

“Knowing when and where to paddle out is just as important in surfing as knowing how to ride a wave.”

MICAH SKLUT

Chief Captain at Surf Captain



**SURF
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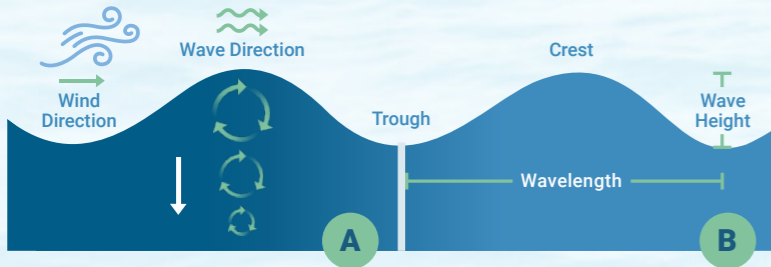


**SURF CAPTAIN
MINI HANDBOOK**

A simple guide to Surf Forecasting

Wave Science Basics

Most waves that people surf are wind generated waves. The frictional force of the wind on the ocean surface transfers energy into the ocean. This energy moves the ocean water particles in an orbital motion, giving an up and down motion to the ocean surface.



- A: Orbital Motion:** The orbital motion of wave particles becomes smaller but continues well below the ocean surface.
- B: Wave Anatomy:** Wave height is the distance between the crest and trough. Wavelength is the distance between successive crests or troughs. Wave period is the time between successive crests or troughs.

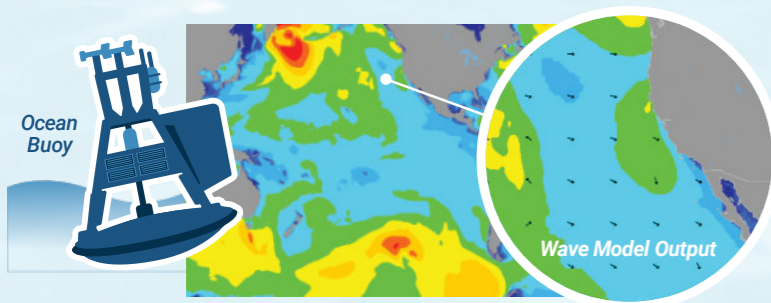
Wind and Wave Heights

The open ocean wave height and wavelength will increase with 3 factors of the wind: speed, duration, and fetch.

	SMALLER WAVE HEIGHTS	BIGGER WAVE HEIGHTS
WIND SPEED	10 MPH	20 MPH
WIND DURATION	3 Hours	36 Hours
WIND FETCH	100 Miles	500 Miles

Forecasting Future Waves

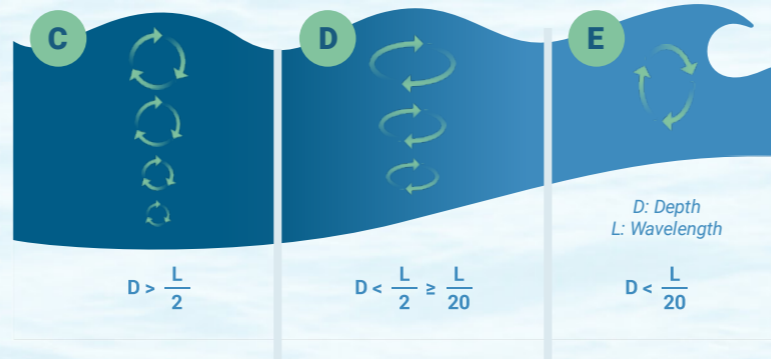
Ocean buoys that can measure waves are great real time tools to see how the waves are right now. Wave models are used to predict waves in the future.



A wave model is software that takes wind and ocean bottom depths as input and uses physics equations to simulate the propagation of wave energy across a body of water.

Surf Heights

As open ocean waves approach shallow waters, the orbital motion of the water particles is changed by the ocean bottom. When the shape of the orbital motion becomes too steep, the water particles become unstable and topple over into a breaking wave.



C: Deep Water Wave: No seafloor interaction.

D: Intermediate Water Waves: The wave motion interacts with the seafloor and changes the shape of the wave motion.

E: Shallow Water Waves: The waves are pushed together, becoming steeper as wavelength decreases and wave height increases. Eventually, the wave gets too steep and topples over into a breaking wave.

Ocean Bottom Depths



Gentle Breaking Wave

Gradual ocean bottom slopes create gentler breaking waves.



Steep Breaking Wave

Steeper ocean bottom slopes create steeper and hollower breaking waves.

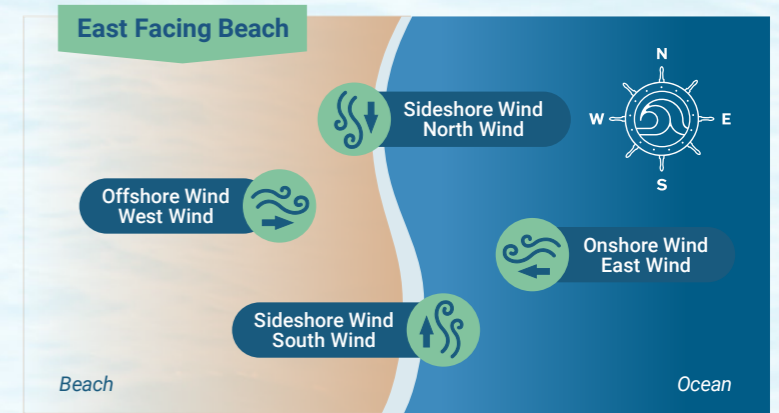
Wave Period Influence

As the wave period (or wavelength) increases, the wave motion has greater stability as it approaches shallow water. This allows for the wave to grow to greater heights before breaking.

DEEP WATER WAVE HEIGHT	DEEP WATER WAVE PERIOD	SURF HEIGHT
3 ft.	7 seconds	2 - 3 ft.
3 ft.	12 seconds	3 - 4 ft.
3 ft.	18 seconds	4 - 5 ft.

Surf Conditions

The local wind speed and wind direction in relation to the orientation of the surf break will determine the ocean surface conditions at each surf spot.



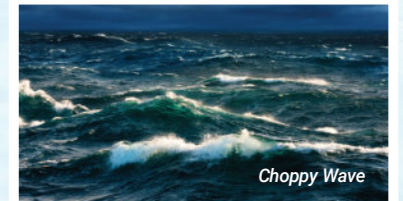
Clean Conditions

- Occurs from the absence of local wind chop
- Clean glassy conditions occur from very light/calm wind
- Clean offshore conditions occur when the wind blows from land



Choppy Conditions

- Occurs during side-shore or onshore wind
- Chop increases as wind becomes stronger
- Direct onshore wind, especially when light, often allows for better conditions than side-shore wind



Headlands/Barriers

- Coastal protrusions can protect surf breaks from side-shore wind chop
- Includes headlands, jetties, inlets, and other coastal features

