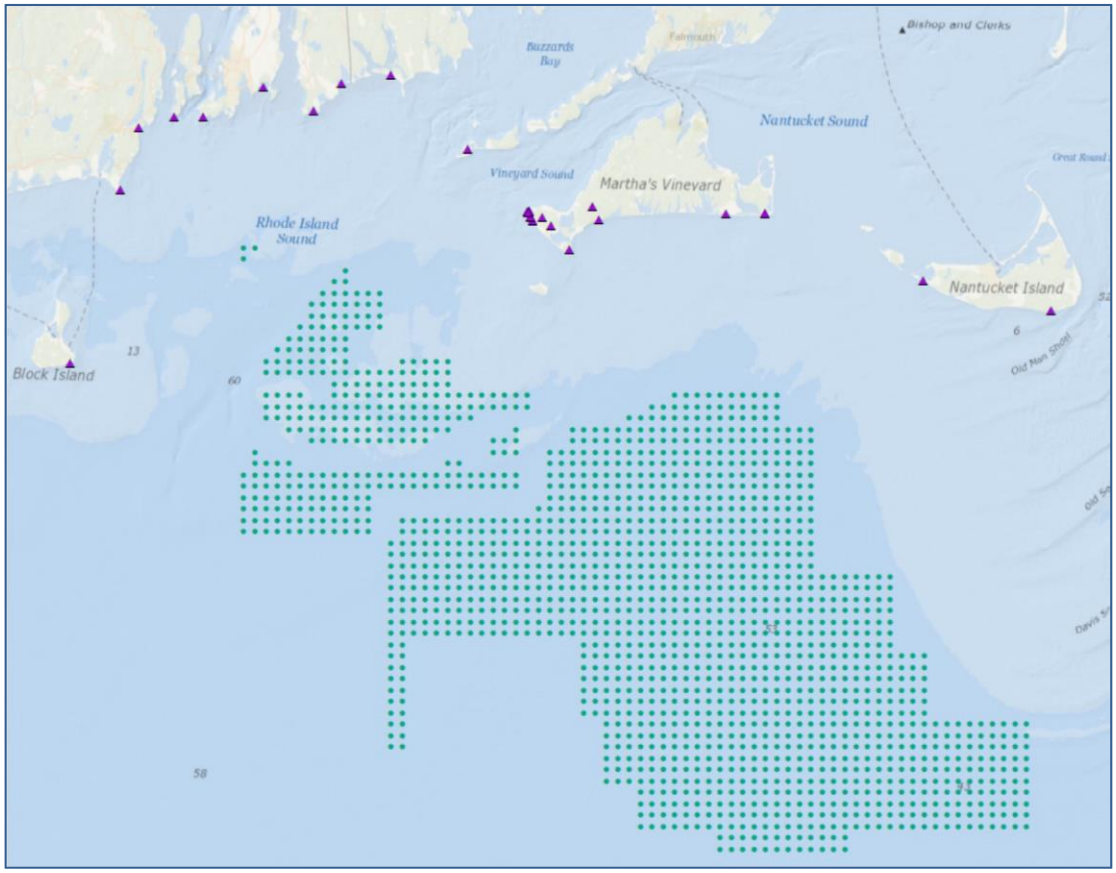
OCS Study
BOEM 2017-037

# Visualization Simulations for Offshore Massachusetts and Rhode Island Wind Energy Area

# Meteorological Report




**U.S. Department of the Interior**
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# Visualization Simulations for Offshore Massachusetts and Rhode Island Wind Energy Area

# Meteorological Report

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# 1.0 INTRODUCTION

This report provides an analysis of the meteorological conditions associated with the offshore Massachusetts and Rhode Island Wind Energy Area (WEAs). Metrics associated with prevailing meteorology and with visibility were developed for 24 specific locations that represented points the public may frequent that could have a view of any wind energy projects developed in the WEAs. The list of these viewpoint locations is presented in Table 1. This report will assist in understanding the meteorological conditions experienced at these viewpoint locations and how they may influence the visibility of a wind energy project. The analysis was developed using the best existing meteorological information from measurement sites within the study area. The sites used are identified in Table 2. Reported data for visibility is only captured to a distance of 10 nautical miles (nm) at these measurements sites and therefore, to evaluate visibility beyond 10 nm, a methodology was developed as described further below. The methodology used to develop the meteorological statistics of interest is also presented.

Table 1 Viewpoints and Locations

| Location | Latitude | Longitude |
|---|---|---|
| Fred Benson Town Beach (Southeast Lighthouse), Block Island, RI[1] | 41.15 | 71.55 |
| Point Judith Lighthouse, Narragansett, RI | 41.36 | 71.48 |
| Narragansett Town Beach, RI | 41.43 | 71.45 |
| Beavertail Lighthouse, Jamestown, RI | 41.44 | 71.39 |
| Brenton Point State Park, Newport, RI | 41.45 | 71.35 |
| Second Beach, Middletown, RI | 41.48 | 71.25 |
| South Shore Beach (Tappens Beach), Little Compton, RI[1] | 41.46 | 71.17 |
| Horseneck Beach State Reservation, Westport, MA | 41.50 | 71.05 |
| Aquinnah (Gay Head) Lighthouse, MA | 41.34 | 70.83 |
| Squibnocket Beach (Squibnocket Farm Road), Chilmark, MA[1] | 41.30 | 70.77 |
| Wasque Point, Martha's Vineyard, MA | 41.35 | 70.45 |
| Tom Nevers Field, Nantucket, MA | 41.23 | 70.00 |
| Lookout Hill Tower Road (Lookout Hill Observation Platform), Gosnold, MA[1] | 41.42 | 70.93 |
| South Beach State Park, Edgartown, MA | 41.34 | 70.52 |
| Madaket Beach Dunes, Nantucket, MA | 41.27 | 70.21 |
| Lucy Vincent Beach, Chilmark, MA | 41.33 | 70.72 |
| Tribal Administration Building, 20 Black Brook Road, Aquinnah, MA | 41.33 | 70.79 |
| Aquinnah Cliffs Overlook Area, Aquinnah, MA | 41.34 | 70.83 |
| Edwin D. Vanderhoop Homestead (outside porch)<br>35 Aquinnah Circle, Aquinnah, MA | 41.34 | 70.83 |
| Top of Circle Park Area, Aquinnah, MA | 41.34 | 70.83 |
| Philbin Beach, Aquinnah, MA | 41.33 | 70.82 |
| Moshup Beach, Aquinnah, MA | 41.34 | 70.83 |
| Gay Head Community Baptist Church<br>2 Meeting House Way, Aquinnah, MA | 41.34 | 70.81 |
| Peaked Hill, Chilmark, MA | 41.35 | 70.73 |

[1] – Alternative locations to the original viewpoints (in parenthesis) were developed in consultation with BOEM due to access, obstructed view or other considerations. The alternatives are very close to the original viewpoints and therefore the meteorological conditions are the same.

# 2.0 DATA COLLECTION AND PREPROCESSING

An assessment of typical meteorological conditions was performed for the 24 coastal viewpoint locations identified in Table 1 which are located in Massachusetts and Rhode Island. The assessments were based on hourly meteorological surface data collected at National Weather

Service (NWS) measurement sites in Massachusetts and Rhode Island over the 10-year period of January 1, 2003–December 31, 2012.

Hourly surface observations recorded at airport locations in Martha's Vineyard, Nantucket and New Bedford, Massachusetts, along with Newport, Block Island, Westerly, Point Judith, Providence, and Quonset Point, Rhode Island were considered. Data from these sites are readily available from the National Climatic Data Center website (www.ncdc.noaa.gov). The hourly observations in the data sets include wind speed, wind direction, cloud cover, cloud ceiling height, visibility, weather codes denoting precipitation, ambient and dew point temperatures and precipitation amounts. These parameters provide the information required to characterize the meteorological conditions occurring at the 24 locations of interested.

## 2.1 ASSIGNMENT OF NWS STATIONS TO VIEWPOINT LOCATIONS

An NWS station was assigned to each of the 24 locations of interest based on proximity and similarity of geography, such as a coastal land location compared to an island location. Table 2 presents a list of the 24 locations of interest, the methodological station selected for data analysis and the distances from the location to the meteorological station.

Table 2 Meteorological Measurement Sites

| Location | Meteorological Station | Distance [Miles] |
|---|---|---|
| Southeast Lighthouse | Block Island/Martha's Vineyard | 1.7/51.6 |
| Point Judith Lighthouse | Block Island/Newport | 14.2/15.7 |
| Narragansett Town Beach | Newport | 11.2 |
| Beavertail Lighthouse | Newport | 8.3 |
| Brenton Point State Park | Newport | 6.8 |
| Second Beach | Newport | 3.4 |
| Tappens Beach (South Shore Beach) | Newport | 7.3 |
| Horseneck Beach State Reservation | Newport | 11.9 |
| Aquinnah (Gay Head) Lighthouse | Martha's Vineyard | 11.9 |
| Squibnocket Farm Road | Martha's Vineyard | 10.2 |
| Wasque Point | Martha's Vineyard | 8.9 |
| Tom Nevers Field | Nantucket | 2.9 |
| Lookout Hill Observation Platform | Martha's Vineyard | 16.7 |
| South Beach State Park | Martha's Vineyard | 5.6 |
| Madaket Beach Dunes | Nantucket | 8.0 |
| Lucy Vincent Beach | Martha's Vineyard | 7.0 |
| Tribal Admin Building | Martha's Vineyard | 10.5 |
| Aquinnah Cliffs Overlook Area | Martha's Vineyard | 12.0 |
| Edwin D. Vanderhoop Homestead | Martha's Vineyard | 11.9 |
| Top of Circle Park Area | Martha's Vineyard | 11.9 |
| Philbin Beach | Martha's Vineyard | 11.7 |
| Moshup Beach | Martha's Vineyard | 11.9 |
| Gay Head Community Baptist Church | Martha's Vineyard | 10.9 |
| Peaked Hill | Martha's Vineyard | 6.8 |

Meteorological data collected at Block Island was used to generate wind roses for the Southeast Lighthouse on Block Island, and the Point Judith Lighthouse in Narragansett (Appendix C). The Block Island data was available for the 2003—2012 data period. While acceptable for generating wind roses, which depict frequency of wind direction and speed, the data was insufficient to characterize haze and fog conditions. For meteorological conditions,

Newport data was used for Point Judith, while Martha's Vineyard data was used to evaluate Block Island. Martha's Vineyard was selected because it is an island location similar to that of Block Island as compared to the more coastal location of Newport.


Figure 1 Location of Meteorological Measurement Sites

Meteorological data collected at Newport was used to evaluate Narragansett Town Beach, Beavertail Lighthouse, Brenton Point State Park, Second Beach, Tappens Beach and Horseneck Beach State Reservation. Newport was selected over New Bedford for the Horseneck Beach evaluation due to geography (coastal compared to more inland location).

Two locations, Tom Nevers Field and Madaket Beach Dunes, are located on Nantucket. The remaining locations are either on Martha's Vineyard or, in the case of Lookout Hill Observation Platform, Martha's Vineyard is the closest NWS station.

Because data is collected at Point Judith every three hours, it was not used for the meteorological conditions as it was not consistent with the one-hour data from other meteorology sites. A wind rose was produced for this site and compared to wind roses for other nearby stations. The Point Judith wind rose compared most favorably to that for Block Island.

Data collection at Westerly began in late May 2005, and was not considered due to less than a 10-year data period.

Horseneck Beach State Reservation is located slightly closer to the Newport station than to the New Bedford site. Newport was selected for Horseneck not only due to the closer proximity, but also because of the coastal location compares more favorably to Newport than the New Bedford site, which is located further inland.

Providence and Quonset Point were not the closest meteorological station to any of the viewpoint locations and therefore were not considered further.

## 3.0 METEOROLOGICAL CONDITIONS AND VISIBILITY ASSESSMENT

Hourly surface observations were evaluated to determine:

Meteorological Condition

- Average number of days when it is clear, cloudy, foggy, rainy and hazy during daylight hours in each of the four seasons,
- Average number of days when it is clear, cloudy, foggy, rainy and hazy for 50% of the daylight hours in each of the four seasons,
- Average percent of daylight hours when it is clear, cloudy, foggy, rainy and hazy in each of the four seasons, and
- Average percent of nighttime hours when it is clear, cloudy, foggy, rainy and hazy in each of the four seasons (i.e. the average conditions for nighttime during each of the seasons).

Visibility

- The average number of days that there is visibility to 10 nm, 20 nm and 30 nm.
- The average number of days that have visibility to 10 nm, 20nm and 30nm for at least 50% of the day in each of the four seasons.
- The average number of days that there is visibility to 10 nm, 20nm and 30nm for at least 75% of the day in each of the four seasons.
- The average distance that visibility is reduced (from clear conditions) on each day that haze is reported in each of the 4 seasons.
- The average visibility distance in each of the four seasons.

Wind Speed and Direction

- Typical (based on average) wind rose plots for each month.

## 3.1 DEFINITION OF DATA PARAMETERS

Since the analysis was done to cover daylight conditions, it was important to define what constitutes daylight as it changes in duration over the year. To determine the time of sunrise and sunset for each of the 24 viewpoint locations, EPA's SUN subroutine contained in EPA's PCRAMMET model was used. PCRAMMET is a meteorological data preprocessor used for preparing NWS data for use in the EPA's short-term air quality dispersion models. Thirty minutes were added before sunrise and after sunset to account for those periods where there is sufficient light to start, or continue, outdoor activities without lighting. This corresponds to civil dusk, when the sun is 6 degrees, or less, below the horizon.

NWS stations provide excellent data capture; however, it is not 100% and missing data periods do occur. Only daylight and nighttime periods with data capture at or better than 50% for the 24-hour data period were included in the analysis, avoiding possible biases in considering periods of a few hours.

Each of the 24 locations was evaluated for clear, cloudy, rainy, foggy and hazy conditions during daylight and nighttime hours. Data available for National Climatic Data Center was sufficient to make these condition determinations and were made based upon the following criteria:

- Clear conditions were defined as having an unlimited cloud ceiling height. Unlimited ceiling heights are associated with clear and scattered sky cover (up to 50% of the sky).

- Cloudy conditions were defined as broken or overcast sky cover, greater than 50% of the sky.

- Rainy conditions were defined as any 'trace' or measureable precipitation (rain, snow, sleet, etc.) amount. The DS-3505 data set includes weather codes that define the type and intensity of different weather conditions. Weather codes 14-27, 29 and 50-99 were used to define precipitation events.

- Foggy and hazy conditions are defined only by weather codes. Fog has weather codes of 10-12, 28 and 40-49. Haze has a weather code of 5.

Each individual daylight period was characterized as being clear, cloudy, rainy, foggy or hazy. When examining the five meteorological conditions, it is possible to have multiple conditions occurring concurrently. For example, haze can occur when it is sunny. Fog and rain occur when it is cloudy or there can be light rain during fog events. In order to avoid 'double counting' any of the conditions and maintaining a 100% count, conditions were assigned based on the following:

1. An hour is either clear or cloudy.

2. If clear or cloudy conditions occur for 50% or more of the daylight hours, assign the day based on visibility restriction.

3. Clear conditions are based on unlimited ceiling height and can include haze. A day was counted as hazy before being counted as sunny.

4. Cloudy conditions are based on limited ceiling height and can also include rain and fog. The day classification order was foggy, rainy and finally cloudy.

5. If clear and cloudy conditions each account for 50% of the daylight hour, the clear condition (sunny, hazy) was assigned 0.5 day as was the cloudy condition (fog, rain, cloud).

This prioritization was also used for evaluating individual hours.

Seasons were defined as follows:

- Winter = December 22–March 21
- Spring = March 22–June 21
- Summer = June 22–September 21
- Autumn = September 22–December 21

# 4.0 METEOROLOGICAL CONDITIONS AND VISIBILITY RESULTS

## 4.1 METEOROLOGICAL CONDITIONS RESULTS

Three tables follow that present representative seasonal and annual meteorological conditions observed at Newport, Nantucket and Martha's Vineyard. These tables present the frequency of occurrence and distribution of clear, foggy, rainy, hazy and cloudy conditions. In each table, the topmost data group presents the average number of days per season/year that each of the five conditions was observed to occur at least for one hour during the daylight period. These numbers are totally independent of each other and should not be summed as multiple tallies could occur in any single daylight period. For example, clouds and fog could occur in the early morning giving way to clear skies later in the morning. A thunderstorm could occur in the late afternoon. In that case, clear, cloudy, rainy and foggy conditions would all occur for at least one hour.

The second data grouping presents how days were characterized, where each day is either clear, cloudy, rainy, foggy or hazy. Opposed to the topmost data group, only a single tally is made for any daylight period. This characterization is based on which of the five meteorological conditions occur for at least 50% of the hours in the daylight period. These numbers can be summed to equal to the number of valid daylight periods occurring during the year.

The third data group presents the distribution of the five meteorological conditions during daylight hours as a percentage. Each hour is characterized as either clear, foggy, rainy, hazy or cloudy. The percentages of the five meteorological conditions can be summed to equal 100%.

The fourth data group presents the distribution of the five meteorological conditions during nighttime hours as a percentage. Each hour is characterized as either clear, foggy, rainy, hazy or cloudy. The percentages of the five meteorological conditions can be summed to equal 100%.

Meteorological conditions for each of the 24 locations are presented in Appendix A.

**Newport Meteorological Site**

The Newport site was used to evaluate 7 of the 24 locations of interest; Point Judith Lighthouse, Narragansett Town Beach, Beavertail Lighthouse, Breton Point State Park, Second Beach, Tappens Beach and Horseneck Beach State Reservation. While conditions will vary slightly at each of these locations, Table 3 below presents a representative summary of the results.

Table 3 Summary of Meteorological Conditions at Newport Locations

| | Winter | Spring | Summer | Autumn | Annual |
|---|---|---|---|---|---|
| Days/Year with 1 or More Daylight Observations | | | | | |
| Clear | 72 | 75 | 83 | 74 | 304 |
| Foggy | 27 | 44 | 48 | 32 | 151 |
| Rainy | 30 | 37 | 33 | 30 | 130 |
| Hazy | 1 | 3 | 9 | 2 | 15 |
| Cloudy | 59 | 70 | 73 | 64 | 266 |
| Days/Year with 50% or More Daylight Observations | | | | | |
| Clear | 55 | 48 | 59 | 50 | 212 |
| Foggy | 9 | 10 | 9 | 10 | 38 |
| Rainy | 9 | 7 | 4 | 6 | 26 |
| Hazy | 0 | 0 | 1 | 0 | 1 |
| Cloudy | 17 | 26 | 19 | 25 | 87 |
| Distribution of Hourly Daylight Observations (%) | | | | | |
| Clear | 59 | 52 | 58 | 55 | 56 |
| Foggy | 13 | 16 | 17 | 14 | 15 |
| Rainy | 8 | 7 | 5 | 7 | 7 |
| Hazy | <1 | 1 | 2 | <1 | 1 |
| Cloudy | 20 | 24 | 18 | 23 | 21 |
| Distribution of Hourly Nighttime Observations (%) | | | | | |
| Clear | 58 | 52 | 60 | 57 | 57 |
| Foggy | 11 | 14 | 16 | 12 | 13 |
| Rainy | 7 | 9 | 6 | 8 | 7 |
| Hazy | <1 | 1 | 1 | <1 | 1 |
| Cloudy | 24 | 24 | 17 | 23 | 22 |

Clear conditions occur at least one hour during daylight 304 days per year at the Newport site, with seasonal values ranging from 72 days during winter to 83 days during summer. Cloudy conditions occur 266 days per year, with seasonal values ranging from 59 days in winter to 73 days in summer. Fog occurred 151 days per year. Seasonal values range from 27 days in winter to 48 days in summer. Rain, without associated fog, occurred 130 days per year. Seasonal values

range from 30 days in winter and autumn to 37 days in spring. Haze occurred about 15 days per year, ranging from one day in winter to 9 days in summer.

Days were characterized as clear, cloudy, foggy, rainy or hazy based on an occurrence of the meteorological condition 50% or more of daylight hours. Clear days occurred 212 days per year, with seasonal values ranging from 48 days in spring to 59 days in summer. Cloudy days occurred 87 days per year, ranging from 17 days in winter to 26 days in spring. Foggy days occurred 38 days per year, with little variation seasonally. Winter and summer each had 9 days per year of foggy days, while spring and fall had 10. Rainy days occurred 26 days per year, ranging from 4 days in summer to 9 days in winter. Hazy days occurred once per year, with the occurrence in summer.

Clear conditions occurred 56% of the daylight hours over the course of the year, with seasonal values ranging from 52% in spring to 59% in winter. Fog occurred 15% of the time, with seasonal values ranging from 13% in winter to 17% in summer. Rain, without associated fog, occurred 7% of the time, with seasonal values ranging from 5% in summer to 8% in winter. Cloudy conditions, without associated fog or rain, occurred 21% of the time, with seasonal values ranging from 18% in summer to 23% in autumn. Haze occurred 1% of the time with seasonal values ranging from less than 1% in winter and autumn to 2% in summer.

Clear conditions occurred 57% of the nighttime hours over the course of the year, with seasonal values ranging from 52% in spring to 60% in winter. Fog occurred 13% of the time, with seasonal values ranging from 11% in winter to 16% in summer. Rain, without associated fog, occurred 7% of the time, with seasonal values ranging from 6% in summer to 9% in spring. Cloudy conditions, without associated fog or rain, occurred 22% of the time, with seasonal values ranging from 17% in summer to 24% in winter and spring. Haze occurred 1% of the time with seasonal values ranging from less than 1% in winter and autumn to 1% in spring and summer.

**Nantucket Meteorological Site**

The Nantucket site was used to evaluate 2 of the 24 locations of interest; Tom Nevers Field and Madaket Beach Dunes. While conditions will vary slightly at each of these locations, Table 4 below presents a representative summary of the results.

Table 4 Summary of Meteorological Conditions at Nantucket Locations

| | Winter | Spring | Summer | Autumn | Annual |
|---|---|---|---|---|---|
| Days/Year with 1 or More Daylight Observations | | | | | |
| Clear | 71 | 73 | 84 | 72 | 300 |
| Foggy | 34 | 51 | 54 | 35 | 174 |
| Rainy | 36 | 39 | 38 | 36 | 149 |
| Hazy | 3 | 6 | 12 | 3 | 24 |
| Cloudy | 67 | 74 | 75 | 71 | 287 |
| Days/Year with 50% or More Daylight Observations | | | | | |
| Clear | 48 | 46 | 52 | 47 | 193 |
| Foggy | 16 | 18 | 21 | 15 | 70 |
| Rainy | 7 | 5 | 2 | 6 | 20 |
| Hazy | 0 | 1 | 1 | 0 | 2 |
| Cloudy | 19 | 22 | 17 | 23 | 81 |
| Distribution of Hourly Daylight Observations (%) | | | | | |
| Clear | 52 | 48 | 53 | 51 | 51 |
| Foggy | 18 | 24 | 26 | 17 | 22 |
| Rainy | 8 | 6 | 4 | 8 | 6 |
| Hazy | 1 | 2 | 3 | 1 | 2 |
| Cloudy | 21 | 20 | 14 | 23 | 19 |
| Distribution of Hourly Nighttime Observations (%) | | | | | |
| Clear | 52 | 47 | 51 | 50 | 50 |
| Foggy | 17 | 24 | 28 | 17 | 21 |
| Rainy | 7 | 6 | 4 | 8 | 7 |
| Hazy | 1 | 1 | 1 | <1 | 1 |
| Cloudy | 23 | 22 | 15 | 24 | 21 |

Clear conditions occur at least one hour during daylight 300 days per year at the Nantucket site, with seasonal values ranging from 71 days during winter to 84 days during summer. Cloudy conditions occur 287 days per year, with seasonal values ranging from 67 days in winter to 75 days in summer. Fog occurred 174 days per year. Seasonal values range from 34 days in winter to 54 days in summer. Rain occurred 149 days per year. Seasonal values range from 36 days in winter and autumn to 39 days in spring. Haze occurred 24 days per year, ranging from three days in winter and autumn to 12 days in summer.

Days were characterized as clear, cloudy, foggy, rainy or hazy based on an occurrence of the meteorological condition 50% or more of daylight hours. Clear days occurred 193 days per year, with seasonal values ranging from 46 days in spring to 52 days in summer. Cloudy days occurred 81 days per year, ranging from 17 days in summer to 23 days in autumn. Foggy days occurred 70 days per year, with little variation seasonally. Seasonal values ranged from 15 days in autumn to 21 days in summer. Rainy days occurred 20 days per year, ranging from 2 days in summer to 7 days in winter. Hazy days occurred twice per year, with the occurrences in spring and summer.

Clear conditions occurred 51% of the daylight hours over the course of the year, with seasonal values ranging from 48% in spring to 52% in winter. Fog occurred 22% of the time, with seasonal values ranging from 17% in autumn to 26% in summer. Rain, without associated fog, occurred 6% of the time, with seasonal values ranging from 4% in summer to 8% in winter and autumn. Cloudy conditions, without associated fog or rain, occurred 19% of the time, with seasonal values ranging from 14% in summer to 23% in autumn. Haze occurred 2% of the time with seasonal values ranging from 1% in winter and autumn to 3% in summer.

Clear conditions occurred 50% of the nighttime hours over the course of the year, with seasonal values ranging from 47% in spring to 52% in winter. Fog occurred 21% of the time, with seasonal values ranging from 17% in winter and autumn to 28% in summer. Rain, without associated fog, occurred 7% of the time, with seasonal values ranging from 4% in summer to 8% in autumn. Cloudy conditions, without associated fog or rain, occurred 21% of the time, with seasonal values ranging from 15% in summer to 24% in autumn. Haze occurred 1% of the time with seasonal values ranging from less than 1% autumn to 1% in winter, spring and summer.

**Martha's Vineyard Meteorological Site**

The Martha's Vineyard site was used to evaluate the remaining 15 locations of interest; Southeast Lighthouse, Aquinnah Lighthouse, Squibnocket Farm Road, Wasque Point, Lookout Hill, South Beach State Park, Lucy Vincent Beach, Tribal Administration Building, Aquinnah Cliffs, Vanderhoop Homestead, Top of Circle Park, Philbin Beach, Moshup Beach, Gay Head Community Baptist Church and Peaked Hill. While conditions will vary slightly at each of these locations, Table 5 below presents a representative summary of the results.

Table 5 Summary of Meteorological Conditions at Martha's Vineyard Locations

| | Winter | Spring | Summer | Autumn | Annual |
|---|---|---|---|---|---|
| Days/Year with 1 or More Daylight Observations | | | | | |
| Clear | 73 | 74 | 81 | 73 | 301 |
| Foggy | 29 | 46 | 56 | 32 | 163 |
| Rainy | 32 | 37 | 36 | 34 | 139 |
| Hazy | 2 | 4 | 14 | 2 | 22 |
| Cloudy | 63 | 72 | 79 | 68 | 282 |
| Days/Year with 50% or More Daylight Observations | | | | | |
| Clear | 53 | 48 | 53 | 47 | 201 |
| Foggy | 11 | 11 | 12 | 11 | 45 |
| Rainy | 8 | 7 | 3 | 6 | 24 |
| Hazy | 0 | 1 | 1 | 0 | 2 |
| Cloudy | 18 | 25 | 22 | 27 | 92 |
| Distribution of Hourly Daylight Observations (%) | | | | | |
| Clear | 57 | 50 | 53 | 52 | 53 |
| Foggy | 14 | 18 | 20 | 15 | 17 |
| Rainy | 8 | 8 | 5 | 8 | 7 |
| Hazy | <1 | 1 | 3 | <1 | 1 |
| Cloudy | 21 | 23 | 19 | 25 | 22 |
| Distribution of Hourly Nighttime Observations (%) | | | | | |
| Clear | 56 | 51 | 54 | 53 | 54 |
| Foggy | 13 | 17 | 21 | 13 | 15 |
| Rainy | 9 | 8 | 6 | 8 | 7 |
| Hazy | <1 | 1 | 2 | <1 | 1 |
| Cloudy | 24 | 24 | 17 | 26 | 23 |

Clear conditions occur at least one hour during daylight 301 days per year, with seasonal values ranging from 73 days during winter and autumn to 81 days during summer. Cloudy conditions occur 282 days per year, with seasonal values ranging from 63 days in winter to 79 days in summer. Fog occurred 163 days per year. Seasonal values range from 29 days in winter to 56 days in summer. Rain occurred 139 days per year. Seasonal values range from 32 days in winter and autumn to 37 days in spring. Haze occurred 22 days per year, ranging from two days in winter and autumn to 14 days in summer.

Days were characterized as clear, cloudy, foggy, rainy or hazy based on an occurrence of the meteorological condition 50% or more of daylight hours. Clear days occurred 201 days per year, with seasonal values ranging from 47 days in autumn to 53 days in winter and summer. Cloudy days occurred 92 days per year, ranging from 18 days in winter to 27 days in autumn. Foggy days occurred 45 days per year, with little variation seasonally. Seasonal values ranged from 11 days in winter, spring and autumn to 12 days in summer. Rainy days occurred 24 days per year, ranging from 3 days in summer to 8 days in winter. Hazy days occurred twice per year, with the occurrences in spring and summer.

Clear conditions occurred 53% of the daylight hours over the course of the year, with seasonal values ranging from 50% in spring to 57% in winter. Fog occurred 17% of the time, with seasonal values ranging from 14% in winter to 20% in summer. Rain, without associated fog, occurred 7% of the time, with seasonal values ranging from 5% in summer to 8% in winter, spring and autumn. Cloudy conditions, without associated fog or rain, occurred 22% of the time, with seasonal values ranging from 19% in summer to 25% in autumn. Haze occurred 1% of the time with seasonal values ranging from less than 1% in winter and autumn to 3% in summer.

Clear conditions occurred 54% of the nighttime hours over the course of the year, with seasonal values ranging from 51% in spring to 56% in winter. Fog occurred 15% of the time, with seasonal values ranging from 13% in winter and autumn to 21% in summer. Rain, without associated fog, occurred 7% of the time, with seasonal values ranging from 6% in summer to 9% in winter. Cloudy conditions, without associated fog or rain, occurred 23% of the time, with seasonal values ranging from 17% in summer to 26% in autumn. Haze occurred 1% of the time with seasonal values ranging from less than 1% in winter and autumn to 2% in summer.

## 4.2 VISIBILITY

Visibility observations in the NWS surface data are limited to a maximum of ten statute miles and therefore in order to evaluate visibility at the 20 nm and 30 nm distances, a methodology was developed using the observed visibility (out to 10 statute miles) and a relational algorithm. The algorithm was developed by team member Egan Environmental and calculates the visibility distance based on relative humidity. The discussion of the development of the method and algorithm is provided in Appendix D.

Hourly surface observations of ambient and dewpoint temperatures from the meteorological measurement sites were used to calculate hourly relative humidity percentages. Relative humidity was calculated from the following equation from the National Weather Service Forecast Office http://www.erh.noaa.gov/bgm/tables/rh.shtml:

$$RH = 100 * ( (112 – 0.1 * TA + DP) / (112 + 0.9 * TA) ) ^8$$

Where,

RH = relative humidity
TA = ambient temperature (ºC)
DP = dew point temperature (ºC)

The visible distance algorithm was developed from a regression analysis of Martha's Vineyard visibility and relative humidity observations. Visibility distance was calculated as:

$$VIS = 69.9 - 0.742 * RH$$

Where,

VIS = visibility distance (statute miles)

The calculated statue miles were then converted to nautical miles by applying a factor of 0.86839.

Visibility calculations were performed for each hour with a valid ambient and dew point temperature. The calculated distance was compared to the observed distance to determine which value to carry forward in the analysis. Observations up to 10 statute miles used the observed value. Observations at 10 statute miles used the greater of the observed or calculated values.

Three tables follow that present representative estimated visibility distances at Newport, Nantucket and Martha's Vineyard. These tables present the frequency of occurrence of visibility greater than 10, 20 and 30 nautical miles, along with the average visibility for clear, foggy, rainy, hazy and cloudy conditions. In each table, the topmost data group presents the average number of days per season/year that there was at least one hour when visibility was at least 10, 20 and 30 nautical miles during a daylight periods. The count for the 20 and 30 nm entries are also contained in the 10 nm entry. The count for the 30 nm entry is also contained in the 20 nm count.

The second and third data groups present the number of days per season/year that visibility exceeded 10, 20 and 30 nautical miles at least 50% and 75% of the daylight hours. As is the case with the topmost data group, the 20 nm and 30 nm values are subsets of the 10 nm values. The 30 nm values are subsets of the 20 nm values.

The last two data groups present the average seasonal and annual visibility distance for clear, foggy, rainy, hazy and cloudy conditions for daylight and nighttime hours. The annual and seasonal averages were determined by taking a weight average of the five meteorological conditions.

Visibility for each of the 24 locations is presented in Appendix B.

As the NWS only reports visibility to 10 statute miles, the algorithm above was used to calculate visibility distances beyond this distance. Observations up to 10 statute miles used the observed value and observations reported as 10 statute mile in the data used the greater of the observed or calculated values, resulting in a conservative estimate of visibility.

**Newport Meteorological Site Visibility**

The Newport site was used to evaluate 7 of the 24 locations of interest; Point Judith Lighthouse, Narragansett Town Beach, Beavertail Lighthouse, Breton Point State Park, Second Beach, Tappens Beach and Horseneck Beach State Reservation. While conditions will vary slightly at each of these locations, Table 6 below presents a representative summary of the results.

Table 6 Summary of Visibility at Newport Locations

| | Winter | Spring | Summer | Autumn | Annual |
|---|---|---|---|---|---|
| Days/Year with 1 or More Daylight Observations | | | | | |
| 10 nm | 76 | 75 | 69 | 73 | 293 |
| 20 nm | 63 | 55 | 49 | 54 | 221 |
| 30 nm | 42 | 36 | 21 | 27 | 126 |
| Days/Year with 50% or More Daylight Observations | | | | | |
| 10 nm | 61 | 52 | 46 | 51 | 210 |
| 20 nm | 42 | 33 | 15 | 22 | 112 |
| 30 nm | 12 | 13 | 1 | 3 | 29 |
| Days/Year with 75% or More Daylight Observations | | | | | |
| 10 nm | 52 | 28 | 14 | 36 | 130 |
| 20 nm | 30 | 13 | 1 | 11 | 55 |
| 30 nm | 5 | 4 | <1 | 1 | 10 |
| Average Daylight Visibility (nm) | | | | | |
| Clear | 24 | 22 | 16 | 19 | 20 |
| Foggy | 3 | 3 | 3 | 3 | 3 |
| Rainy | 8 | 9 | 8 | 9 | 8 |
| Hazy | 5 | 5 | 4 | 4 | 4 |
| Cloudy | 15 | 12 | 10 | 13 | 12 |
| Average | 18 | 15 | 12 | 15 | 15 |
| Average Nighttime Visibility (nm) | | | | | |
| Clear | 24 | 20 | 13 | 19 | 20 |
| Foggy | 3 | 3 | 3 | 3 | 3 |
| Rainy | 8 | 9 | 8 | 9 | 9 |
| Hazy | 3 | 4 | 5 | 4 | 4 |
| Cloudy | 16 | 12 | 9 | 14 | 13 |
| Average | 19 | 14 | 11 | 15 | 15 |

Visibility of at least 10 nm occurred for at least one hour during daylight 293 days per year, with seasonal values ranging from 69 days during summer to 76 days during winter. Visibility to 20 nm occurred 221 days per year, with seasonal values ranging from 49 days in summer to 63 days in winter. Visibility extended to 30 nm 126 days per year. Seasonal values range from 21 days in summer to 42 days in winter.

Visibility extended to 10 nm for 50% or more of the daylight hours 210 days per year, with seasonal values ranging from 46 days in summer to 61 days in winter. Visibility to 20 nm occurred 112 days per year, ranging from 15 days in summer to 42 days in winter. Visibility to 30 nm occurred 29 days per year. Seasonal values ranged from 1 day in summer to 13 days in spring.

Visibility extends to 10 nm for 75% or more of the daylight hours 130 days per year, with seasonal values ranging from 14 days in summer to 52 days in winter. Visibility to 20 nm occurred 59 days per year, ranging from 1 day in summer to 30 days in winter. Visibility to 30

nm occurred 10 days per year. Seasonal values ranged from no days in summer to 5 days in winter.

The average daylight visibility for clear conditions was 20 nm, with seasonal values ranging from 16 nm in summer to 24 nm in winter. Cloudy conditions reduce the average visibility to 12 miles, ranging from 10 nm in summer to 16 nm in winter. Rainy, hazy and foggy conditions have an average visibility of 8, 4 and 3 nm, respectfully. These visibilities are consistent through the year. The average daylight visibility in winter, spring, summer and fall, regardless of meteorological condition, is 18, 15, 12 and 15 nm, respectfully.

The average nighttime visibility for clear conditions is 20 nm, with seasonal values ranging from 13 nm in summer to 24 nm in winter. Cloudy conditions reduce the average visibility to 13 miles, ranging from 9 nm in summer to 16 nm in winter. Rainy, hazy and foggy conditions have an average visibility of 9, 4 and 3 nm, respectfully. These visibilities are consistent through the year. The average nighttime visibility in winter, spring, summer and fall, regardless of meteorological condition, is 19, 14, 11 and 15 nm, respectfully.

**Nantucket Meteorological Site Visibility**

The Nantucket site was used to evaluate 2 of the 24 locations of interest; Tom Nevers Field and Madaket Beach Dunes. While conditions will vary slightly at each of these locations, Table 7 below presents a representative summary of the results.

Table 7 Summary of Visibility at Nantucket Locations

| | Winter | Spring | Summer | Autumn | Annual |
|---|---|---|---|---|---|
| Days/Year with 1 or More Daylight Observations | | | | | |
| 10 nm | 69 | 64 | 55 | 67 | 255 |
| 20 nm | 49 | 40 | 30 | 45 | 164 |
| 30 nm | 23 | 23 | 10 | 14 | 70 |
| Days/Year with 50% or More Daylight Observations | | | | | |
| 10 nm | 51 | 39 | 33 | 48 | 171 |
| 20 nm | 31 | 20 | 8 | 21 | 80 |
| 30 nm | 6 | 5 | 0 | 3 | 14 |
| Days/Year with 75% or More Daylight Observations | | | | | |
| 10 nm | 41 | 18 | 9 | 35 | 103 |
| 20 nm | 20 | 7 | 1 | 12 | 40 |
| 30 nm | 2 | 1 | <1 | 1 | 4 |
| Average Daylight Visibility (nm) | | | | | |
| Clear | 21 | 18 | 14 | 18 | 17 |
| Foggy | 3 | 2 | 3 | 3 | 3 |
| Rainy | 8 | 9 | 8 | 9 | 9 |
| Hazy | 5 | 5 | 4 | 5 | 4 |
| Cloudy | 15 | 11 | 8 | 14 | 12 |
| Average | 15 | 12 | 10 | 14 | 12 |
| Average Nighttime Visibility (nm) | | | | | |
| Clear | 20 | 14 | 11 | 17 | 16 |
| Foggy | 3 | 3 | 3 | 3 | 3 |
| Rainy | 9 | 9 | 8 | 9 | 9 |
| Hazy | 4 | 5 | 4 | 5 | 4 |
| Cloudy | 15 | 10 | 7 | 15 | 13 |
| Average | 15 | 10 | 8 | 13 | 12 |

Visibility of at least 10 nm occurred for at least one hour during daylight 255 days per year, with seasonal values ranging from 55 days during summer to 69 days during winter. Visibility to 20 nm occurred 164 days per year, with seasonal values ranging from 30 days in summer to 49 days in winter. Visibility extended to 30 nm 70 days per year. Seasonal values range from 10 days in summer to 23 days in winter and spring.

Visibility extends to 10 nm for 50% or more of the daylight hours 171 days per year, with seasonal values ranging from 33 days in summer to 51 days in winter. Visibility to 20 nm occurred 80 days per year, ranging from 8 days in summer to 31 days in winter. Visibility to 30 nm occurred 14 days per year. Seasonal values ranged from no days in summer to 6 days in spring.

Visibility extended to 10 nm for 75% or more of the daylight hours 103 days per year, with seasonal values ranging from 9 days in summer to 41 days in winter. Visibility to 20 nm occurred 40 days per year, ranging from 1 day in summer to 40 days in winter. Visibility to 30 nm occurred 4 days per year. Seasonal values ranged from no days in summer to 2 days in winter.

The average daylight visibility for clear conditions is 17 nm, with seasonal values ranging from 14 nm in summer to 21 nm in winter. Cloudy conditions reduce the average visibility to 12 miles, ranging from 8 nm in summer to 15 nm in winter. Rainy, hazy and foggy conditions have an average visibility of 9, 4 and 3 nm, respectfully. These visibilities are consistent through the year. The average daylight visibility in winter, spring, summer and fall, regardless of meteorological condition, is 15, 12, 10 and 14 nm, respectfully.

The average nighttime visibility for clear conditions is 16 nm, with seasonal values ranging from 11 nm in summer to 20 nm in winter. Cloudy conditions reduce the average visibility to 13 miles, ranging from 7 nm in summer to 15 nm in winter and autumn. Rainy, hazy and foggy conditions have an average visibility of 9, 4 and 3 nm, respectfully. These visibilities are consistent through the year. The average nighttime visibility in winter, spring, summer and fall, regardless of meteorological condition, is 15, 10, 8 and 13 nm, respectfully.

**Martha's Vineyard Meteorological Site Visibility**

The Martha's Vineyard site was used to evaluate the remaining 15 locations of interest; Southeast Lighthouse, Aquinnah Lighthouse, Squibnocket Farm Road, Wasque Point, Lookout Hill, South Beach State Park, Lucy Vincent Beach, Tribal Administration Building, Aquinnah Cliffs, Vanderhoop Homestead, Top of Circle Park, Philbin Beach, Moshup Beach, Gay Head Community Baptist Church and Peaked Hill. While conditions will vary slightly at each of these locations, Table 8 below presents a representative summary of the results.

