

"Great Coastal Gale"

02-03 DEC 2007



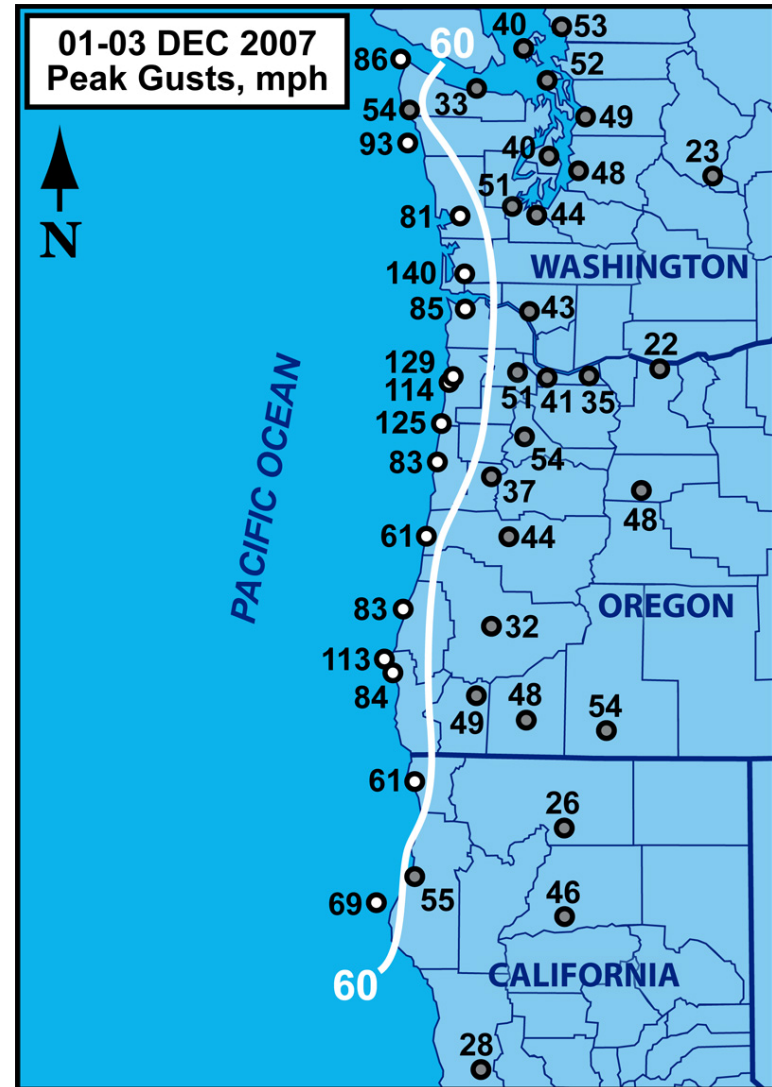
Wolf Read
Consulting Meteorologist
MSc Candidate in Forest Science
University of British Columbia

Overview

- How fast?
Examination of peak wind speeds.
- How significant?
Climatology of peak wind speeds.
- How long?
Examination of wind duration.

