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October 3, 2018

Ms. Michelle Arsenault
National Organic Standards Board
USDA-AMS-NOP
1400 Independence Ave. SW
Room 2648-S, Mail Stop 0268
Washington, DC 20250-0268

Re. MS, CS, HS, LS: Marine materials, revised comments

These comments to the National Organic Standards Board (NOSB) on its Fall 2018 agenda are submitted on behalf of Beyond Pesticides. Founded in 1981 as a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to bridge the interests of consumers, farmers, and farmworkers, Beyond Pesticides advances improved protections from pesticides and alternative pest management strategies that reduce or eliminate a reliance on pesticides. Our membership and network span the 50 states and the world.

This is a revision of comments previously submitted. The difference is that these comments do not support certifying as organic any marine products. After additional consultation, we realized that requiring marine products as inputs to be certified organic is not consistent with positions we have taken on aquaculture and would set an unreasonable precedent for inputs into organic production.

The conservation of marine materials used in organic production affects materials used in crop production, livestock production, and handling. The Spring 2017 proposed annotations of the listings in §§205.601, 205.605, and 205.606 with more accurate identifications of the marine algae was a first step, but more needs to be done. We are happy to see the excellent discussion document produced by the Materials Subcommittee (MS), and that crops (CS) and handling (HS) materials are recognized, as well as recognition of marine materials under the purview of the Livestock Subcommittee (LS). The coordinated approach through the Materials Subcommittee, as suggested in the discussion document, will ensure a consistent and coordinated approach. Here we support the approach that applies language in wildcrafting standards to all uses of marine algae in organic production and products.

Marine biodiversity is important, and the roles played by marine algae (seaweed) are important to marine biodiversity and ecology.

Marine biodiversity is declining. Human threats to marine environments include overfishing, global warming, biological introductions, pesticide run-off, and other forms of pollution. These factors, separately and together, have resulted in a rapid decline in global marine biodiversity, as reflected in species extinctions, population depletions, and community homogenization. This biodiversity loss may result in changes in ecosystem function and a reduction in the provision of ecosystem services. The timing and magnitude of future catastrophic events like ecological collapse cannot be predicted, though it is likely that they will become more frequent.[1] In coastal areas, "Human impacts have depleted >90% of formerly important species, destroyed >65% of seagrass and wetland habitat, degraded water quality, and accelerated species invasions. Twentieth-century conservation efforts achieved partial recovery of upper trophic levels but have so far failed to restore former ecosystem structure and function."[2]

Biodiversity loss in the oceans has negative impacts on humans, and scientists recommend applying the precautionary principle to preventing harm to the oceans. "We conclude that marine biodiversity loss is increasingly impairing the ocean's capacity to provide food, maintain water quality, and recover from perturbations. Yet available data suggest that at this point, these trends are still reversible."[3] A precautionary strategy should "consider the ecological significance of all animals and plants when providing policy protections and to address the levels of genome, species, and habitat."[4]

Marine algae play multiple ecological roles, and overharvesting of marine algae can have multiple detrimental impacts on marine biodiversity. Kelp forests are some of the most diverse and productive habitats on Earth.[5] Kelps provide physical structure, habitat, and shading, as well as a source of food. They provide habitat for invertebrates, fish, and marine top-predators, such as seabirds and sea mammals.[6] The detritus from these habitats is exported to other habitats –some quite distant— where it serves as a significant biological resource.[7]

The oceans provide a sink for carbon dioxide. As stated in the technical review,[8] biological forces that remove CO_2 from the atmosphere include phytoplankton, seagrasses, and