Table 8 Summary of Visibility at Martha's Vineyard Locations

| | Winter | Spring | Summer | Autumn | Annual |
|---|---|---|---|---|---|
| Days/Year with 1 or More Daylight Observations | | | | | |
| 10 nm | 74 | 77 | 70 | 70 | 291 |
| 20 nm | 60 | 57 | 48 | 48 | 213 |
| 30 nm | 35 | 35 | 19 | 27 | 116 |
| Days/Year with 50% or More Daylight Observations | | | | | |
| 10 nm | 58 | 53 | 45 | 51 | 207 |
| 20 nm | 38 | 31 | 19 | 25 | 113 |
| 30 nm | 12 | 15 | 1 | 4 | 32 |
| Days/Year with 75% or More Daylight Observations | | | | | |
| 10 nm | 47 | 24 | 12 | 34 | 117 |
| 20 nm | 25 | 10 | 2 | 13 | 50 |
| 30 nm | 5 | 3 | <1 | 2 | 10 |
| Average Daylight Visibility (nm) | | | | | |
| Clear | 23 | 22 | 17 | 20 | 20 |
| Foggy | 3 | 3 | 3 | 4 | 3 |
| Rainy | 9 | 9 | 9 | 10 | 9 |
| Hazy | 5 | 4 | 5 | 4 | 5 |
| Cloudy | 15 | 13 | 10 | 14 | 13 |
| Average | 18 | 15 | 12 | 15 | 15 |
| Average Nighttime Visibility (nm) | | | | | |
| Clear | 23 | 20 | 13 | 19 | 18 |
| Foggy | 4 | 3 | 3 | 4 | 3 |
| Rainy | 9 | 10 | 8 | 9 | 9 |
| Hazy | 4 | 4 | 4 | 5 | 4 |
| Cloudy | 15 | 12 | 9 | 14 | 13 |
| Average | 18 | 13 | 10 | 15 | 14 |

Visibility of at least 10 nm occurred for at least one hour during daylight 291 days per year, with seasonal values ranging from 70 days during summer and autumn to 77 days during spring. Visibility to 20 nm occurred 213 days per year, with seasonal values ranging from 48 days in summer and autumn to 60 days in winter. Visibility extends to 30 nm 116 days per year. Seasonal values range from 19 days in summer to 35 days in winter and spring.

Visibility in extended to 10 nm for 50% or more of the daylight hours 207 days per year, with seasonal values ranging from 45 days in summer to 58 days in winter. Visibility to 20 nm occurred 113 days per year, ranging from 19 days in summer to 38 days in winter. Visibility to 30 nm occurred 32 days per year. Seasonal values ranged from 1 day in summer to 15 days in spring.

Visibility in extended to 10 nm for 75% or more of the daylight hours 117 days per year, with seasonal values ranging from 12 days in summer to 47 days in winter. Visibility to 20 nm occurred 50 days per year, ranging from 2 days in summer to 25 days in winter. Visibility to 30 nm occurred 10 days per year. Seasonal values ranged from no days in summer to 5 days in winter.

The average daylight visibility for clear conditions is 18 nm, with seasonal values ranging from 17 nm in summer to 23 nm in winter. Cloudy conditions reduce the average visibility to 13 miles, ranging from 10 nm in summer to 15 nm in winter. Rainy, hazy and foggy conditions have an average visibility of 9, 5 and 3 nm, respectfully. These visibilities are consistent through the

year. The average daylight visibility in winter, spring, summer and fall, regardless of meteorological condition, is 18, 15, 12 and 15 nm, respectfully.

The average nighttime visibility for clear conditions is 18 nm, with seasonal values ranging from 13 nm in summer to 23 nm in winter. Cloudy conditions reduce the average visibility to 13 miles, ranging from 9 nm in summer to 15 nm in winter. Rainy, hazy and foggy conditions have an average visibility of 9, 4 and 3 nm, respectfully. These visibilities are consistent through the year. The average nighttime visibility in winter, spring, summer and fall, regardless of meteorological condition, is 18, 13, 10 and 15 nm, respectfully.

### 4.3 WIND ROSES

Appendix C presents the annual and monthly wind roses for Martha's Vineyard, Nantucket, Block Island and Newport. Wind Roses depict the frequencies that the wind is blowing from each of the sixteen compass point directions. The length of each sector shows the overall frequency of winds from that direction. Wind speed ranges are shown by different colors within each sector, with speeds increasing outward from the center.

As shown in the wind rose figures, the predominant winds for Block Island, Nantucket and Martha's Vineyard are from the southwest through northerly directions. Newport does not have the same southwesterly spike as the other locations, with predominant winds occurring from the south and the north-northwest through north sectors

Block Island, Nantucket and Martha's Vineyard show similar patterns of winds throughout the year. Northwesterly winds are dominant through the winter months. March brings about a shift from northwest winds to southwest winds. Southwest winds are frequent from April through September. October and November show a more westerly component, bringing the winds back to the northwest. Newport is similar, with a major difference being the lack of southwest winds. In Newport, southerly winds are more dominant in April through September.

## 5.0 EFFECT OF HAZE ON VISIBILITY

As shown in the tables in Appendix B, and the tables above, haze can greatly reduce visibility. Clear skies, on average result in daytime visibilities of 17-20 nm where hazy skies result in an average visibility of 4 to 5 miles.

Based on data from the Newport site, daylight hazy skies result in average visibilities of 4 nm compared to 20 nm for clear conditions. In winter, clear skies have an average visibility of 24 nm compare to 5 nm for hazy skies. This represents approximately an 80% reduction in visibility. In spring, visibility decreases from 22 nm for clear conditions to 5 nm for hazy conditions, a reduction of approximately 75%. In summer, the average visibility for clear skies is 16 nm compared to 4 nm for hazy skies, representing a 75% reduction in visibility. In autumn, clear skies have an average visibility of 19 nm compare to 4 nm for hazy conditions, an 80% reduction in visibility.

Nighttime hazy skies result in average visibilities of 4 nm compared to 20 nm for clear conditions. In winter, clear skies have an average visibility of 24 nm compare to 3 nm for hazy skies. This represents approximately greater than an 80% reduction in visibility. In spring, visibility decreases from 20 nm for clear conditions to 4 nm for hazy conditions, a reduction of 75%. In summer, the average visibility for clear skies is 13 nm compared to 5 nm for hazy skies, representing a 60% reduction in visibility. In autumn, clear skies have an average visibility of 19 nm compare to 4 nm for hazy conditions, an 80% reduction in visibility.

Based on data from the Nantucket site, daylight hazy skies result in average visibilities of 4 nm compared to 17 nm for clear conditions. In winter, clear skies have an average visibility of 21 nm compare to 5 nm for hazy skies. This represents approximately a 75% reduction in visibility. In spring, visibility decreases from 18 nm for clear conditions to 5 nm for hazy conditions, a reduction of approximately 70%. In summer, the average visibility for clear skies is 14 nm compared to 4 nm for hazy skies, representing greater than a 60% reduction in visibility. In autumn, clear skies have an average visibility of 18 nm compare to 5 nm for hazy conditions, a 70% reduction in visibility.

Nighttime hazy skies result in average visibilities of 4 nm compared to 16 nm for clear conditions. In winter, clear skies have an average visibility of 20 nm compare to 4 nm for hazy skies. This represents an 80% reduction in visibility. In spring, visibility decreases from 14 nm for clear conditions to 5 nm for hazy conditions, a reduction of greater than 60%. In summer, the average visibility for clear skies is 11 nm compared to 4 nm for hazy skies, representing greater than a 60% reduction in visibility. In autumn, clear skies have an average visibility of 17 nm compare to 5 nm for hazy conditions, and 70% reduction in visibility.

Based on data from the Martha's Vineyard, daylight hazy skies result in average visibilities of 5 nm compared to 20 nm for clear conditions. In winter, clear skies have an average visibility of 23 nm compare to 5 nm for hazy skies. This represents approximately an 80% reduction in visibility. In spring, visibility decreases from 22 nm for clear conditions to 4 nm for hazy conditions, a reduction of approximately 80%. In summer, the average visibility for clear skies is 17 nm compared to 5 nm for hazy skies, representing a 70% reduction in visibility. In autumn, clear skies have an average visibility of 20 nm compare to 4 nm for hazy conditions, an 80% reduction in visibility.

Nighttime hazy skies result in average visibilities of 4 nm compared to 18 nm for clear conditions. In winter, clear skies have an average visibility of 23 nm compare to 4 nm for hazy skies. This represents an 80% reduction in visibility. In spring, visibility decreases from 20 nm for clear conditions to 4 nm for hazy conditions, a reduction of 80%. In summer, the average visibility for clear skies is 13 nm compared to 4 nm for hazy skies, representing a 70% reduction in visibility. In autumn, clear skies have an average visibility of 19 nm compare to 5 nm for hazy conditions, approximately a 75% reduction in visibility.

# Appendix A

# Meteorological Conditions Tables

**Site: Southeast Lighthouse**

Latitude: 41.1534 Longitude: 71.5521

Meteological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 554 | 55.4 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 358 | 35.8 | 336 | 33.6 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 724 | 72.4 | 791 | 79.1 | 679 | 67.9 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 525 | 52.5 | 480 | 48 | 536 | 53.7 | 473 | 47.3 |
| Foggy | 108 | 10.9 | 116 | 11.6 | 118 | 11.8 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 71 | 7.1 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 182 | 18.3 | 246 | 24.6 | 214 | 21.5 | 269 | 26.9 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5621 | 57.1 | 6814 | 50.2 | 7201 | 53.3 | 5306 | 51.9 |
| Foggy | 1395 | 14.2 | 2378 | 17.5 | 2672 | 19.8 | 1481 | 14.5 |
| Rainy | 762 | 7.7 | 1099 | 8.1 | 700 | 5.2 | 821 | 8 |
| Hazy | 23 | 0.2 | 119 | 0.9 | 436 | 3.2 | 25 | 0.2 |
| Cloudy | 2048 | 20.8 | 3156 | 23.3 | 2503 | 18.5 | 2595 | 25.4 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6464 | 55.9 | 4141 | 50.7 | 4429 | 54.4 | 6073 | 53 |
| Foggy | 1490 | 12.9 | 1383 | 16.9 | 1713 | 21 | 1463 | 12.8 |
| Rainy | 816 | 7.1 | 667 | 8.2 | 459 | 5.6 | 977 | 8.5 |
| Hazy | 21 | 0.2 | 47 | 0.6 | 184 | 2.3 | 12 | 0.1 |
| Cloudy | 2769 | 24 | 1925 | 23.6 | 1358 | 16.7 | 2929 | 25.6 |

**Site: Point Judith Lighthouse**
Latitude: 41.3610 Longitude 71.4814
Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 828 | 82.8 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 480 | 48 | 318 | 31.8 |
| Rainy | 303 | 30.3 | 373 | 37.3 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 644 | 64.4 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 548 | 54.8 | 483 | 48.3 | 588 | 58.8 | 497 | 49.7 |
| Foggy | 94 | 9.4 | 100 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 90 | 9 | 67 | 6.7 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.8 | 264 | 26.5 | 191 | 19.1 | 249 | 24.9 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5845 | 59.2 | 7053 | 51.8 | 7920 | 58.3 | 5639 | 55.2 |
| Foggy | 1257 | 12.7 | 2134 | 15.7 | 2283 | 16.8 | 1417 | 13.9 |
| Rainy | 761 | 7.7 | 1021 | 7.5 | 723 | 5.3 | 749 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1988 | 20.1 | 3290 | 24.2 | 2382 | 17.5 | 2374 | 23.2 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6722 | 58.1 | 4327 | 52.5 | 4870 | 59.8 | 6527 | 57 |
| Foggy | 1335 | 11.5 | 1152 | 14 | 1283 | 15.7 | 1405 | 12.3 |
| Rainy | 772 | 6.7 | 750 | 9.1 | 474 | 5.8 | 905 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2728 | 23.6 | 1948 | 23.6 | 1399 | 17.2 | 2603 | 22.7 |

**Site: Narragansett Town Beach**
Latitude: 41.4352 Longitude: 71.4553
Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 828 | 82.8 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 480 | 48 | 318 | 31.8 |
| Rainy | 303 | 30.3 | 373 | 37.3 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 644 | 64.4 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 548 | 54.8 | 483 | 48.3 | 588 | 58.8 | 497 | 49.7 |
| Foggy | 94 | 9.4 | 100 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 90 | 9 | 66 | 6.6 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.8 | 265 | 26.5 | 191 | 19.1 | 249 | 24.9 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5845 | 59.2 | 7056 | 51.8 | 7920 | 58.3 | 5639 | 55.2 |
| Foggy | 1257 | 12.7 | 2135 | 15.7 | 2283 | 16.8 | 1417 | 13.9 |
| Rainy | 761 | 7.7 | 1022 | 7.5 | 723 | 5.3 | 749 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1988 | 20.1 | 3295 | 24.2 | 2382 | 17.5 | 2374 | 23.2 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6722 | 58.1 | 4324 | 52.5 | 4870 | 59.8 | 6527 | 57 |
| Foggy | 1335 | 11.5 | 1151 | 14 | 1283 | 15.7 | 1405 | 12.3 |
| Rainy | 772 | 6.7 | 749 | 9.1 | 474 | 5.8 | 905 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2728 | 23.6 | 1943 | 23.6 | 1399 | 17.2 | 2603 | 22.7 |

**Site: Beavertail Lighthouse**

Latitude: 41.4494 Longitude: 71.3994

Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 828 | 82.8 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 480 | 48 | 318 | 31.8 |
| Rainy | 303 | 30.3 | 373 | 37.3 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 644 | 64.4 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 548 | 54.8 | 483 | 48.3 | 588 | 58.8 | 497 | 49.7 |
| Foggy | 94 | 9.4 | 100 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 90 | 9 | 66 | 6.6 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.8 | 265 | 26.5 | 191 | 19.1 | 249 | 24.9 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5845 | 59.2 | 7056 | 51.8 | 7920 | 58.3 | 5639 | 55.2 |
| Foggy | 1257 | 12.7 | 2135 | 15.7 | 2283 | 16.8 | 1417 | 13.9 |
| Rainy | 761 | 7.7 | 1022 | 7.5 | 723 | 5.3 | 749 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1988 | 20.1 | 3295 | 24.2 | 2382 | 17.5 | 2374 | 23.2 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6722 | 58.1 | 4324 | 52.5 | 4870 | 59.8 | 6527 | 57 |
| Foggy | 1335 | 11.5 | 1151 | 14 | 1283 | 15.7 | 1405 | 12.3 |
| Rainy | 772 | 6.7 | 749 | 9.1 | 474 | 5.8 | 905 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2728 | 23.6 | 1943 | 23.6 | 1399 | 17.2 | 2603 | 22.7 |

**Site: Brenton Point State Park**

Latitude: 41.4517 Longitude: 71.3570

Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 828 | 82.8 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 480 | 48 | 319 | 31.9 |
| Rainy | 303 | 30.3 | 373 | 37.3 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 644 | 64.4 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 548 | 54.8 | 483 | 48.3 | 589 | 59 | 497 | 49.7 |
| Foggy | 94 | 9.4 | 100 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 90 | 9 | 66 | 6.6 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.8 | 265 | 26.5 | 190 | 19 | 249 | 24.9 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5843 | 59.2 | 7056 | 51.8 | 7925 | 58.3 | 5643 | 55.2 |
| Foggy | 1257 | 12.7 | 2135 | 15.7 | 2284 | 16.8 | 1419 | 13.9 |
| Rainy | 763 | 7.7 | 1022 | 7.5 | 724 | 5.3 | 750 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1988 | 20.1 | 3295 | 24.2 | 2385 | 17.6 | 2377 | 23.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6724 | 58.1 | 4324 | 52.5 | 4865 | 59.8 | 6523 | 57 |
| Foggy | 1335 | 11.5 | 1151 | 14 | 1282 | 15.7 | 1403 | 12.3 |
| Rainy | 770 | 6.7 | 749 | 9.1 | 473 | 5.8 | 904 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2728 | 23.6 | 1943 | 23.6 | 1396 | 17.1 | 2600 | 22.7 |

**Site: Second Beach**

Latitude: 41.4878 Longitude: 71.2565

Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 828 | 82.8 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 480 | 48 | 319 | 31.9 |
| Rainy | 303 | 30.3 | 373 | 37.3 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 643 | 64.3 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 548 | 54.8 | 483 | 48.3 | 589 | 59 | 497 | 49.7 |
| Foggy | 95 | 9.5 | 100 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 89 | 8.9 | 66 | 6.6 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.8 | 265 | 26.5 | 190 | 19 | 249 | 24.9 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5849 | 59.2 | 7050 | 51.8 | 7925 | 58.3 | 5640 | 55.2 |
| Foggy | 1258 | 12.7 | 2134 | 15.7 | 2284 | 16.8 | 1419 | 13.9 |
| Rainy | 763 | 7.7 | 1022 | 7.5 | 724 | 5.3 | 749 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1991 | 20.2 | 3292 | 24.2 | 2385 | 17.6 | 2371 | 23.2 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6718 | 58.1 | 4330 | 52.5 | 4865 | 59.8 | 6526 | 57 |
| Foggy | 1334 | 11.5 | 1152 | 14 | 1282 | 15.7 | 1403 | 12.3 |
| Rainy | 770 | 6.7 | 749 | 9.1 | 473 | 5.8 | 905 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2725 | 23.6 | 1946 | 23.6 | 1396 | 17.1 | 2606 | 22.8 |

**Site: Tappens Beach**

Latitude: 41.4613 Longitude: 71.1792

Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 827 | 82.7 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 480 | 48 | 319 | 31.9 |
| Rainy | 303 | 30.3 | 373 | 37.3 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 643 | 64.3 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 548 | 54.8 | 483 | 48.3 | 589 | 59 | 496 | 49.7 |
| Foggy | 95 | 9.5 | 101 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 89 | 8.9 | 66 | 6.6 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.8 | 264 | 26.5 | 190 | 19 | 249 | 25 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5849 | 59.2 | 7044 | 51.8 | 7917 | 58.3 | 5646 | 55.2 |
| Foggy | 1258 | 12.7 | 2133 | 15.7 | 2283 | 16.8 | 1419 | 13.9 |
| Rainy | 763 | 7.7 | 1022 | 7.5 | 724 | 5.3 | 749 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1991 | 20.2 | 3289 | 24.2 | 2384 | 17.6 | 2375 | 23.2 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6718 | 58.1 | 4336 | 52.6 | 4873 | 59.8 | 6520 | 57 |
| Foggy | 1334 | 11.5 | 1153 | 14 | 1283 | 15.7 | 1403 | 12.3 |
| Rainy | 770 | 6.7 | 749 | 9.1 | 473 | 5.8 | 905 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2725 | 23.6 | 1949 | 23.6 | 1397 | 17.1 | 2602 | 22.7 |

**Site: Horseneck Beach State Reservation**

Latitude: 41.5062 Longitude: 71.0559

Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 725 | 72.5 | 746 | 74.6 | 827 | 82.7 | 736 | 73.6 |
| Foggy | 272 | 27.2 | 437 | 43.7 | 481 | 48.1 | 319 | 31.9 |
| Rainy | 303 | 30.3 | 374 | 37.4 | 327 | 32.7 | 300 | 30 |
| Hazy | 11 | 1.1 | 33 | 3.3 | 88 | 8.8 | 17 | 1.7 |
| Cloudy | 591 | 59.1 | 702 | 70.2 | 734 | 73.4 | 643 | 64.3 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 549 | 54.9 | 483 | 48.3 | 587 | 58.8 | 496 | 49.7 |
| Foggy | 95 | 9.5 | 101 | 10.1 | 85 | 8.5 | 101 | 10.1 |
| Rainy | 89 | 8.9 | 66 | 6.6 | 44 | 4.4 | 61 | 6.1 |
| Hazy | 0 | 0 | 5 | 0.5 | 8 | 0.8 | 1 | 0.1 |
| Cloudy | 167 | 16.7 | 264 | 26.5 | 192 | 19.3 | 249 | 25 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5849 | 59.2 | 7051 | 51.8 | 7920 | 58.3 | 5652 | 55.2 |
| Foggy | 1256 | 12.7 | 2133 | 15.7 | 2284 | 16.8 | 1420 | 13.9 |
| Rainy | 764 | 7.7 | 1025 | 7.5 | 724 | 5.3 | 750 | 7.3 |
| Hazy | 18 | 0.2 | 111 | 0.8 | 270 | 2 | 34 | 0.3 |
| Cloudy | 1992 | 20.2 | 3289 | 24.2 | 2381 | 17.5 | 2377 | 23.2 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6718 | 58.1 | 4329 | 52.5 | 4870 | 59.8 | 6514 | 57 |
| Foggy | 1336 | 11.6 | 1153 | 14 | 1282 | 15.7 | 1402 | 12.3 |
| Rainy | 769 | 6.7 | 746 | 9.1 | 473 | 5.8 | 904 | 7.9 |
| Hazy | 12 | 0.1 | 64 | 0.8 | 124 | 1.5 | 11 | 0.1 |
| Cloudy | 2724 | 23.6 | 1949 | 23.7 | 1400 | 17.2 | 2600 | 22.7 |

**Site: Aquinnah Lighthouse**
Latitude: 41.3485 Longitude: 70.8350
Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5327 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1486 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 823 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2597 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6052 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1458 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 975 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2927 | 25.6 |

**Site: Squibnocket Farm Road**

Latitude: 41.3034 Longitude: 70.7701

Meteorlogical Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6793 | 50.2 | 7193 | 53.2 | 5330 | 51.9 |
| Foggy | 1399 | 14.2 | 2372 | 17.5 | 2679 | 19.8 | 1487 | 14.5 |
| Rainy | 765 | 7.7 | 1098 | 8.1 | 703 | 5.2 | 824 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3144 | 23.2 | 2503 | 18.5 | 2602 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4162 | 50.7 | 4437 | 54.5 | 6049 | 53 |
| Foggy | 1486 | 12.9 | 1390 | 16.9 | 1706 | 21 | 1457 | 12.8 |
| Rainy | 813 | 7.1 | 670 | 8.2 | 456 | 5.6 | 974 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1942 | 23.6 | 1358 | 16.7 | 2922 | 25.6 |

**Site: Wasque Point**

Latitude: 41.3514 Longitude: 70.4513

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 555 | 55.5 | 324 | 32.4 |
| Rainy | 323 | 32.3 | 375 | 37.5 | 359 | 35.9 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 136 | 13.6 | 18 | 1.8 |
| Cloudy | 625 | 62.5 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 475 | 47.5 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 116 | 11.6 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 252 | 25.2 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6781 | 50.2 | 7187 | 53.2 | 5333 | 51.9 |
| Foggy | 1400 | 14.2 | 2373 | 17.6 | 2679 | 19.8 | 1487 | 14.5 |
| Rainy | 763 | 7.7 | 1097 | 8.1 | 704 | 5.2 | 826 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 436 | 3.2 | 25 | 0.2 |
| Cloudy | 2063 | 20.9 | 3136 | 23.2 | 2498 | 18.5 | 2607 | 25.4 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4173 | 50.7 | 4443 | 54.5 | 6046 | 53 |
| Foggy | 1485 | 12.9 | 1389 | 16.9 | 1706 | 20.9 | 1457 | 12.8 |
| Rainy | 815 | 7.1 | 671 | 8.2 | 455 | 5.6 | 972 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 184 | 2.3 | 12 | 0.1 |
| Cloudy | 2754 | 23.9 | 1950 | 23.7 | 1363 | 16.7 | 2917 | 25.6 |

**Site: Tom Nevers Field**

Latitude: 41.2397 Longitude: 70.0086

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 707 | 70.7 | 732 | 73.2 | 838 | 83.8 | 722 | 72.2 |
| Foggy | 341 | 34.1 | 511 | 51.1 | 544 | 54.4 | 345 | 34.5 |
| Rainy | 360 | 36 | 388 | 38.8 | 380 | 38 | 359 | 35.9 |
| Hazy | 34 | 3.4 | 61 | 6.1 | 122 | 12.2 | 32 | 3.2 |
| Cloudy | 666 | 66.6 | 737 | 73.7 | 751 | 75.1 | 710 | 71 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 482 | 48.2 | 454 | 45.5 | 521 | 52.2 | 469 | 46.9 |
| Foggy | 156 | 15.6 | 182 | 18.2 | 204 | 20.5 | 148 | 14.8 |
| Rainy | 69 | 6.9 | 48 | 4.8 | 20 | 2 | 61 | 6.1 |
| Hazy | 0 | 0 | 12 | 1.2 | 5 | 0.5 | 2 | 0.2 |
| Cloudy | 194 | 19.4 | 222 | 22.3 | 166 | 16.6 | 230 | 23 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5216 | 52.4 | 6473 | 48 | 7142 | 52.8 | 5263 | 51 |
| Foggy | 1827 | 18.3 | 3270 | 24.2 | 3501 | 25.9 | 1806 | 17.5 |
| Rainy | 751 | 7.5 | 798 | 5.9 | 582 | 4.3 | 821 | 8 |
| Hazy | 60 | 0.6 | 213 | 1.6 | 346 | 2.6 | 63 | 0.6 |
| Cloudy | 2108 | 21.2 | 2745 | 20.3 | 1943 | 14.4 | 2370 | 23 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6005 | 52.1 | 3898 | 46.9 | 4174 | 51.4 | 5732 | 50.3 |
| Foggy | 1950 | 16.9 | 1974 | 23.8 | 2303 | 28.4 | 1912 | 16.8 |
| Rainy | 825 | 7.2 | 537 | 6.5 | 342 | 4.2 | 917 | 8.1 |
| Hazy | 58 | 0.5 | 102 | 1.2 | 117 | 1.4 | 44 | 0.4 |
| Cloudy | 2696 | 23.4 | 1794 | 21.6 | 1179 | 14.5 | 2782 | 24.4 |

**Site: Lookout Hill Observation Platform**

Latitude: 41.4206 Longitude: 70.9338

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 731 | 73.1 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 360 | 36 | 336 | 33.6 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 791 | 79.1 | 679 | 67.9 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 525 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.2 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 182 | 18.3 | 250 | 25 | 217 | 21.8 | 270 | 27 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5621 | 57 | 6804 | 50.2 | 7193 | 53.2 | 5326 | 51.9 |
| Foggy | 1396 | 14.2 | 2374 | 17.5 | 2677 | 19.8 | 1485 | 14.5 |
| Rainy | 762 | 7.7 | 1100 | 8.1 | 702 | 5.2 | 822 | 8 |
| Hazy | 23 | 0.2 | 119 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2057 | 20.9 | 3148 | 23.2 | 2505 | 18.5 | 2600 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6464 | 56 | 4151 | 50.7 | 4437 | 54.5 | 6053 | 53 |
| Foggy | 1489 | 12.9 | 1388 | 16.9 | 1708 | 21 | 1459 | 12.8 |
| Rainy | 816 | 7.1 | 668 | 8.2 | 457 | 5.6 | 976 | 8.5 |
| Hazy | 21 | 0.2 | 47 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2760 | 23.9 | 1938 | 23.7 | 1356 | 16.7 | 2924 | 25.6 |

**Site: South Beach State Park**

Latitude: 41.3495 Longitude: 70.5237

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 323 | 32.3 | 375 | 37.5 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 136 | 13.6 | 18 | 1.8 |
| Cloudy | 625 | 62.5 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 475 | 47.5 | 532 | 53.2 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 116 | 11.6 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 251 | 25.1 | 218 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6787 | 50.2 | 7190 | 53.2 | 5340 | 51.9 |
| Foggy | 1400 | 14.2 | 2373 | 17.6 | 2682 | 19.8 | 1489 | 14.5 |
| Rainy | 763 | 7.7 | 1098 | 8.1 | 705 | 5.2 | 826 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 436 | 3.2 | 25 | 0.2 |
| Cloudy | 2063 | 20.9 | 3139 | 23.2 | 2501 | 18.5 | 2608 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4167 | 50.7 | 4440 | 54.5 | 6039 | 53 |
| Foggy | 1485 | 12.9 | 1389 | 16.9 | 1703 | 20.9 | 1455 | 12.8 |
| Rainy | 815 | 7.1 | 670 | 8.1 | 454 | 5.6 | 972 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 184 | 2.3 | 12 | 0.1 |
| Cloudy | 2754 | 23.9 | 1947 | 23.7 | 1360 | 16.7 | 2916 | 25.6 |

**Site: Madaket Beach Dunes**

Latitude: 41.2738 Longitude: 70.2109

Meteorological Site Location: Nantucket

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 707 | 70.7 | 732 | 73.2 | 838 | 83.8 | 721 | 72.1 |
| Foggy | 341 | 34.1 | 511 | 51.1 | 544 | 54.4 | 345 | 34.5 |
| Rainy | 360 | 36 | 388 | 38.8 | 379 | 37.9 | 359 | 35.9 |
| Hazy | 34 | 3.4 | 62 | 6.2 | 122 | 12.2 | 32 | 3.2 |
| Cloudy | 665 | 66.5 | 737 | 73.7 | 751 | 75.1 | 710 | 71 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 482 | 48.2 | 454 | 45.5 | 521 | 52.2 | 469 | 46.9 |
| Foggy | 157 | 15.7 | 182 | 18.2 | 204 | 20.5 | 148 | 14.8 |
| Rainy | 69 | 6.9 | 48 | 4.8 | 20 | 2 | 61 | 6.1 |
| Hazy | 0 | 0 | 12 | 1.2 | 5 | 0.5 | 2 | 0.2 |
| Cloudy | 193 | 19.3 | 222 | 22.3 | 166 | 16.6 | 230 | 23 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5204 | 52.3 | 6481 | 47.9 | 7143 | 52.9 | 5260 | 51 |
| Foggy | 1826 | 18.4 | 3276 | 24.2 | 3498 | 25.9 | 1806 | 17.5 |
| Rainy | 751 | 7.6 | 799 | 5.9 | 582 | 4.3 | 822 | 8 |
| Hazy | 60 | 0.6 | 216 | 1.6 | 346 | 2.6 | 63 | 0.6 |
| Cloudy | 2101 | 21.1 | 2747 | 20.3 | 1945 | 14.4 | 2372 | 23 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6017 | 52.1 | 3890 | 47 | 4173 | 51.4 | 5735 | 50.4 |
| Foggy | 1951 | 16.9 | 1968 | 23.8 | 2306 | 28.4 | 1912 | 16.8 |
| Rainy | 825 | 7.1 | 536 | 6.5 | 342 | 4.2 | 916 | 8 |
| Hazy | 58 | 0.5 | 99 | 1.2 | 117 | 1.4 | 44 | 0.4 |
| Cloudy | 2703 | 23.4 | 1792 | 21.6 | 1177 | 14.5 | 2780 | 24.4 |

**Site: Lucy Vincent Beach**

Latitude: 41.3389 Longitude: 70.7276

Meteorlological Site Location: Martha's Vineyard

## Daytime Meteorological Conditions

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6793 | 50.2 | 7193 | 53.2 | 5330 | 51.9 |
| Foggy | 1399 | 14.2 | 2372 | 17.5 | 2679 | 19.8 | 1487 | 14.5 |
| Rainy | 765 | 7.7 | 1098 | 8.1 | 703 | 5.2 | 824 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3144 | 23.2 | 2503 | 18.5 | 2602 | 25.3 |

## Nighttime Meteorological Conditions

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4162 | 50.7 | 4437 | 54.5 | 6049 | 53 |
| Foggy | 1486 | 12.9 | 1390 | 16.9 | 1706 | 21 | 1457 | 12.8 |
| Rainy | 813 | 7.1 | 670 | 8.2 | 456 | 5.6 | 974 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1942 | 23.6 | 1358 | 16.7 | 2922 | 25.6 |

**Site: Tribal Administration Building**

Latitude: 41.3313 Longitude: 70.7997

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5330 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1487 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 824 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2602 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6049 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1457 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 974 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2922 | 25.6 |

**Site: Aquinnah Cliffs Overlook Area**
Latitude: 41.3473 Longitude: 70.8371
Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5327 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1486 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 823 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2597 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6052 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1458 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 975 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2927 | 25.6 |

**Site: Edwin D. Vanderhoop Homestead**
Latitude: 41.3461 Longitude: 70.8355
Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5327 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1486 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 823 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2597 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6052 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1458 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 975 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2927 | 25.6 |

**Site: Top of Circle Park Area**

Longitude: 41.3465 Latitude: 70.8366

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5327 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1486 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 823 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2597 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6052 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1458 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 975 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2927 | 25.6 |

**Site: Philbin Beach**

Latitude: 41.3372 Longitude: 70.8286

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5327 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1486 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 823 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2597 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6052 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1458 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 975 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2927 | 25.6 |

**Site: Moshup Beach**

Latitude: 41.3413 Longitude: 70.8326

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5327 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1486 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 823 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2597 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6052 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1458 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 975 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2927 | 25.6 |

**Site: Gay Head Community Baptist Church**

Latitude: 41.3412 Longitude: 70.8135

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6799 | 50.2 | 7198 | 53.2 | 5330 | 51.9 |
| Foggy | 1399 | 14.2 | 2373 | 17.5 | 2680 | 19.8 | 1487 | 14.5 |
| Rainy | 765 | 7.7 | 1099 | 8.1 | 703 | 5.2 | 824 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3146 | 23.2 | 2506 | 18.5 | 2602 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4156 | 50.7 | 4432 | 54.5 | 6049 | 53 |
| Foggy | 1486 | 12.9 | 1389 | 16.9 | 1705 | 21 | 1457 | 12.8 |
| Rainy | 813 | 7.1 | 669 | 8.2 | 456 | 5.6 | 974 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1940 | 23.7 | 1355 | 16.7 | 2922 | 25.6 |

**Site: Peaked Hill**

Latitude: 41.3552 Longitude: 70.7351

Meteorological Site Location: Martha's Vineyard

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| Clear | 726 | 72.6 | 739 | 73.9 | 815 | 81.5 | 730 | 73 |
| Foggy | 287 | 28.7 | 459 | 45.9 | 556 | 55.6 | 324 | 32.4 |
| Rainy | 322 | 32.2 | 374 | 37.4 | 361 | 36.1 | 337 | 33.7 |
| Hazy | 19 | 1.9 | 45 | 4.5 | 135 | 13.5 | 18 | 1.8 |
| Cloudy | 626 | 62.6 | 723 | 72.3 | 792 | 79.2 | 678 | 67.8 |
| Days with 50% or More Observations: | | | | | | | | |
| Clear | 524 | 52.5 | 478 | 47.8 | 532 | 53.3 | 471 | 47.1 |
| Foggy | 108 | 10.9 | 115 | 11.5 | 119 | 11.9 | 106 | 10.6 |
| Rainy | 82 | 8.2 | 70 | 7 | 32 | 3.2 | 62 | 6.2 |
| Hazy | 1 | 0.1 | 5 | 0.5 | 13 | 1.3 | 0 | 0 |
| Cloudy | 183 | 18.3 | 250 | 25 | 217 | 21.8 | 271 | 27.1 |
| Distribution of Hourly Observations: | | | | | | | | |
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 5630 | 57 | 6793 | 50.2 | 7193 | 53.2 | 5330 | 51.9 |
| Foggy | 1399 | 14.2 | 2372 | 17.5 | 2679 | 19.8 | 1487 | 14.5 |
| Rainy | 765 | 7.7 | 1098 | 8.1 | 703 | 5.2 | 824 | 8 |
| Hazy | 23 | 0.2 | 118 | 0.9 | 435 | 3.2 | 25 | 0.2 |
| Cloudy | 2062 | 20.9 | 3144 | 23.2 | 2503 | 18.5 | 2602 | 25.3 |

**Nighttime Meteorological Conditions**

| Distribution of Hourly Observations: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. | Total Hours | Total Pct. |
| Clear | 6455 | 56 | 4162 | 50.7 | 4437 | 54.5 | 6049 | 53 |
| Foggy | 1486 | 12.9 | 1390 | 16.9 | 1706 | 21 | 1457 | 12.8 |
| Rainy | 813 | 7.1 | 670 | 8.2 | 456 | 5.6 | 974 | 8.5 |
| Hazy | 21 | 0.2 | 48 | 0.6 | 185 | 2.3 | 12 | 0.1 |
| Cloudy | 2755 | 23.9 | 1942 | 23.6 | 1358 | 16.7 | 2922 | 25.6 |

# Appendix B

# Visibility Analysis Tables

| Site: Southeast Lighthouse | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Latitude: 41.1534 Longitude: 71.5521 | | | | | | | | |
| Meteorlogical Site Location: Martha's Vineyard | | | | | | | | |
| **Daytime Visibility Conditions** | | | | | | | | |
| | Winter | | Spring | | Summer | | Autumn | |
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 742 | 74.2 | 771 | 77.1 | 699 | 69.9 | 756 | 75.6 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 485 | 48.5 | 553 | 55.3 |
| 30 nm | 352 | 35.2 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 582 | 58.2 | 535 | 53.5 | 458 | 45.8 | 510 | 51 |
| 20 nm | 380 | 38 | 319 | 31.9 | 194 | 19.4 | 248 | 24.8 |
| 30 nm | 124 | 12.4 | 149 | 14.9 | 16 | 1.6 | 42 | 4.2 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 473 | 47.3 | 235 | 23.5 | 120 | 12 | 337 | 33.7 |
| 20 nm | 252 | 25.2 | 101 | 10.1 | 19 | 1.9 | 133 | 13.3 |
| 30 nm | 50 | 5 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5550 | 23.2 | 6767 | 22.5 | 7100 | 16.7 | 5263 | 19.8 |
| Fog | 1382 | 3.4 | 2371 | 2.7 | 2658 | 2.9 | 1476 | 3.6 |
| Rainy | 723 | 8.8 | 1093 | 9.2 | 685 | 8.8 | 813 | 9.5 |
| Hazy | 23 | 4.7 | 119 | 4.3 | 424 | 4.7 | 23 | 4.4 |
| Cloudy | 2033 | 15.5 | 3154 | 12.7 | 2494 | 10.4 | 2590 | 14 |
| **Nighttime Visibility Conditions** | | | | | | | | |
| Average Visibility (nm): | | | | | | | | |
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6401 | 22.9 | 4095 | 17.7 | 4387 | 12.5 | 6031 | 18.3 |
| Fog | 1481 | 3.5 | 1368 | 2.8 | 1705 | 3 | 1459 | 3.5 |
| Rainy | 781 | 8.5 | 661 | 9.8 | 447 | 8.4 | 960 | 9.1 |
| Hazy | 20 | 4.4 | 47 | 4.4 | 177 | 4.2 | 12 | 4.8 |
| Cloudy | 2758 | 15.1 | 1916 | 12 | 1356 | 9.4 | 2927 | 14 |

**Site: Point Judith Lighthouse**

Latitude:41.3610 Longitude:71.4814

Meteorological Site Location: Newport

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 731 | 73.1 |
| 20 nm | 630 | 63 | 553 | 55.3 | 489 | 48.9 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 271 | 27.1 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 607 | 60.7 | 525 | 52.5 | 459 | 45.9 | 514 | 51.4 |
| 20 nm | 421 | 42.1 | 332 | 33.2 | 151 | 15.1 | 220 | 22 |
| 30 nm | 120 | 12 | 129 | 12.9 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 517 | 51.7 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 298 | 29.8 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 12 | 1.2 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5823 | 24.1 | 7015 | 22 | 7890 | 16.1 | 5608 | 19.2 |
| Foggy | 1243 | 3 | 2129 | 2.9 | 2283 | 3.1 | 1411 | 3 |
| Rainy | 697 | 7.6 | 1001 | 8.8 | 708 | 8.1 | 725 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1980 | 15.6 | 3289 | 12.2 | 2382 | 9.8 | 2372 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6709 | 24.3 | 4289 | 19.7 | 4852 | 13.4 | 6508 | 19.2 |
| Foggy | 1333 | 2.9 | 1140 | 3 | 1264 | 3.3 | 1401 | 3.3 |
| Rainy | 746 | 7.8 | 739 | 9.3 | 467 | 8.2 | 874 | 8.6 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2721 | 16 | 1943 | 11.9 | 1399 | 9.3 | 2593 | 14.1 |

**Site: Narragansett Town Beach**

Latitude: 41.4352 Longitude: 71.4553

Meteorological Site Location: Newport

**Daytime Meteorological Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 731 | 73.1 |
| 20 nm | 630 | 63 | 553 | 55.3 | 489 | 48.9 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 271 | 27.1 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 607 | 60.7 | 524 | 52.4 | 459 | 45.9 | 514 | 51.4 |
| 20 nm | 421 | 42.1 | 332 | 33.2 | 151 | 15.1 | 220 | 22 |
| 30 nm | 120 | 12 | 129 | 12.9 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 517 | 51.7 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 298 | 29.8 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 12 | 1.2 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5823 | 24.1 | 7018 | 22 | 7890 | 16.1 | 5608 | 19.2 |
| Foggy | 1243 | 3 | 2130 | 2.9 | 2283 | 3.1 | 1411 | 3 |
| Rainy | 697 | 7.6 | 1002 | 8.8 | 708 | 8.1 | 725 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1980 | 15.6 | 3294 | 12.2 | 2382 | 9.8 | 2372 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6709 | 24.3 | 4286 | 19.7 | 4852 | 13.4 | 6508 | 19.2 |
| Foggy | 1333 | 2.9 | 1139 | 3 | 1264 | 3.3 | 1401 | 3.3 |
| Rainy | 746 | 7.8 | 738 | 9.3 | 467 | 8.2 | 874 | 8.6 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2721 | 16 | 1938 | 11.9 | 1399 | 9.3 | 2593 | 14.1 |

**Site: Beavertail Lighthouse**

Latitude: 41.4494 Longitude:71.3994

Meteorological Site Location: Newport

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 731 | 73.1 |
| 20 nm | 630 | 63 | 553 | 55.3 | 489 | 48.9 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 271 | 27.1 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 607 | 60.7 | 524 | 52.4 | 459 | 45.9 | 514 | 51.4 |
| 20 nm | 421 | 42.1 | 332 | 33.2 | 151 | 15.1 | 220 | 22 |
| 30 nm | 120 | 12 | 129 | 12.9 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 517 | 51.7 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 298 | 29.8 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 12 | 1.2 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5823 | 24.1 | 7018 | 22 | 7890 | 16.1 | 5608 | 19.2 |
| Foggy | 1243 | 3 | 2130 | 2.9 | 2283 | 3.1 | 1411 | 3 |
| Rainy | 697 | 7.6 | 1002 | 8.8 | 708 | 8.1 | 725 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1980 | 15.6 | 3294 | 12.2 | 2382 | 9.8 | 2372 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6709 | 24.3 | 4286 | 19.7 | 4852 | 13.4 | 6508 | 19.2 |
| Foggy | 1333 | 2.9 | 1139 | 3 | 1264 | 3.3 | 1401 | 3.3 |
| Rainy | 746 | 7.8 | 738 | 9.3 | 467 | 8.2 | 874 | 8.6 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2721 | 16 | 1938 | 11.9 | 1399 | 9.3 | 2593 | 14.1 |