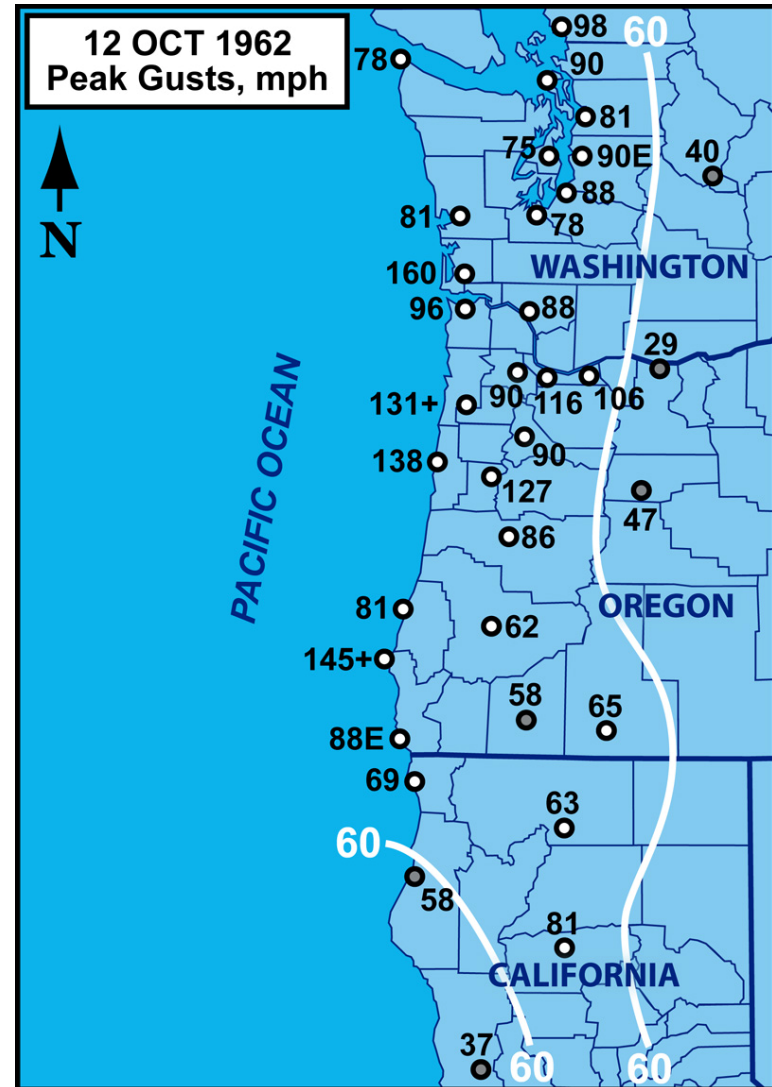
Peak Gusts: 02-03 Dec 2007 a Coastal Storm

- Fastest winds focused on the coastal strip from CA to BC
- “Ground Zero” in coastal:
 - Tillamook County, OR
 - Clatsop County, OR
 - Pacific County, WA
 - Grays Harbor County, WA
- Numerous locations with gusts exceeding 57 mph
- Perhaps 10K to 15K mi² afflicted by high-wind criteria gusts.



Peak Gusts: Columbus Day Storm

- Columbus Day Storm brought coastal-type winds far inland
- “Ground Zero”:
 - Just about everywhere west of the Cascade Mountains !!!
- Numerous interior locations with gusts exceeding 80 mph
- Perhaps 75K to 90K mi² afflicted by high-wind criteria gusts



Extreme Winds: Bay City Blast

Gust of 129 mph measured at the Fire House!
Supported by damage in vicinity.