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[1] Sala, E. and Knowlton, N., 2006. Global marine biodiversity trends. *Annu. Rev. Environ. Resour.*, *31*, pp.93-122.
[2] Lotze, H.K., Lenihan, H.S., Bourque, B.J., Bradbury, R.H., Cooke, R.G., Kay, M.C., Kidwell, S.M., Kirby, M.X., Peterson, C.H. and Jackson, J.B., 2006. Depletion, degradation, and recovery potential of estuaries and coastal seas. *Science*, *312*(5781), pp.1806-1809.
[3] Worm, B., Barbier, E.B., Beaumont, N., Duffy, J.E., Folke, C., Halpern, B.S., Jackson, J.B., Lotze, H.K., Micheli, F., Palumbi, S.R. and Sala, E., 2006. Impacts of biodiversity loss on ocean ecosystem services. *Science*, *314*(5800), pp.787-790.
[4] Wilder, R.J., Tegner, M.J. and Dayton, P.K., 1999. Saving marine biodiversity. *Issues in Science and Technology*, *15*(3), pp.57-64.
[5] Smale, D.A., Burrows, M.T., Moore, P., O'Connor, N. and Hawkins, S.J., 2013. Threats and knowledge gaps for ecosystem services provided by kelp forests: a northeast Atlantic perspective. *Ecology and evolution*, *3*(11), pp. 4016-4038.
[6] Lorentsen, S.H., Sjøtun, K. and Grémillet, D., 2010. Multi-trophic consequences of kelp harvest. *Biological Conservation*, *143*(9), pp.2054-2062.
[7] Krumhansl, K.A. and Scheibling, R.E., 2012. Production and fate of kelp detritus. *Marine Ecology Progress Series*, *467*, pp.281-302.
[8] Technical Review for Marine Plants and Algae, Lines 1099-1113.

marine algae. A recent study shows that "marine macroalgae do contain refractory compounds and thus may be more valuable to long-term carbon sequestration than we previously have considered."[9]

The Spring 2017 proposals were a start; the proposed steps in the Fall 2018 discussion document support the conservation of biodiversity and natural resources.

The NOSB should continue its efforts to clarify the identities of species of marine algae used in organic production. Application of binomial nomenclature to marine algae needs to be clarified, and any restrictions need to be justified.

OFPA requires that each material be itemized by specific use or application. Marine algae listings should be clarified by adding binomial nomenclature. However, the listings should continue to be listed by specific use or application. Common names –e.g., "carrageenan" or "kelp"– frequently refer to several different species. The NOSB may find it necessary for reasons, such as conservation or the avoidance of contamination, to restrict the use in organic production to a subset of the full range of species thus identified. Some species included under a common name may be threatened or be part of a threatened community. In those cases, it is appropriate to exclude the threatened species or population with an annotation. In addition, algae accumulate toxic materials –including heavy metals and radiation. It is therefore necessary that some listings would require algae taken from specific locations (or not taken from others.)

Although the technical review provides a great deal of detail regarding species used for specific purposes, and some of that detail is contained in the background to the proposals, the Spring 2017 motions themselves were less precise. A number of commenters pointed out that, while current products used in compliance with the aquatic plant extracts listing on §205.601 may contain Rhodophyceae (red seaweeds) and Chlorophyceae (green seaweeds), the proposal would allow only Phaeophyceae (brown seaweeds) in these products. If this limitation was intentional and not accidental, then the NOSB must justify it.

Listings should include genus and species, rather than referencing classes, whenever possible. Thus, we do not support the Spring 2017 HS proposal, which uses only class names, and would therefore use identical annotations for agar-agar and carrageenan, which belong to the same class. Since the board voted to remove carrageenan from the National List, we share the concern expressed by Consumers Union that the proposal could lead to the continued use of carrageenan under a different name. Specifically, for agar-agar, the annotation should specify "from genera *Gelidium*, *Gracilaria*, *Pterocladia*, or *Gelidiella*."

[9] Trevathan-Tackett, S.M., Kelleway, J., Macreadie, P.I., Beardall, J., Ralph, P. and Bellgrove, A., 2015. Comparison of marine macrophytes for their contributions to blue carbon sequestration. *Ecology*, *96*(11), pp.3043-3057.

We support mechanisms for protecting marine ecology from the impacts of harvesting marine algae for use in organic products and production and the approach to natural materials in use in crops and livestock, as well as those on the National List.

