environmental impacts (Pacheco et al.). The letters raise questions about how science interacts with society and how evidence-based reasoning can play an important role in creating a healthy relationship between humans and the biosphere.

We concur with Dror that getting scientists more politically active is important. This trend may have already started, with actions ranging from global marches for science to scientists' running for and holding political office (Fairley 2017). One potential result of a new environmental ethic, as is suggested by Skubała, would be to recognize and accept that there are critical environmental limits to resource-dependent economic growth. In our article, we emphasize the need to "reassess the role of an economy rooted in growth" and urge revising our economy to "reduce wealth inequality" and "take into account the real costs which consumption patterns impose on the environment." Our article also underscores the importance of stabilizing and gradually reducing the global population, which itself would be a significant contributor to ending economic growth (Victor 2010).

We agree with Pachecho and colleagues that transformative change is essential, whereby humanity abandons the pursuit of economic growth as the overarching guide to public policy. We need a new development paradigm to ensure that economies deliver well-being while respecting both social and planetary boundaries (Raworth 2017). Most helpful for this paradigm shift, both symbolically and pragmatically, would be for the scientist members of the Royal Swedish Academy of Sciences to insist that its Economic Sciences Prize Committee give greater weight to awarding prizes for economic theory that accounts for environment–economy interlinkages and feedback loops. If Nobel memorial prizes in economics were given to those drawing attention to economic drivers of environmental degradation and the well-being implications of

The Role of Scientists' Warning in Shifting Policy from Growth to Conservation Economy

We are pleased to see the three follow-up letters concerning our "World Scientists' Warning to Humanity: A Second Notice" (Ripple et al. 2017). Each letter expresses a thoughtful, heartfelt response to our paper. We agree in how they describe the need to get more scientists into policymaking positions (Dror), to create a new global environmental ethic (Skubała), and to recognize economic growth as a major driver of

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degraded ecosystems, it would draw attention to problems with mainstream economic theory as well as encourage other economists and natural scientists to collaborate and to do more work in this area.

Another way to promote a global shift toward a conservation economy is, for example, to implement carbon pricing to mitigate climate change. Putting a price on carbon pollution has been shown to be a successful method of reducing greenhouse gas emissions and driving investment into clean-energy technologies (World Bank et al. 2017). As an emerging global trend, some 42 countries and 25 states, provinces, and cities have implemented or scheduled to implement carbon-pricing mechanisms, with more jurisdictions considering implementing them in the future (*http://carbonpricingdashboard.worldbank.org/*). Despite this progress, accelerating the pace of action and significantly increasing the price on carbon soon will be necessary for carbon pricing to make a significant contribution to curbing climate change (World Bank et al. 2017).

Our world scientists' warning article was signed by 15,364 scientists from 184 countries *(http://scientists.forestry.oregonstate.edu)*. The original article has been translated into 17 different languages: Spanish, Portuguese, French, Traditional Chinese, Simplified Chinese, Dutch, German, Telugu, Hindi, Swedish, Serbian, Italian, Hebrew, Turkish, Japanese, Catalan, and Korean versions of our original scientists' warning article can be found in the supplemental material for this article. We wanted our paper to ignite a global conversation followed by action, and it has been successful in reaching many millions of people through these language translations, mass media, and social media (*https://oxfordjournals.altmetric.com/details/28854048*). For example, on Twitter alone, there have been more than 8000 tweets reaching up to 14,000,000 people. Content from the paper has also been read aloud on the floor of one of Canada's provincial legislatures (*https://youtu.be/URi0WU7-Ey0*). Although Dror notes that social, economic, and political change may not necessarily follow, the media discussions highlight the need to put human behavior at the center of a new environmental ethic. We are smart enough to solve these problems, as Skubała notes, but if humanity does not forcefully pursue the behavioral changes and policies we urge in our warning, the human and nonhuman suffering we warn about may multiply. An alliance among scientists, policymakers and influencers, faith/spiritual leaders, and the public will hopefully allow us to make the needed transformations. Already, we have seen examples of great conservation success when we work together to overcome environmental challenges (Sodhi et al. 2011). These conservation wins generate encouraging messages of optimism, helping garner much-needed public support to protect the Earth's biosphere and create an environmentally sustainable future.

Supplemental material

Supplementary data are available at *BIOSCI* online.

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