**Site: Brenton Point State**

Latitude: 41.4517 Longitude: 71.3570

Meteorological Site Location: Newport

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 731 | 73.1 |
| 20 nm | 630 | 63 | 553 | 55.3 | 489 | 48.9 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 271 | 27.1 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 606 | 60.6 | 524 | 52.4 | 458 | 45.8 | 512 | 51.2 |
| 20 nm | 419 | 41.9 | 332 | 33.2 | 151 | 15.1 | 220 | 22 |
| 30 nm | 120 | 12 | 129 | 12.9 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 516 | 51.6 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 298 | 29.8 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 12 | 1.2 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5821 | 24.1 | 7018 | 22 | 7895 | 16.1 | 5612 | 19.2 |
| Foggy | 1243 | 3 | 2130 | 2.9 | 2284 | 3.1 | 1413 | 3 |
| Rainy | 699 | 7.6 | 1002 | 8.8 | 709 | 8.1 | 726 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1980 | 15.6 | 3294 | 12.2 | 2385 | 9.8 | 2375 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6711 | 24.3 | 4286 | 19.7 | 4847 | 13.4 | 6504 | 19.2 |
| Foggy | 1333 | 2.9 | 1139 | 3 | 1263 | 3.3 | 1399 | 3.3 |
| Rainy | 744 | 7.8 | 738 | 9.3 | 466 | 8.2 | 873 | 8.6 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2721 | 16 | 1938 | 11.9 | 1396 | 9.3 | 2590 | 14.1 |

**Site: Second Beach**

Latitude: 41.4878 Longitude: 71.2565

Meteorological Site Location: Newport

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 730 | 73 |
| 20 nm | 630 | 63 | 553 | 55.3 | 489 | 48.9 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 270 | 27 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 605 | 60.5 | 524 | 52.4 | 458 | 45.8 | 512 | 51.2 |
| 20 nm | 419 | 41.9 | 330 | 33 | 151 | 15.1 | 219 | 21.9 |
| 30 nm | 120 | 12 | 127 | 12.7 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 516 | 51.6 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 298 | 29.8 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 11 | 1.1 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5827 | 24.1 | 7012 | 22 | 7895 | 16.1 | 5609 | 19.2 |
| Foggy | 1244 | 3 | 2129 | 2.9 | 2284 | 3.1 | 1413 | 3 |
| Rainy | 699 | 7.6 | 1002 | 8.8 | 709 | 8.1 | 725 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1983 | 15.6 | 3291 | 12.2 | 2385 | 9.8 | 2369 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6705 | 24.3 | 4292 | 19.7 | 4847 | 13.4 | 6507 | 19.2 |
| Foggy | 1332 | 2.9 | 1140 | 3 | 1263 | 3.3 | 1399 | 3.3 |
| Rainy | 744 | 7.8 | 738 | 9.3 | 466 | 8.2 | 874 | 8.6 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2718 | 16 | 1941 | 12 | 1396 | 9.3 | 2596 | 14.1 |

**Site: Tappens Beach**

Latitude 41.4613 Longitute 71.1792

Meteorlogical Site Location: Newport

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 730 | 73 |
| 20 nm | 630 | 63 | 553 | 55.3 | 488 | 48.8 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 270 | 27 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 605 | 60.5 | 524 | 52.4 | 458 | 45.8 | 512 | 51.2 |
| 20 nm | 419 | 41.9 | 330 | 33 | 150 | 15 | 218 | 21.8 |
| 30 nm | 120 | 12 | 126 | 12.6 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 516 | 51.6 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 298 | 29.8 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 11 | 1.1 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5827 | 24.1 | 7006 | 22 | 7887 | 16.1 | 5615 | 19.2 |
| Foggy | 1244 | 3 | 2128 | 2.9 | 2283 | 3.1 | 1413 | 3 |
| Rainy | 699 | 7.6 | 1002 | 8.8 | 709 | 8.1 | 725 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1983 | 15.6 | 3288 | 12.2 | 2384 | 9.8 | 2373 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6705 | 24.3 | 4298 | 19.7 | 4855 | 13.4 | 6501 | 19.2 |
| Foggy | 1332 | 2.9 | 1141 | 3 | 1264 | 3.3 | 1399 | 3.3 |
| Rainy | 1332 | 2.9 | 1141 | 3 | 1264 | 3.3 | 1399 | 3.3 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2718 | 16 | 1944 | 12 | 1397 | 9.3 | 2592 | 14.1 |

**Site: Horseneck Beach State Reservation**

Latitude: 41.5062 Longitude: 71.0559

Meteorological Site Location: Newport

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 759 | 75.9 | 752 | 75.2 | 690 | 69 | 730 | 73 |
| 20 nm | 630 | 63 | 553 | 55.3 | 488 | 48.8 | 538 | 53.8 |
| 30 nm | 422 | 42.2 | 363 | 36.3 | 211 | 21.1 | 270 | 27 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 605 | 60.5 | 522 | 52.2 | 458 | 45.8 | 512 | 51.2 |
| 20 nm | 419 | 41.9 | 329 | 32.9 | 147 | 14.7 | 218 | 21.8 |
| 30 nm | 120 | 12 | 125 | 12.5 | 7 | 0.7 | 30 | 3 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 514 | 51.4 | 280 | 28 | 143 | 14.3 | 357 | 35.7 |
| 20 nm | 297 | 29.7 | 130 | 13 | 9 | 0.9 | 110 | 11 |
| 30 nm | 48 | 4.8 | 38 | 3.8 | 0 | 0 | 12 | 1.2 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5827 | 24.1 | 7013 | 22 | 7890 | 16.1 | 5621 | 19.2 |
| Foggy | 1242 | 3 | 2128 | 2.9 | 2284 | 3.1 | 1414 | 3 |
| Rainy | 700 | 7.6 | 1005 | 8.8 | 709 | 8.1 | 726 | 8.7 |
| Hazy | 18 | 4.5 | 111 | 4.5 | 270 | 4.4 | 27 | 4.2 |
| Cloudy | 1984 | 15.6 | 3288 | 12.2 | 2381 | 9.8 | 2375 | 13 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6705 | 24.3 | 4291 | 19.8 | 4852 | 13.4 | 6495 | 19.2 |
| Foggy | 1334 | 2.9 | 1141 | 3 | 1263 | 3.3 | 1398 | 3.3 |
| Rainy | 743 | 7.8 | 735 | 9.3 | 466 | 8.2 | 873 | 8.6 |
| Hazy | 12 | 3.2 | 62 | 4.3 | 124 | 4.5 | 10 | 4 |
| Cloudy | 2717 | 16 | 1944 | 12 | 1400 | 9.3 | 2590 | 14.1 |

**Site: Aquinnah Lighthouse**

Latitude: 41.3485 Longitude: 70.8350

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5284 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1481 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 815 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2592 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6010 | 18.3 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1454 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 958 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2925 | 14.1 |

**Site: Squibnocket Farm Road**

Latitude: 41.3034 Longitude: 70.7701

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 571 | 57.1 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 529 | 52.9 | 453 | 45.3 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 146 | 14.6 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 338 | 33.8 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6746 | 22.4 | 7092 | 16.7 | 5287 | 19.8 |
| Foggy | 1386 | 3.4 | 2365 | 2.7 | 2665 | 2.9 | 1482 | 3.6 |
| Rainy | 726 | 8.8 | 1092 | 9.2 | 688 | 8.8 | 816 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3142 | 12.7 | 2494 | 10.4 | 2597 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4116 | 17.8 | 4395 | 12.6 | 6007 | 18.4 |
| Foggy | 1477 | 3.5 | 1375 | 2.8 | 1698 | 3 | 1453 | 3.5 |
| Rainy | 778 | 8.5 | 664 | 9.7 | 444 | 8.4 | 957 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1933 | 12 | 1356 | 9.4 | 2920 | 14.1 |

**Site: Wasque Point**

Latitude: 41.3514 Longitude: 70.4513

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 570 | 57 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 264 | 26.4 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 576 | 57.6 | 526 | 52.6 | 449 | 44.9 | 510 | 51 |
| 20 nm | 375 | 37.5 | 312 | 31.2 | 186 | 18.6 | 245 | 24.5 |
| 30 nm | 120 | 12 | 143 | 14.3 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 470 | 47 | 234 | 23.4 | 118 | 11.8 | 339 | 33.9 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.1 | 6734 | 22.4 | 7086 | 16.7 | 5290 | 19.8 |
| Foggy | 1387 | 3.4 | 2366 | 2.7 | 2665 | 2.9 | 1482 | 3.6 |
| Rainy | 725 | 8.8 | 1091 | 9.2 | 689 | 8.8 | 818 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 424 | 4.7 | 23 | 4.4 |
| Cloudy | 2048 | 15.4 | 3134 | 12.7 | 2489 | 10.4 | 2602 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4127 | 17.8 | 4401 | 12.6 | 6004 | 18.4 |
| Foggy | 1476 | 3.5 | 1374 | 2.8 | 1698 | 3 | 1453 | 3.5 |
| Rainy | 779 | 8.5 | 665 | 9.7 | 443 | 8.4 | 955 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 177 | 4.3 | 12 | 4.8 |
| Cloudy | 2743 | 15.2 | 1941 | 12 | 1361 | 9.4 | 2915 | 14.1 |

**Site: Tom Nevers Field**

Latitude: 41.2397 Longitude:70.0086

Meteorological Site Location: Nantucket

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 693 | 69.3 | 644 | 64.4 | 545 | 54.5 | 672 | 67.2 |
| 20 nm | 485 | 48.5 | 404 | 40.4 | 296 | 29.6 | 450 | 45 |
| 30 nm | 231 | 23.1 | 230 | 23 | 101 | 10.1 | 142 | 14.2 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 508 | 50.8 | 392 | 39.2 | 325 | 32.5 | 482 | 48.2 |
| 20 nm | 311 | 31.1 | 195 | 19.5 | 83 | 8.3 | 207 | 20.7 |
| 30 nm | 61 | 6.1 | 53 | 5.3 | 2 | 0.2 | 29 | 2.9 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 411 | 41.1 | 184 | 18.4 | 89 | 8.9 | 349 | 34.9 |
| 20 nm | 201 | 20.1 | 74 | 7.4 | 14 | 1.4 | 115 | 11.5 |
| 30 nm | 24 | 2.4 | 13 | 1.3 | 0 | 0 | 9 | 0.9 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5166 | 20.5 | 6383 | 18.2 | 6990 | 13.8 | 5202 | 17.9 |
| Foggy | 1812 | 2.9 | 3258 | 2.4 | 3475 | 2.5 | 1788 | 3 |
| Rainy | 704 | 8.4 | 780 | 8.7 | 569 | 8 | 800 | 9.1 |
| Hazy | 59 | 4.8 | 213 | 4.5 | 343 | 4.3 | 56 | 4.8 |
| Cloudy | 2101 | 14.5 | 2742 | 10.8 | 1931 | 8.4 | 2357 | 13.8 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 5973 | 20 | 3816 | 14.3 | 4085 | 10.9 | 5690 | 16.6 |
| Foggy | 1943 | 2.9 | 1930 | 2.5 | 2269 | 2.8 | 1902 | 3.1 |
| Rainy | 788 | 8.8 | 504 | 8.7 | 340 | 7.9 | 888 | 8.8 |
| Hazy | 57 | 4.3 | 101 | 4.6 | 112 | 4.2 | 40 | 4.8 |
| Cloudy | 4685 | 14.5 | 1765 | 9.9 | 1169 | 7.4 | 2766 | 14.7 |

**Site: Lookout Hill Observation Platform**

Latitude:41.4206 Longitude:70.9338

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 771 | 77.1 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 579 | 57.9 | 531 | 53.1 | 456 | 45.6 | 509 | 50.9 |
| 20 nm | 377 | 37.7 | 314 | 31.4 | 190 | 19 | 246 | 24.6 |
| 30 nm | 122 | 12.2 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 102 | 10.2 | 19 | 1.9 | 132 | 13.2 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5549 | 23.2 | 6757 | 22.4 | 7092 | 16.7 | 5283 | 19.8 |
| Foggy | 1383 | 3.4 | 2367 | 2.7 | 2663 | 2.9 | 1480 | 3.6 |
| Rainy | 723 | 8.8 | 1094 | 9.2 | 687 | 8.8 | 814 | 9.5 |
| Hazy | 23 | 4.7 | 119 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2042 | 15.5 | 3146 | 12.7 | 2496 | 10.4 | 2595 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6402 | 22.9 | 4105 | 17.8 | 4395 | 12.6 | 6011 | 18.3 |
| Foggy | 1480 | 3.5 | 1373 | 2.8 | 1700 | 3 | 1455 | 3.5 |
| Rainy | 781 | 8.5 | 662 | 9.7 | 445 | 8.4 | 959 | 9.1 |
| Hazy | 20 | 4.4 | 47 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2749 | 15.1 | 1929 | 12 | 1354 | 9.4 | 2922 | 14.1 |

**Site: South Beach State Park**

Latitude: 41.3495 Longitude: 70.5237

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 570 | 57 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 576 | 57.6 | 527 | 52.7 | 450 | 45 | 510 | 51 |
| 20 nm | 375 | 37.5 | 312 | 31.2 | 186 | 18.6 | 245 | 24.5 |
| 30 nm | 120 | 12 | 143 | 14.3 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 470 | 47 | 234 | 23.4 | 119 | 11.9 | 339 | 33.9 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.1 | 6740 | 22.4 | 7089 | 16.7 | 5297 | 19.8 |
| Foggy | 1387 | 3.4 | 2366 | 2.7 | 2668 | 2.9 | 1484 | 3.6 |
| Rainy | 725 | 8.8 | 1093 | 9.2 | 690 | 8.8 | 818 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 424 | 4.7 | 23 | 4.4 |
| Cloudy | 2048 | 15.4 | 3137 | 12.7 | 2492 | 10.4 | 2603 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4121 | 17.8 | 4398 | 12.6 | 5997 | 18.4 |
| Foggy | 1476 | 3.5 | 1374 | 2.8 | 1695 | 3 | 1451 | 3.5 |
| Rainy | 779 | 8.5 | 664 | 9.7 | 442 | 8.4 | 955 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 177 | 4.3 | 12 | 4.8 |
| Cloudy | 2743 | 15.2 | 1938 | 12 | 1358 | 9.4 | 2914 | 14.1 |

| Site: Madaket Beach Dunes<br>Latitude: 41.2738 Longitude: 70.2109<br>Meteorologial Site Location: Nantucket | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Daytime Visibility Conditions** | | | | | | | | |
| | Winter | | Spring | | Summer | | Autumn | |
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 693 | 69.3 | 644 | 64.4 | 545 | 54.5 | 672 | 67.2 |
| 20 nm | 485 | 48.5 | 404 | 40.4 | 296 | 29.6 | 450 | 45 |
| 30 nm | 231 | 23.1 | 230 | 23 | 101 | 10.1 | 142 | 14.2 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 508 | 50.8 | 392 | 39.2 | 326 | 32.6 | 482 | 48.2 |
| 20 nm | 313 | 31.3 | 197 | 19.7 | 84 | 8.4 | 206 | 20.6 |
| 30 nm | 61 | 6.1 | 53 | 5.3 | 2 | 0.2 | 29 | 2.9 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 411 | 41.1 | 184 | 18.4 | 89 | 8.9 | 350 | 35 |
| 20 nm | 201 | 20.1 | 74 | 7.4 | 14 | 1.4 | 116 | 11.6 |
| 30 nm | 24 | 2.4 | 13 | 1.3 | 0 | 0 | 9 | 0.9 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5154 | 20.5 | 6391 | 18.2 | 6991 | 13.8 | 5199 | 17.9 |
| Foggy | 1811 | 2.9 | 3264 | 2.4 | 3472 | 2.5 | 1788 | 3 |
| Rainy | 704 | 8.4 | 781 | 8.7 | 569 | 8 | 801 | 9.1 |
| Hazy | 59 | 4.8 | 216 | 4.5 | 343 | 4.3 | 56 | 4.8 |
| Cloudy | 2094 | 14.6 | 2744 | 10.8 | 1933 | 8.4 | 2359 | 13.8 |
| **Nighttime Visibility Conditions** | | | | | | | | |
| Average Visibility (nm): | | | | | | | | |
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 5985 | 20 | 3808 | 14.3 | 4084 | 10.9 | 5693 | 16.6 |
| Foggy | 1944 | 2.9 | 1924 | 2.5 | 2272 | 2.8 | 1902 | 3.1 |
| Rainy | 788 | **8.8** | 503 | 8.7 | 340 | 7.9 | 887 | 8.8 |
| Hazy | 57 | 4.3 | 98 | 4.6 | 112 | 4.2 | 40 | 4.8 |
| Cloudy | 2692 | 14.5 | 1763 | 9.9 | 1167 | 7.4 | 2764 | 14.6 |

**Site: Lucy Vincent Beach**

Latitude: 41.3389 Longitude: 70.7276

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 571 | 57.1 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 529 | 52.9 | 453 | 45.3 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 146 | 14.6 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 338 | 33.8 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6746 | 22.4 | 7092 | 16.7 | 5287 | 19.8 |
| Foggy | 1386 | 3.4 | 2365 | 2.7 | 2665 | 2.9 | 1482 | 3.6 |
| Rainy | 726 | 8.8 | 1092 | 9.2 | 688 | 8.8 | 816 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3142 | 12.7 | 2494 | 10.4 | 2597 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4116 | 17.8 | 4395 | 12.6 | 6007 | 18.4 |
| Foggy | 1477 | 3.5 | 1375 | 2.8 | 1698 | 3 | 1453 | 3.5 |
| Rainy | 778 | 8.5 | 664 | 9.7 | 444 | 8.4 | 957 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1933 | 12 | 1356 | 9.4 | 2920 | 14.1 |

**Site: Tribal Administration Building**

Latitude: 41.3313 Longitude: 70.7997

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 570 | 57 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.4 | 119 | 11.9 | 338 | 33.8 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6740 | 22.4 | 7097 | 16.7 | 5287 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1482 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 816 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2597 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6007 | 18.4 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1453 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 957 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2920 | 14.1 |

**Site: Aquinnah Cliffs Overlook Area**
Latitude: 41.3473 Longitude: 70.8371
Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5284 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1481 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 815 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2592 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6010 | 18.3 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1454 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 958 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2925 | 14.1 |

**Site: Edwin D. Vanderhoop Homestead**

Latitude: 41.3461 Longitude: 70.8355

Meteorological Site Location: Martha's Vineyard

## Daytime Visibility Conditions

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5284 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1481 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 815 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2592 | 14 |

## Nighttime Visibility Conditions

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6010 | 18.3 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1454 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 958 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2925 | 14.1 |

**Site: Top Circle Park Area**

Latitude: 41.3465 Longitude: 70.8366

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5284 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1481 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 815 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2592 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6010 | 18.3 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1454 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 958 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2925 | 14.1 |

**Site: Philbin Beach**

Latitude: 41.3372 Longitude: 70.8286

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5284 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1481 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 815 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2592 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6010 | 18.3 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1454 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 958 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2925 | 14.1 |

**Site: Moshup Beach**

Latitude: 41.3413 Longitude: 70.8326

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 337 | 33.7 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5284 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1481 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 815 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2592 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6010 | 18.3 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1454 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 958 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2925 | 14.1 |

**Site: Gay Head Community Baptish Church**

Latitude: 41.3412 Longitude: 70.8135

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 572 | 57.2 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 530 | 53 | 454 | 45.4 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 148 | 14.8 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 338 | 33.8 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6752 | 22.4 | 7097 | 16.7 | 5287 | 19.8 |
| Foggy | 1386 | 3.4 | 2366 | 2.7 | 2666 | 2.9 | 1482 | 3.6 |
| Rainy | 726 | 8.8 | 1093 | 9.2 | 688 | 8.8 | 816 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3144 | 12.7 | 2497 | 10.4 | 2597 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4110 | 17.8 | 4390 | 12.6 | 6007 | 18.4 |
| Foggy | 1477 | 3.5 | 1374 | 2.8 | 1697 | 3 | 1453 | 3.5 |
| Rainy | 778 | 8.5 | 663 | 9.7 | 444 | 8.4 | 957 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1931 | 12 | 1353 | 9.4 | 2920 | 14.1 |

**Site: Peaked Hill**

Latitude: 41.3552 Longitude: 70.7351

Meteorological Site Location: Martha's Vineyard

**Daytime Visibility Conditions**

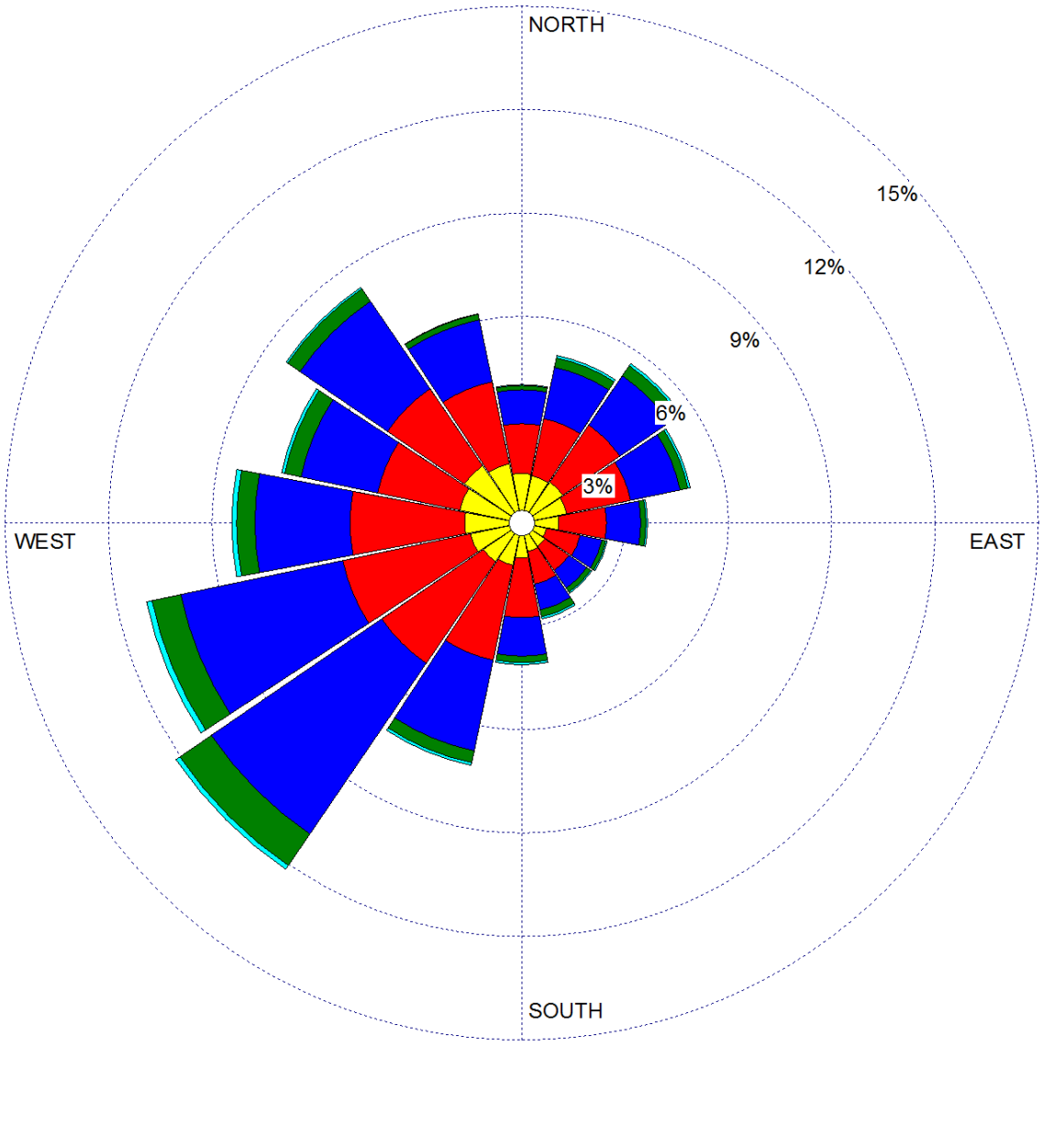
| | Winter | | Spring | | Summer | | Autumn | |
|---|---|---|---|---|---|---|---|---|
| | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year | Total Days | Days/ Year |
| Days with 1 or More Observations: | | | | | | | | |
| 10 nm | 743 | 74.3 | 770 | 77 | 699 | 69.9 | 755 | 75.5 |
| 20 nm | 595 | 59.5 | 571 | 57.1 | 484 | 48.4 | 553 | 55.3 |
| 30 nm | 351 | 35.1 | 349 | 34.9 | 191 | 19.1 | 265 | 26.5 |
| Days with 50% or More Observations: | | | | | | | | |
| 10 nm | 578 | 57.8 | 529 | 52.9 | 453 | 45.3 | 510 | 51 |
| 20 nm | 376 | 37.6 | 314 | 31.4 | 189 | 18.9 | 246 | 24.6 |
| 30 nm | 121 | 12.1 | 146 | 14.6 | 14 | 1.4 | 41 | 4.1 |
| Days with 75% or More Observations: | | | | | | | | |
| 10 nm | 471 | 47.1 | 235 | 23.5 | 119 | 11.9 | 338 | 33.8 |
| 20 nm | 251 | 25.1 | 101 | 10.1 | 19 | 1.9 | 131 | 13.1 |
| 30 nm | 49 | 4.9 | 27 | 2.7 | 0 | 0 | 17 | 1.7 |
| Average Visibility (nm): | | | | | | | | |
| Clear | 5558 | 23.2 | 6746 | 22.4 | 7092 | 16.7 | 5287 | 19.8 |
| Foggy | 1386 | 3.4 | 2365 | 2.7 | 2665 | 2.9 | 1482 | 3.6 |
| Rainy | 726 | 8.8 | 1092 | 9.2 | 688 | 8.8 | 816 | 9.5 |
| Hazy | 23 | 4.7 | 118 | 4.3 | 423 | 4.7 | 23 | 4.4 |
| Cloudy | 2047 | 15.4 | 3142 | 12.7 | 2494 | 10.4 | 2597 | 14 |

**Nighttime Visibility Conditions**

| Average Visibility (nm): | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. | Total Hours | Avg. |
| Clear | 6393 | 22.9 | 4116 | 17.8 | 4395 | 12.6 | 6007 | 18.4 |
| Foggy | 1477 | 3.5 | 1375 | 2.8 | 1698 | 3 | 1453 | 3.5 |
| Rainy | 778 | 8.5 | 664 | 9.7 | 444 | 8.4 | 957 | 9.1 |
| Hazy | 20 | 4.4 | 48 | 4.4 | 178 | 4.3 | 12 | 4.8 |
| Cloudy | 2744 | 15.2 | 1933 | 12 | 1356 | 9.4 | 2920 | 14.1 |

# Appendix C

# Wind Roses




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 00:00
End: 12/31/2012 - 23:00

**Calm Winds:**
4.29%

**Average Wind Speed:**
9.60 Knots

**Total Data Hours:**
75905

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

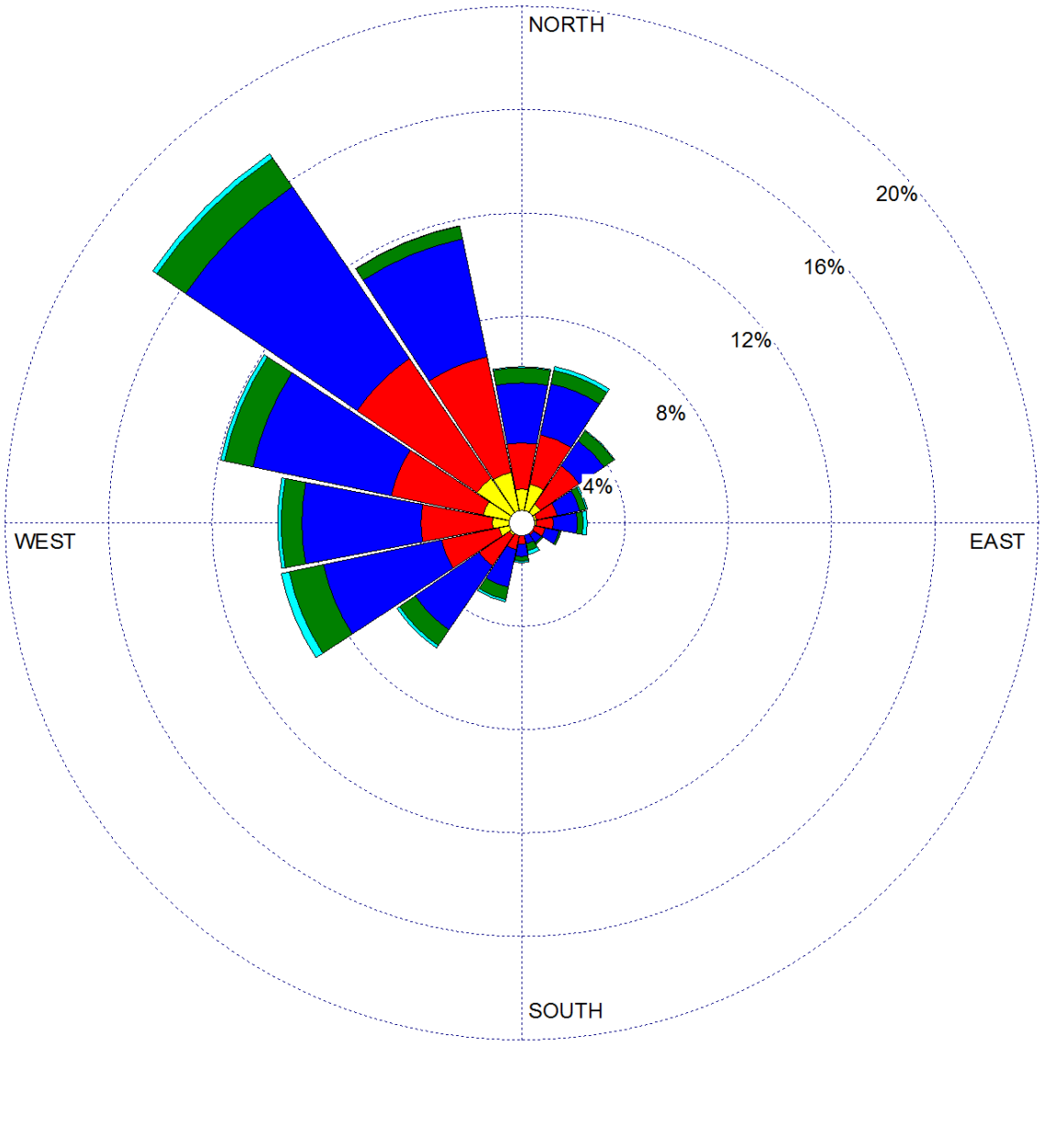
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - Annual Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 00:00
End: 1/31/2012 - 23:00

**Calm Winds:**
2.80%

**Average Wind Speed:**
10.72 Knots

**Total Data Hours:**
6391

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

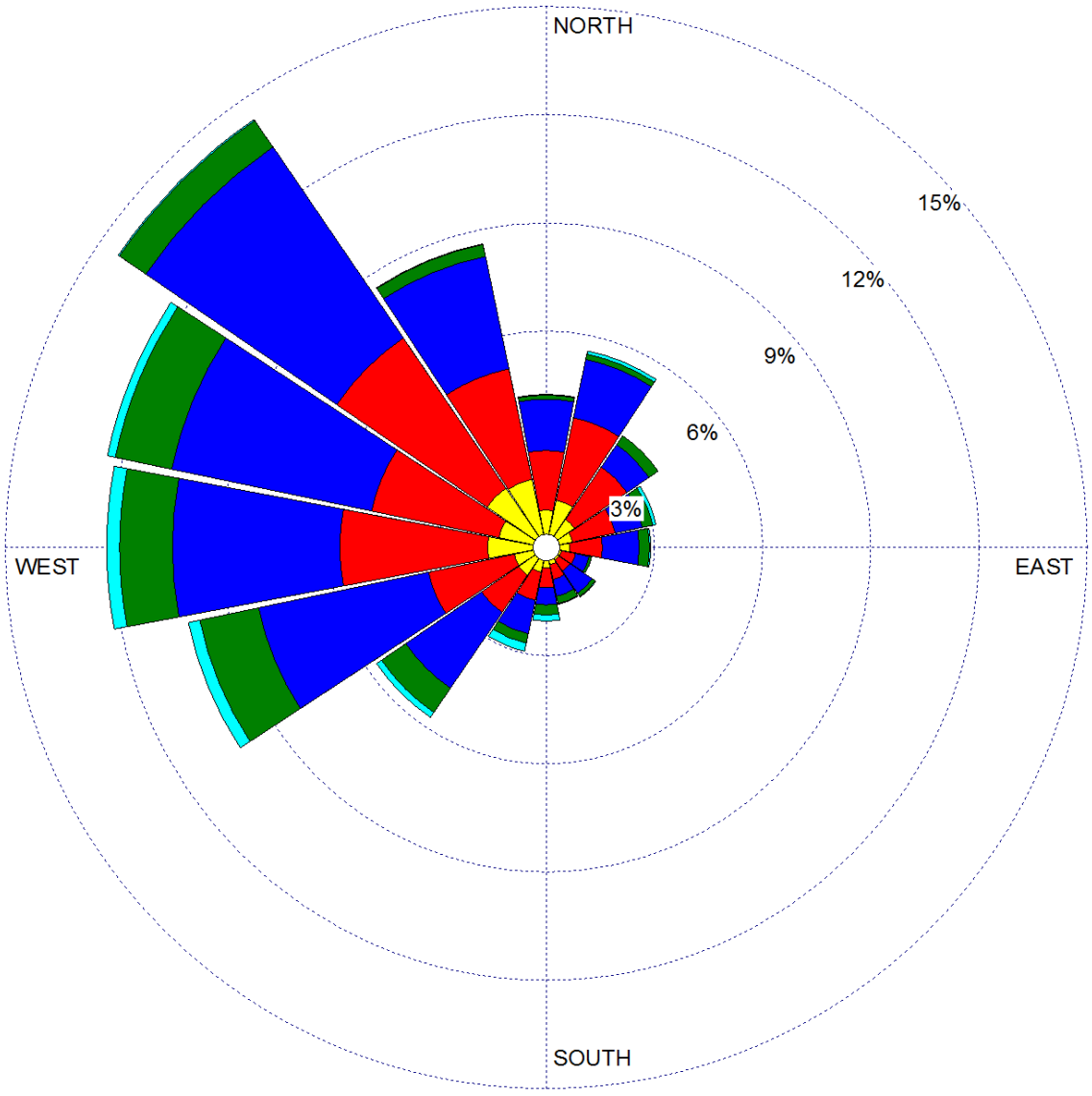
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - January Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 2/1/2003 - 00:00
End: 2/29/2012 - 23:00

**Calm Winds:**
4.78%

**Average Wind Speed:**
10.13 Knots

**Total Data Hours:**
5286

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

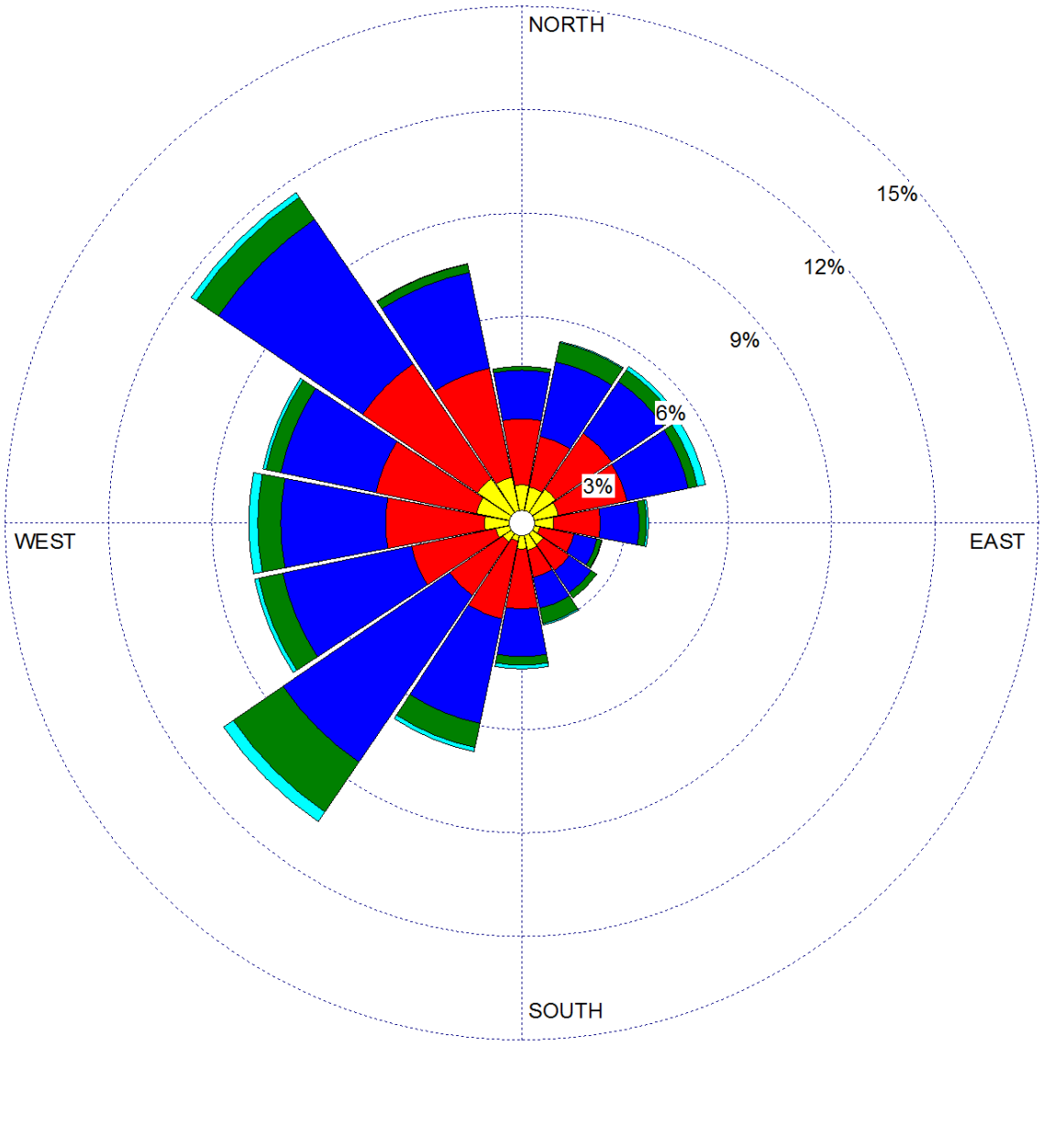
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - February Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 3/1/2003 - 00:00
End: 3/31/2012 - 23:00

**Calm Winds:**
2.18%

**Average Wind Speed:**
10.52 Knots

**Total Data Hours:**
6459

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

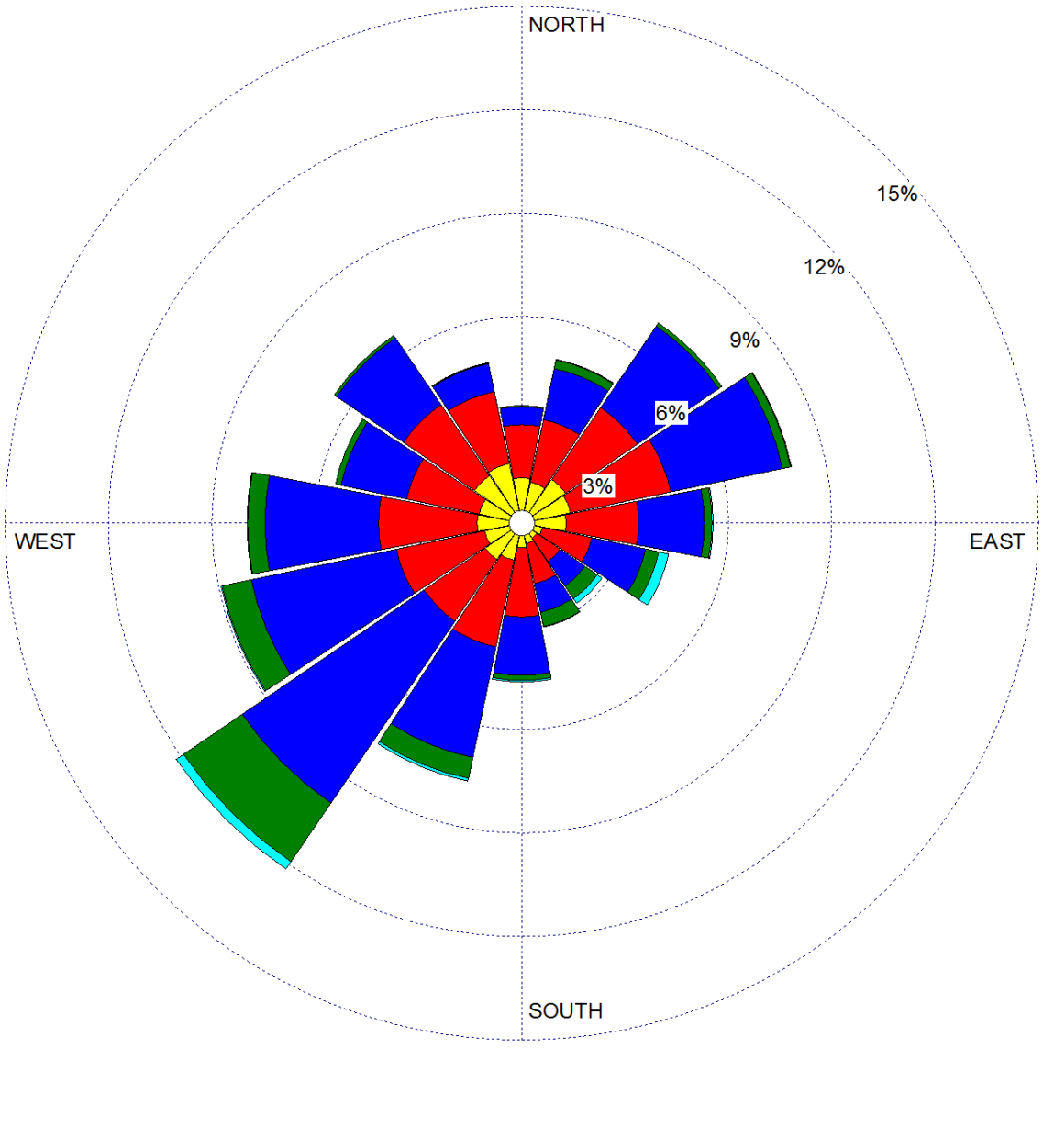
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - March Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 4/1/2003 - 00:00
End: 4/30/2012 - 23:00

