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Winter Storms and Shifting Baselines

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Powerful weather passing through parts of North America has me thinking about a seemingly simple question: Just how cold is it?

First, I was wondering about the pine beetles that have devastated forests from British Columbia to California and New Mexico ([NYT video](#)). Time was that cold spells kept these native pests in check. But according to a December 18 report in the Loveland, Colorado [Reporter-Herald](#), the severity of the current season still doesn't measure up.

A three-day stretch of below-zero temperatures in Colorado is not long enough nor cold enough to kill the mountain pine beetle. "The bottom line is it needs to be about minus 30 under the bark," said Sheryl Costello, entomologist with the U.S. Forest Service. "That's the point at which they really can't handle it. That's the point where you'll start seeing a lot of mortality."

The intensity of winters past is vividly on display in the Portland Art Museum exhibit, [Wild Beauty: Photographs of the Columbia River Gorge, 1867-1957](#). A snow storm in the 1890s buried the gorge rail line a dozen or more feet deep. And a massive ice jam appeared in 1907 on the pre-dam Columbia, with billows and shards pushing downriver from British Columbia.

Assessing Change

"Nothing endures but change," observed the Greek philosopher Heraclitus. And fluctuations in temperature and precipitation over extended periods of time are now observable to climate scientists through tree-ring or ice-core samples. But other scientific disciplines do not have the benefit of similar data.

Fisheries scientist [Daniel Pauly](#) used the term [shifting baseline](#) to describe the perceptual bias that can arise from assessments based on the limited timescales of personal experiences. Here's Pauly, from his 1995 paper, "Anecdotes and the shifting baseline syndrome of fisheries."

Essentially, this syndrome has arisen because each generation of fisheries scientists accepts as a baseline the stock size and species composition that occurred at the beginning of their careers, and uses this to evaluate changes. When the next generation starts its career, the stocks have further declined, but it is the stocks at that time that serve as a new baseline. The result obviously is a gradual shift of the baseline, a gradual accommodation of the creeping disappearance of resource species, and inappropriate reference points for evaluating economic losses resulting from overfishing, or for identifying targets for rehabilitation measures.

Open Avenues

This topic suggests to me several areas for exploration, each of which I'm going to leave open for now. Here are two paths. Please join me in following these or identifying others.

- Daniel Pauly states that anecdotal (i.e. local or traditional) knowledge can provide an important corrective to historical data gaps. He recommends "developing frameworks for incorporation of earlier knowledge." In a recent perspective, I discussed two participatory frameworks, [citizen science and](#)

[social learning](#). My focus in that piece was less on filling data gaps than on the social benefits of participatory engagement. What other tangible benefits – in addition to these two – might be gained from incorporating local and traditional knowledge into ecosystem management?

- The shifting baselines syndrome discussed by Daniel Pauly is ascribed broader significance in a 2006 Resilience Alliance-published [paper on urban sprawl](#): “The spread of sprawling growth is often viewed as rapid, but it is an additive phenomenon increasing with each generation. Each generation is likely to recognize only those changes that have occurred within their lifetimes, a shifting baseline that may make social change and recognition of the problem more difficult.” Is attention to ecological issues impeded by the increasing urbanization of modern life?