existing marine channels safely accommodate existing boating traffic?
  
- Development of a comprehensive marine asset management system

# Evaluation of Vessel Count Methodologies

Count Methodology	Manual Observation	Manual with Still Photo	Video	Aerial Photography
Basic data (volume, direction, time of day)	✓	✓	✓	✓
Origin-Destination information	Direction Only	Direction Only	Direction Only (for ground-based video)	Full O-D Data (see note)
Classification data	✓	✓	✓	✗
Cost of field data collection	Between video and aerial	Between video and aerial	Lowest	Highest
Post-Processing Required	✓	✓	✓	✓
Ability to save raw data and use QA/QC to compensate for human error	Data collection depends on accurate entry; no ability to review or verify counts	Classification can be verified by reviewing photos, but photos must be taken and images must be clear	With archived video, both count and classification data can be reviewed and verified	Archived aerial photos can be reviewed and count data verified
Ability to archive data	(counts only)	✓	✓	✓

# Manual Count Testing

Channel Attributes	Classified Manual Counts	Manual Counts with Still Photography	Manual Counts with Record of Vessel Registration	Manual class count, Digital Photo-graphs, and Record of Vessel Registration	Video Photo-graphy (Miovision)
<ul style="list-style-type: none"> <li>Shoreline accessible</li> <li>Sight distance 0 – 300 feet</li> <li>No/low wake zone</li> </ul>	✓	✓	✓	✓	✓
<ul style="list-style-type: none"> <li>Shoreline accessible</li> <li>Sight distance 0 – 300 feet</li> <li>Medium/ high wake zone</li> </ul>	✓	Limited (dependent on resolution of digital photos)	Limited (difficult to capture vessel information on fast-moving vessels)	Limited (dependent on resolution of digital photos; difficult to capture vessel information on fast-moving vessels)	✓
<ul style="list-style-type: none"> <li>Shoreline accessible</li> <li>Sight distance &gt; 300 feet</li> <li>Varying wake zones</li> </ul>	✓ with binoculars	Manual class data only	Limited (vessel information)		
<ul style="list-style-type: none"> <li>Shoreline not accessible</li> <li>Limited or no sight distance</li> </ul>	✓ from boat				

# Vessel Classification Scheme

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- Consideration of U.S. Coast Guard, NJ Motor Vehicle Commission, and National Marine Manufacturer's Association
- A classification scheme should be easily observable to a trained observer
- Personal Watercraft
- Small Motorboat
- Large Motorboat
- Large Fishing Boat
- Small Sailboat
- Medium Sailboat
- Large Sailboat