**Calm Winds:**
1.91%

**Average Wind Speed:**
10.13 Knots

**Total Data Hours:**
6168

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

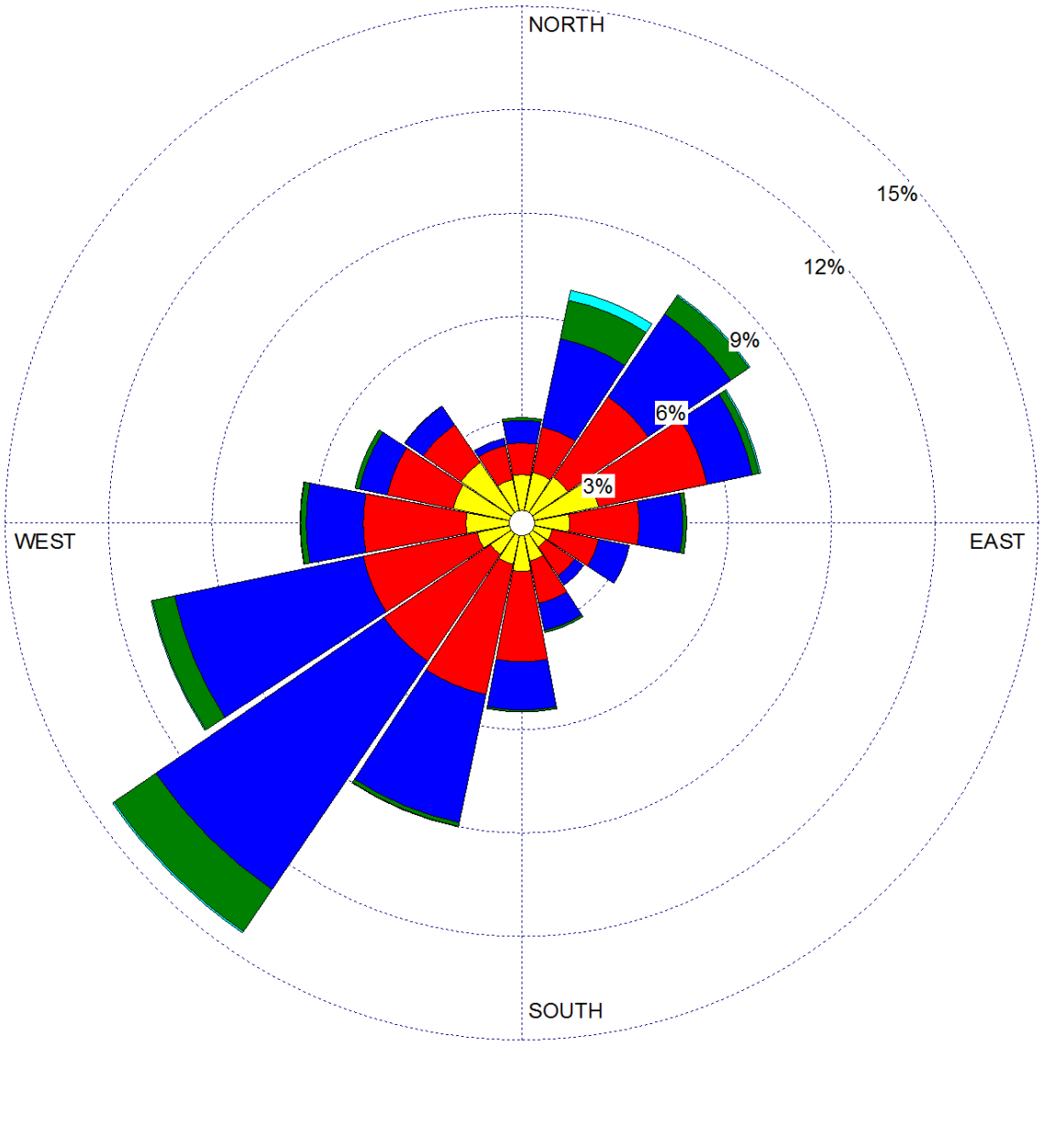
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - April Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 5/1/2003 - 00:00
End: 5/31/2012 - 23:00

**Calm Winds:**
2.49%

**Average Wind Speed:**
9.38 Knots

**Total Data Hours:**
6051

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

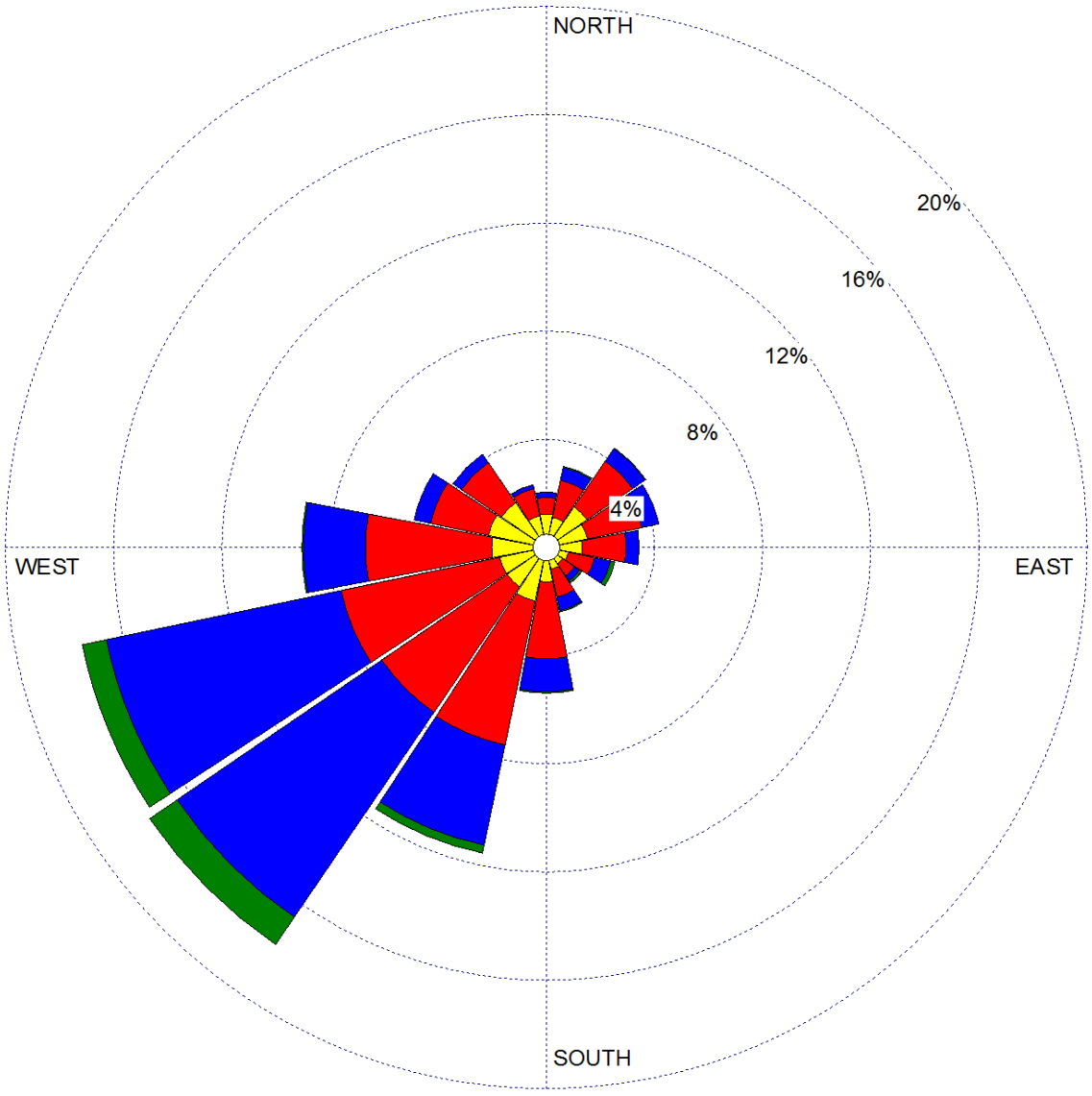
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - May Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 6/1/2003 - 00:00
End: 6/28/2012 - 19:00

**Calm Winds:**
2.30%

**Average Wind Speed:**
8.92 Knots

**Total Data Hours:**
6036

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

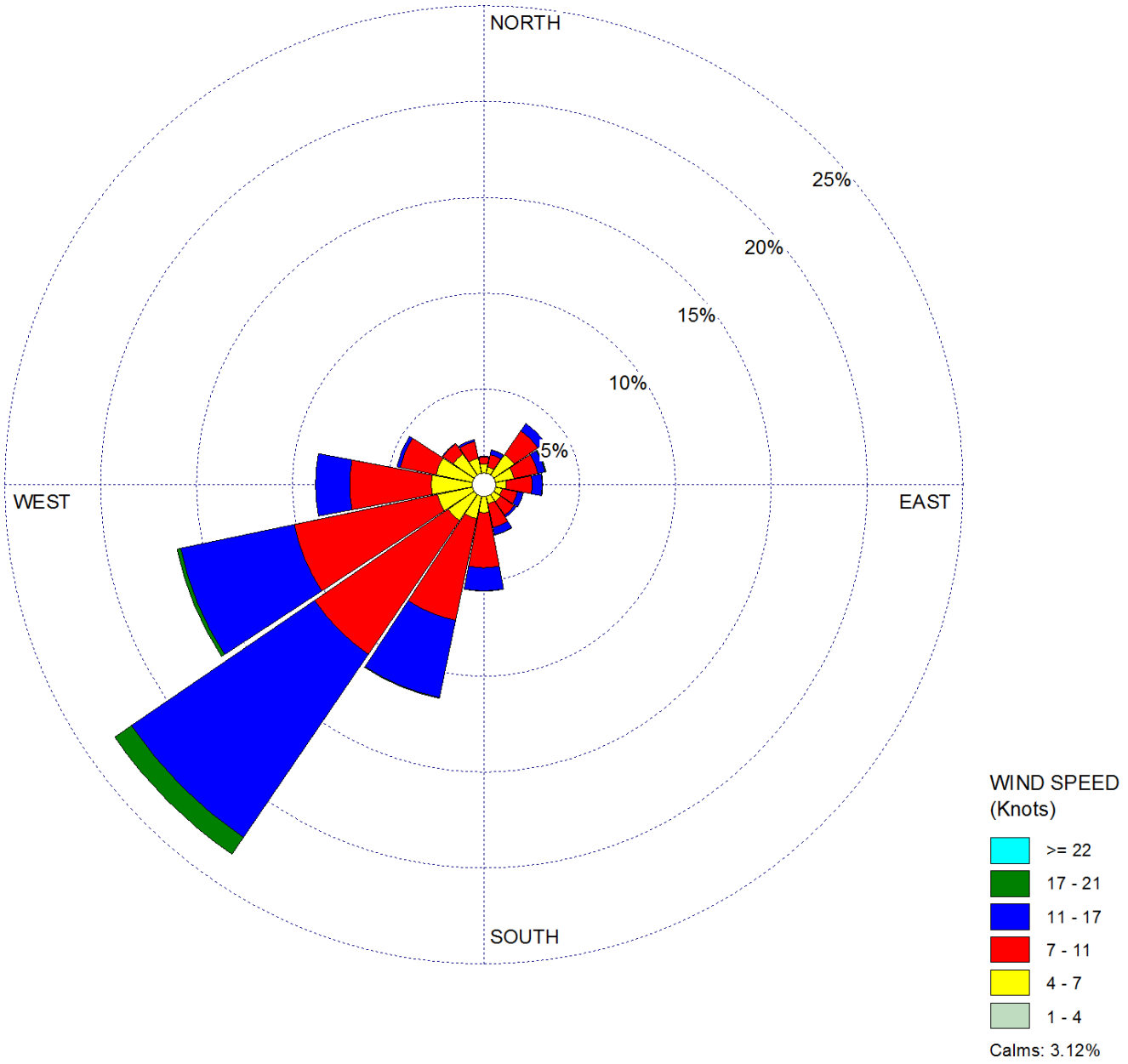
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - June Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 7/1/2003 - 00:00
End: 7/31/2012 - 21:00

**Calm Winds:**
3.12%

**Average Wind Speed:**
8.44 Knots

**Total Data Hours:**
6628

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

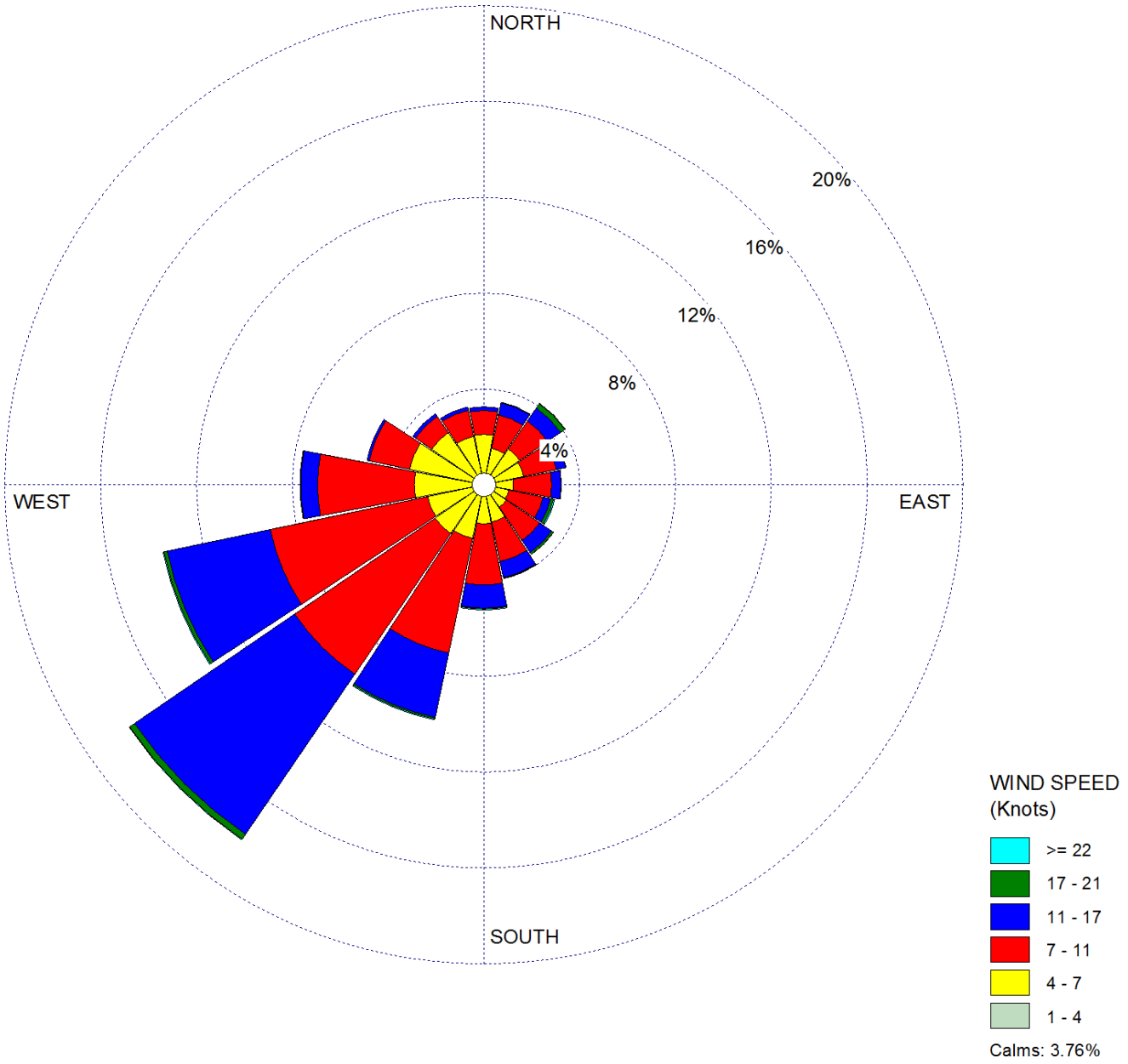
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - July Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 8/1/2003 - 00:00
End: 8/31/2012 - 23:00

**Calm Winds:**
3.76%

**Average Wind Speed:**
7.85 Knots

**Total Data Hours:**
6787

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

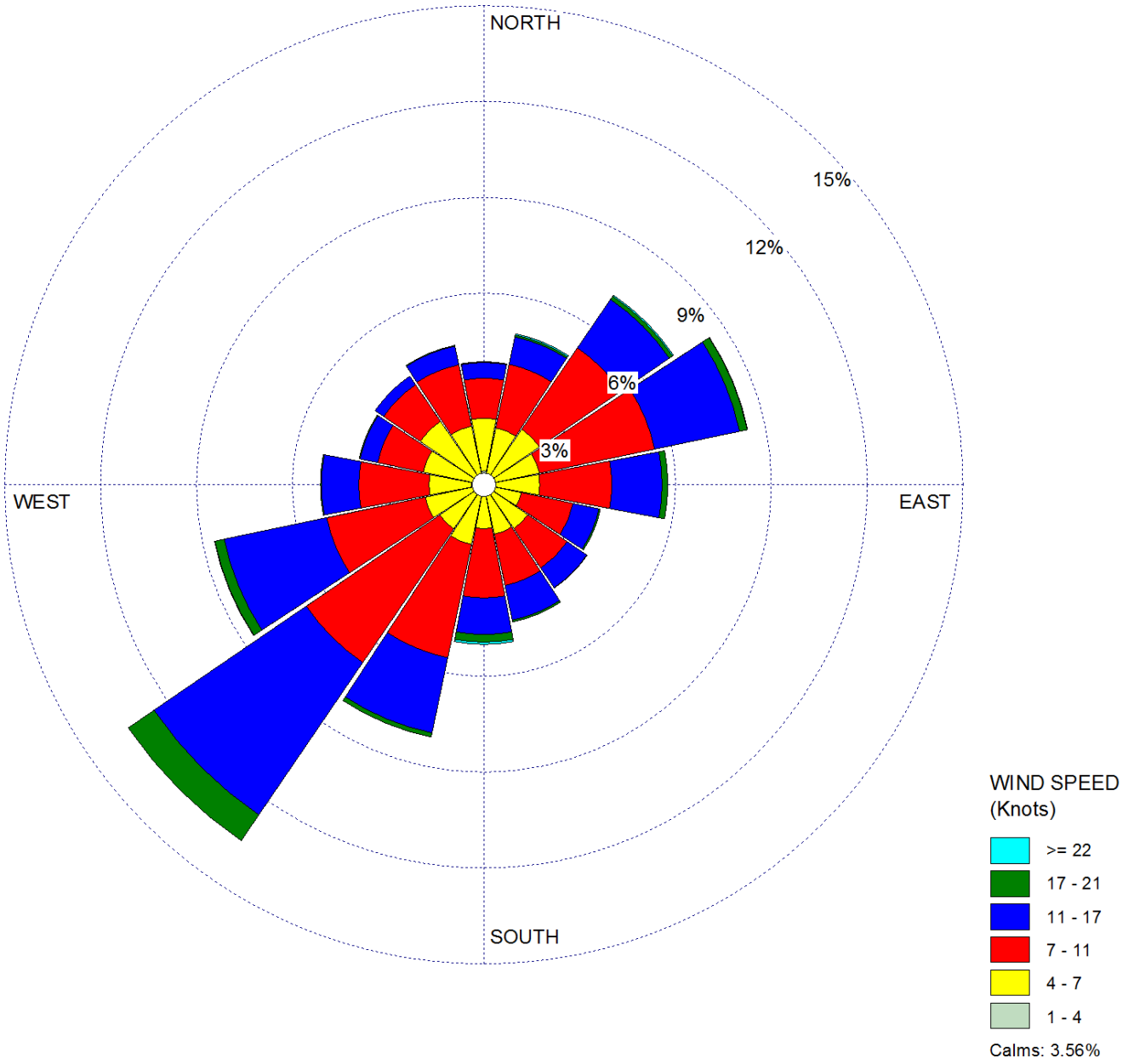
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - August Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 9/1/2003 - 00:00
End: 9/30/2012 - 23:00

**Calm Winds:**
3.56%

**Average Wind Speed:**
8.34 Knots

**Total Data Hours:**
6755

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

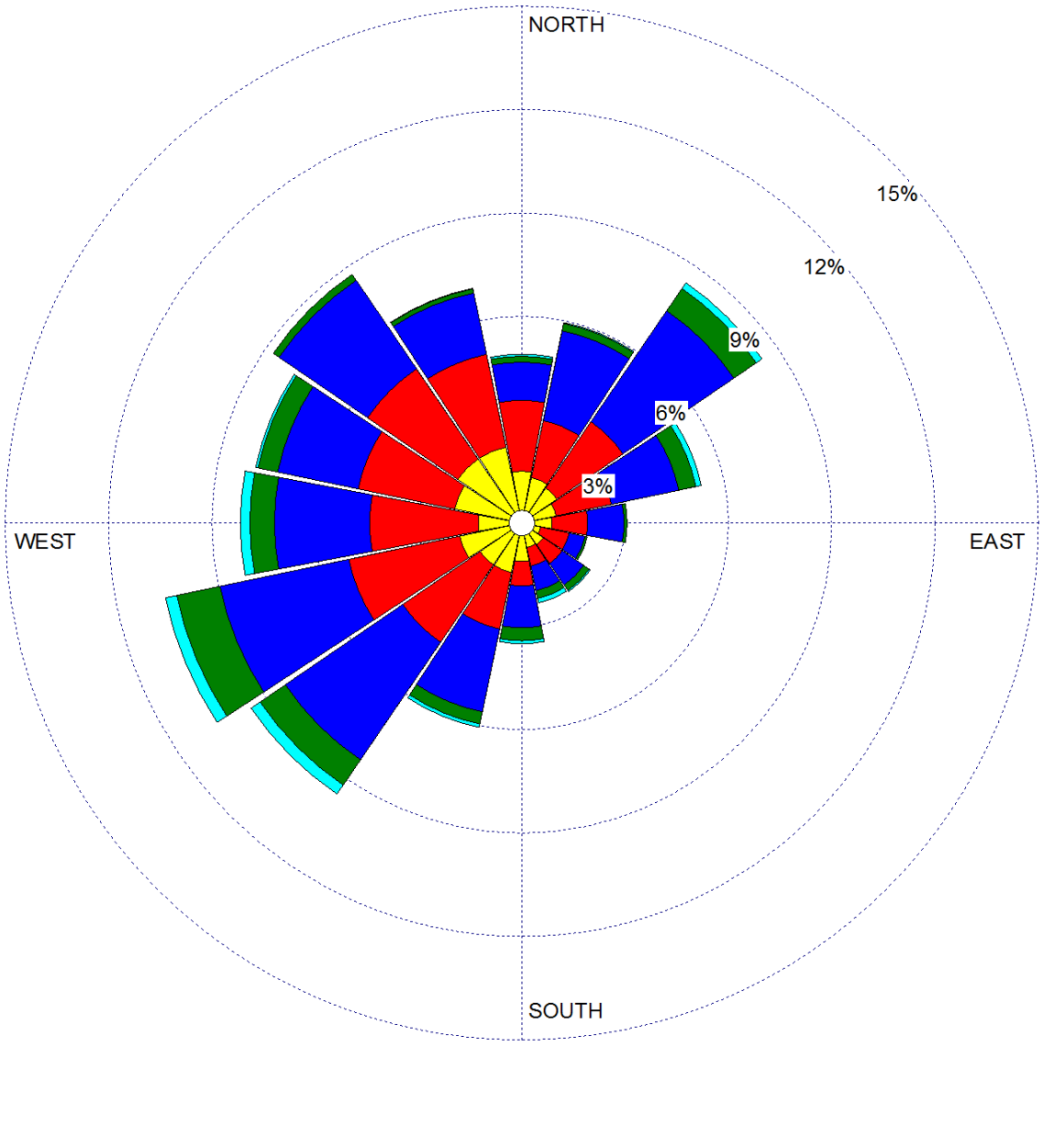
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - September Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 10/1/2003 - 00:00
End: 10/20/2012 - 03:00

**Calm Winds:**
3.00%

**Average Wind Speed:**
9.87 Knots

**Total Data Hours:**
6892

## Relevant Viewpoint Locations

Southeast Lighthouse
Point Judith Lighthouse

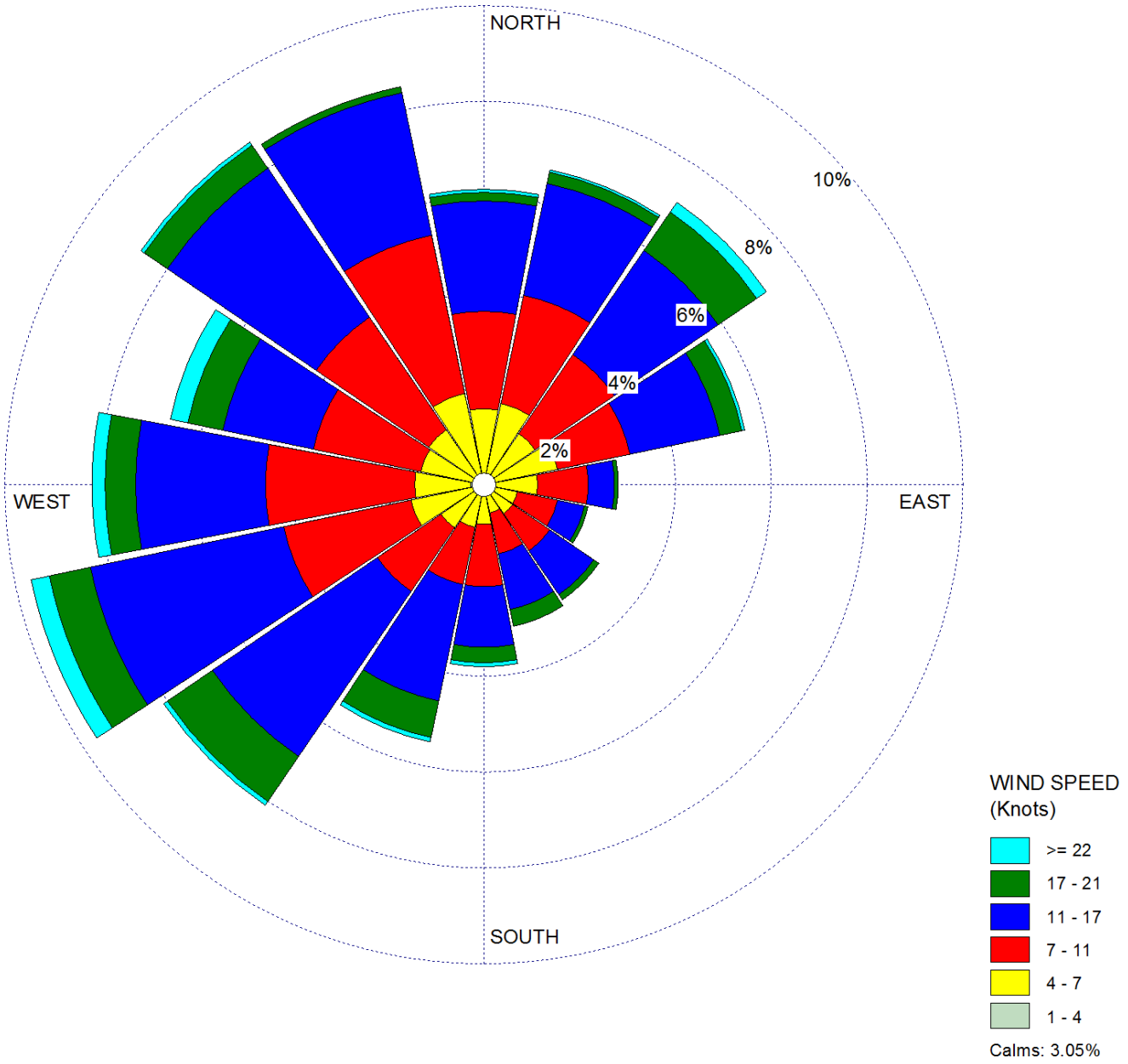
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - October Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 11/1/2003 - 00:00
End: 11/29/2011 - 12:00

**Calm Winds:**
3.05%

**Average Wind Speed:**
10.14 Knots

**Total Data Hours:**
6175

## Relevant Viewpoint Locations

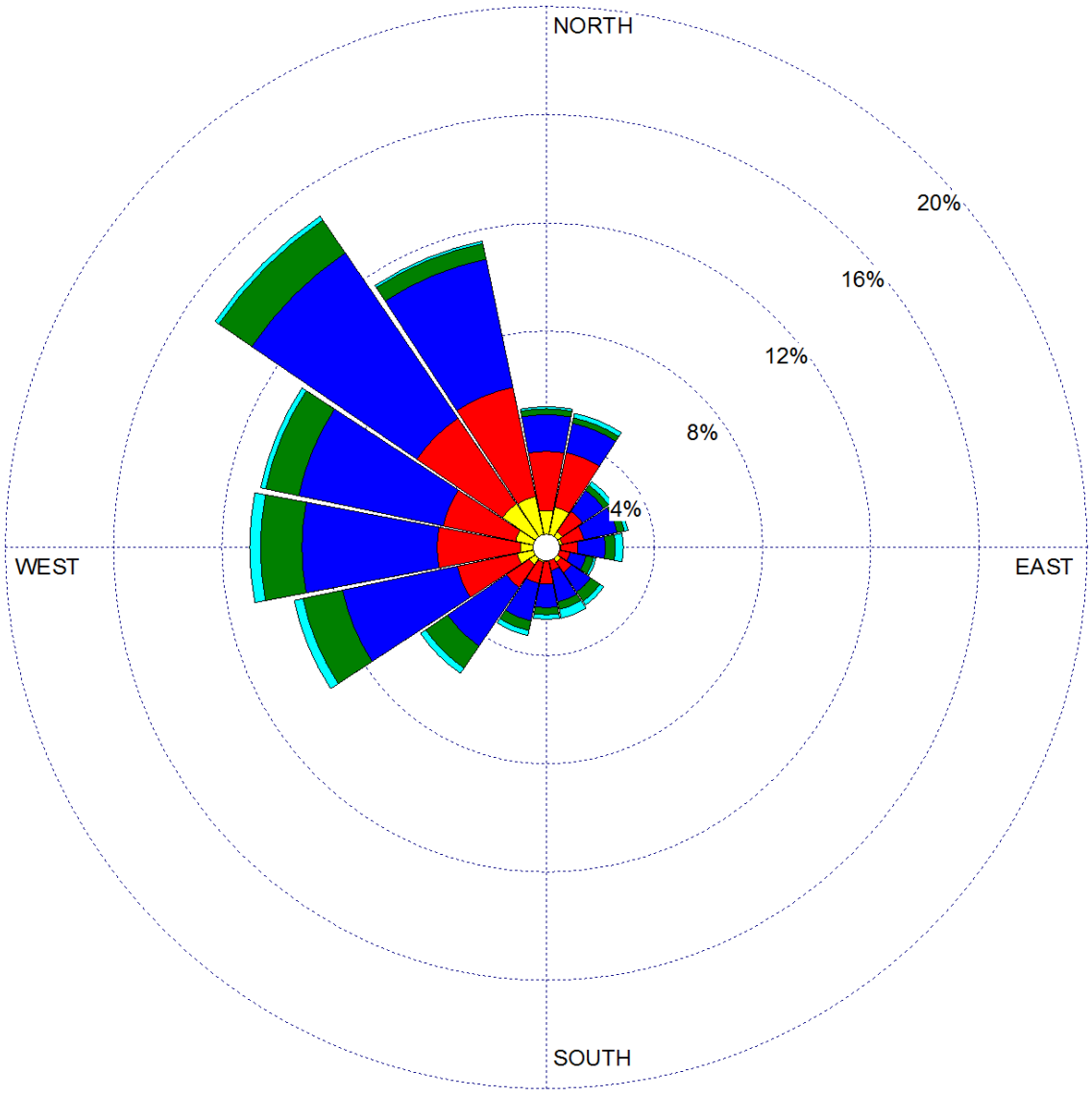
Southeast Lighthouse
Point Judith Lighthouse

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - November Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 12/1/2003 - 00:00
End: 12/31/2012 - 23:00

**Calm Winds:**
3.01%

**Average Wind Speed:**
11.07 Knots

**Total Data Hours:**
6277

## Relevant Viewpoint Locations

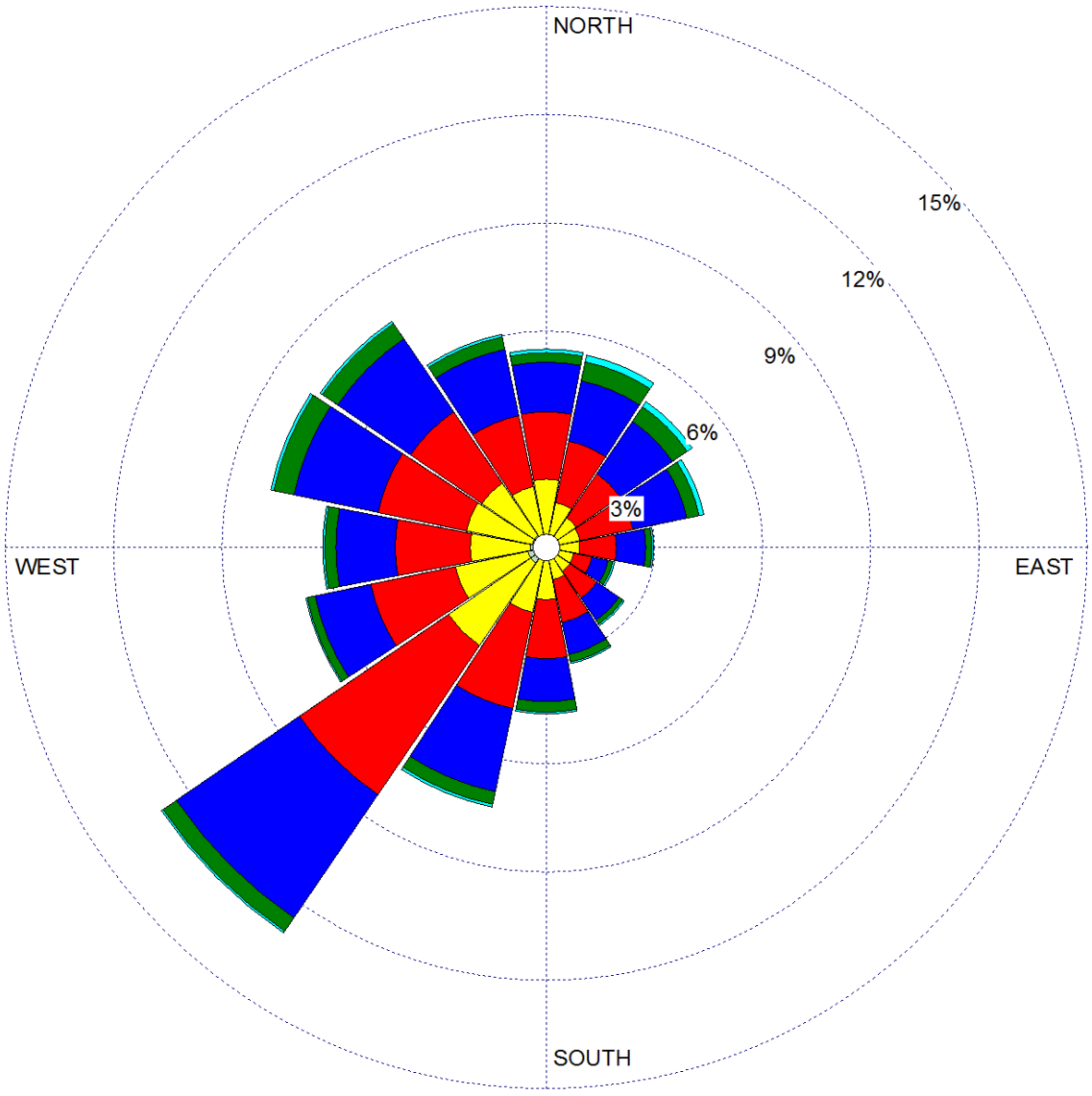
Southeast Lighthouse
Point Judith Lighthouse

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Block Island - December Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 02:00
End: 12/31/2012 - 23:00

**Calm Winds:**
9.61%

**Average Wind Speed:**
8.64 Knots

**Total Data Hours:**
86861

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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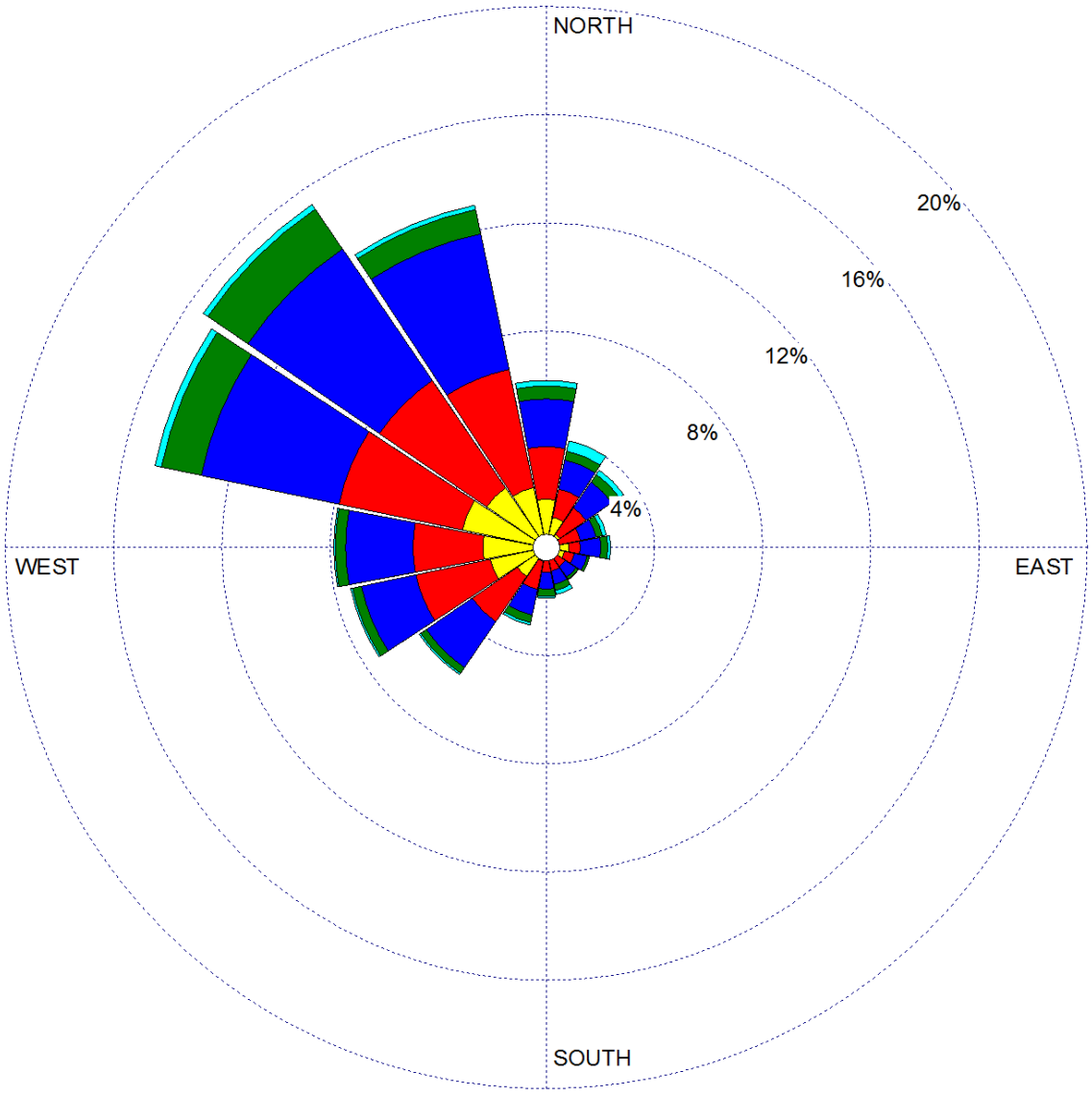
**Martha's Vineyard - Annual Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 02:00
End: 1/31/2012 - 23:00