Cultivated marine algae should also be subject to examination of the impacts of the cultural practices used to produce them. For example, warm water species that are cultivated for use in carrageenan present "serious bio-invasive risks for nearby marine communities" — not only spreading beyond cultivation sites, but also smothering coral ecosystems and contributing to reef degradation. Other adverse impacts are detailed in the carrageenan technical review.[10]

A recent brief by the United Nations University and the Scottish Association for Marine Science also highlights impacts of production of marine algae products.[11] In relation to cultivated species, it says,

> For example, the red seaweed *Kappaphycus* is one of the most valuable crops grown for its carrageenan content, a product used widely in food, pharmaceuticals, and nutraceuticals. As a result, the cultivation of this crop has been promoted in over 30 countries worldwide. The occurrence of 'ice-ice' disease - a bacterial infection causing whitening of the seaweed branches and epiphyte infestations, however, have led to dramatic declines in the productivity of this crop in the Philippines, where this seaweed originated, in many of the other countries where it has been introduced (e.g. Madagascar and Tanzania). In the Philippines alone, disease caused a 15% loss in production of *Kappaphycus alvarezii* between 2011 and 2013 (a reduction of 268,000 tonnes), equating to a loss of over US$ 310 million based on a value of 1.09 USD/kg (farm-gate price). [12]

Rockweed (*Ascophyllum nodosum*) and other easily over-harvested species must be protected.

Many commenters to the Spring 2017 NOSB meeting and proposals focused on rockweed (*Ascophyllum nodosum*), pointing out problems caused by its commercial harvest. Rockweed is of particular ecological importance, and there are also practical problems that arise in protecting it.

The Pleasant River Wildlife Foundation described the ecological importance of rockweed:

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[10] 2011 TR lines 469-551.

[11] Cottier-Cook, E.J., Nagabhatla, N., Badis, Y., Campbell, M., Chopin, T, Dai, W, Fang, J., He, P, Hewitt, C, Kim, G. H., Huo, Y, Jiang, Z, Kema, G, Li, X, Liu, F, Liu, H, Liu, Y, Lu, Q, Luo, Q, Mao, Y, Msuya, F. E, Rebours, C, Shen, H., Stentiford, G. D., Yarish, C, Wu, H, Yang, X, Zhang, J, Zhou, Y, Gachon, C. M. M. (2016). Safeguarding the future of the global seaweed aquaculture industry. United Nations University (INWEH) and Scottish Association for Marine Science Policy Brief. ISBN 978-92-808-6080-1. 12pp. http://voices.nationalgeographic.com/files/2016/08/Final-unu-seaweed-aquaculture-policy-for-printing.pdf.

[12] Cottier-Cook, E.J., et al. (2016). Safeguarding the future of the global seaweed aquaculture industry. United Nations University (INWEH) and Scottish Association for Marine Science Policy Brief. ISBN 978-92-808-6080-1. 12pp. http://voices.nationalgeographic.com/files/2016/08/Final-unu-seaweed-aquaculture-policy-for-printing.pdf.

First, like a tropical rain forest, the canopy of a rockweed bed is essential habitat to a multitude of dependent species; several of these are “at risk” bird species already suffering severe population declines. (Testimony of Maine DIFW biologist Lindsay Tudor before the Maine DMR Rockweed Plan Development Committee 2015). Cutting the rockweed directly deprives them of the habitat essential to their survival at critical times in the seasonal cycle. And the habitat damage is long term. Rockweed, once cut, re-grows only slowly taking several (5-18) years to recover its pre-harvest height.

Among the birds of special concern to wildlife biologists and conservationists in Maine are the Common Eider Duck, the American Black Duck and Purple Sandpiper; all need access to mature stands of rockweed as habitat at specific times in their life cycles (see L. Tudor ref. above). These three bird species do not feed directly on rockweed plants; instead they forage for a variety of invertebrates found living in the rockweed. Benefitting from their remarkable protective coloration, adult Black Ducks in winter and Eider chicks in the spring also seek shelter from predators in the rockweed and feed in the rockweed. Commercially important fish (e.g. Cod and Pollock) and shellfish (periwinkles) also benefit from services the canopy of mature rockweed stands provides.

The second important ecological role of rockweed is as a major primary producer of biomass (detrital matter) that helps support the marine food webs of the Gulf of Maine. Each year a mature stand of rockweed captures a prodigious amount of CO_2, converts it to carbohydrates and polysaccharides and sheds into coastal waters roughly 50% of its base weight in new biomass. In fact, rockweed is one of the Gulf of Maine’s largest contributors of detrital matter. To the extent that rockweed is cut down and trucked away this bounty is lost to the food web. Ultimately, Maine’s waters will no longer be able to support the diversity and abundance for which they are known.