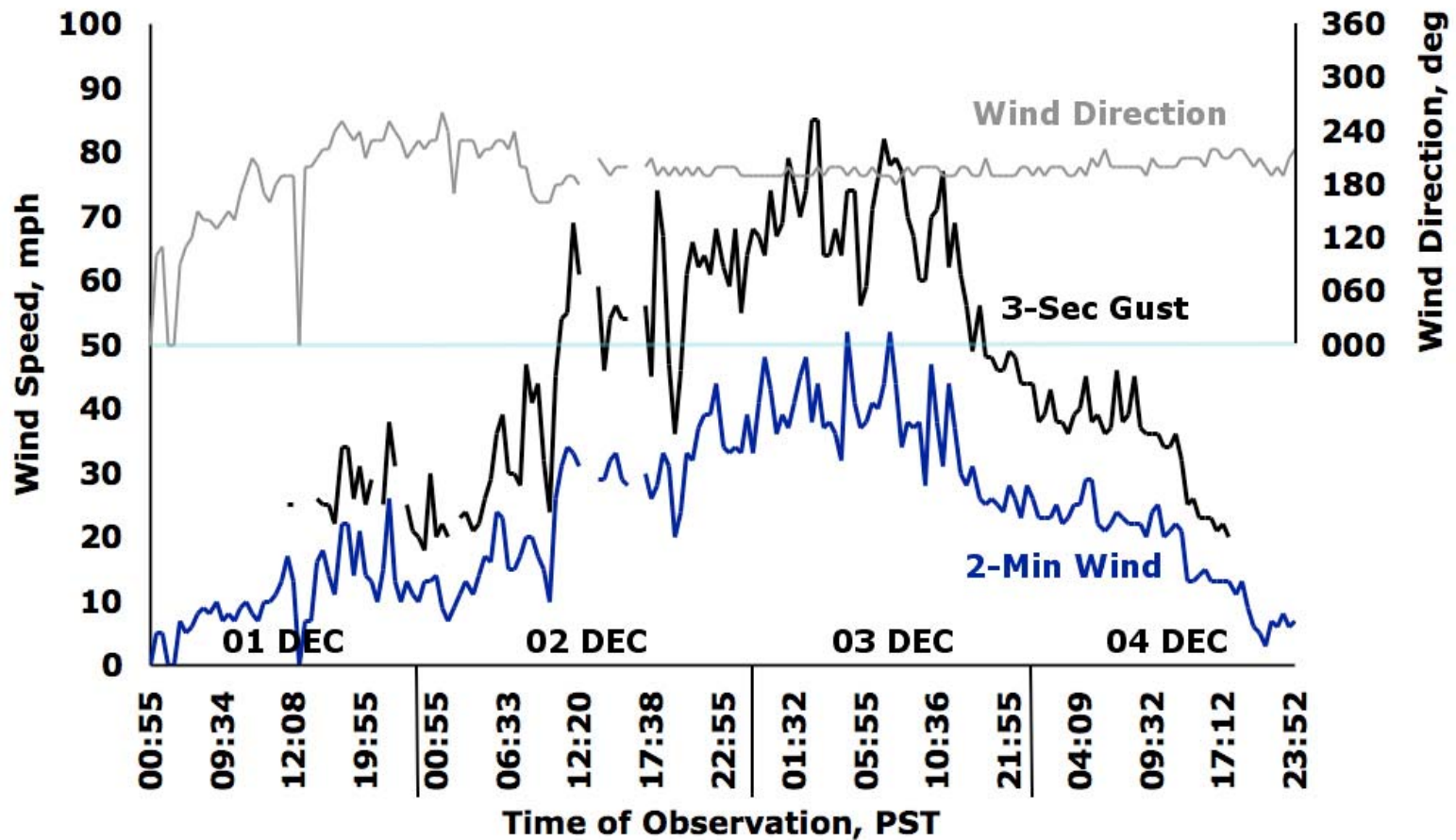


Raw Wind Force

G 129 mph suggests an 85-100 mph 1-minute wind: *Cat-1 to Cat-2 hurricane strength.*