1) Personal Watercraft



2) Small Motorboat



3) Large Motorboat



4) Large Fishing Boat



5) Small Sailboat



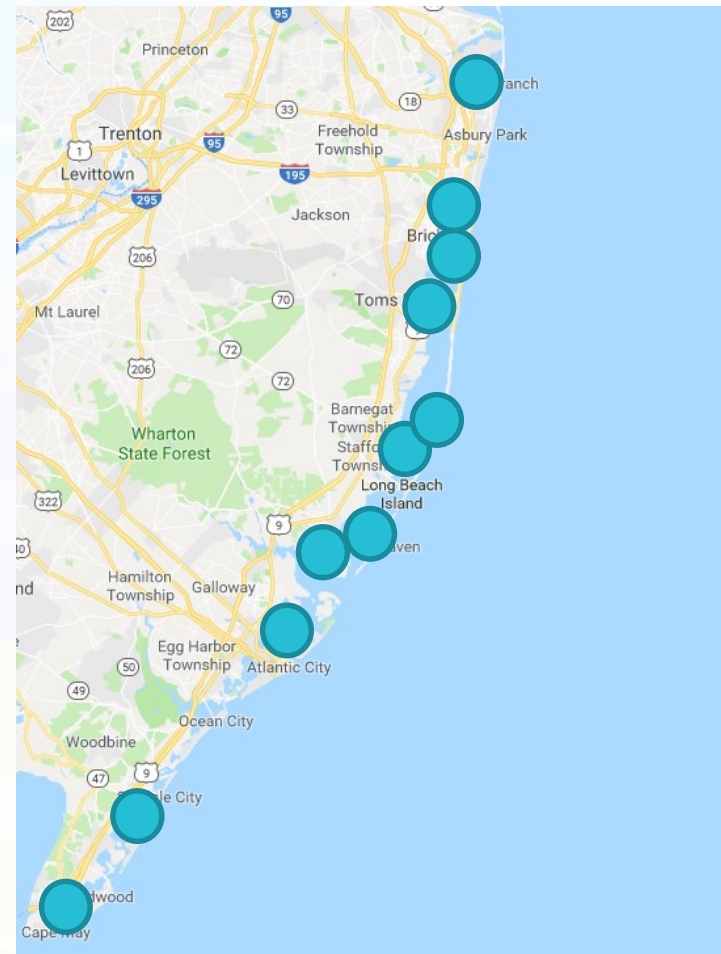
6) Medium Sailboat



7) Large Sailboat

# Procedure

- Preparation of pilot data collection
- Site visit and research
- Methodology testing
- Coordination with local officials
- Staff training
- Implementation



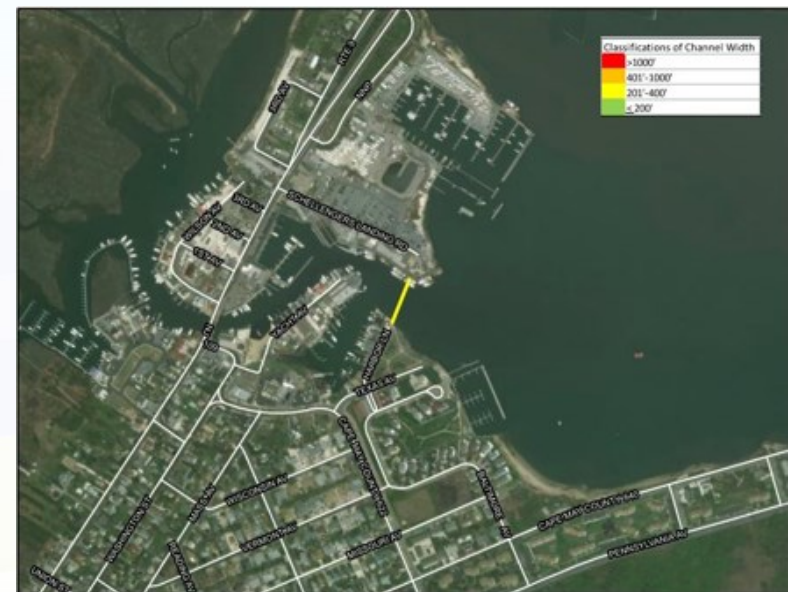


# Procedure Implementation

- Implementation of procedure across multiple field conditions



Gunner's Ditch (Wide Waterway)

