Wave Energy

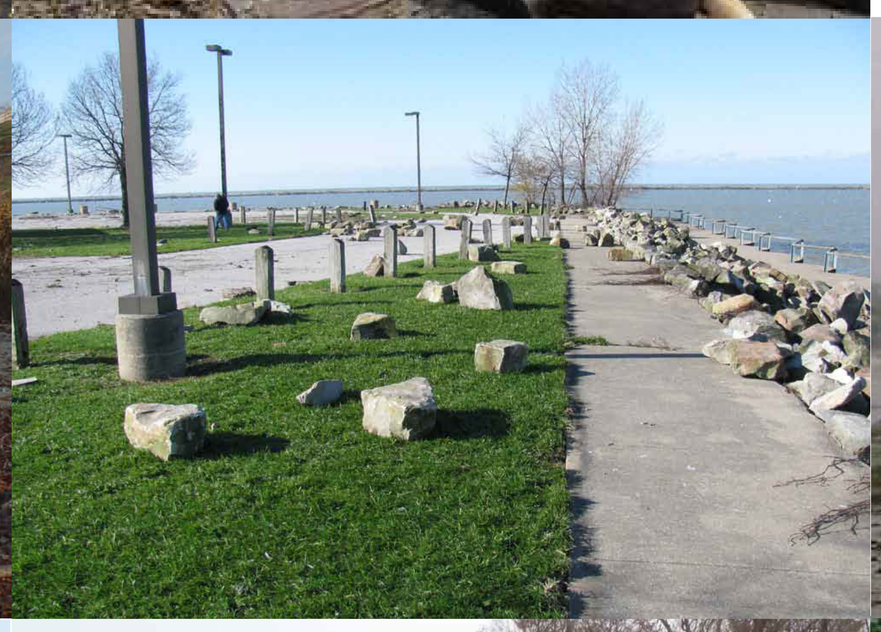
Impacts Ohio's Coast

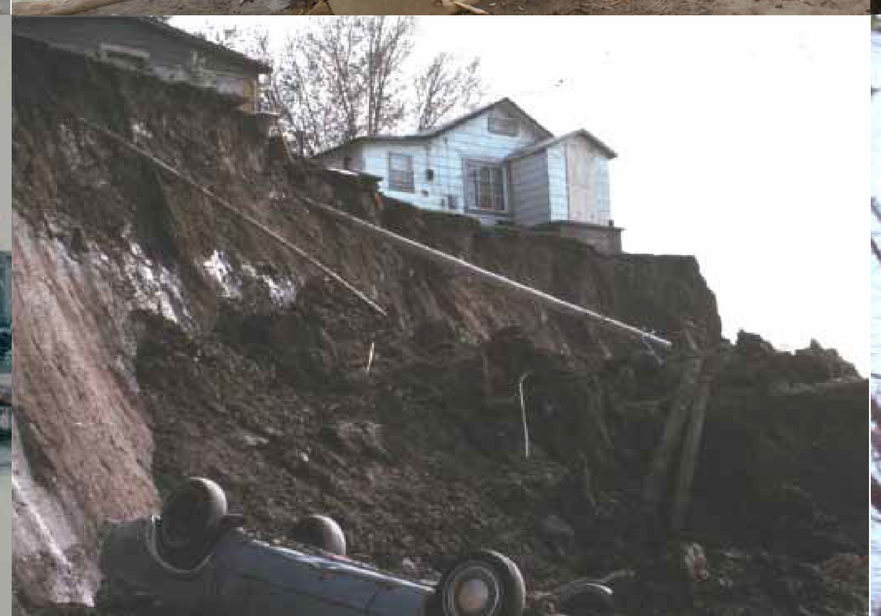
As wind blows across Lake Erie's surface, energy is transferred from the wind to the water.

The wind's energy generates currents and builds waves.

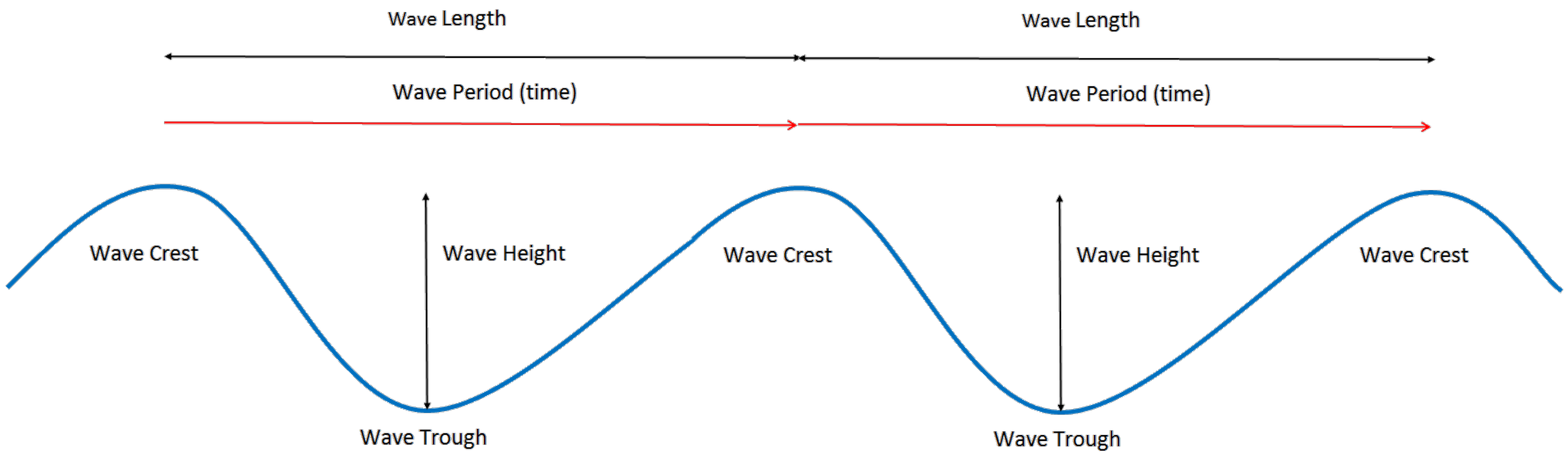
The energy from wind, waves and currents is transferred to the materials along the shore.

