Twenty-seven Years After the Exxon Valdez Oil Spill: Volunteers Continue to Monitor Longterm Variability of Intertidal Biology in Western Prince William Sound

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INTRODUCTION AND APPROACH
The 1989 Exxon Valdez oil spill stimulated several long-term shoreline monitoring projects. Recovery from disaster, such as an oil spill, must account for natural variability. Long after the oil was nearly gone from shorelines the senior author continued to photo-monitor several rocky inter-tidal sites to visually document year-to-year variability of the dominant biota. With focus on the changing cover of seaweeds, mussels and other rocky-shore marine organisms. The primary question was “How variable is the abundance of shore biota in the Sound?” As photo-monitoring continued the senior author found that the landscape-scale images inspired citizens and managers to better appreciate, on a human and landscape scale, how marine life undergoes natural variability.

This work also captured the interest of local citizens and scientists, who volunteered to visit and continue photographing many of the sites. By 2012, volunteers (including co-authors) were visiting 9 long-term study sites and providing images to the senior author.

As shown in this poster, the abundance of the dominant shore biota is neither constant nor stable, undergoing 4 to 7 year cycles in abundance. In 2016 the cover of rockweed was, for the fourth time in a quarter century, extremely low for neither constant nor stable, undergoing 4 to 7 year cycles in abundance. In 2016 the cover of rockweed was, for the fourth time in a quarter century, extremely low.

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NOISY ROCKWEED SIGNALS!
Unlike long-term trends for mussels (lower left of poster) rockweed (Fucus) trends are more complicated.

Looking at these graphs, with the notable exceptions, there appear to be four periods of high Rockweed percent cover, but centered on different years. Recently high Rockweed cover occurred in 2012 and 2013, declined in 2015 and was very low in 2016.

IMPLICATIONS
1) Inter-tidal marine life of rocky shores support shorebirds and otters and provide refuge for juvenile fish, shrimp and crabs.

2) There is high inter-annual variability of conspicuous marine life on these sheltered rocky shore with events occurring at 4 to 10 year intervals.

3) Should there be another disaster in PWS, at the scale of the Exxon Valdez oil spill, these and previous studies suggest that the high variability on these shore will complicate understanding when “recovery” will take place.

4) “Recovery” may be defined as “the return to the range of natural variation”.

5) This approach, annual summer low tide photo-visits to multiple sites by local citizens and scientists conducting other activities in the Sound provides a simple monitoring scheme for tracking inter-annual variability.

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