Unusually High Wind & Long Storm Duration

Wind and Gust at Astoria, OR, With Wind Direction
01-04 Dec 2007



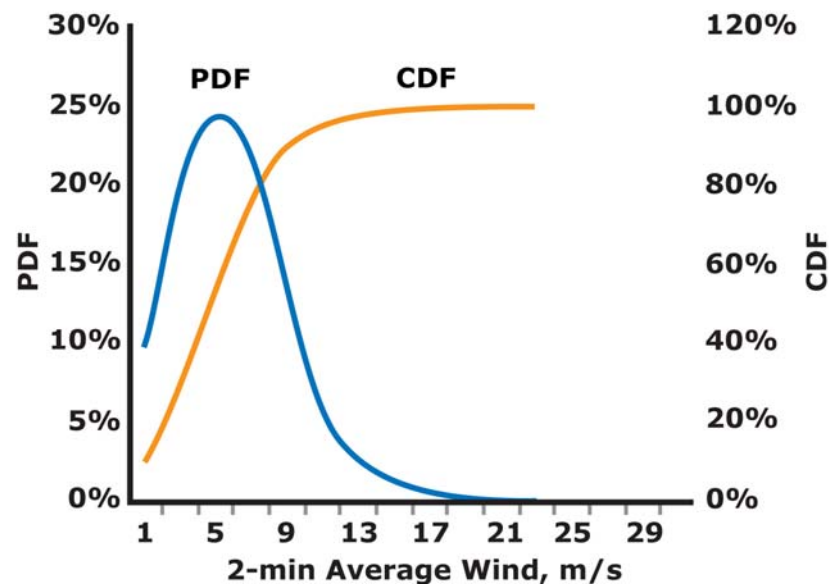
Extreme Wind Speeds

02-03 Dec 2007 is 2nd only to the Columbus Day Storm, 1948-2007

Event Date	AST Peak Gust, mph	Other Name
12-Oct-1962	96	Columbus Day Storm
03-Dec-2007	85	"Great Coastal Gale"
15-Dec-2006	82	Hanukkah Eve Storm
15-Jan-1951	80	
16-Jan-2000	78	
03-Mar-1999	78	
13-Feb-1979	76	Kitsap Blowdown

At high speeds, a few mph is very significant!

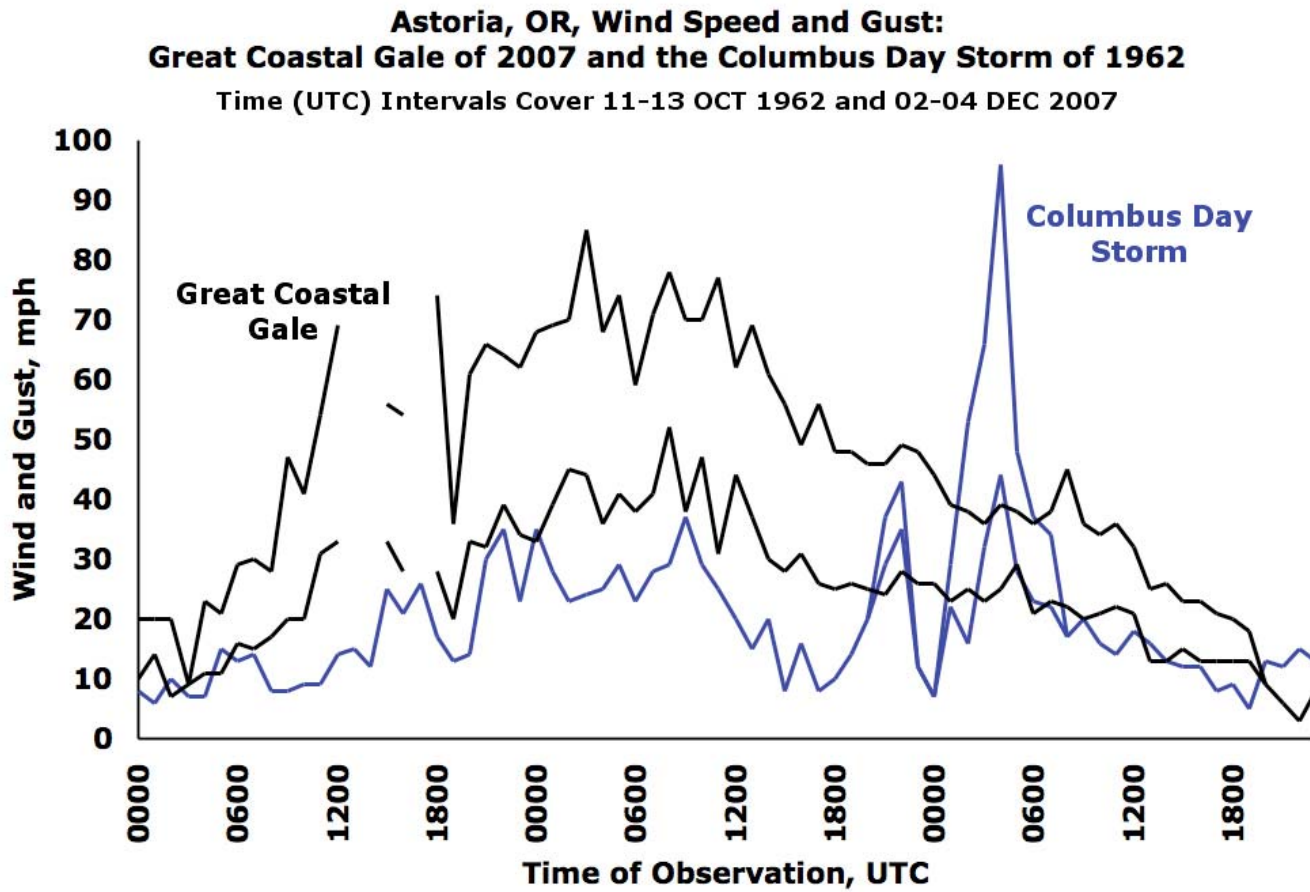
Buoy 46029, Astoria, OR: 2-min Average Wind, 1996 to 2005, Probability and Cumulative Distribution Functions



