



Great Lakes Basic Marine Weather Seminar For Both Sailors and Power Boaters

Seminar Description: Learn a little meteorology and reduce some of the uncertainty of boating on the Great Lakes. An enhanced understanding of basic weather principles and a few simple forecasting skills can improve cruise planning, racing performance and reduce the likelihood of being exposed to uncomfortable or hazardous weather conditions. It is impossible to predict the weather with total precision, but that doesn't mean that the weather is entirely unpredictable.

The one-day Basic Marine Weather Seminar provides attendees with an understanding of basic meteorological principles and explores the conditions favoring the development of severe weather. Animated graphics and case studies of actual weather events are used to focus on the interesting and unique forecasting challenges associated with the Great Lakes. Attendees will also develop a basic daily forecasting resource kit based upon readily available government and university websites.

Introduction: My background and a discussion of the seminar's structure.

A Solid Foundation: An understanding of the weather requires a familiarity with basic physical and meteorological principles. This section addresses concepts such as barometric pressure, air masses, atmospheric instability and other meteorological terminology in order to build a foundation for the remainder of the seminar.

Interpreting Weather Graphics: Weather forecast graphics use a confusing array of symbols, meteorological shorthand, and color schemes to display current weather conditions and portray future weather patterns. The symbols identifying high and low pressure systems, frontal boundaries, troughs, ridges, and other meteorological features will be explained.

The Invisible Forces Controlling the Wind: Mariners have attempted to explain the capricious nature of the wind for thousands of years. This section looks at the forces that control the wind and reviews a variety of online resources that will improve your ability to predict its speed and direction. Small-scale and short-lived features such as sea and land breezes will also be presented.

Clouds & Precipitation: The sectors of a low pressure system signal their intentions by the types of clouds they produce. In the absence of on-line resources, "reading" the clouds can help to fill in the weather picture. We'll examine the common types of clouds and the weather associated with them.

Low Pressure Systems: Sailing on the Great Lakes will place you in the path of low pressure system, known as "cyclones" in the meteorological community. Their passage often presents a significant risk to boaters in the form of strong, gusty, shifty winds, steep waves, dangerous lightning, and damaging thunderstorms. This section will investigate low pressure systems in detail and review a variety of resources for predicting the development, strength, and movement of these weather-makers.

Observational Tools – Radar and Satellite Imagery: Doppler weather radar and satellite imagery have a lot to offer the weather-savvy mariner. This section will introduce common types of Doppler weather radar and satellite imagery and provide instruction in their interpretation and use. You'll learn how

weather radar works (along with a few of its quirks) and how it can be used to monitor the development, intensity, and speed of approaching thunderstorms. Offshore cruisers venture beyond the reach of Doppler radar, and therefore must rely on satellite imagery to monitor approaching weather systems. We'll investigate how to use visible and infrared satellite imagery to enhance marine weather observations and forecasts.

Thunderstorms: Thunderstorms can quickly spoil a cruise in many ways—strong winds, large waves, dangerous lightning or visibility-limiting rain. This section will examine the various types of thunderstorms and the atmospheric ingredients that lead to their formation. Learn why thunderstorms often 'pop-up' late on summer afternoons and why some storms have short life-spans while others persist for hours. Discover why thunderstorms remain independent on some days and form into damaging long-lived squall lines on others. Reduce your chances of a hair-raising or wind-swept encounter with a thunderstorm by learning to assess the potential for their development using readily available Internet resources and the sky.

Waves: Wave heights and direction can make all the difference between a pleasant trip and a wet, uncomfortable one. This section explains the dynamics of wave formation and the forces that sustain them. We will review a variety of forecasting resources to help you predict the size of the waves you will be encountering.

A Daily Forecast Routine: This section will include a hands-on exercise to reinforce the seminar's meteorological concepts and increase your familiarity with a variety of on-line forecasting resources.

On-board Forecasting Resources: Access to weather-related data and forecasts becomes more difficult when you leave the dock. This section will examine several tools and resources that will help you to monitor developing weather conditions while underway.

Instructor Biography



Mark Thornton has been sailing on Lake Erie for more than 20 years and currently owns *Osprey*, a C&C 35. His interest in weather forecasting grew from his experiences cruising and racing on the lake. Mark is a 2006 graduate of the Penn State University *Certificate of Achievement in Weather Forecasting*, a two-year program that develops skills in general, tropical, and severe weather forecasting.

He is the president of LakeErieWX LLC, a company dedicated to providing marine weather education and forecasting resources for recreational boaters (www.lakeeriewx.com). He served as race meteorologist for the 2014-2017 Bell's Beer Bayview Race to Mackinac, and is the past president of the Cleveland chapter of the American Meteorological Society. Mark is employed as the Vice-President of Administration for the law firm of Wegman, Hessler & Vanderburg, and as a Teaching Assistant in the *Certificate of Achievement in Weather Forecasting Program* at Penn State University. He can be reached by email at Mark@LakeErieWX.com.