

October 2016—AQUACULTURE PERSPECTIVES

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Global warming may be offering wild fisheries and aquaculture a mixed bag

by Bill Mancini

I receive regular updates on the status of wild fisheries and aquaculture facilities all over the world. This may sound strange, but one constant is the inconsistency of the reports.

By that, I mean I can never quite guess what the reports might say. They always seem to surprise to the upside or downside.

Of course, one of the major factors to influence these reports is the increased volatility of our climate—more specifically, global warming. I'm not here to say why global warming is happening. That's a debate for climatologists. But we can say, based on irrefutable data, the world is on average getting warmer.

Global warming is an odd thing. It can make summers hotter and winters milder, but we also can see cooler summers and very cold winters. My armchair conclusion is that climatic volatility—up or down—now reigns supreme.

Quite simply, the atmosphere now has more energy. It seems we can now reach extremes of temperature or wind or precipitation more easily.

There is one characteristic of our climatic world, however, that seems to be changing in a fairly uniform and unrelenting fashion. The tropics are expanding. The latitudes north and south of the equator with relatively warm water are on a march toward the poles.

We see the effects of this trend as fish populations migrate in response. For example, Atlantic Cod and Alaska Pollock are ever-so-slightly but ever-so-surely moving north away from some historic fishing grounds at the southern end of their ranges.

Given their evolutionary past, living in very thermally stable cold water generation after generation, they are very sensitive to increases in water temperature and move north to compensate.

The same may be true for fish in the Southern Hemisphere. Time will tell how long and how far this trend continues.

We hear all the time how the atmosphere continues to accumulate carbon dioxide from the burning of fossil fuels.

We also know the world's lakes and oceans absorb much of this carbon dioxide, which happens to be a raw material of photosynthesis and the phenomenon known as primary productivity (i.e., storing the sun's energy within photosynthetic plants such as algae).

So, what does all of this mean for wild and aquacultured fishes?

The opportunities for the production of warmwater fishes, whether wild or farmed, may increase as we move into the future. Primary productivity is the basis for the production of everything else that depends on it—sort of the base of a pyramid—with apex predators of primary and secondary producers (including us) at the top of the pyramid.

Without primary production, we would be nowhere. Net primary production may be on the rise.

A warmer planet may bode well for wild and aquacultured warmwater fishes in the tropics. Coldwater species, including Atlantic Cod, Alaska Pollock, trout, and salmon may find their opportunities more limited within their shrinking environments.

Increasing concentrations of atmospheric carbon dioxide do have their downside in water, where this gas becomes carbonic acid and lowers pH. As we are seeing, this can have devastating effects on species that rely on stable and benign pH (and temperatures) in their environment, such as corals and shellfishes.

Wild salmon populations appear to be in a boom-and-bust cycle where one year's harvest creates records, while the following year is less than ideal or very poor.

The poster child for climate volatility is the Peruvian Anchovy, an important species which now displays swings in supply based on the vagaries of El Niño and La Niña wind and current patterns in the Pacific.

This era of global warming and climate volatility is without a doubt a challenge. Humankind must continue to be nimble in our strategies to deal with it, take advantage of it when we can, and work to stabilize the situation whenever possible.

As our future continues to unfold, a warmer planet awaits us and the aquatic animals we count on for our survival.

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