**Calm Winds:**
7.49%

**Average Wind Speed:**
9.63 Knots

**Total Data Hours:**
7334

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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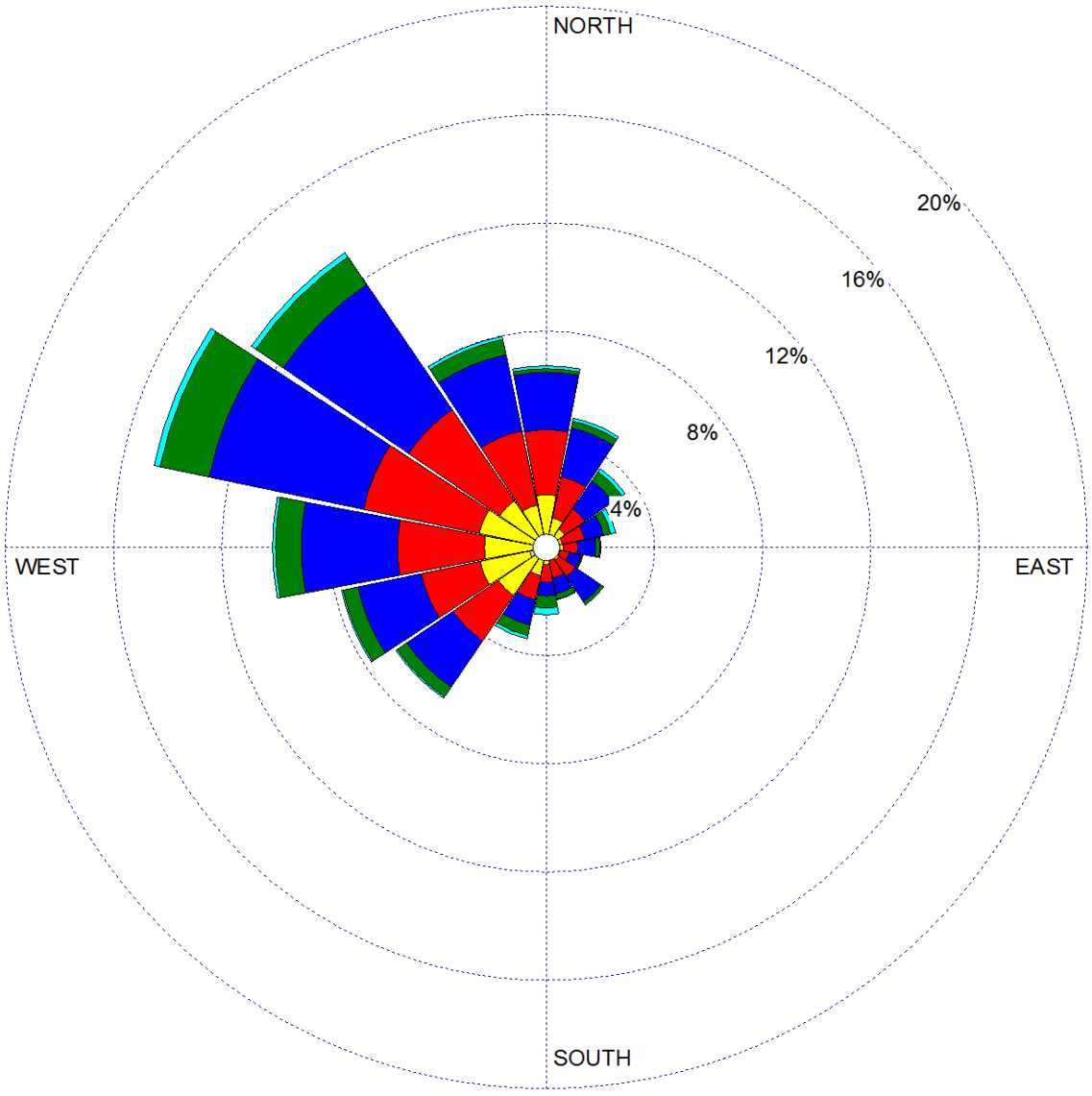
**Martha's Vineyard - January Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 2/1/2003 - 02:00
End: 2/29/2012 - 23:00

**Calm Winds:**
7.21%

**Average Wind Speed:**
9.61 Knots

**Total Data Hours:**
6703

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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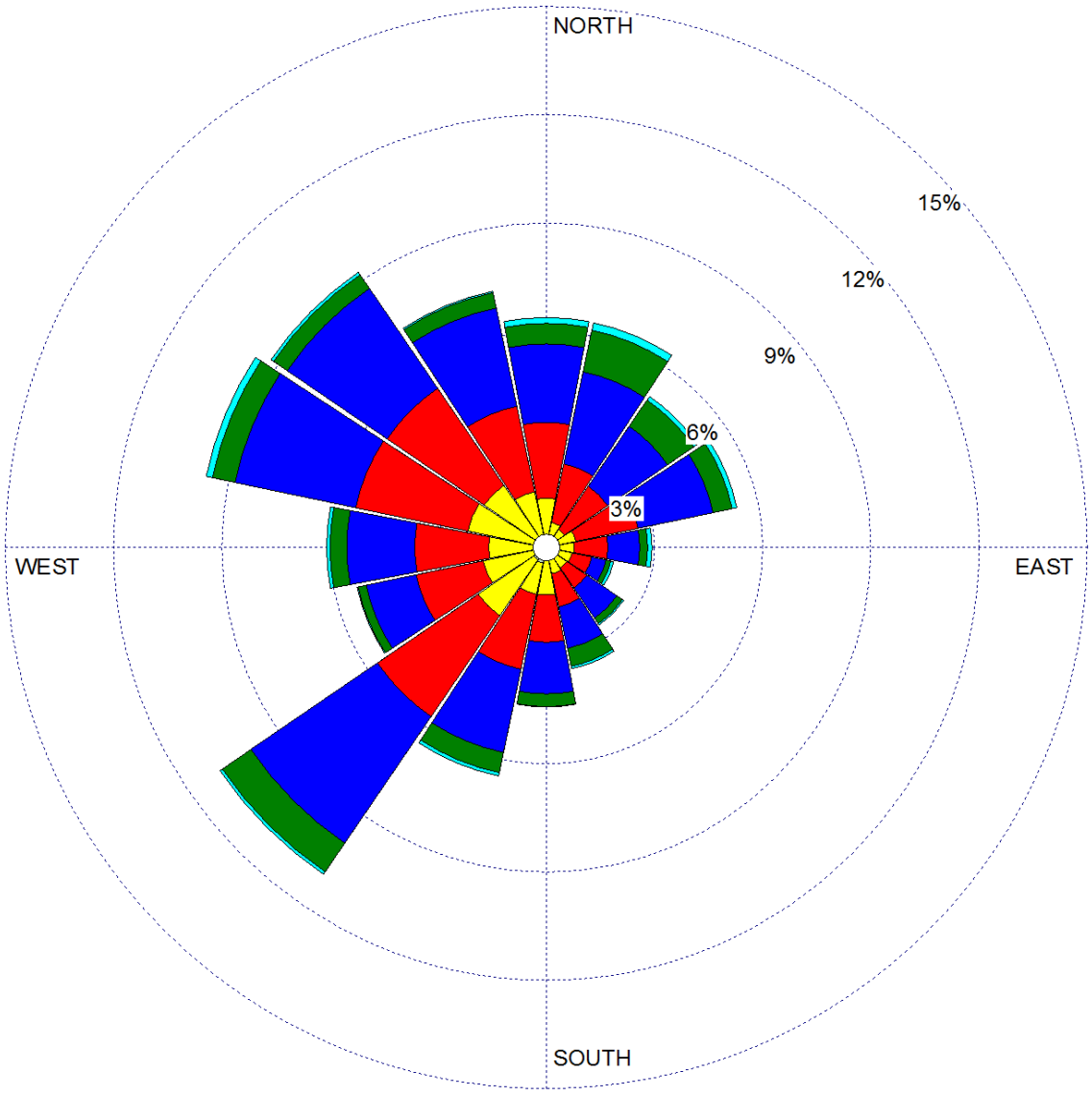
**Martha's Vineyard - February Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 3/1/2003 - 00:00
End: 3/31/2012 - 23:00

**Calm Winds:**
6.10%

**Average Wind Speed:**
9.81 Knots

**Total Data Hours:**
7385

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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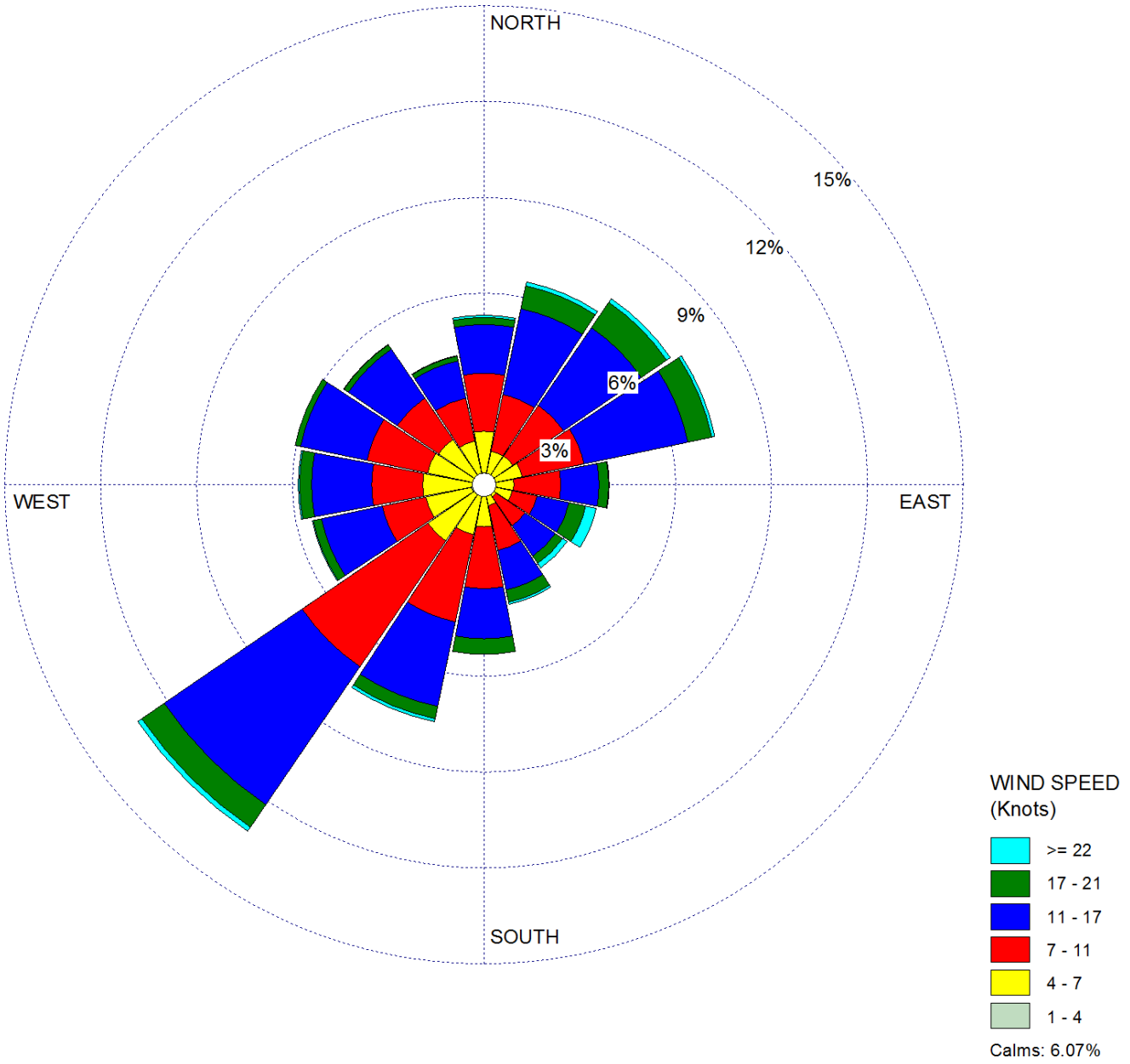
**Martha's Vineyard - March Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 4/1/2003 - 00:00
End: 4/30/2012 - 23:00

**Calm Winds:**
6.07%

**Average Wind Speed:**
9.63 Knots

**Total Data Hours:**
7151

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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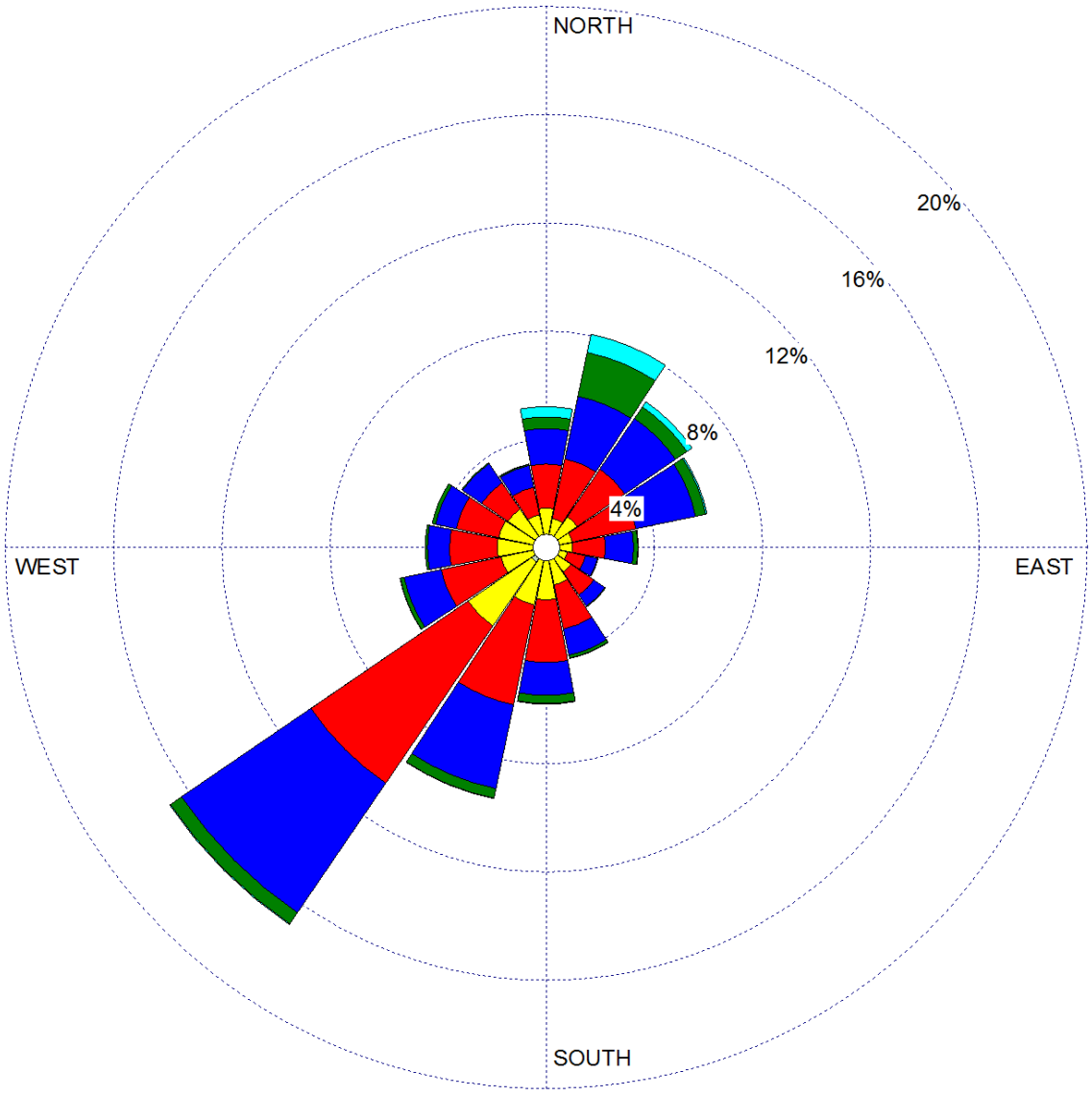
**Martha's Vineyard - April Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 5/1/2003 - 00:00
End: 5/31/2012 - 23:00

**Calm Winds:**
7.95%

**Average Wind Speed:**
8.66 Knots

**Total Data Hours:**
7386

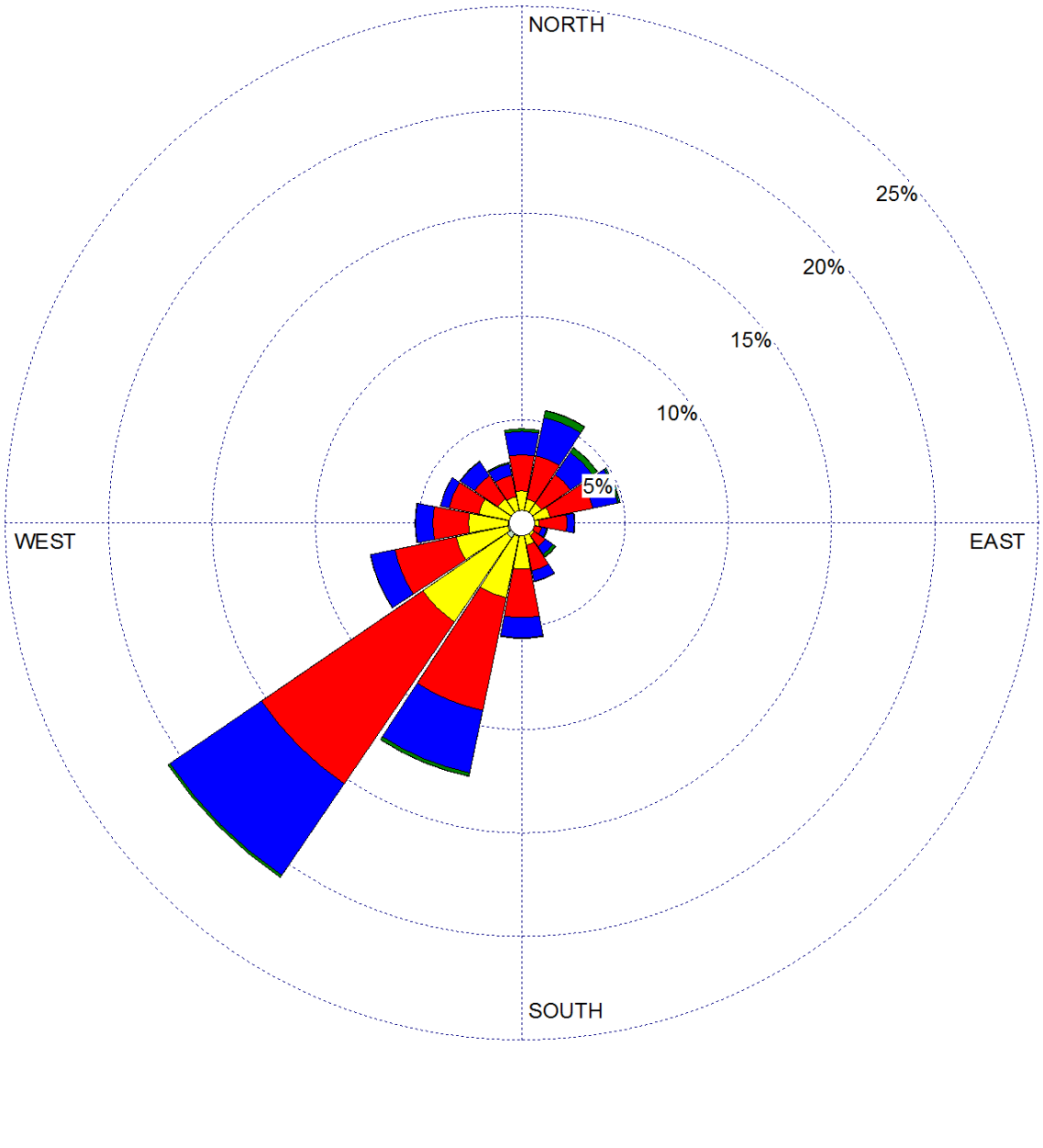
## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 6/1/2003 - 00:00
End: 6/30/2012 - 23:00

**Calm Winds:**
8.92%

**Average Wind Speed:**
7.48 Knots

**Total Data Hours:**
7154

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

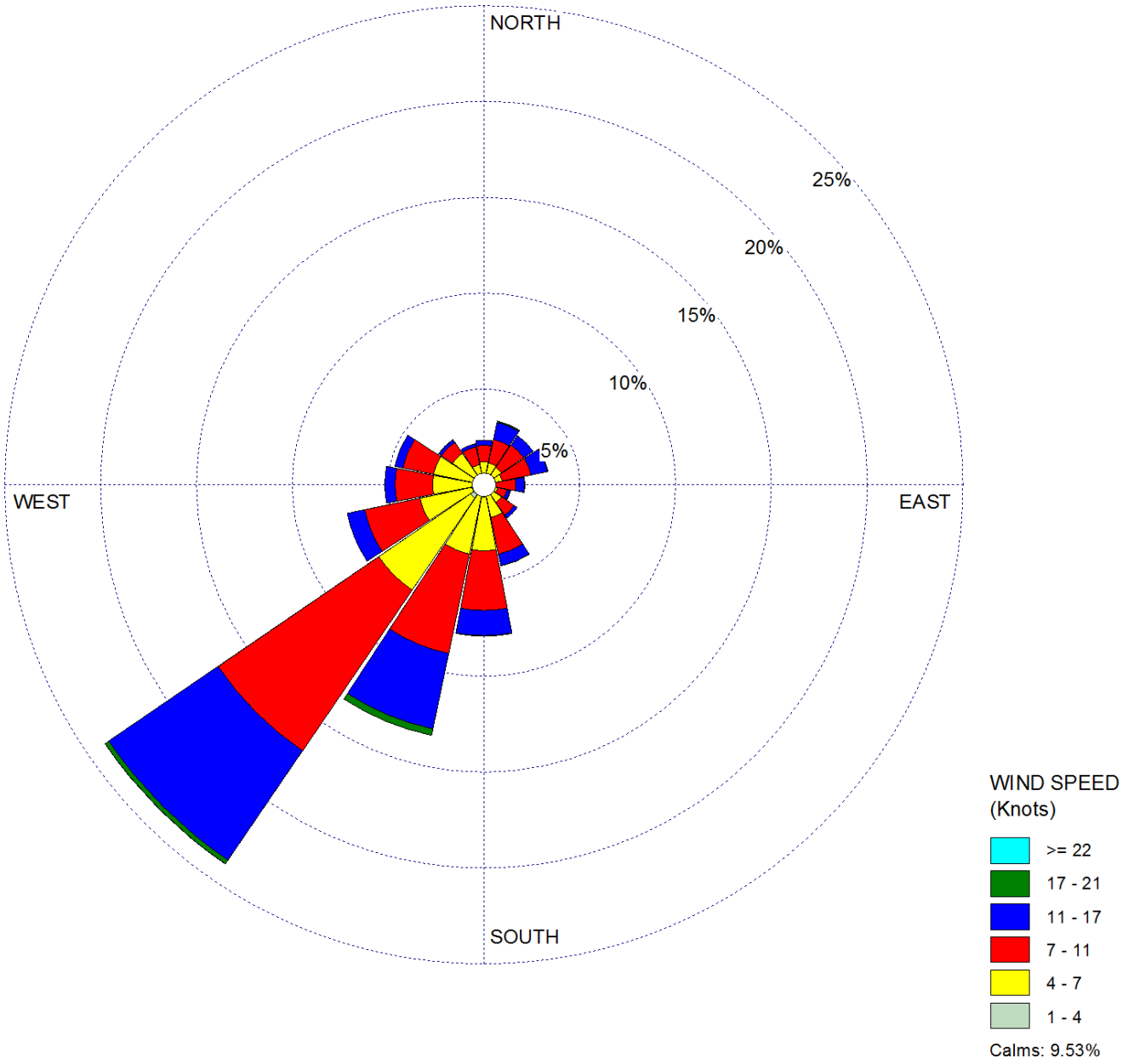
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Martha's Vineyard - June Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 7/1/2003 - 00:00
End: 7/31/2012 - 23:00

**Calm Winds:**
9.53%

**Average Wind Speed:**
7.09 Knots

**Total Data Hours:**
7397

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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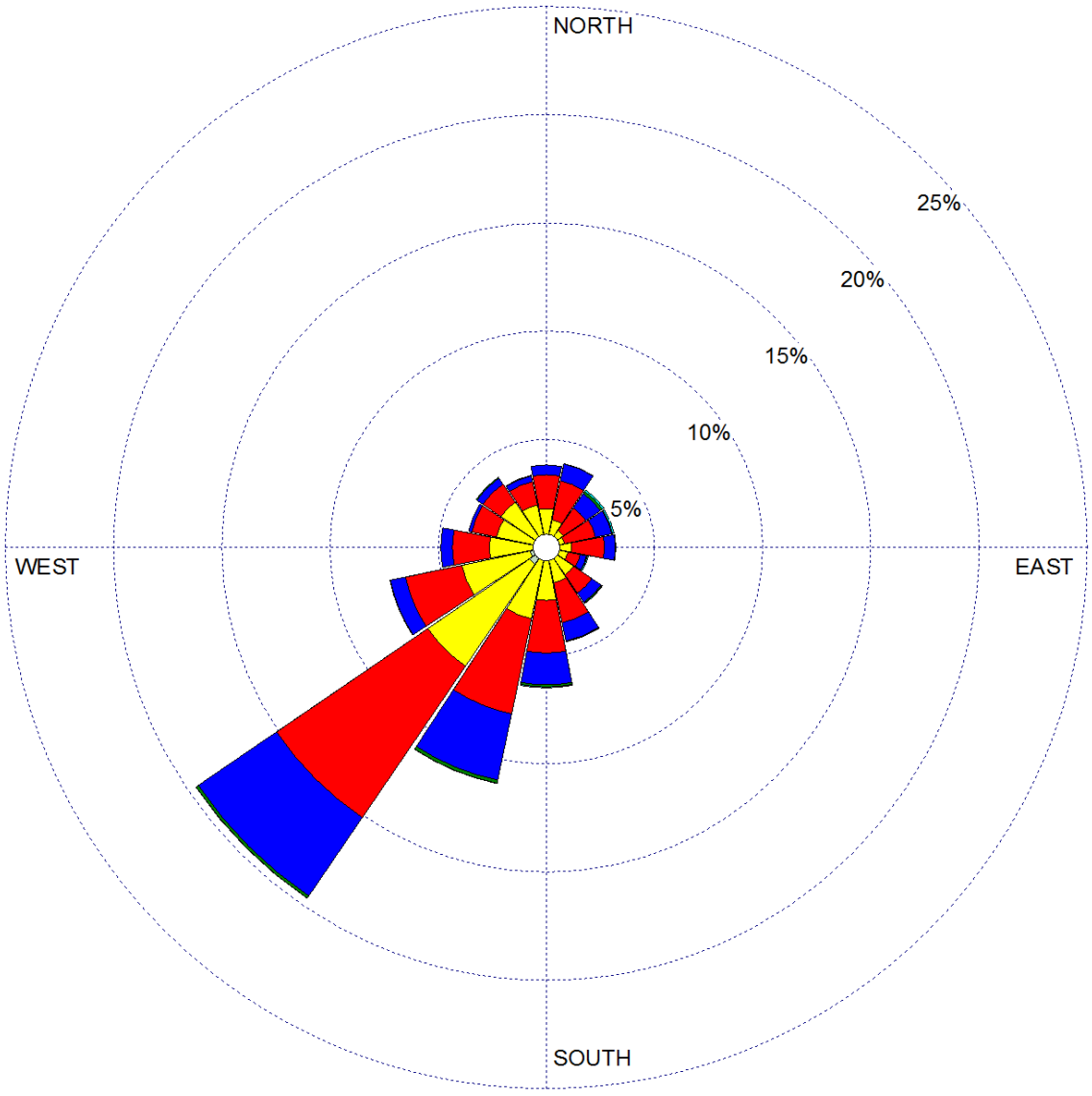
**Martha's Vineyard - July Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 8/1/2003 - 00:00
End: 8/31/2012 - 23:00

**Calm Winds:**
11.57%

**Average Wind Speed:**
6.77 Knots

**Total Data Hours:**
7374

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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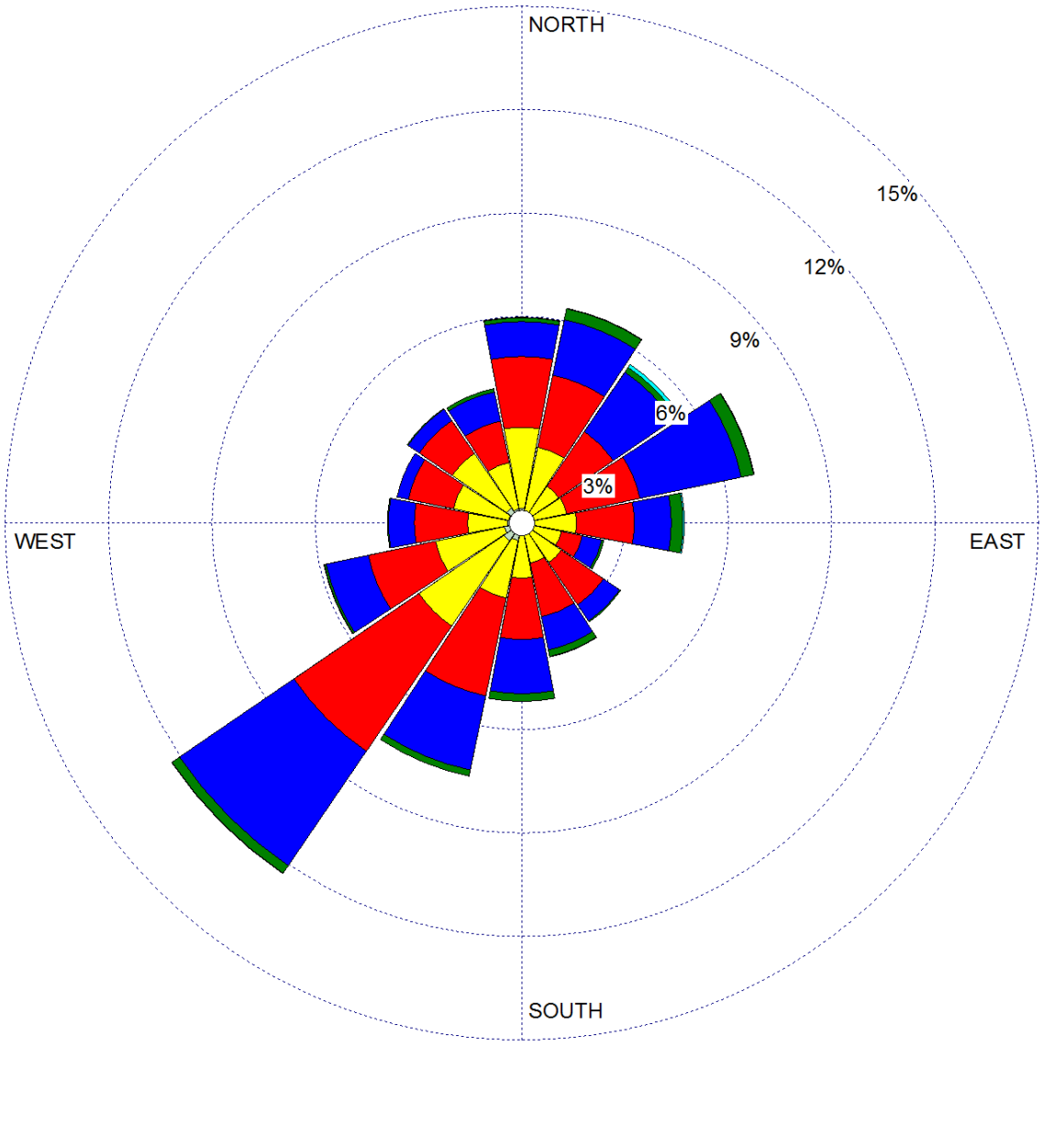
**Martha's Vineyard - August Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 9/1/2003 - 00:00
End: 9/30/2012 - 23:00

**Calm Winds:**
13.04%

**Average Wind Speed:**
7.33 Knots

**Total Data Hours:**
7063

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

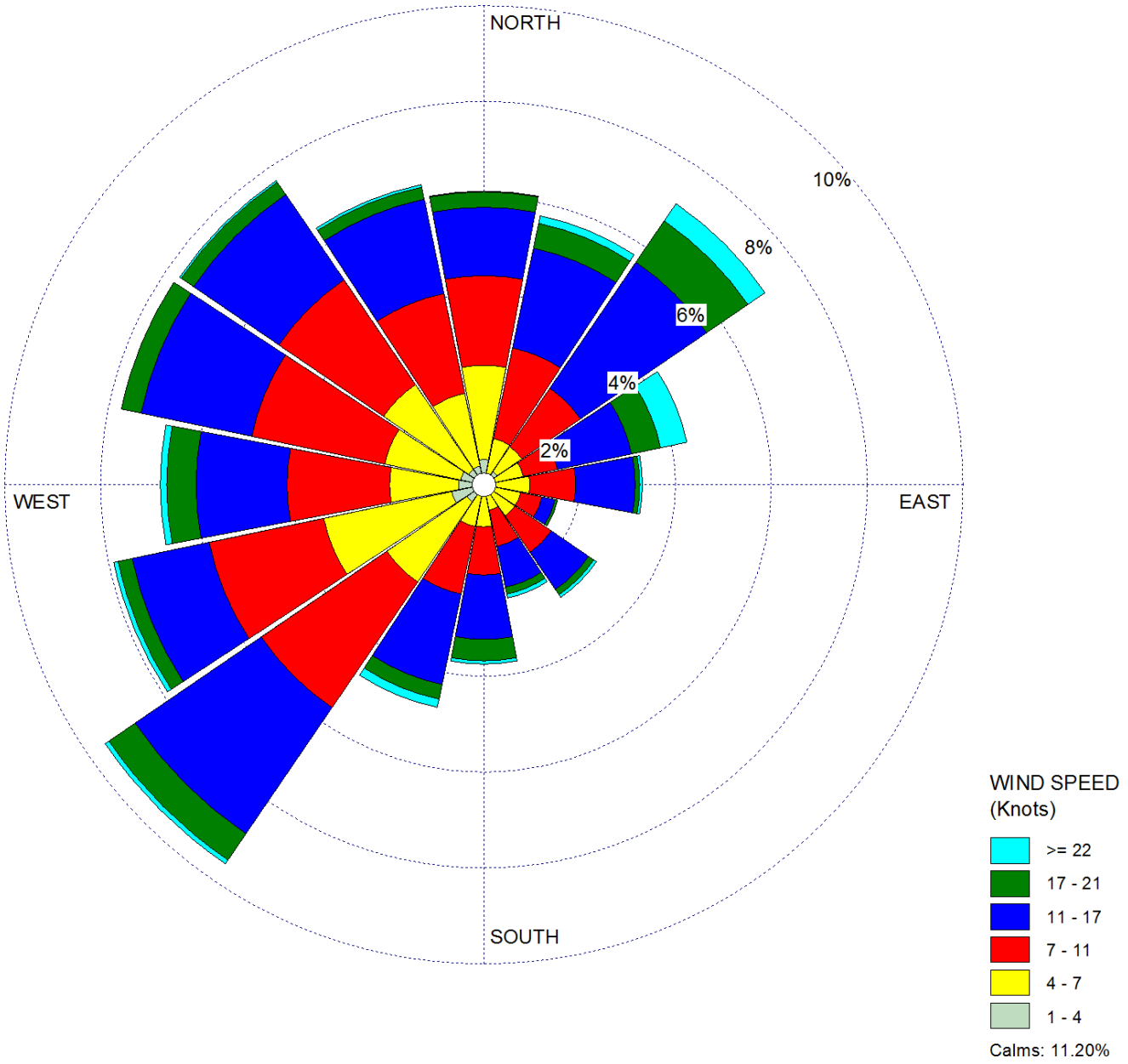
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Martha's Vineyard - September Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 10/1/2003 - 00:00
End: 10/31/2012 - 23:00

**Calm Winds:**
11.20%

**Average Wind Speed:**
8.76 Knots

**Total Data Hours:**
7389

## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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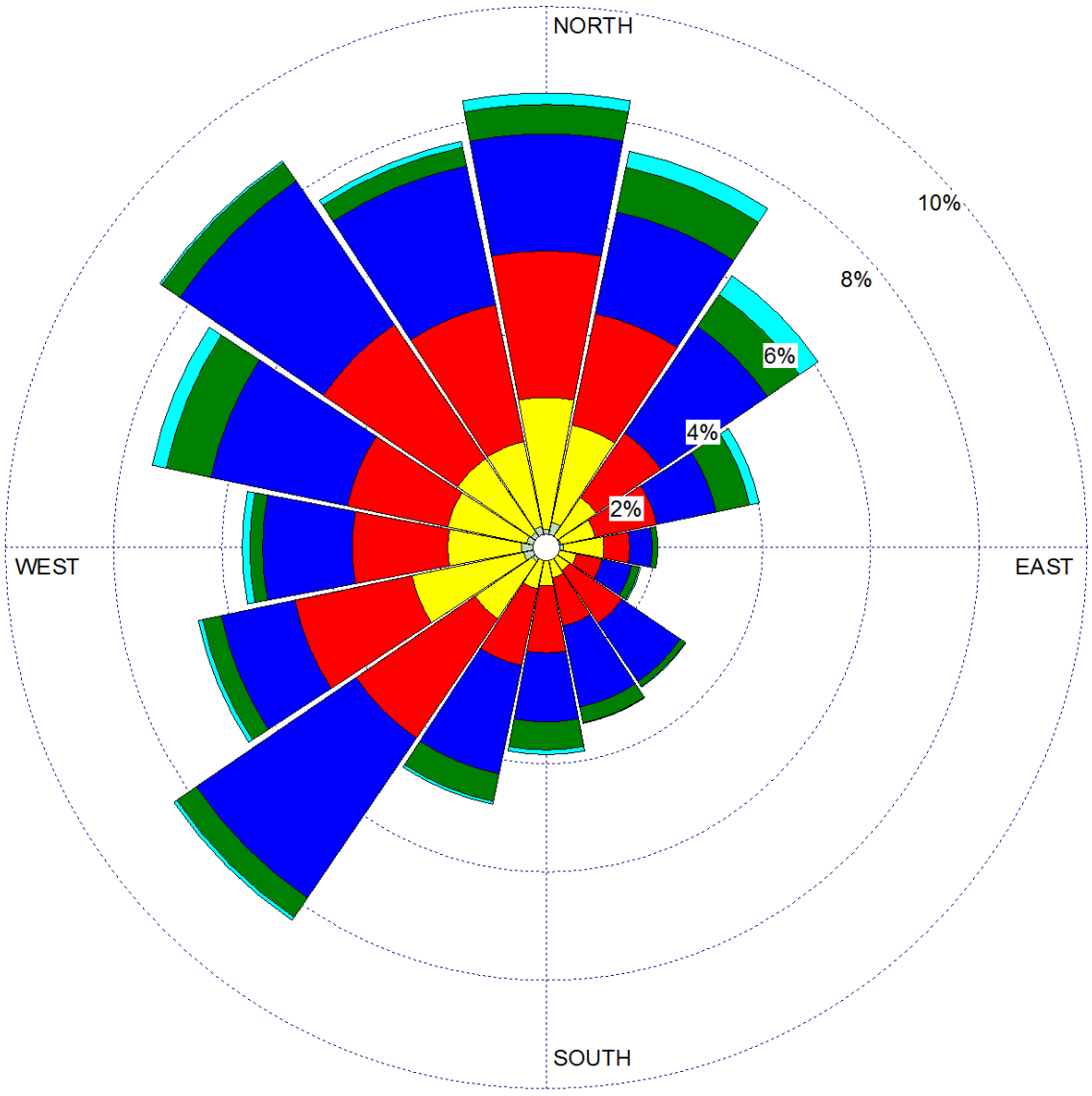
Bureau of Ocean Energy Management

**Martha's Vineyard - October Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 11/1/2003 - 00:00
End: 11/30/2012 - 23:00

**Calm Winds:**
10.00%

**Average Wind Speed:**
9.12 Knots

**Total Data Hours:**
7148

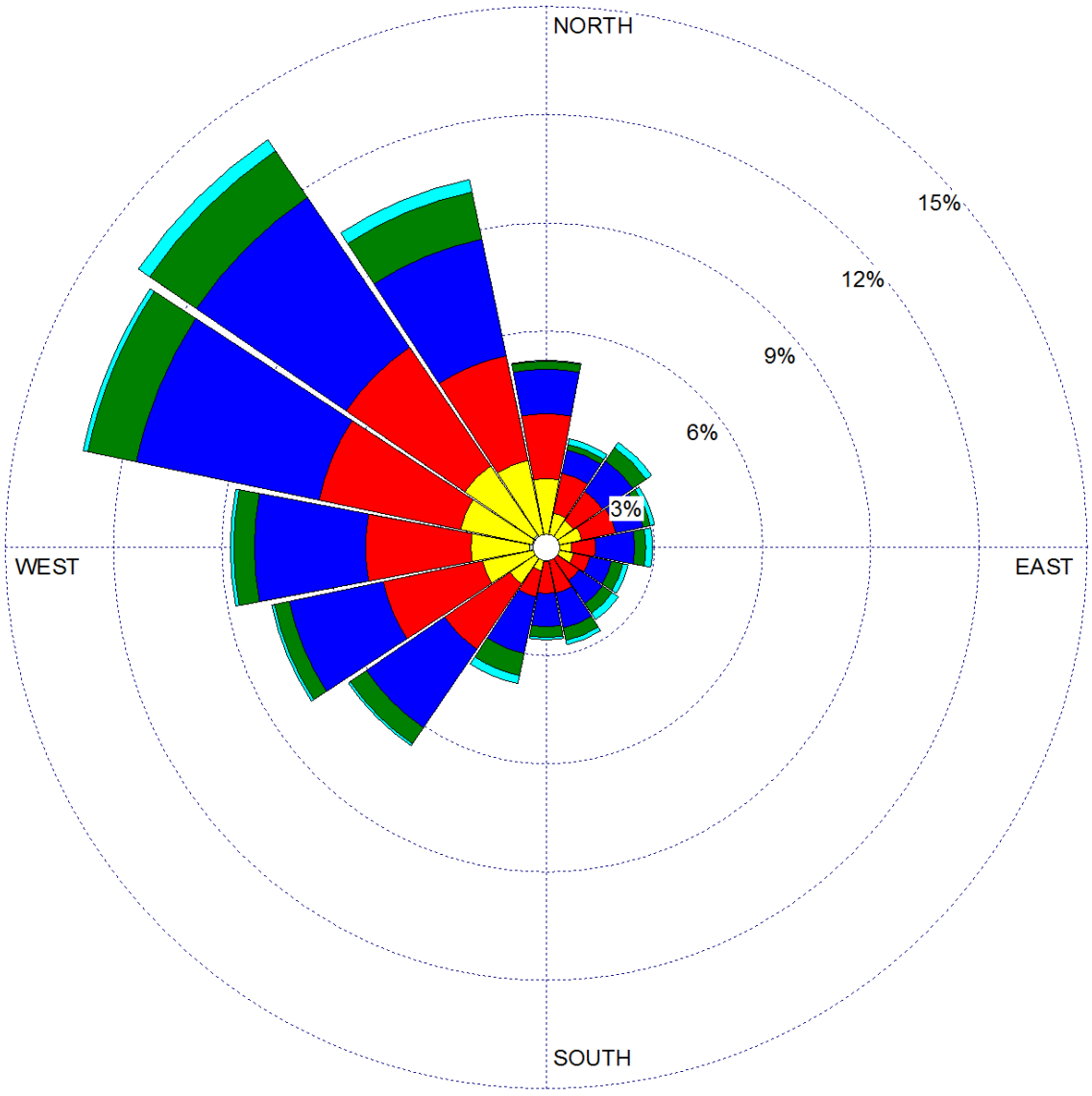
## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 12/1/2003 - 00:00
End: 12/31/2012 - 23:00