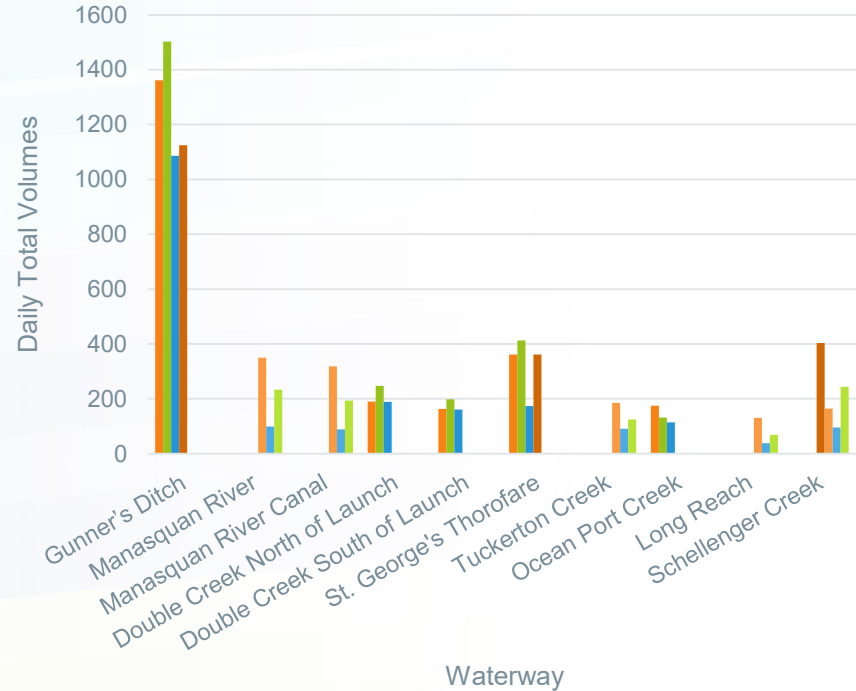
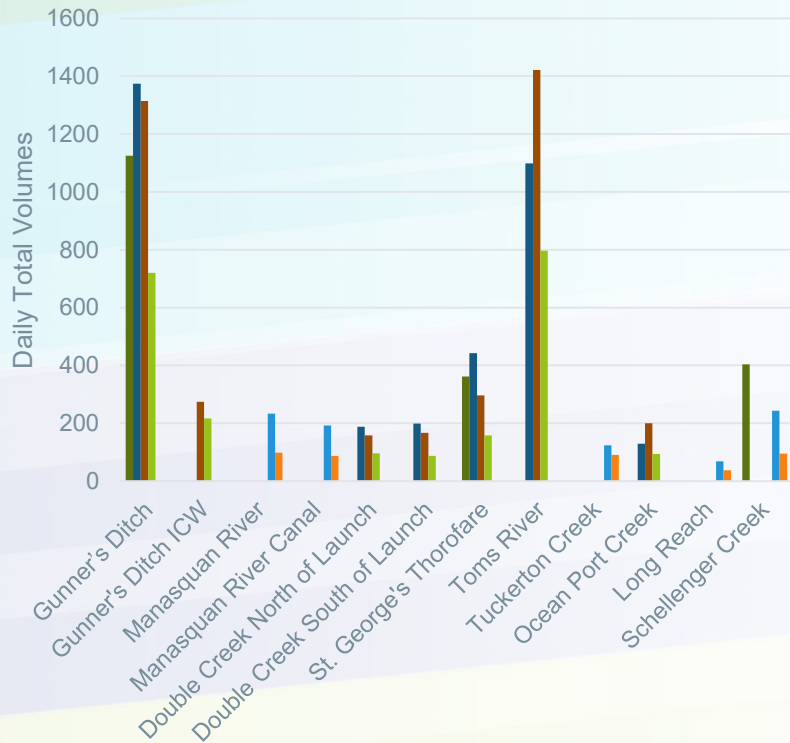


Schellenger's Creek (Narrow Waterway)

# Development of Project Waterway Classification System

Waterway	Classification	Waterway Width (in feet)	Average Daily Volume
Toms River	<b>1 (1,000 Feet + )</b>	4,975	1,106
Metedeconk River	1	2,175	1,376
Oceanport Creek	1	1,175	141
Gunner's Ditch ICW	<b>2 (400 Feet – 1,000 Feet)</b>	741	246
Liberty Thorofare	2	635	273
Gunner's Ditch	2	456	1,212
Long Reach Thorofare	2	410	79
Tuckerton Creek Channel	<b>3 (200 – 400 Feet)</b>	335	133
Manasquan River	3	325	227
Schellenger's Creek	3	291	227
Double Creek Mainland North	3	225	178
High Bar Harbor	3	215	321
Point Pleasant Canal	<b>4 ( &lt; 200 Feet)</b>	175	200
Double Creek Mainland South	4	175	163
St. George's Thorofare	4	130	303

# Holiday vs Non-Holiday Waterway Usage



Waterway

- Saturday 8/17/2013
- Friday 8/25/2017
- Saturday 6/18/2016
- Saturday 9/9/2017
- Saturday 8/26/2017
- Friday 9/8/2017