When enough energy is transferred, materials along the shore move and erosion can occur.





Waves - a natural force that formed and continues to shape Lake Erie



Waves are a ridge, deformation or undulation of the surface of a liquid.

Wave energy is the capacity of waves to do work. The energy of a wave system is proportional to the square of the wave height times the wave period.

Wave height is the vertical distance between a crest and the preceding trough.

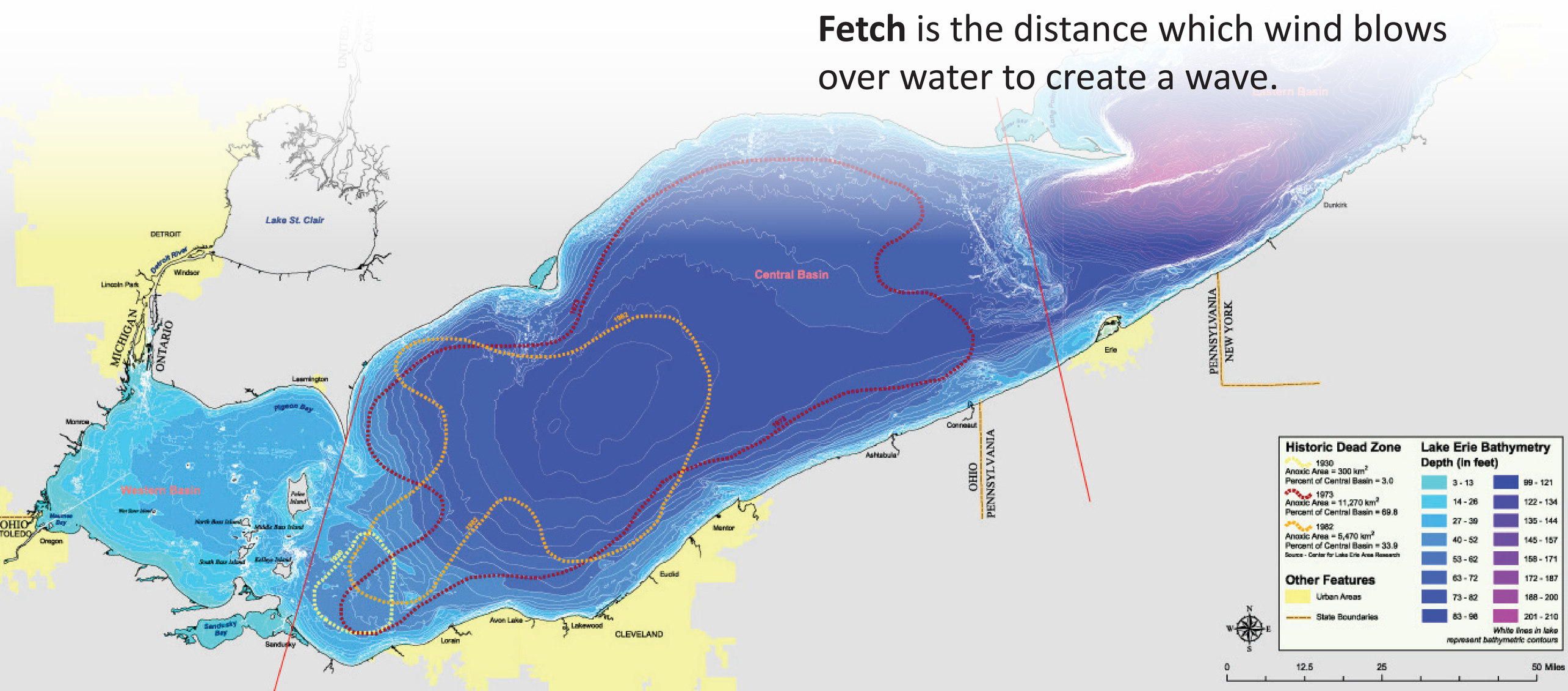
Wave crest is the highest part of a wave above still water level.

Wave trough is the lowest part of a wave form between successive crests. Also the part of a wave below stillwater level.

Wavelength is the horizontal distance between successive wave crests, or other equivalent points, in a series of harmonic waves.

Wave period is the time for a wave crest to traverse a distance equal to one wavelength.

Fetch is the distance which wind blows over water to create a wave.



Types of Breaking Waves

$\xi > 3.3$

Surging/Collapsing Breaker

$\xi > 0.5$ and < 3.3

Plunging Breaker

$\xi < 0.5$ Spilling Breaker

Wave Height

Wave height depends on wind energy transferred to the water (wind speed, duration and fetch) and water depth.

The water depth of Lake Erie varies along the shore and within the lake's three basins: Western, Central and Eastern.

The maximum height of waves cannot be more than 0.78 x water depth.

The energy of a wave system is proportional to the square of the wave height times the wave period.

The amount of potential energy waves carry onto the shore will impact potential erosion of the upland.

(energy transfer = erosion potential)