Jaross & Read 2006

1999-2006 gusts are converted from 5-sec to Instant (1-sec) using a 1.19 factor.

Extreme Wind Duration



- Columbus Day Storm produced a short, intense pulse compared to the long-lasting Great Coastal Gale.

Extreme Wind Duration

Astoria, OR, Storms

Typical windstorm duration: ~ 2 to 6 hr

Storm Event	Duration, hrs	Peak Gust, mph
03-Dec-2007	28	85
16-Dec-2001	11+	78
03-Mar-1999	11	78
13-Feb-1979	11	76
09-Jan-1990	8	64

1999-2001 gusts are converted from 5-sec to Instant (1-sec) using a 1.19 factor.

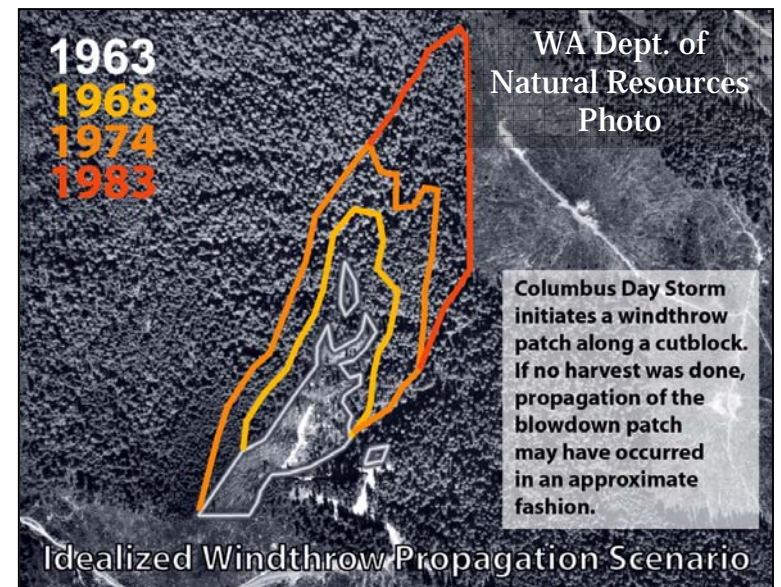
- The data in the table are not derived from a complete account of long-duration events.
- Table lists the approximate duration of 25-knot and higher 1-min and 2-min wind speed.
- Characterizing wind duration is somewhat challenging, as wind speed varies considerably during storms.

Extreme Wind Duration

Why is Duration Important?

Trees!

- Trees can heal wind-induced injuries in the time between events
- The longer the storm, the more likely an accumulation of injuries (e.g. root failures) will lead to toppling
- In essence, if a typical windstorm lasts 3-hr, a 30-hr event has the potential to topple 10 windstorms' worth of timber
- 10 windstorms on 02-03 Dec 2007?



Summary: Great Coastal Gale

- How fast?
Official gust 85 mph Astoria, OR, with some unofficial gusts 114-140 in the region
- How significant?
Wind speeds second only to the Columbus Day Storm, 1948-2007
- How long?
Perhaps all-time longest high-wind event at Astoria, OR, 1948-2007

Unquestionably a historic disaster on par with the 18 May 1980 eruption of Mt. St. Helens.

Questions & Comments



**Wolf Read
University of British Columbia
Forest Sciences
3041-2424 Main Mall
Vancouver, BC
V6T 1Z4**

wolfread@interchange.ubc.ca