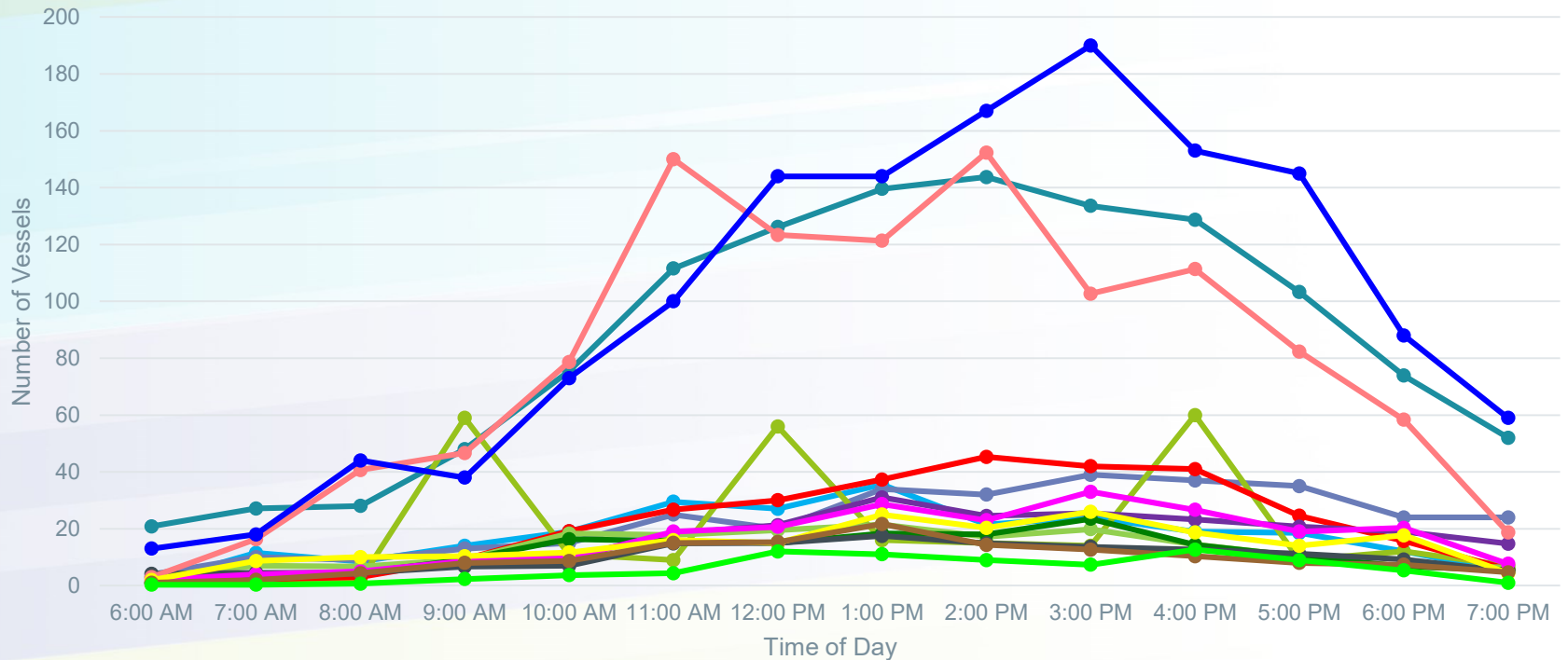
- Memorial Day Weekend Saturday 5/28/2016
- 4th of July Weekend Saturday 7/2/2016
- Memorial Day Weekend Saturday 5/27/2017
- Labor Day Weekend Friday 9/1/2017