**Calm Winds:**
7.33%

**Average Wind Speed:**
9.84 Knots

**Total Data Hours:**
7377

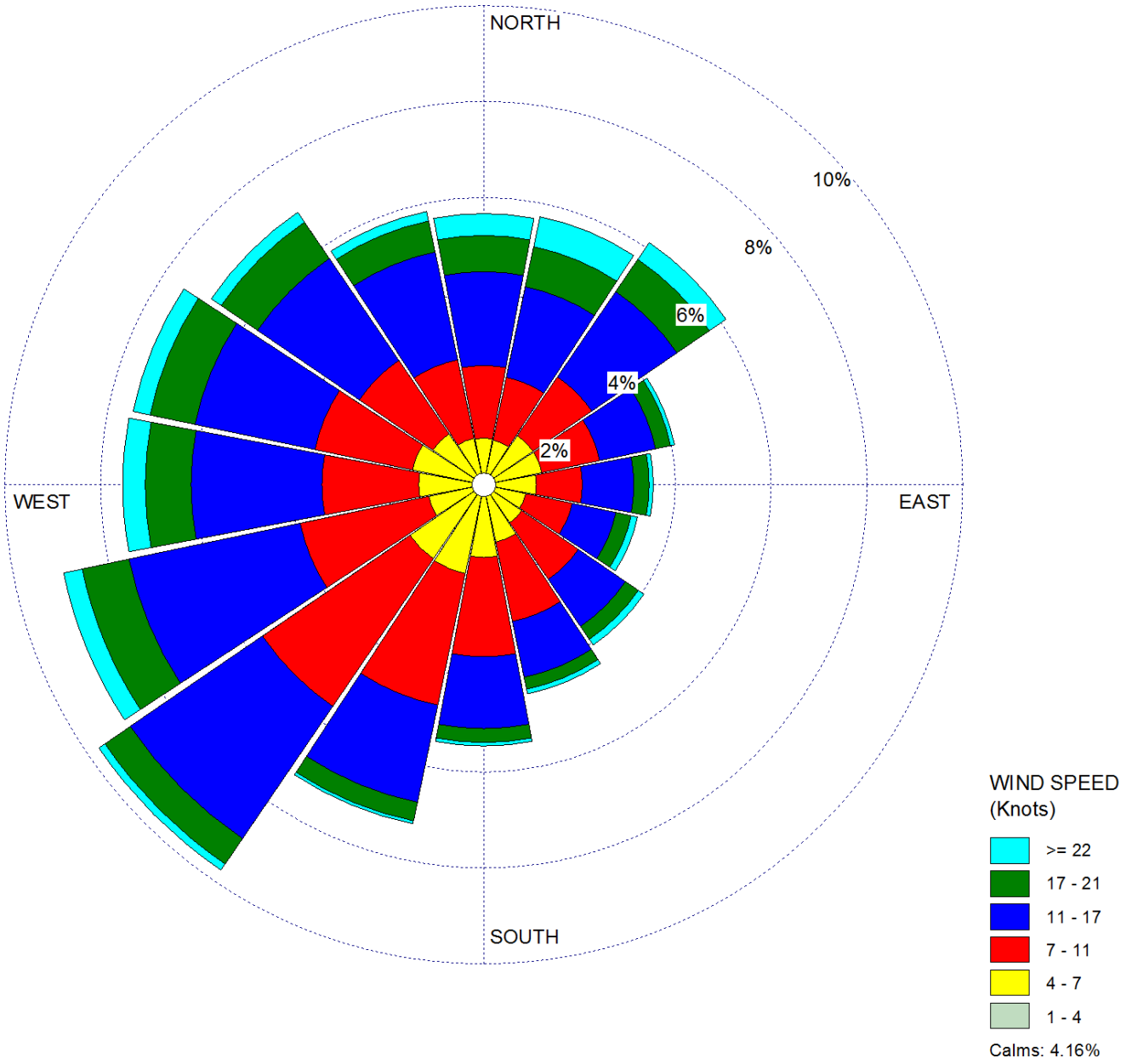
## Relevant Viewpoint Locations

Aquinnah Lighthouse
Squibnocket Farm Road
Wasque Point
Lookout Hill
South Beach State Park
Lucy Vincent Beach
Tribal Admin. Building
Aquinnah Cliffs
Vanderhoop Homestead
Top of Circle Park
Philbin Beach
Moshup Beach
Gayhead Baptist Church
Peaked Hill

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 01:00
End: 12/31/2012 - 08:00

**Calm Winds:**
4.16%

**Average Wind Speed:**
10.59 Knots

**Total Data Hours:**
86941

## Relevant Viewpoint Locations

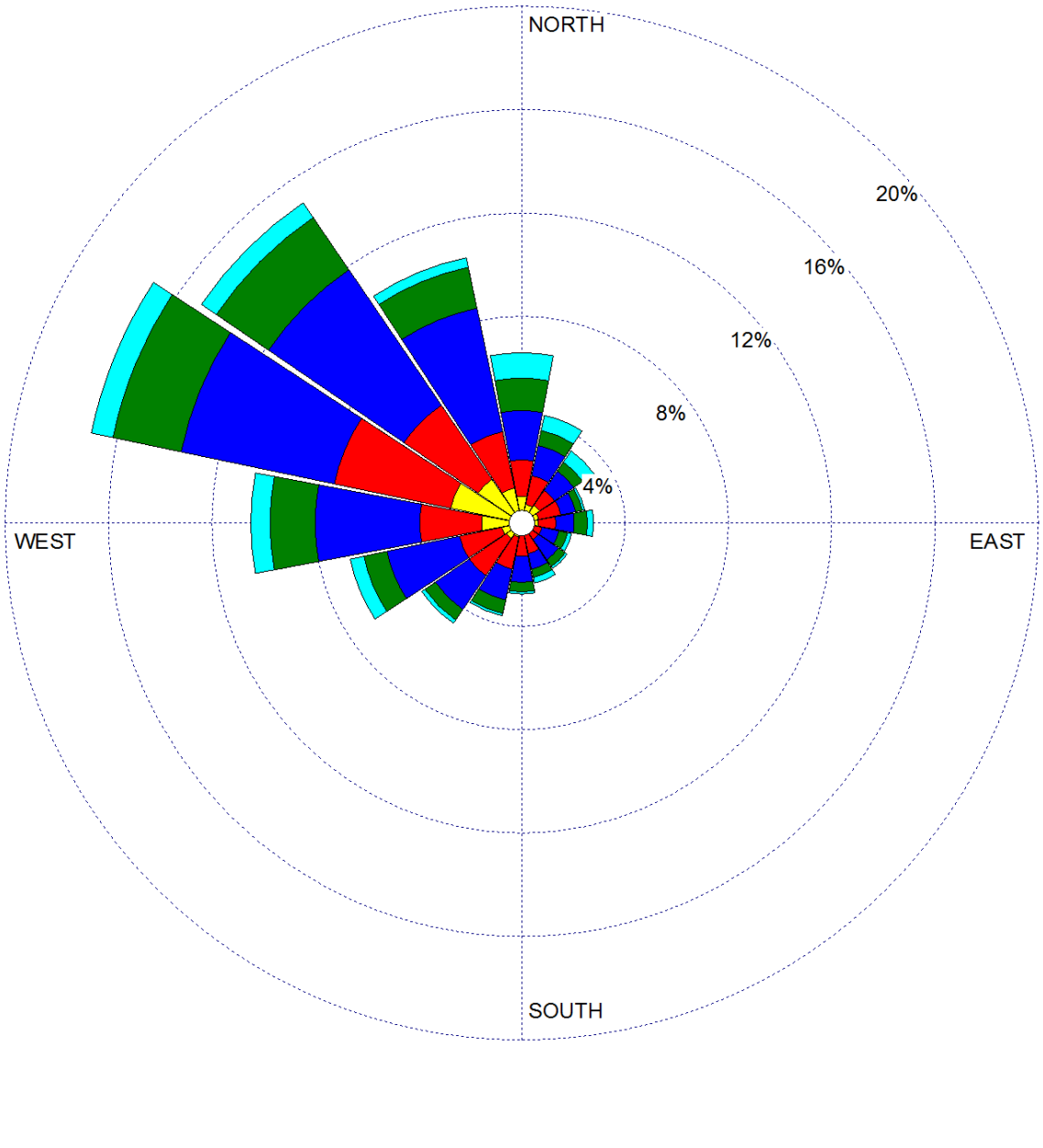
Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - Annual Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 01:00
End: 1/31/2012 - 23:00

**Calm Winds:**
3.04%

**Average Wind Speed:**
12.00 Knots

**Total Data Hours:**
7363

## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

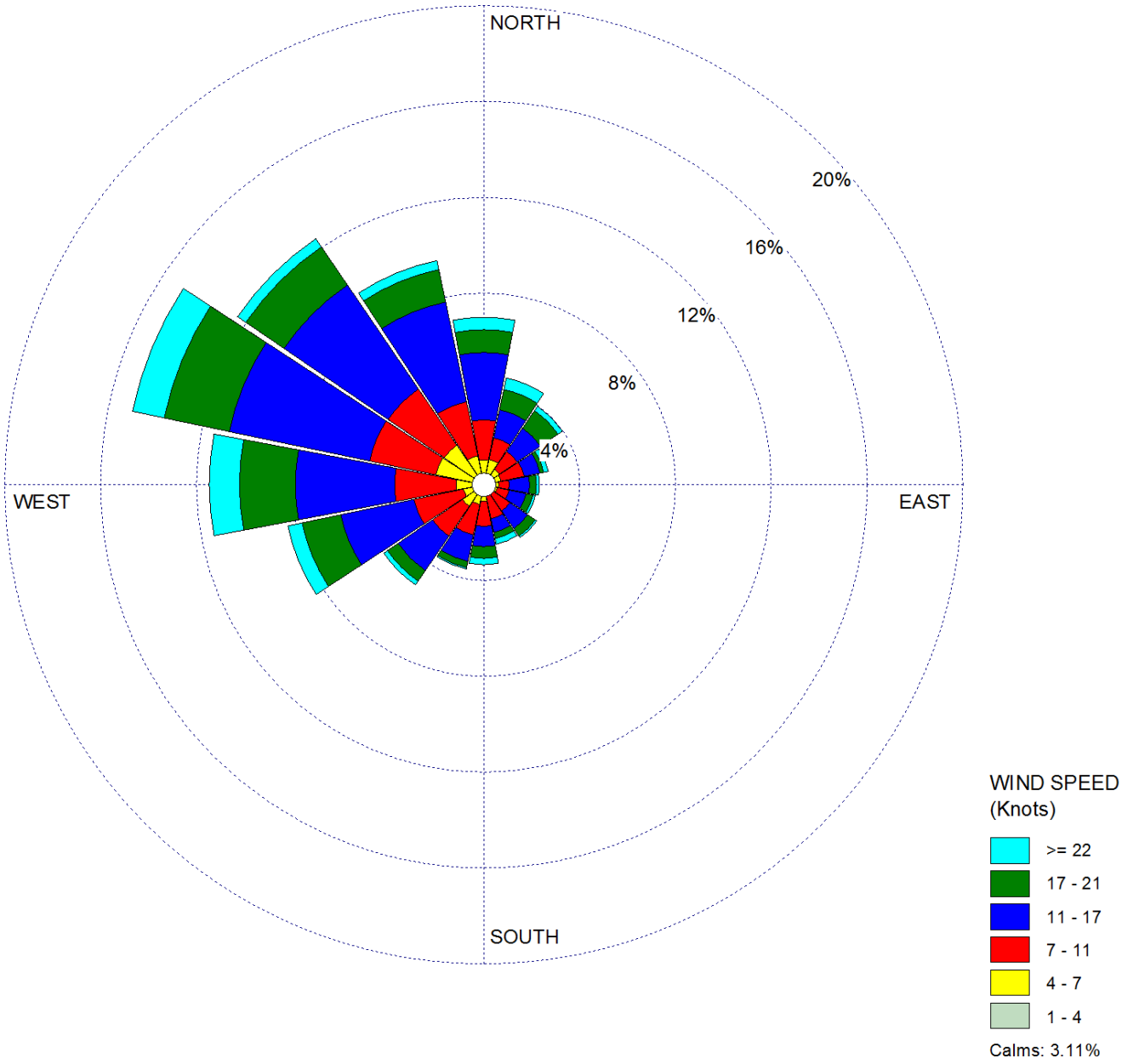
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - January**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 2/1/2003 - 00:00
End: 2/29/2012 - 23:00

**Calm Winds:**
3.11%

**Average Wind Speed:**
12.02 Knots

**Total Data Hours:**
6747

## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

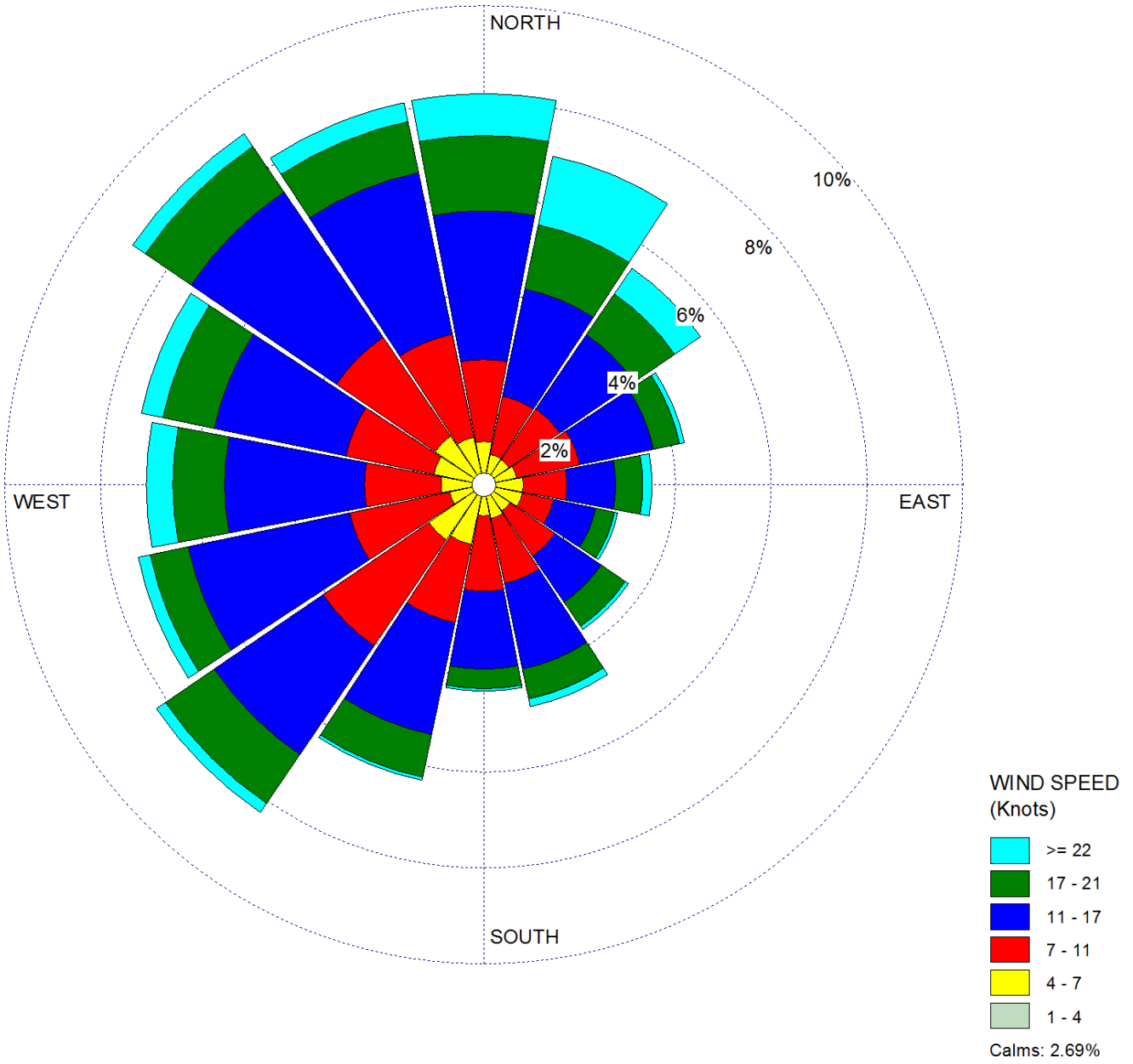
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - February Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 3/1/2003 - 00:00
End: 3/31/2012 - 23:00

**Calm Winds:**
2.69%

**Average Wind Speed:**
12.01 Knots

**Total Data Hours:**
7394

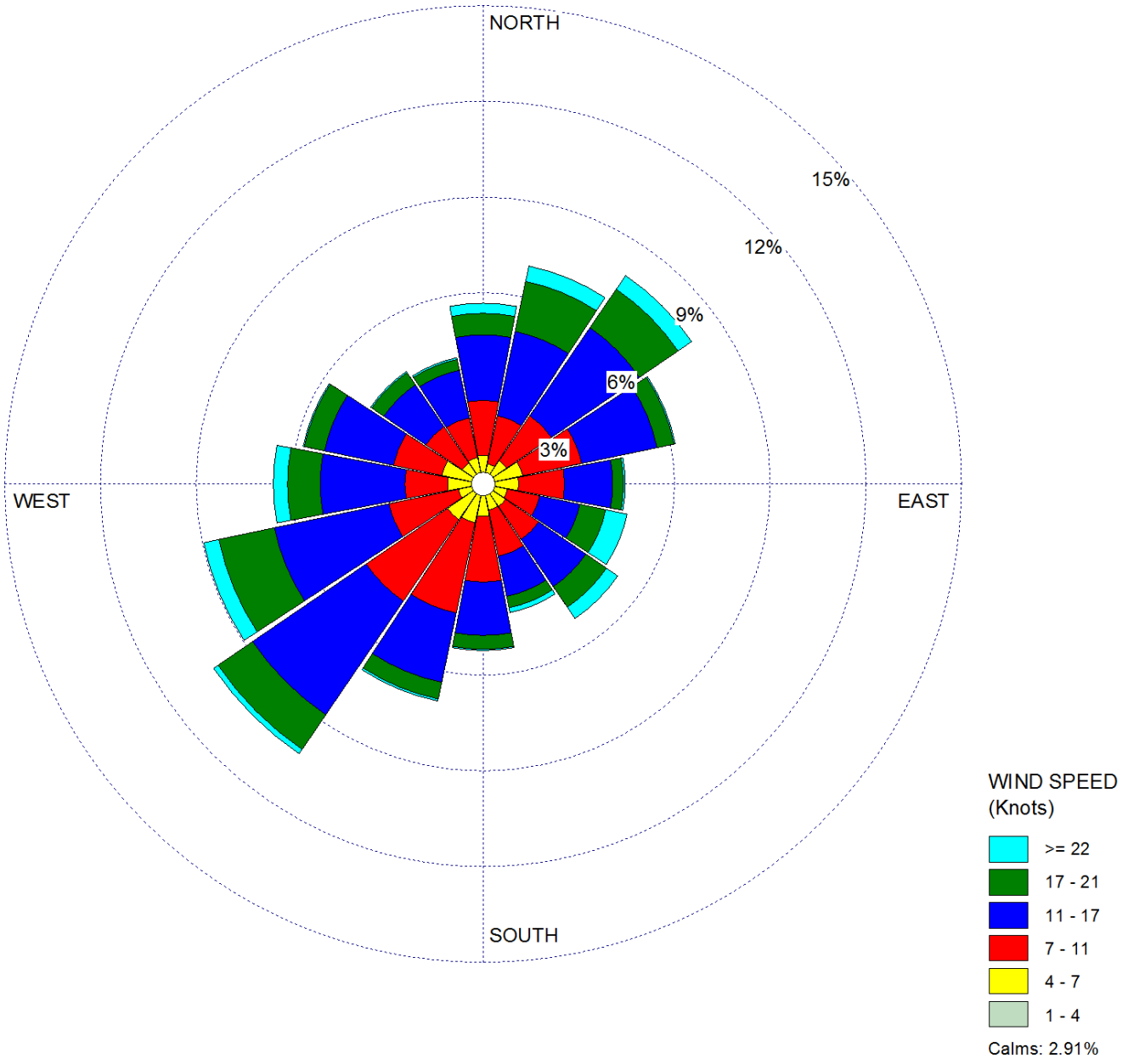
## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 4/1/2003 - 00:00
End: 4/30/2012 - 23:00

**Calm Winds:**
2.91%

**Average Wind Speed:**
11.39 Knots

**Total Data Hours:**
7174

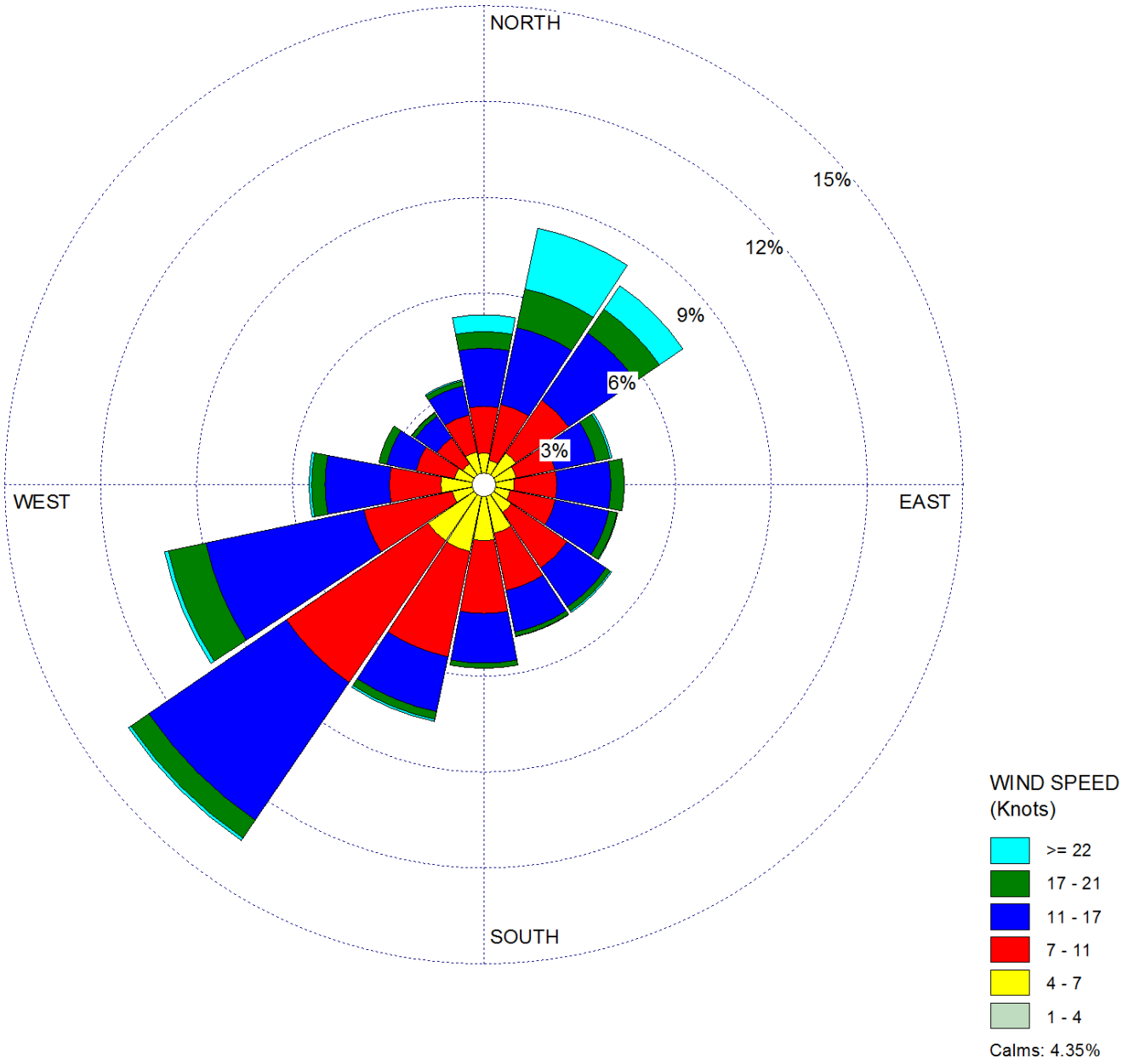
## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 5/1/2003 - 00:00
End: 5/31/2012 - 23:00

**Calm Winds:**
4.35%

**Average Wind Speed:**
10.31 Knots

**Total Data Hours:**
7359

## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

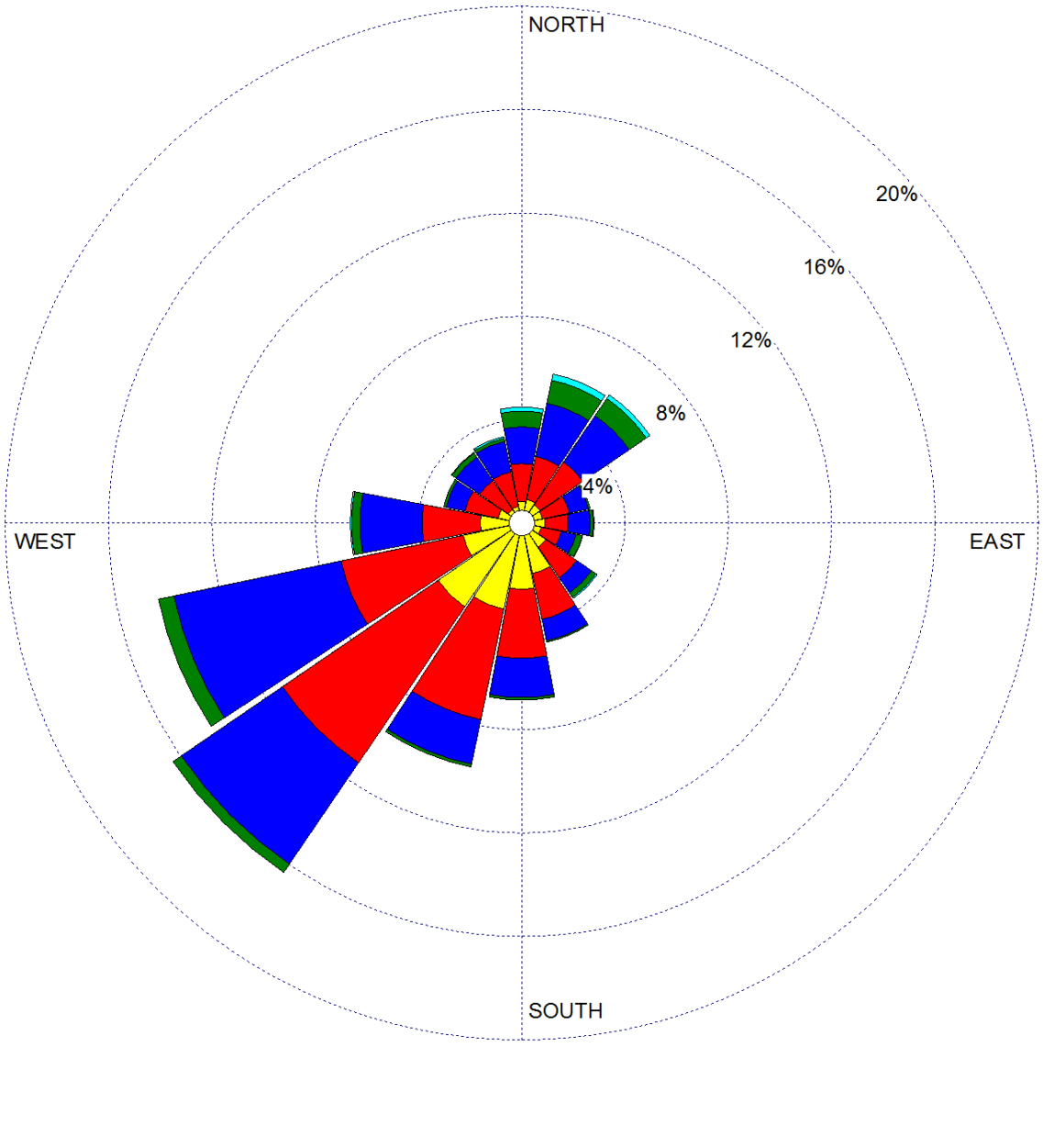
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - May**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 6/1/2003 - 00:00
End: 6/30/2012 - 23:00

**Calm Winds:**
3.68%

**Average Wind Speed:**
9.21 Knots

**Total Data Hours:**
7168

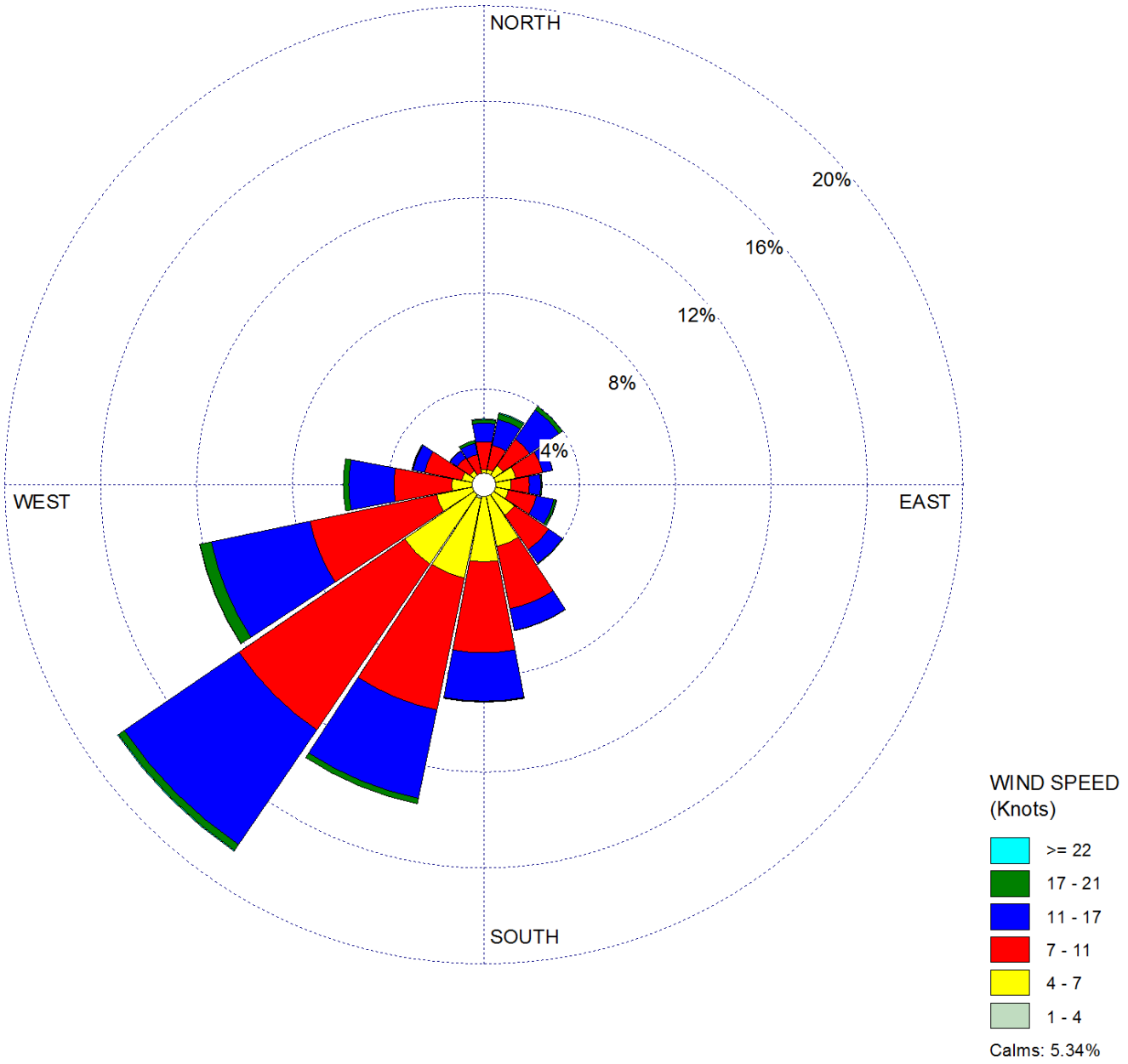
## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 7/1/2003 - 00:00
End: 7/31/2012 - 23:00

**Calm Winds:**
5.34%

**Average Wind Speed:**
8.37 Knots

**Total Data Hours:**
7388

## Relevant Viewpoint Locations

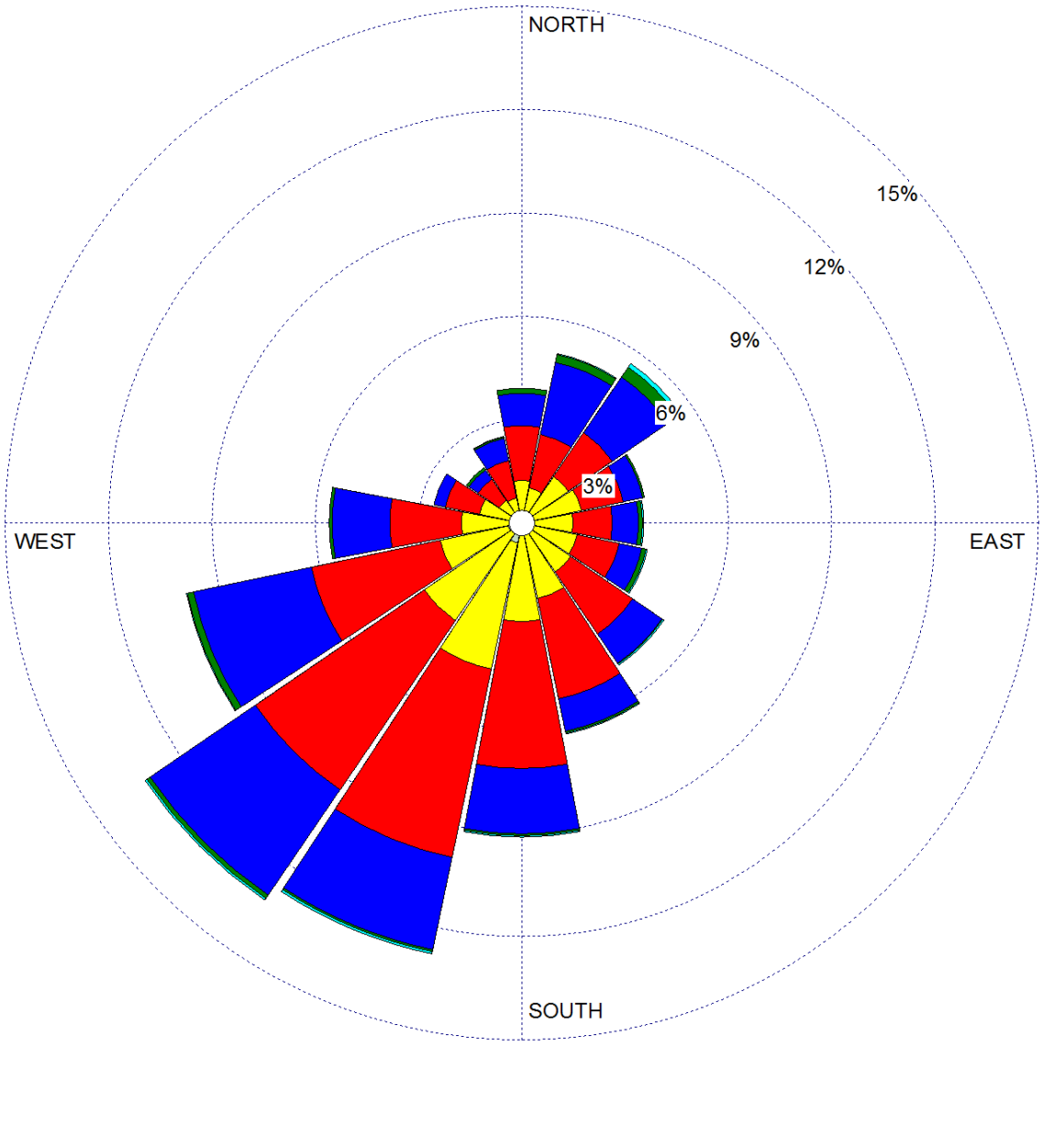
Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - July**
**Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 8/1/2003 - 00:00
End: 8/31/2012 - 23:00

**Calm Winds:**
5.31%

**Average Wind Speed:**
8.12 Knots

**Total Data Hours:**
7401

## Relevant Viewpoint Locations

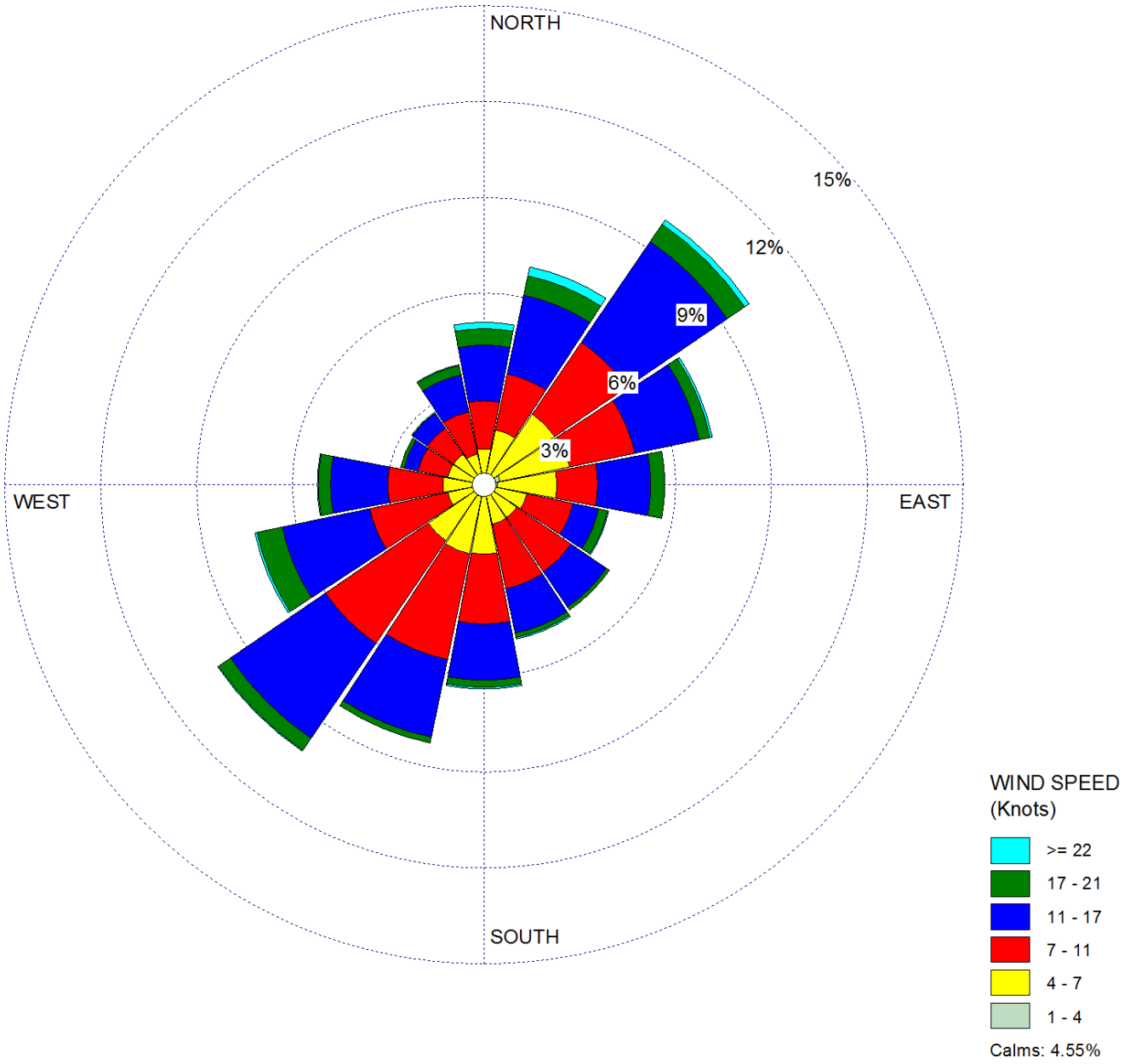
Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - August Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 9/1/2003 - 00:00
End: 9/30/2012 - 23:00

**Calm Winds:**
4.55%

**Average Wind Speed:**
9.17 Knots

**Total Data Hours:**
6988

## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

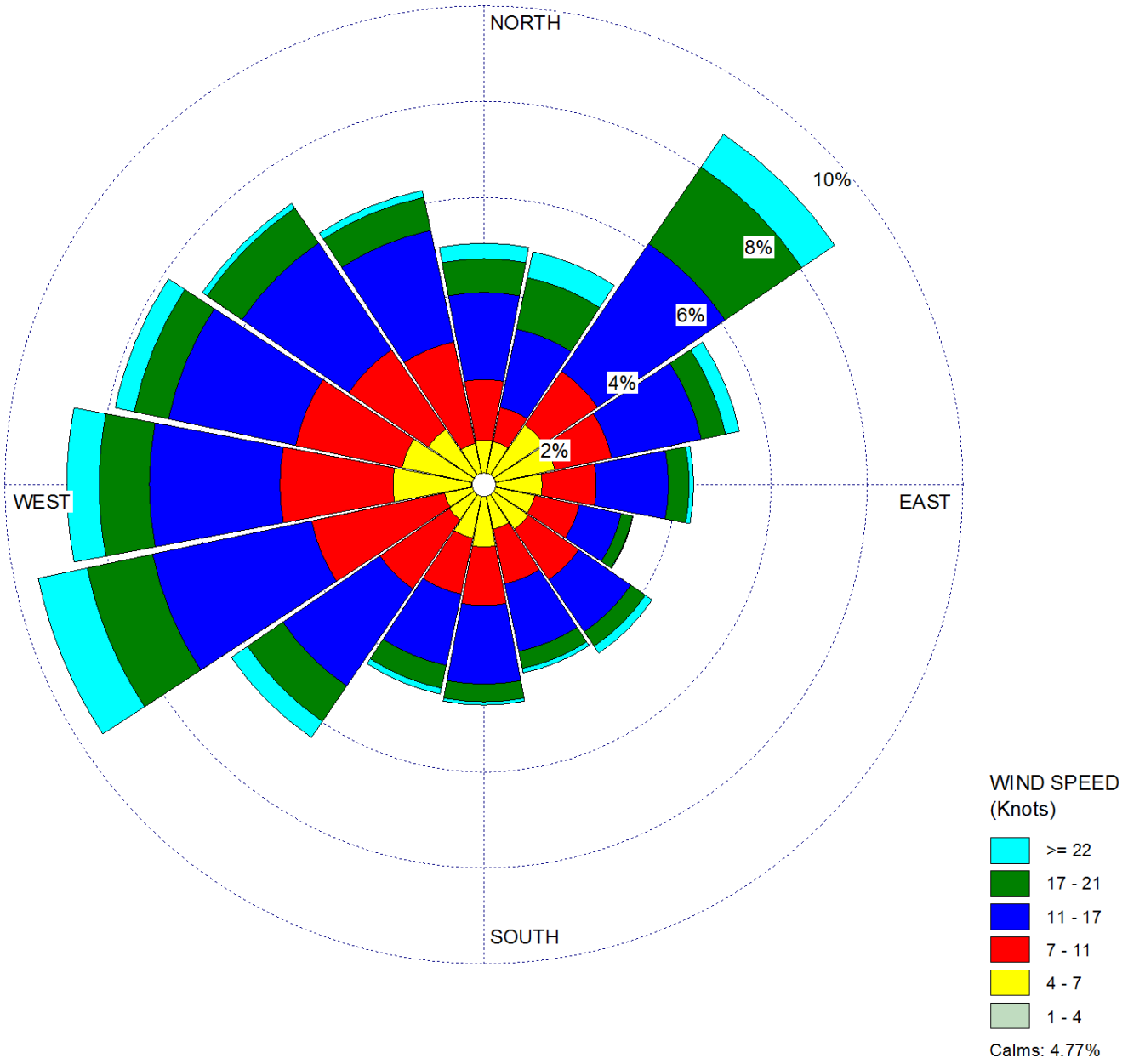
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - September Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 10/1/2003 - 00:00
End: 10/31/2012 - 23:00

