

Reply to Metson et al.: The importance of phosphorus perturbations

We thank Metson et al. (1) for their addition to our paper (2). These authors raise an important point, and are definitely right in pointing out the global importance of phosphorous and the dominant role of the livestock industry in its use. Our omission of phosphorous from our calculations, which Metson et al. point out, joins several other important environmental costs of livestock husbandry also omitted from our study in the name of brevity or tractability. Those omissions include, for example, air pollution and malodors, or societal costs because of antibiotic resistance. These omissions

by no means indicate that we deem these topics unimportant. On the contrary, we completely second the great biogeochemical and societal import of the phosphorous cycle perturbations Metson et al. (1) eloquently raise. We sincerely hope quantitative analysis of these and other omitted aspects of the livestock industry will follow.

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1 Metson GS, et al. (2014) Phosphorus is a key component of the resource demands for meat, eggs, and dairy production in the United States. *Proc Natl Acad Sci USA* 111:E4906–E4907.

2 Eshel G, Shepon A, Makov T, Milo R (2014) Land, irrigation water, greenhouse gas, and reactive nitrogen burdens of meat, eggs, and dairy production in the United States. *Proc Natl Acad Sci USA* 111(33):11996–12001.

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The authors declare no conflict of interest.

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