# *Preliminary Takeaways*

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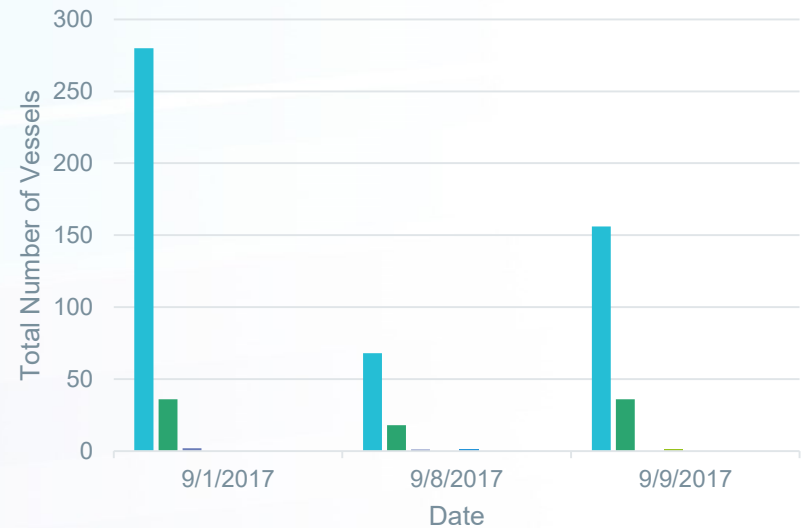
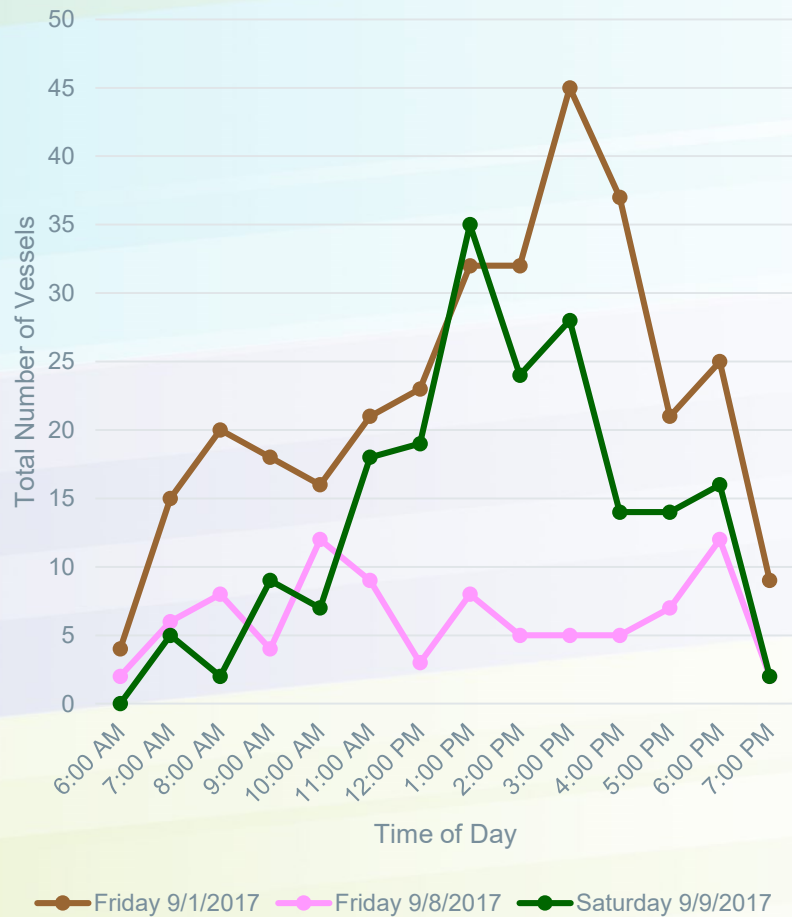
- All 4 methods of vessel counting yielded similar results (within 3.2%)
- Only ground-based counts are able to produce reliable vessel classification data at a reasonable cost
- Location and selection of suitable vantage point must be considered to accurately determine volume and classification
- Additional counts would be needed to test the methodologies