**Calm Winds:**
4.77%

**Average Wind Speed:**
11.10 Knots

**Total Data Hours:**
7391

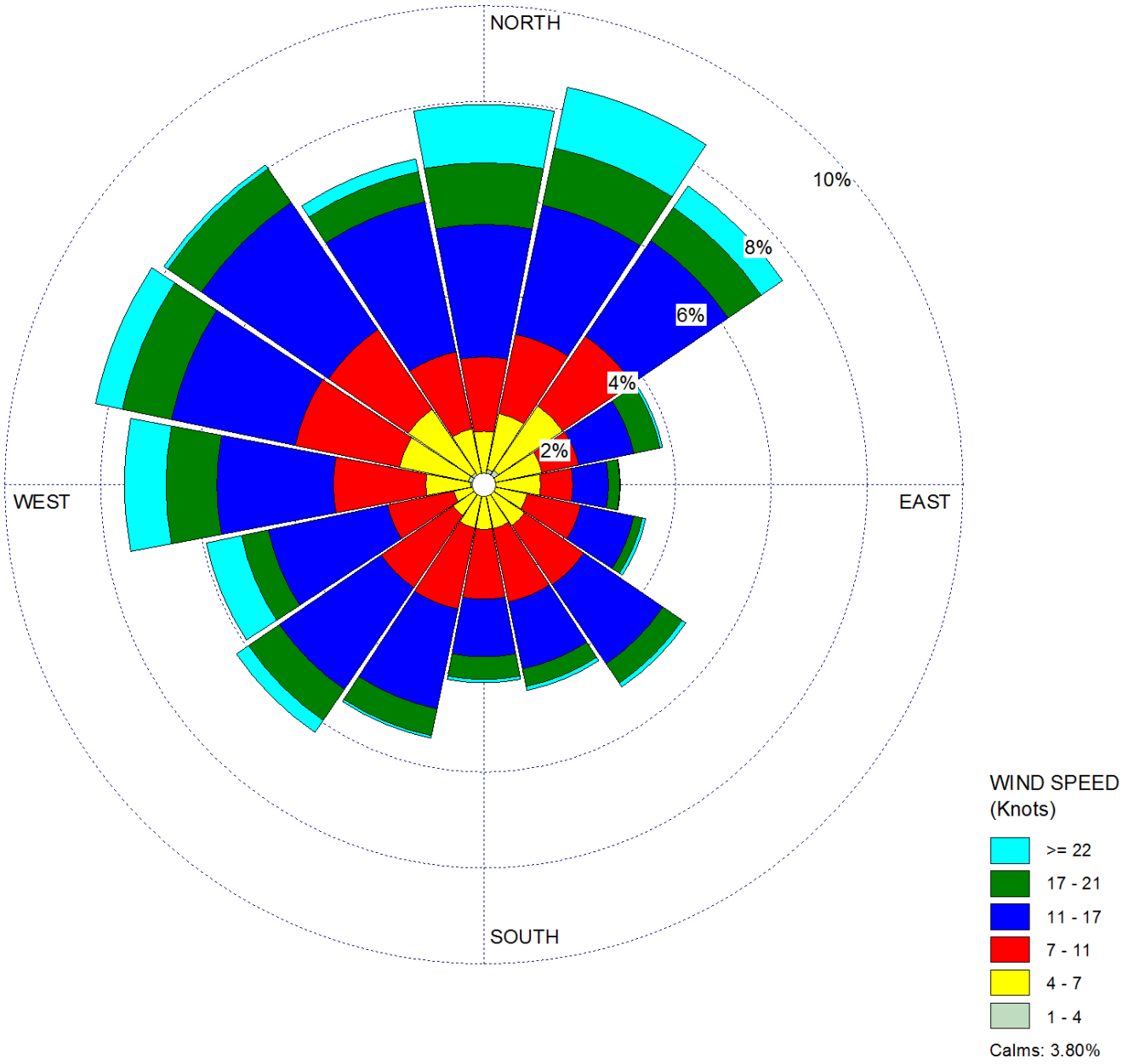
## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044




## Wind Rose Data

**Data Period:**
Start: 11/1/2003 - 00:00
End: 11/30/2012 - 23:00

**Calm Winds:**
3.80%

**Average Wind Speed:**
11.31 Knots

**Total Data Hours:**
7175

## Relevant Viewpoint Locations

Tom Nevers Field
Madaket Beach Dunes

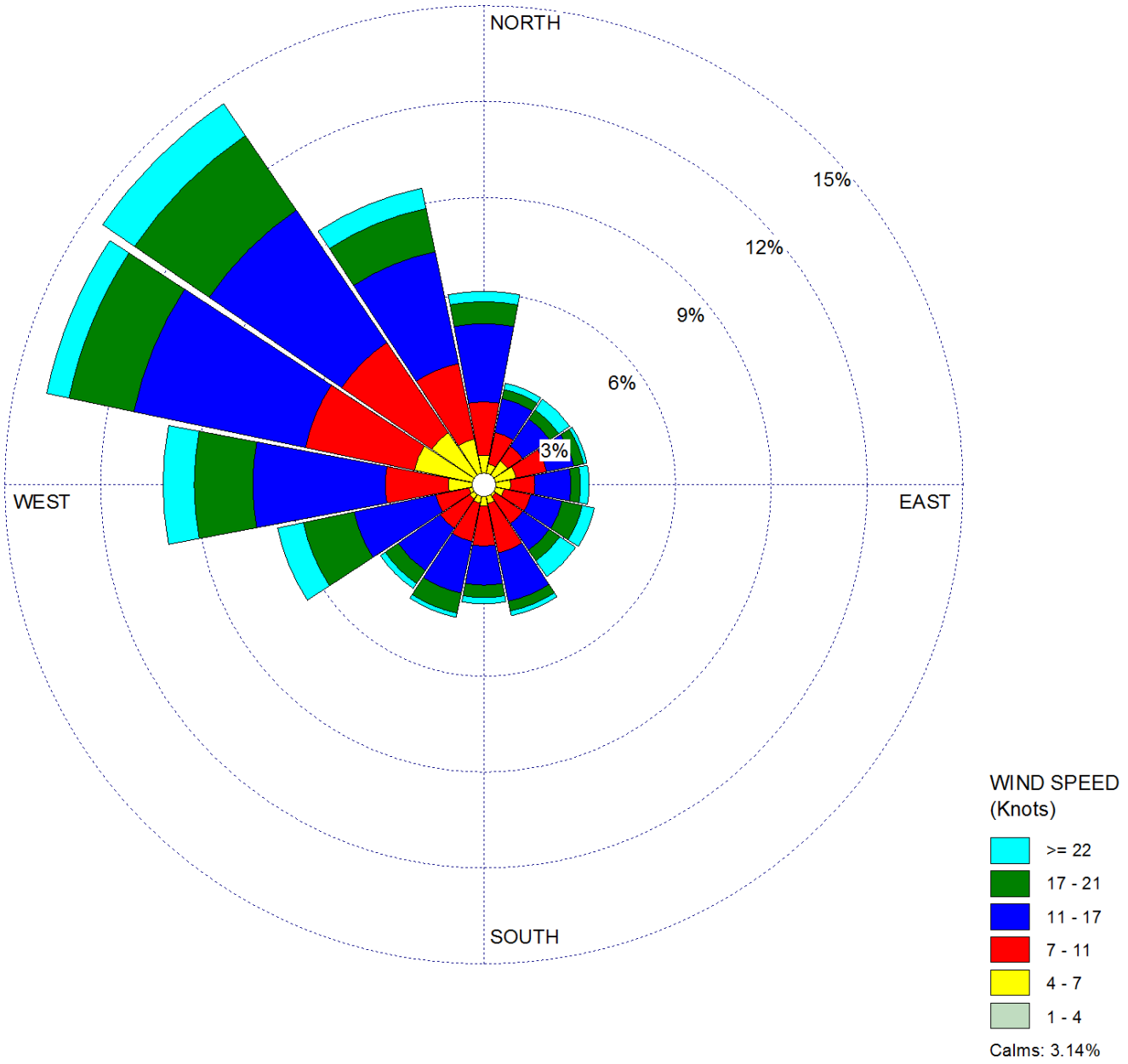
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - November Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 12/1/2003 - 00:00
End: 12/31/2012 - 08:00

**Calm Winds:**
3.14%

**Average Wind Speed:**
12.10 Knots

**Total Data Hours:**
7393

## Relevant Viewpoint Locations

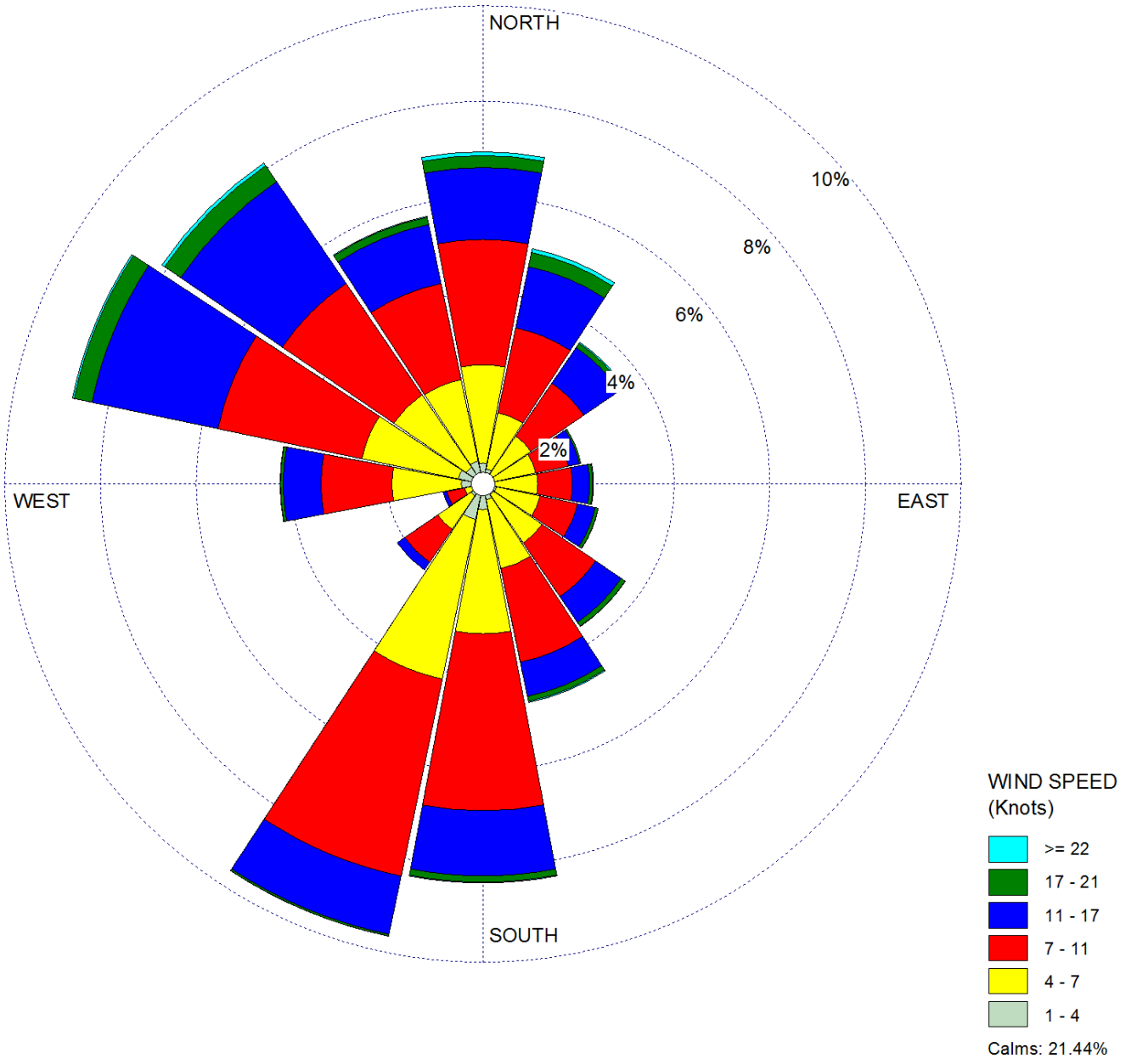
Tom Nevers Field
Madaket Beach Dunes

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Nantucket - December Windrose Data**




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 02:00
End: 12/31/2012 - 23:00

**Calm Winds:**
21.44%

**Average Wind Speed:**
6.46 Knots

**Total Data Hours:**
86995

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

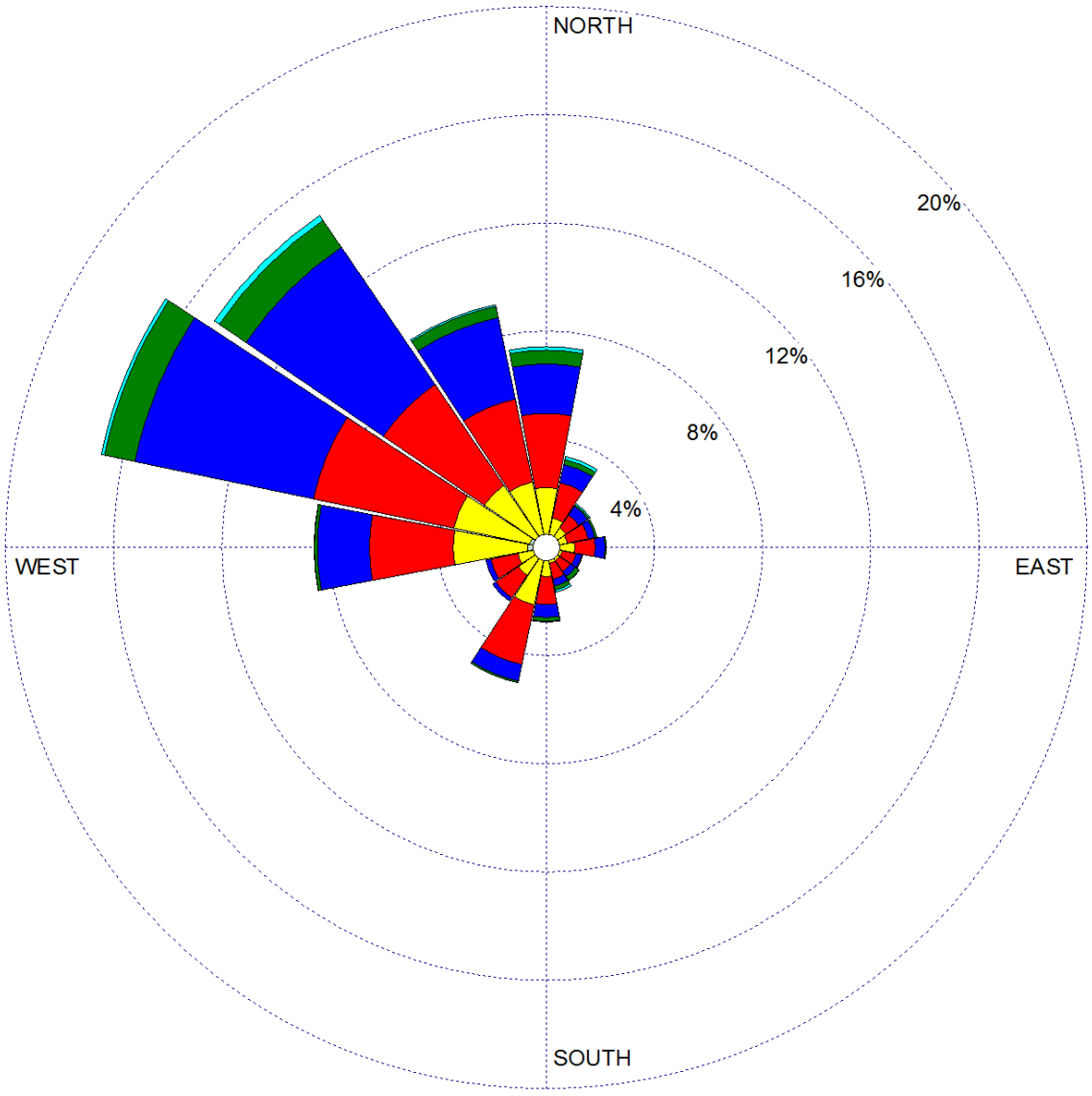
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - Annual Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 1/1/2003 - 02:00
End: 1/31/2012 - 23:00

**Calm Winds:**
15.55%

**Average Wind Speed:**
7.71 Knots

**Total Data Hours:**
7350

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

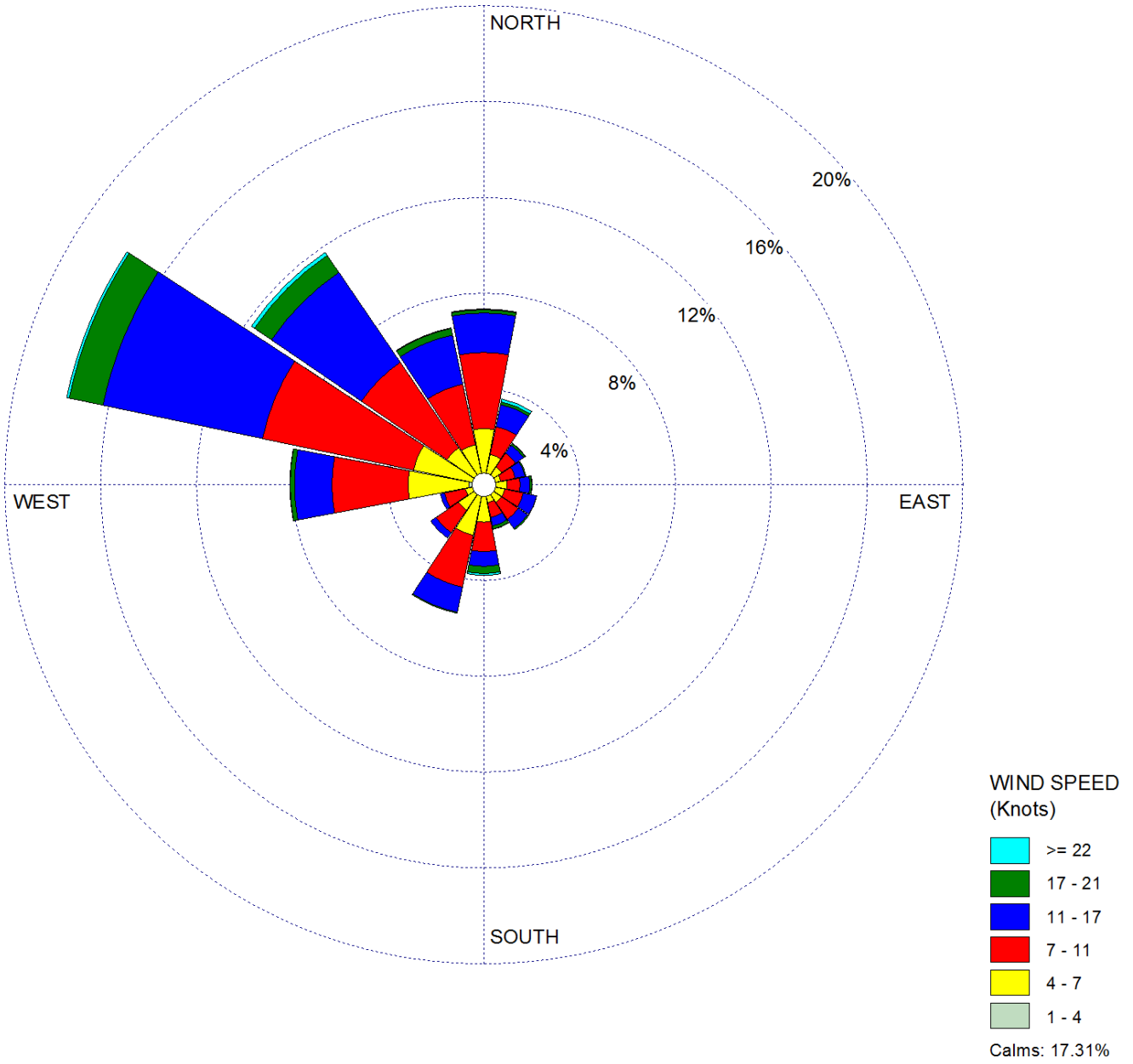
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - January**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 2/1/2003 - 00:00
End: 2/29/2012 - 23:00

**Calm Winds:**
17.31%

**Average Wind Speed:**
7.42 Knots

**Total Data Hours:**
6730

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

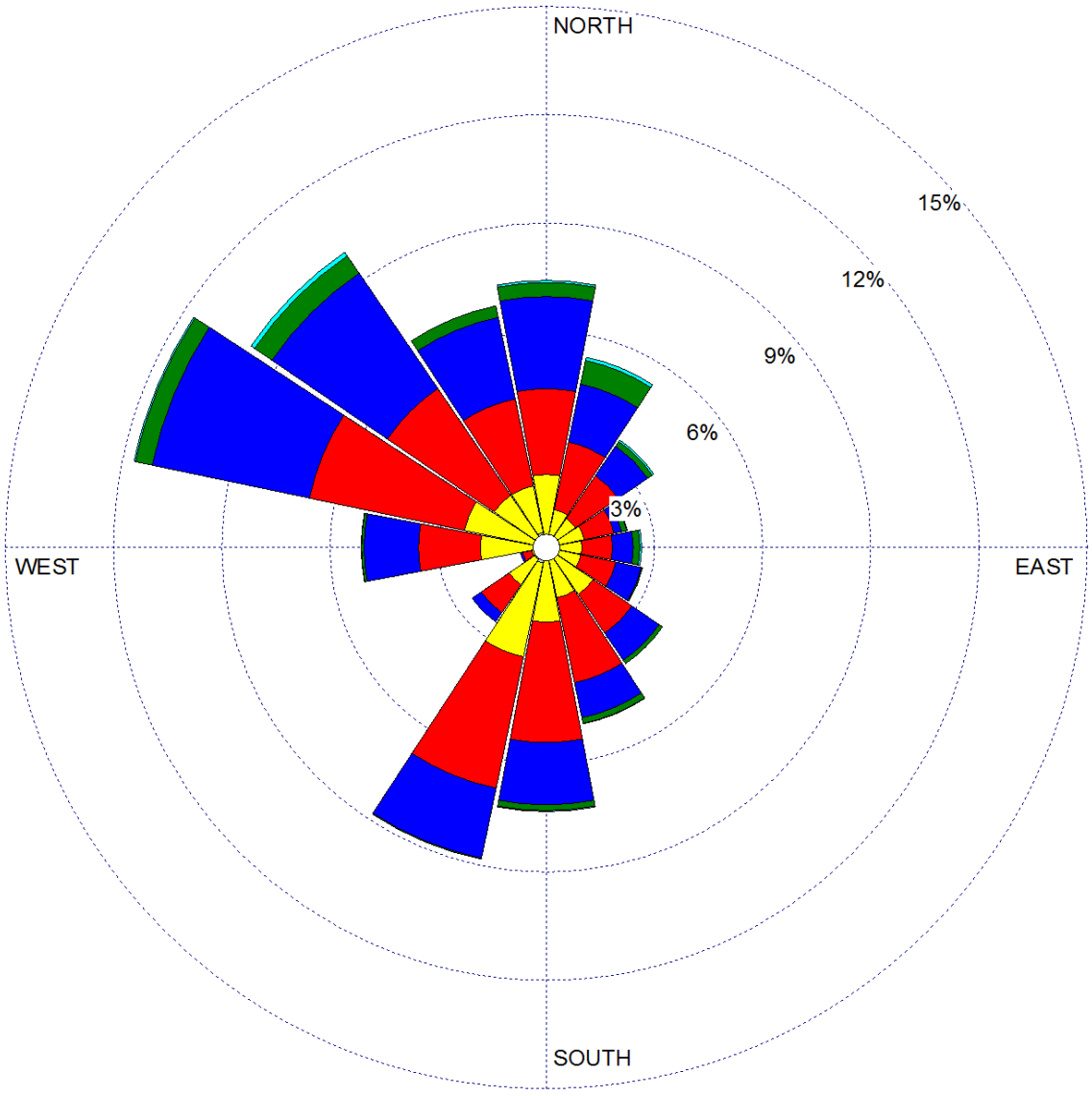
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - February Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 3/1/2003 - 00:00
End: 3/31/2012 - 23:00

**Calm Winds:**
13.32%

**Average Wind Speed:**
7.87 Knots

**Total Data Hours:**
7378

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

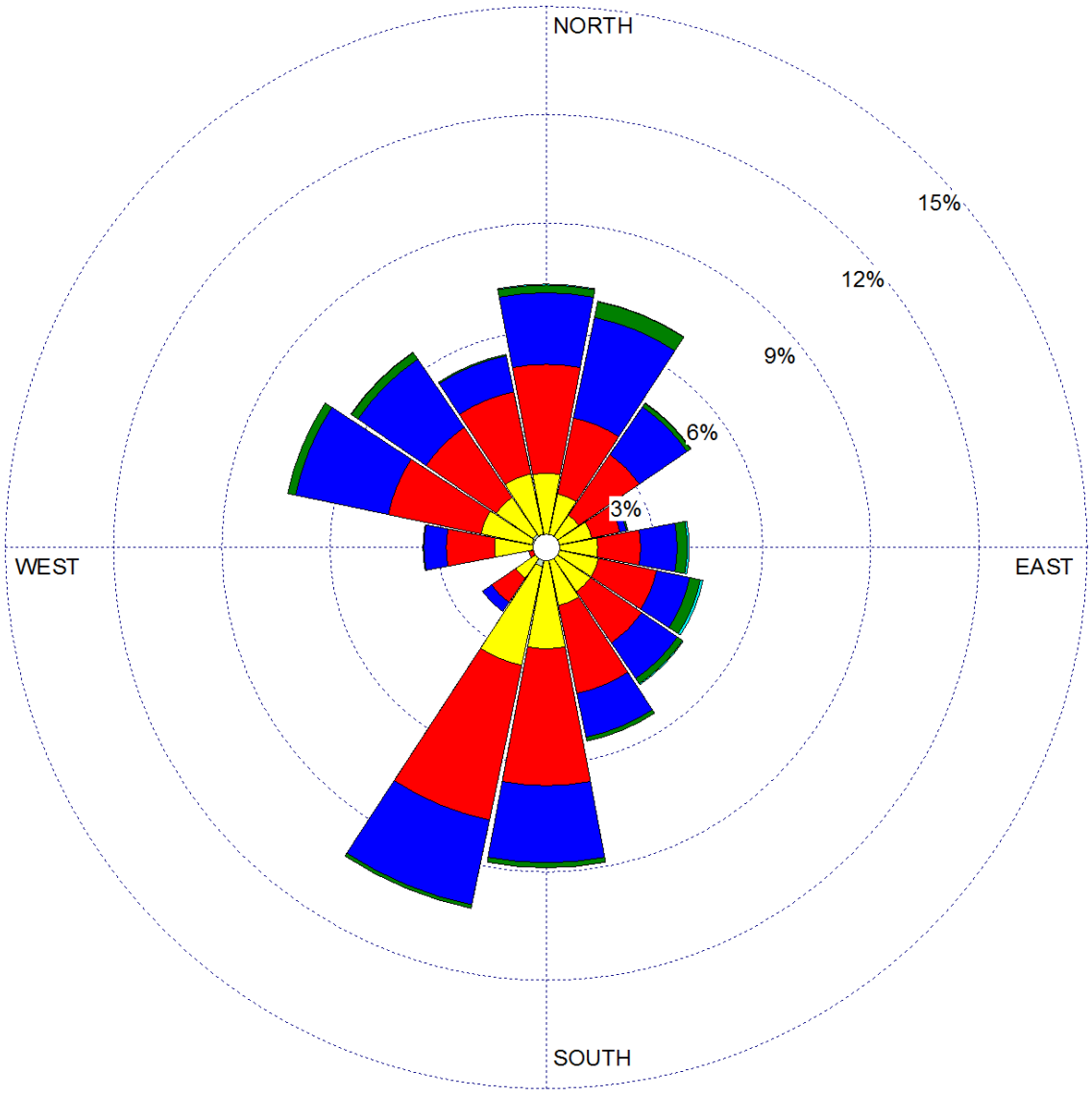
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - March**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 4/1/2003 - 00:00
End: 4/30/2012 - 23:00

**Calm Winds:**
14.66%

**Average Wind Speed:**
7.39 Knots

**Total Data Hours:**
7179

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

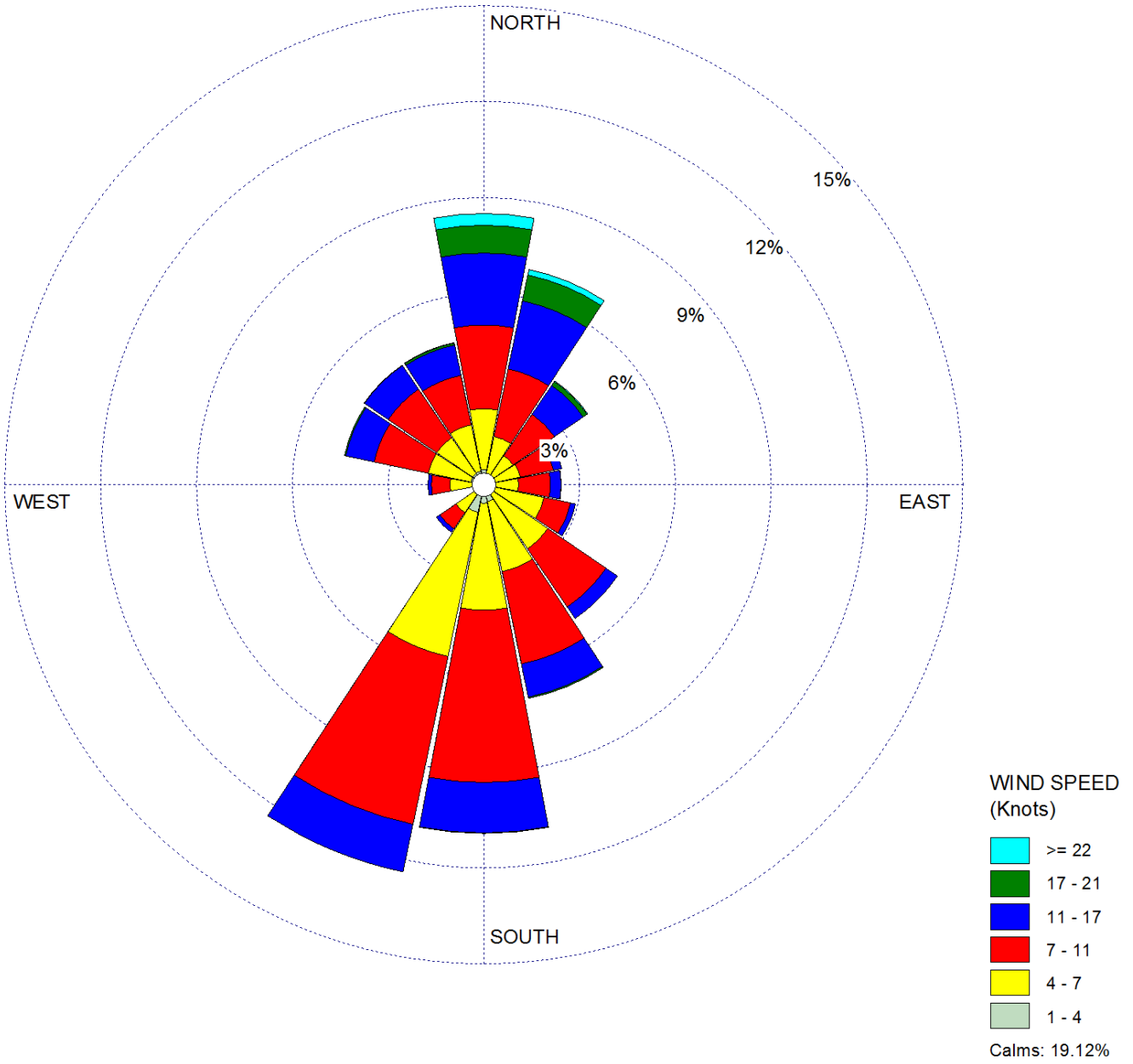
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - April**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 5/1/2003 - 00:00
End: 5/31/2012 - 23:00

**Calm Winds:**
19.12%

**Average Wind Speed:**
6.37 Knots

**Total Data Hours:**
7375

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

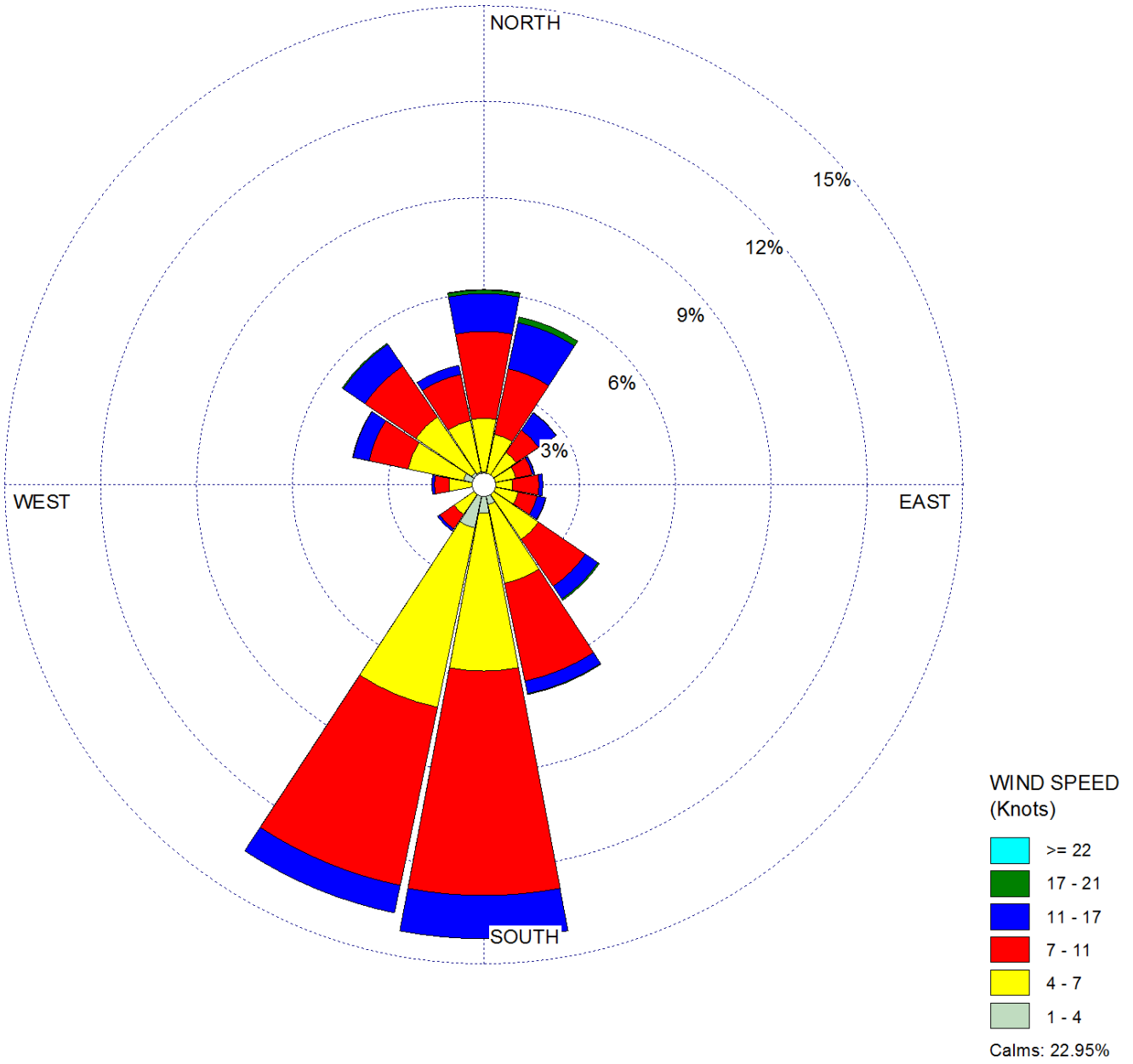
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - May**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 6/1/2003 - 00:00
End: 6/30/2012 - 23:00

**Calm Winds:**
22.95%

**Average Wind Speed:**
5.34 Knots

**Total Data Hours:**
7180

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

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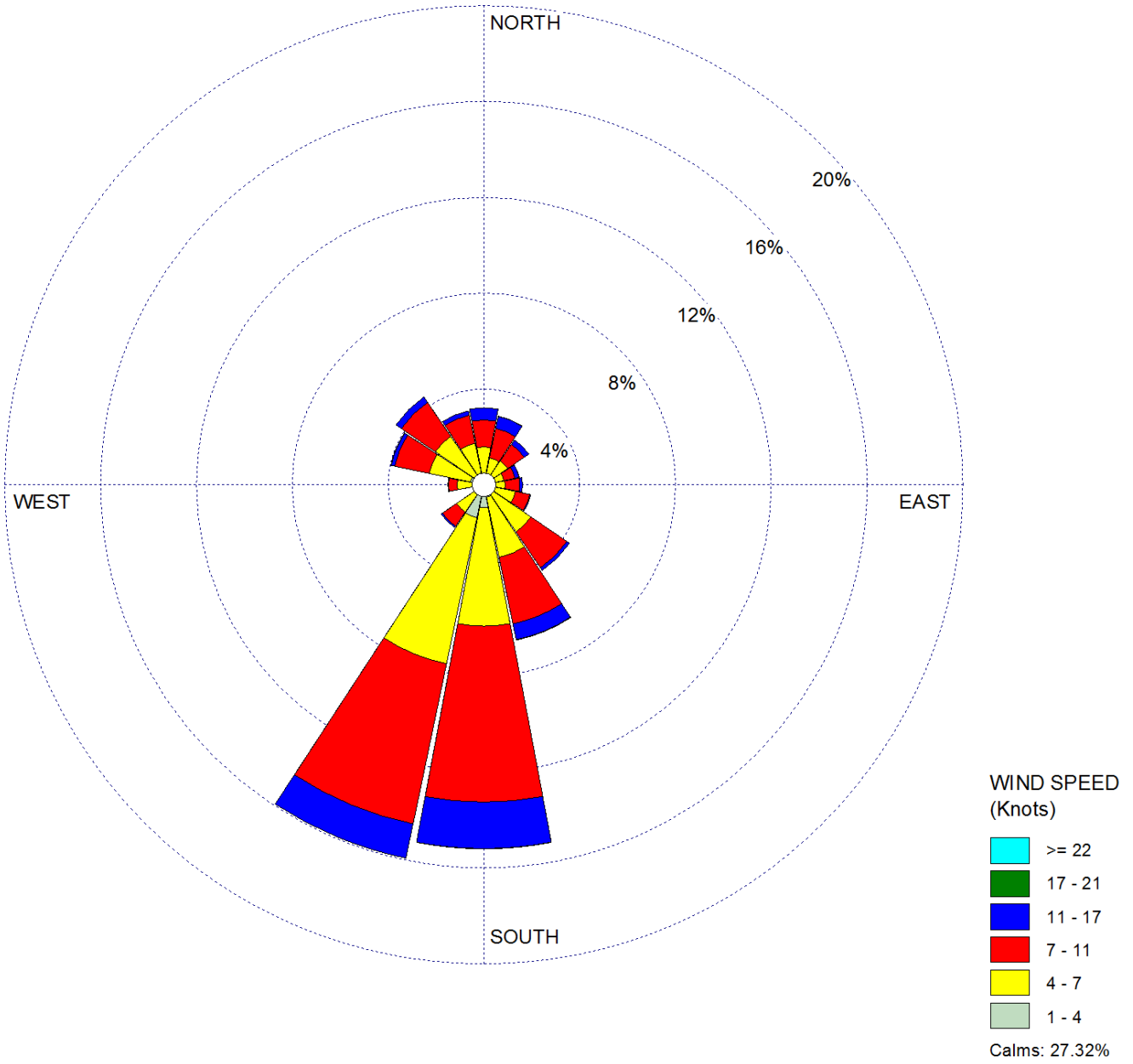
Bureau of Ocean Energy Management