# Temporal Breakdown of Marine Traffic



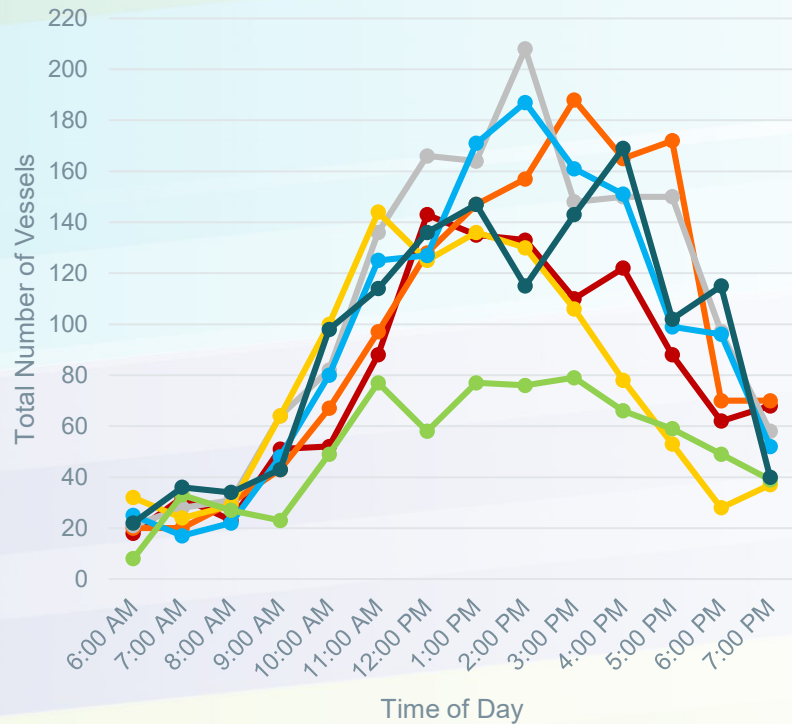
- Gunner's Ditch
- Liberty Thorofare
- Double Creek Mainland - North
- Tom's River
- Point Pleasant Canal
- Gunner's Ditch - ICW
- St. George's Thorofare
- Double Creek Mainland -South
- Metedeconk River
- Tuckerton Creek Channel
- High Bar Harbor
- Schellenger's Creek
- Oceanport Creek
- Manasquan River
- Long Reach Thorofare

# Analysis of Marine Traffic – Narrow Waterway (Point Pleasant Canal)

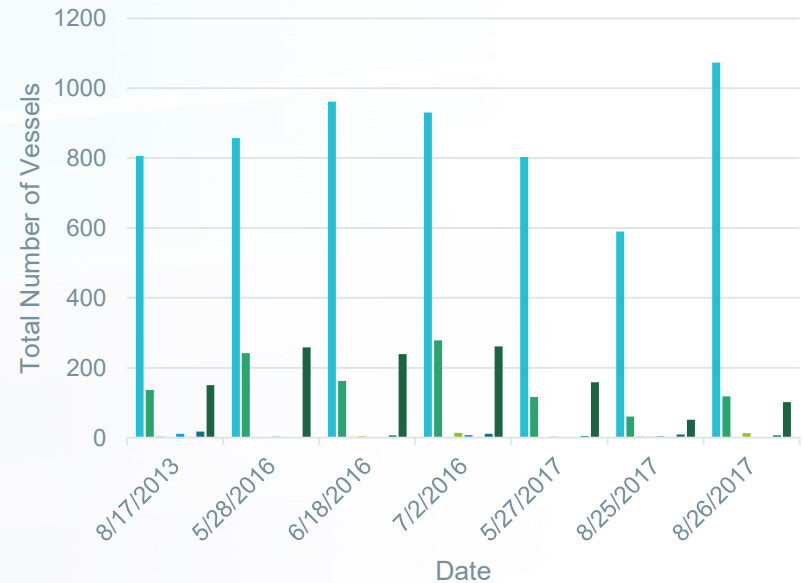


- Small Motor boat
- Medium Motor boat
- Large Motor boat
- Small Sailboat
- Medium Sailboat
- Large Sailboat
- Personal Water Craft Non-Motorized
- Personal Water Craft Motorized

# Analysis of Marine Traffic – Wide Waterway (Gunner's Ditch)



- Saturday 8/17/2013
- Saturday 6/18/2016
- Saturday 7/2/2016
- Saturday 5/27/2017
- Saturday 5/28/2016
- Friday 8/25/2017
- Saturday 8/26/2017



- Small Motor boat
- Medium Motor boat
- Large Motor boat
- Small Sailboat
- Medium Sailboat
- Large Sailboat
- Personal Water Craft Non-Motorized
- Personal Water Craft Motorized

# *Establishing a Formal Data Collection Plan*

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- Phase 1: Sorting of all 214 New Jersey channels and waterways into classification system
- Phase 2: Development of a waterway counting plan
- Phase 3: Preparation & logistical arrangements for field data collection
- Phase 4: Data collection
- Phase 5: Post-processing



# *Future Steps for NJDOT*

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- Adoption and implementation of formalized count procedures and classification systems
- Data-driven decision making from additional counts
  - » Regression analysis of different variables (weather, channel width, channel depth, vertical clearance, population demographics, temporal, tides)
  - » Year-over-year trends
- Development of a formalized marine asset management system

Any  
questions



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