**Newport - June**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 7/1/2003 - 00:00
End: 7/31/2012 - 23:00

**Calm Winds:**
27.32%

**Average Wind Speed:**
4.81 Knots

**Total Data Hours:**
7400

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

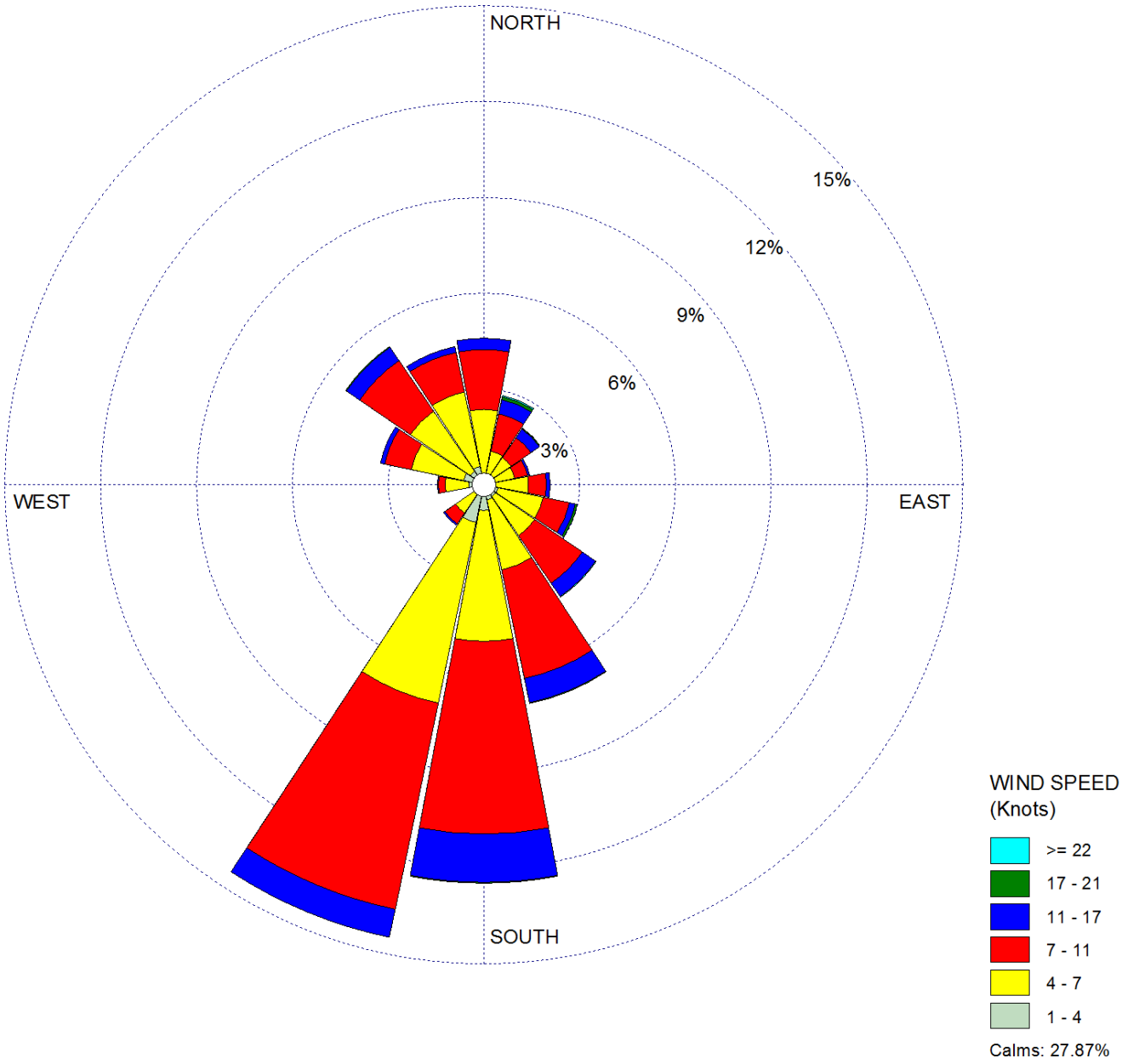
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - July**
**Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 8/1/2003 - 00:00
End: 8/31/2012 - 23:00

**Calm Winds:**
27.87%

**Average Wind Speed:**
4.76 Knots

**Total Data Hours:**
7361

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

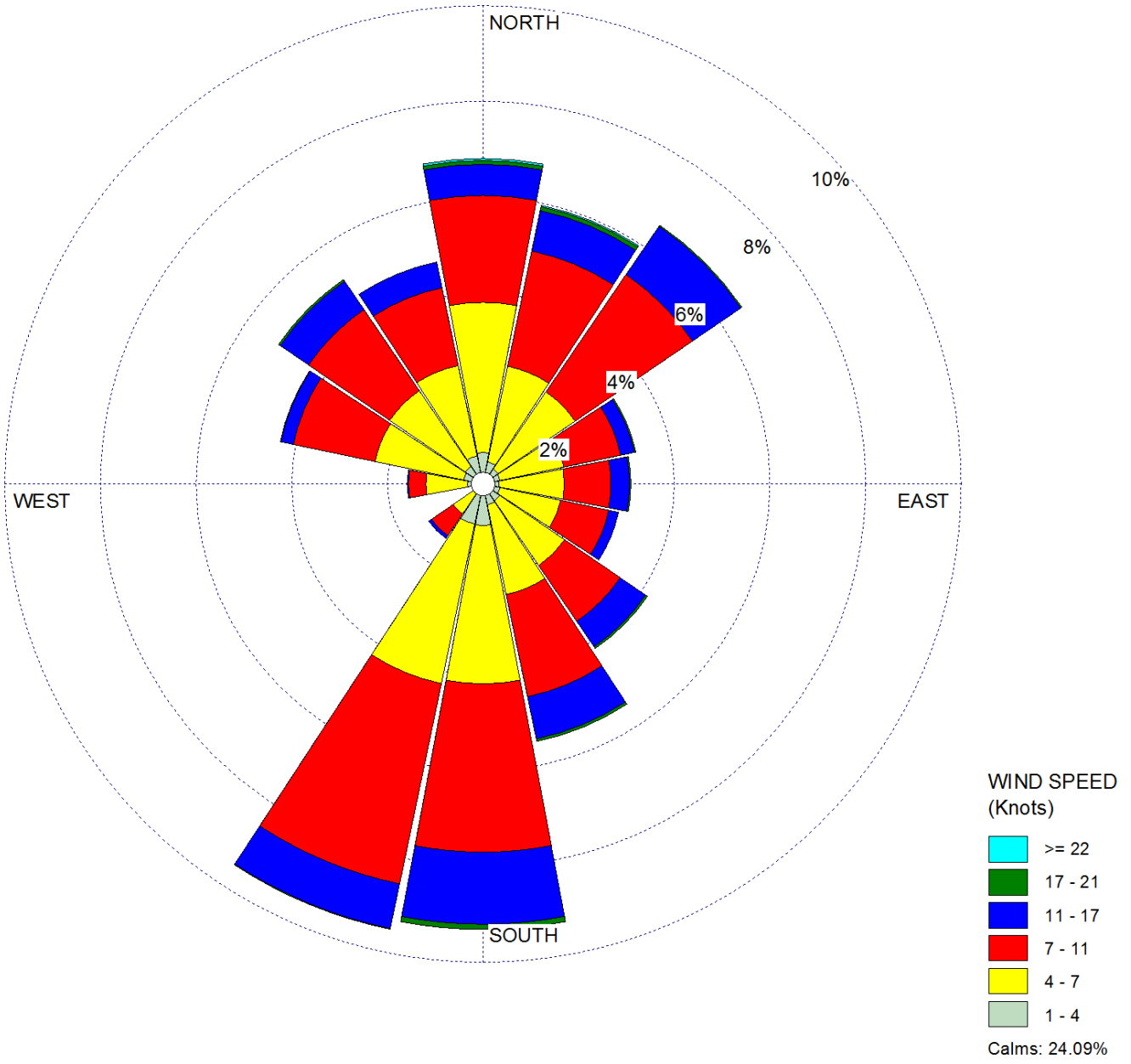
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - August Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 9/1/2003 - 00:00
End: 9/30/2012 - 23:00

**Calm Winds:**
24.09%

**Average Wind Speed:**
5.27 Knots

**Total Data Hours:**
7125

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

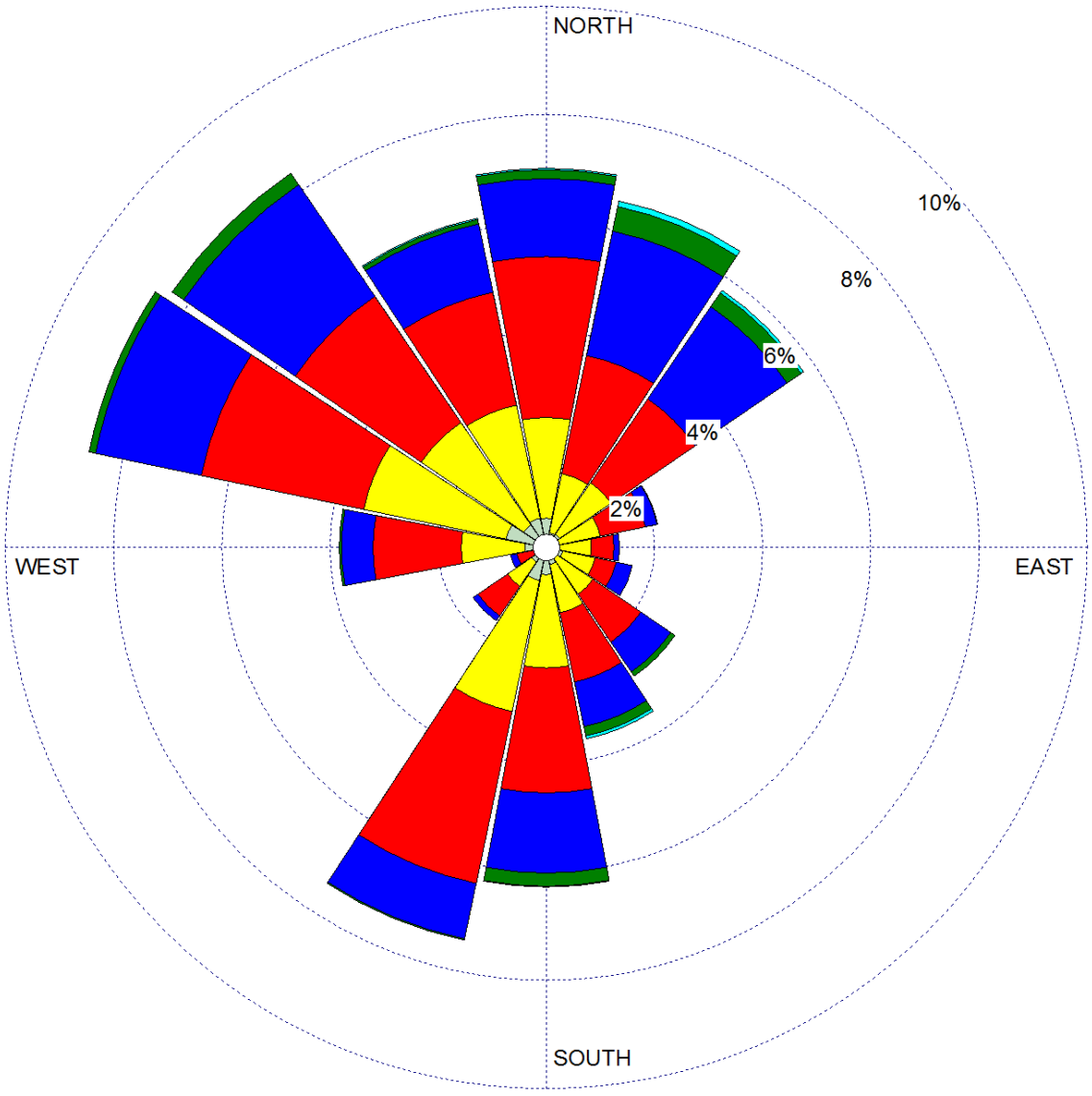
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - September Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 10/1/2003 - 00:00
End: 10/31/2012 - 23:00

**Calm Winds:**
24.50%

**Average Wind Speed:**
6.16 Knots

**Total Data Hours:**
7380

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

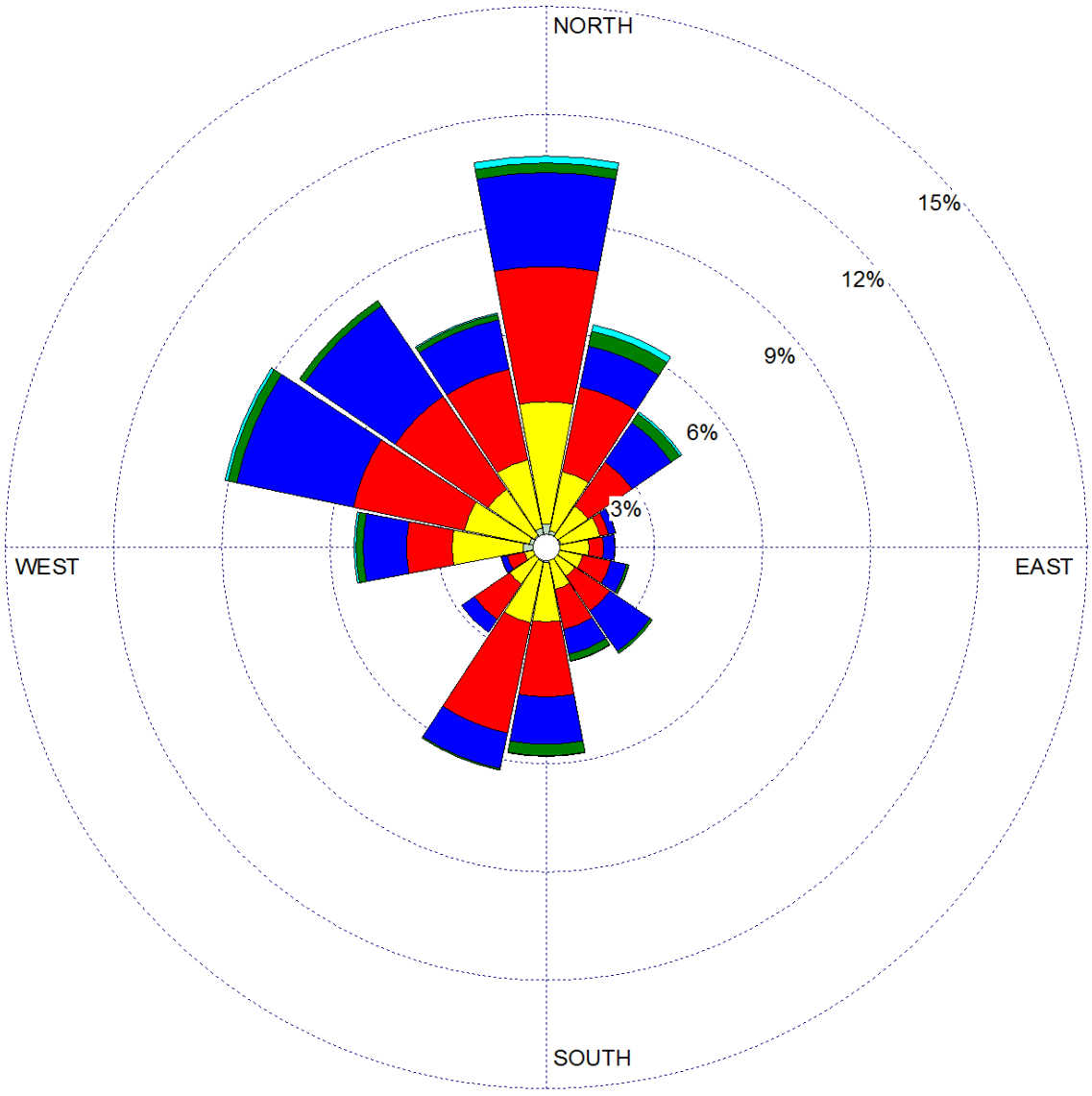
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - October Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 11/1/2003 - 00:00
End: 11/30/2012 - 23:00

**Calm Winds:**
18.49%

**Average Wind Speed:**
6.90 Knots

**Total Data Hours:**
7165

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

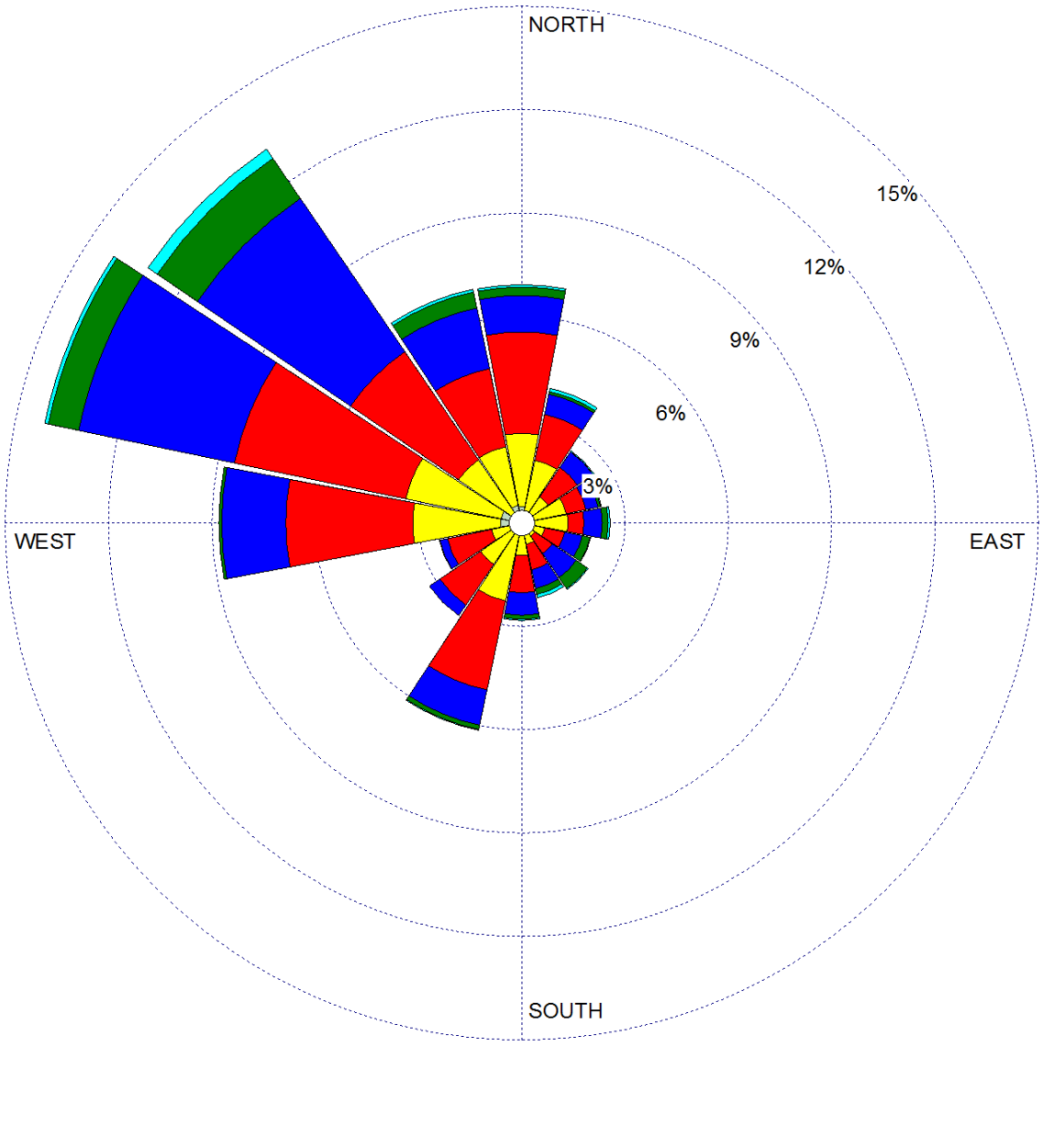
## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - November Windrose Data**

**Figure 1**




## Wind Rose Data

**Data Period:**
Start: 12/1/2003 - 00:00
End: 12/31/2012 - 23:00

**Calm Winds:**
16.37%

**Average Wind Speed:**
7.53 Knots

**Total Data Hours:**
7372

## Relevant Viewpoint Locations

Narragansett Beach
Beavertail Lighthouse
Brenton Pooint State Park
Second Beach
Tappens Beach
Horseneck Beach

## Project Information

**Project Name:**
Bureau of Ocean Energy Management Massachusetts and Rhode Island Wind Energy Areas Visualization Simulations

**Project Task #:**
M13PD00044

**Newport - December Windrose Data**

**Figure 1**

# Appendix D

# Visibility Methods Report

# REPORT
# Estimating and Extrapolating the Visibility of Offshore Wind Turbines

Dr. Bruce A. Egan, CCM
Egan Environmental Inc.
Beverly, MA

December 23, 2013

## Introduction

Egan Environmental Inc. is assisting the ESS Group on the Visualization Simulations for Offshore Massachusetts and Rhode Island Wind Energy Area project sponsored by the Bureau of Ocean Energy Management. Our work involves testing methods for estimating how often wind turbines might be visible at large distances from various coastal locations along the Massachusetts and Rhode Island shorelines utilizing routinely available observational weather data.

There are two important limitations to line-of-sight distance determinations. The first is the curvature of the earth's surface which limits the height above the horizon that any object could possibly be seen. This involves geometric calculations which depend upon the radius of the earth, and the heights above sea level of both the observer and the object being viewed. The second limiting factor is the visual range within the lower atmosphere as a function primarily of the liquid and vapor water content of the air. These latter visibility determinations are made as if the earth were flat and are the subject of this report.

The National Weather Service (NWS), on an hourly basis, records meteorological measurements and estimates of visibility ranges at their airport locations. Visibility is logged with one or two –significant digit distances from 0 to 9 statute miles and also into a single category of 10 miles but meaning greater than or equal to 10 statute miles. There is no breakout of the visibility ranges beyond 10 miles. The visibility data out to 10 miles provides a basis for estimates within that range. Our task was to recommend a method to estimate or extrapolate visibility to longer distances, specifically to distances beyond 20 and 30 nautical miles. In this report involving the NWS data, for consistency reasons, we will work with distances in units of statute miles. When the recommended prediction scheme is applied to other data sets, distances will be converted to nautical miles.

## Approach

Our basic approach is twofold: (1) to review current literature and identify methods that have been used to predict visibility at such distances, test and quantify the performance of these methods using a representative data base available from the NWS and; (2) use the same data base to test alternative methods that could be used to extrapolate the 0 to 9 mile data to greater distances and breakout the hours labeled as 10 miles to categories of greater than 20 and greater than 30 nautical miles.

Recent research studies involving visibility modeling have primarily been associated either with scenic visibility issues in mountainous areas or with occurrences of low visibility associated with fog and with aircraft and marine transportation applications. Climate differences between mountainous areas and the east coast suggest that those studies might not provide especially appropriate test data. We identified and reviewed a report by Gultepe and Milbrandt (2010) that seems applicable to our effort. Their research effort compared several visual range methods developed for use in the parameterization of numerical weather prediction models with data from a Canadian research study entitled the Fog Remote Sensing and Modeling (FRAM) field project. FRAM was conducted in two phases: near Toronto, Ontario in the winter of 2006 and in Lunenburg, Nova Scotia during the summer of 2007. Visibility was quantified at the 5% brightness contrast level using measured surface level extinction parameters and Koschmieder's law (Friedlander (1977), Hidy (1994)).

The Gultepe and Milbrandt analyses use measured Relative Humidity (RH) or RH in combination with precipitation data to predict visual ranges. Precipitation data was an important factor for the shorter visibility distances. The different sets of equations that were tested or developed are detailed in the Gultepe and Milbrandt paper. In our work we have included comparisons of predictions with five of their equations with the observational visibility data we are using.

For our analyses, we selected a ten year plus set of meteorological data from 2003 through part of 2013 from the NWS station at Martha's Vineyard for purposes of exploring the relationships between the recorded visibilities and meteorological data. In this data set, 27% of the visibility observations were in the range of 0 to 9 miles and 73% were observed to be in the 10 miles or greater category. The NWS does not record RH directly so we calculated values for each measurement hour from temperature and dew point data.

In an initial review of this data set we confirmed that measurable precipitation was not associated with observations of the longer visibilities and therefore we focused on the role of RH in predicting visibility.

The data set allows two independent comparisons of how well a model for visual range works. The first is to compare the number of observed visibilities within each of the range bins between 0 and 10 miles used by the NWS with the number of predicted visibilities in the same range bins. The second comparison is how well the number of observed visibilities greater than 10 miles compares with the number of predicted values in that same bin category. We first determined the intercept and slope and correlation coefficient of the standard least square error regression line on the basis of the RH values compared to visibility distances recorded in the range of 0 to 10 miles. We also coded for inclusion in the analysis several relevant equations cited in the Gultepe and Milbrandt study including their suggested limitations on the lower applicable range of RH values to use (30%). Upon review of these results, we developed another method for extrapolating data from less than 10 miles to greater than 10 miles. This method involved sorting the observed visibilities into 1 mile bin categories and averaging the associated

RH values in each bin. The relationship we found suggested an alternative linear regression extrapolation method discussed in the next section.

Analyses to evaluate overall performance on predicting visibility were conducted using the standard regression line fit, five different equations from Gultepe and Milbrandt and our bin-averaged RH regression equation. . A summary of the results is provided in this section. Figure 1 compares the number of observed hours from the Martha's Vineyard data with those from the different prediction methods.

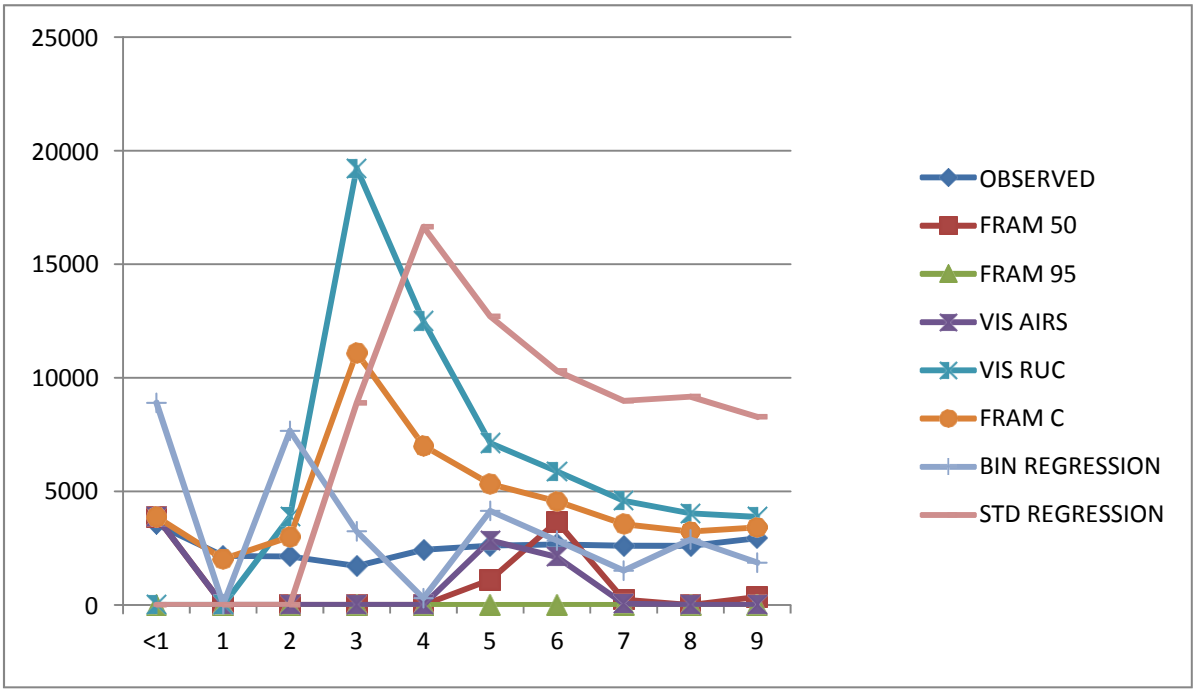



Figure 1. Comparisons of number of observed and predicted hours for visibilities ranging from <1 to 9 miles.

The FRAM 50 and FRAM 95 equations were developed from the FRAM measurements at Lunenburg, Nova Scotia and represent the mean and the 95$^{th}$ percentile of high values curves through their Visibility vs. RH data points. Focusing on the high end of the visibility distances (5 to 9 miles), we note that the FRAM C (Ontario data set) and VIS RUC (the Rapid Update Cycle used in a weather prediction model) methods appear to perform better than the others from Gultepe and Milbrandt. The standard RH regression line over predicts the number of observed occurrences. The Bin averaged regression method provides a more reasonable fit.

Figure 2 compares the methods with the observed category of greater than or equal to 10 miles. The FRAM 50% method and the bin averaged RH method come closest to predicting the number of observed hours in this category. The standard RH regression line significantly under predicts the observed number of hours for this category.

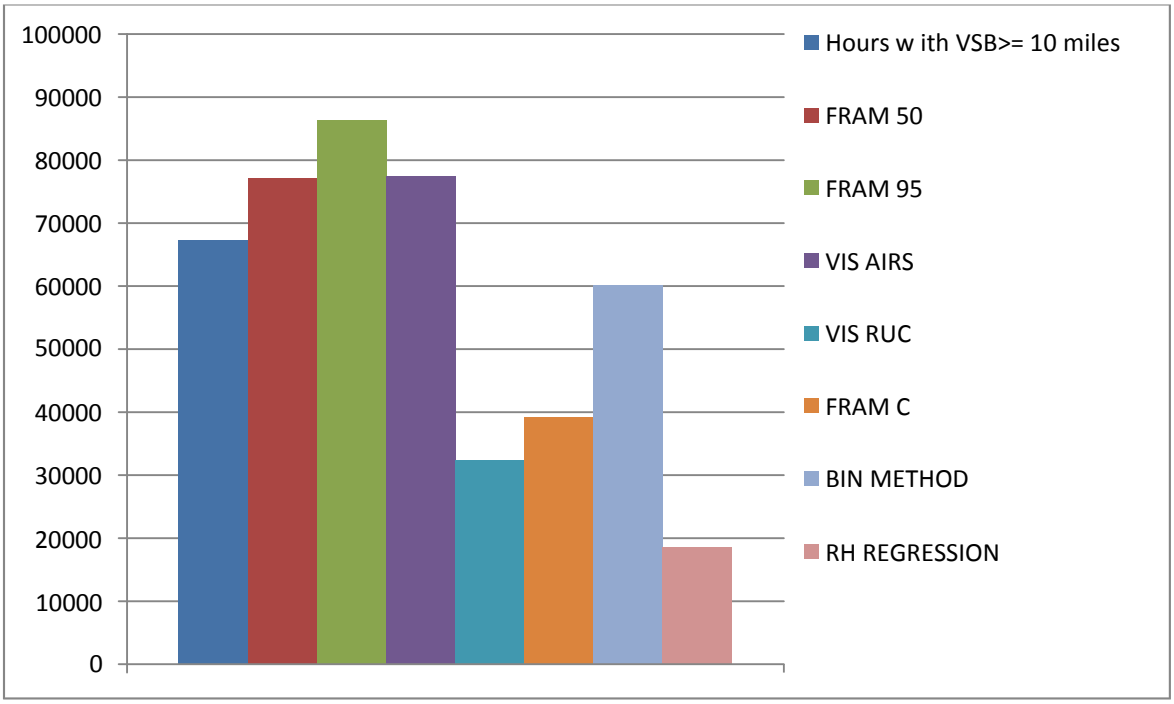



Figure 2. Observed and Predicted number of hours with visibilities greater than 10 miles.

**The Bin Averaged RH regression method**

In the process of sorting data into the visibility distance category bins, we noted a remarkably linear relationship between the averages of the relative humidity values in each bin with the average visibility distances associated with each bin. This is shown in Figure 3 where the bin averaged RH values in the range of 0 to 9 miles have values that decrease linearly from about 94% to 82%. Superimposed on the RH averages and then extrapolated to greater distances is the regression line formed from the 10 average RH values and the average distances of each of the bins. The single bin averaged RH value of 59% corresponds to the category of greater than 10 miles. The equation for the line through the 10 bin averaged values for the range of 0 to 9 miles is the equation for the bin averaged RH method:

Visibility (statute miles) =69.9-0.742*RH.

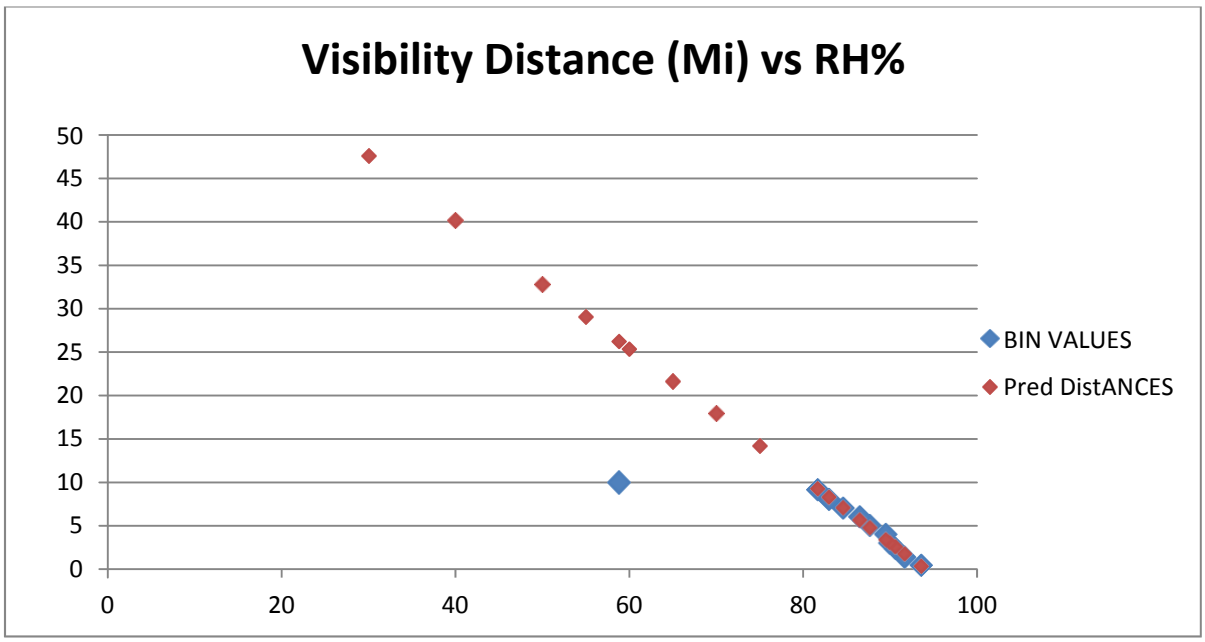



Figure 3.Visibility vs. Bin averaged Relative Humidity

Table 1 provides the statistics for the 0 to 9 mile subset of data for the visibility observations and for each of the methods tested. One can compare the average values, the maximum and minimum values and the standard deviations. Also included are the correlation coefficients and the rms errors of the predicted vs. observed visibilities. Figure 4 compares the visibility vs. RH values for the different equations.

**Table 1. Statistics for comparisons 0 to 9 miles observed Visibility Ranges**

| | Visibility Obs. | FRAM 50% | FRAM 95% | VIS AIRS | Vis RUC | FRAM C | BIN AVG RH Method | RH Regression |
|---|---|---|---|---|---|---|---|---|
| Hours | 25,423 | 25,397 | 25,397 | 25,397 | 25,523 | 25,397 | 25,523 | 25,523 |
| Units | mi | mi | mi | mi | mi | mi | mi | mi |
| Average | 4.69 | 11.08 | 25.34 | 12.61 | 4.24 | 4.14 | 4.68 | 4.73 |
| Maximum | 9.10 | 24.88 | 32.43 | 37.85 | 59.58 | 31.49 | 69.88 | 15.14 |
| Minimum | 0.00 | 0.45 | 18.01 | -0.12 | 2.62 | 0.74 | -4.35 | 3.28 |
| Standard Deviation | 2.88 | 6.14 | 3.94 | 8.51 | 3.94 | 3.17 | 8.31 | 1.33 |
| Correlation Coefficient | | 0.43 | 0.43 | 0.43 | 0.14 | 0.38 | 0.34 | 0.34 |
| RMS Error | | 8.42 | 20.92 | 11.04 | 4.57 | 3.41 | 7.78 | 2.72 |

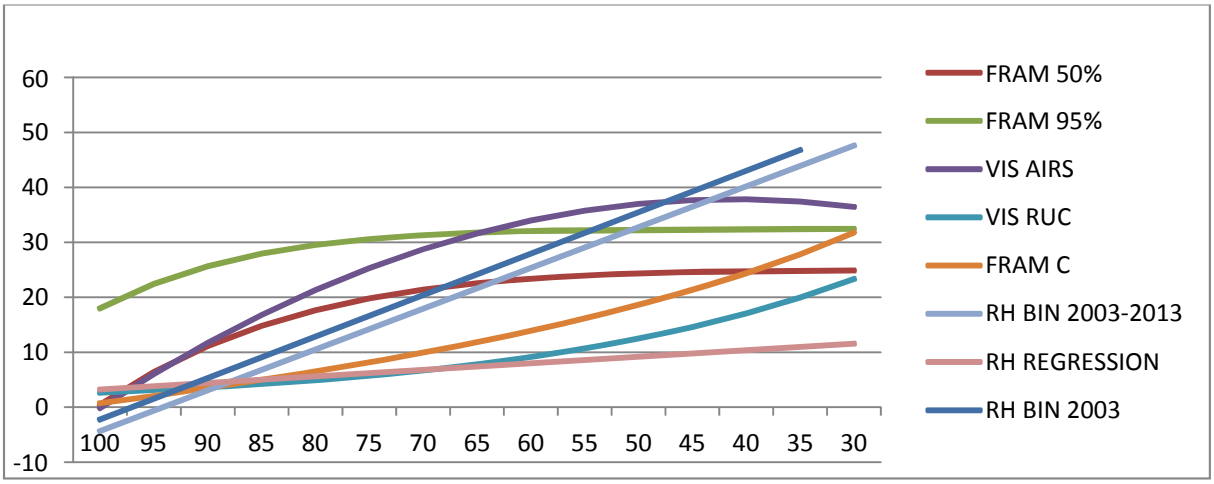



Figure 4. Comparison plots of distance vs. RH for the different equations.

Also included in Figure 4 is the Bin averaged RH method line for the single year of 2003 data showing close agreement with the 10 year based values.

Table 2 displays the number of hours of visibility distances for the 0-9 mile observed and predicted ranges and also the number of hours of the predicted /extrapolated visibilities beyond 10, 20, and 30 statute miles. No model excels in predicting the number in each category of 0-9 miles and also the category of >=10 miles. The standard regression equation is the poorest performer from this standpoint as it greatly over predicts the number of hours of visibilities less than 10 miles and greatly under predicts the hours of visibilities greater than 10 miles. The bin RH method shows improvement over the standard regression line and comes closest to predicting the total number of hours in the range of 0 through 9 miles (33,386 compared to 25,423 hrs) and in the range of 5 to 9 miles (13,241 vs. 13,124 hrs). FRAM C predicts the single category of 9 miles better than any other model. However, FRAM C under predicts the number of visibilities greater than or equal to 10 miles. The Bin RH method is the closest for the category of greater than 10 miles by predicting 60,075 vs. 67,270 hrs. Of these 60,075 hours, the Bin RH method predicts that 16,634 hrs would be in the range of 10 to 20 miles, 14,625 hrs would be in the range of 20 to 30 miles and 28,816 hrs would have visibilities greater than 30 miles. Curvature of the earth considerations would, in reality, reduce this latter number of hours appreciably.

**Table 2. Observed and Predicted Number of Hours by Visibility Distance Range**

| Visibility Range (statute miles) | Observations | FRAM 50% | FRAM 95% | VIS AIRS | VIS RUC | FRAM C | BIN RH Method | RH Regression |
|---|---|---|---|---|---|---|---|---|
| | # Hours | # Hours | # Hours | #Hours Hours | #Hours Hours | #Hours Hours | # Hours | # Hours |
| <1 | 3,555 | 3,884 | 0 | 3,884 | 0 | 3,884 | 8,899 | 0 |
| 1 | 2,159 | 0 | 0 | 0 | 0 | 2,018 | 35 | 0 |
| 2 | 2,137 | 0 | 0 | 0 | 3,891 | 2,997 | 7,668 | 0 |
| 3 | 1,718 | 0 | 0 | 0 | 19,227 | 11,105 | 3,243 | 8,893 |
| 4 | 2,430 | 0 | 0 | 0 | 12,498 | 7,013 | 300 | 16,651 |
| 5 | 2,610 | 1,105 | 0 | 2,842 | 7,126 | 5,325 | 4,144 | 12,701 |
| 6 | 2,665 | 3,666 | 0 | 2,116 | 5,880 | 4,564 | 2,836 | 10,304 |
| 7 | 2,609 | 242 | 0 | 55 | 4,583 | 3,559 | 1,512 | 8,987 |
| 8 | 2,601 | 2 | 0 | 2 | 4,036 | 3,231 | 2,883 | 9,173 |
| 9 | 2,939 | 353 | 0 | 0 | 3,875 | 3,413 | 1,866 | 8,281 |
| SUM<10 | 25,423 | 9,252 | 0 | 8,899 | 61,116 | 47,109 | 33,386 | 74,990 |
| >=10 | 67,270 | 77,037 | 86,289 | 77,390 | 32,345 | 39,180 | 60,075 | 18,471 |
| >=20 | | 44,520 | 82,405 | 53,947 | 10,772 | 15,237 | 43,441 | 0 |
| >=10,<20 | | 32,517 | 3,884 | 23,443 | 21,573 | 23,943 | 16,634 | 18,471 |
| >20,<30 | | 44,520 | 33,392 | 16,818 | 7,806 | 13,719 | 14,625 | 0 |
| >30 | | 0 | 49,013 | 37,129 | 2,966 | 1,518 | 28,816 | 0 |
| SUM | 92,693 | 86,289 | 86,289 | 86,289 | 93,461 | 86,289 | 93,461 | 93,461 |

Although these analyses and comparisons are based upon only the Martha's Vineyard data set, the results indicate that the bin averaged RH method fits the data base better than the alternative methods and we recommend that it be used to extrapolate NWS visibility distances beyond 10 miles for the other locations in this study area.

## References

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## The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the sound use of our land and water resources, protecting our fish, wildlife and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island communities.

## The Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) works to manage the exploration and development of the nation's offshore resources in a way that appropriately balances economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies.

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