Marine biologist Carl Merrill said,
Rockweed (both *Ascophyllum nodosum* and *Fucus* sp.) is prevalent along the shoreline there and plays a critical role as a provider of food, substrate, and shelter for a great variety of intertidal organisms. Over the years, and against our wishes, harvesters have cut "rockweed" along our lab's shoreline. Harvesting of rockweed does disrupt and degrade the habitat used by a variety of organisms including seals, eider ducks, black ducks, a variety of invertebrates, and young fin fish including economically valuable species. Harvesting of rockweed along the shoreline adjacent to conservation areas compromises the intentions of generous donors to provide for conservation for the benefit of wildlife and society.

The Friends of Maine Coastal Islands National Wildlife Refuge is concerned about wild marine algae harvesting because “the many species of ‘seaweed’ provide habitat and food for the lowest levels of the food chain, the invertebrates and plants that provide food for the fish that higher levels, from seabirds to crustaceans to humans, eat. Rockweed in particular can suffer long-term damage from uncontrolled or inappropriate harvesting around seabird nesting or feeding islands, reducing food supplies for seabirds and their chicks at a critical time in their reproductive cycle.”

The Audubon Project Puffin seabird restoration program commented,

> National Audubon has operated field stations for more than 40 years on some of Maine's most important seabird nesting islands. Here, we actively manage seabird populations to enhance the viability of rare and endangered Maine seabirds. At these and other important Maine seabird nesting islands, we have observed that most of the seabirds forage or rest in the intertidal areas where they utilize marine algae. These algae are linked to many small invertebrates such as amphipods that either serve directly as food for seabirds (such as state threatened Arctic Terns) or provide food for small forage fish (such as Atlantic herring) which in turn are key to the survival of most Maine seabirds. Atlantic Puffins forage in *Ascophyllum*. *Fucus*, *Ascophyllum* (rockweed) and other intertidal marine algae also provide important food to migratory shorebirds and land birds.

> At Eastern Egg Rock, for example, more than 200 bird species use the island either for nesting or migration. During migration, many small shorebirds and land birds feed in the intertidal and on rockweeds that are tossed up on the beaches and high tide. The rockweed decomposes from the grazing of amphipods and other crustacean- many of which are eaten by the migrant birds. Also, the nutrients that were in the rockweed, drain into the muds and sandy shorelines, feeding soft shell clams and marine worms. These nutrients also wash further offshore where they benefit submerged kelp and other plants that provide shelter for shedding lobsters.

Rockweed belongs to the owner of intertidal land on which it grows, and those owners have difficulty protecting it from harvest. One such land owner (Ken Ross) stated,

> Essentially, the dispute over rockweed is: commercial harvesters assert that gathering rockweed is a time-honored coastal enterprise and a public right, it creates wealth and jobs, only a small percentage of the rockweed is taken, it soon grows back, and it does little or no harm to the ecosystem. Environmentalists argue that the amount taken is escalating far above traditional use, the ownership is in doubt, the monetary value is low and the bulk of it is used for fertilizer, a decade or more may be required for full recovery after cutting, and the ecosystem is threatened because rockweed is crucial habitat for about 150 coastal species. Adequate evidence of impacts is expensive, difficult, and lacking; therefore a key unresolved question is where to place the burden of doubt.

Another landowner (Edward Page) described the destruction:

> Last summer I experienced at first hand the machine harvesting of *Ascophyllum* on my property. The environment of my ledge was severely degraded - the machines cut seaweed on my ledge for hours at a time and have made the algae cover very thin and patchy. The machines also harassed seals on a nearby ledge, causing them to flee into the water…. The process of machine harvesting of Rockweed devastates the seaweed bed which is harvested, leaving an area once a rich habitat for small fish, young crustaceans and other small creatures as a wasteland of short fronds of seaweed with

little or no shelter for these former residents. The whine of the machine also scares off seabirds, ducks and shorebirds.

The Pleasant River Wildlife Foundation summarized difficulties:
Rockweed harvest is a uniquely serious concern to land trusts like ours in Maine that protect intertidal rockweed properties because, by long established Maine law, intertidal lands are the property of the adjacent riparian landowner. A court in Maine has recently confirmed that the rockweed growing on our land is also our property. We in the land trust community take it as our responsibility to protect our rockweed from exploitation – but we are helpless to resist the unbridled pressure of the world's largest processor of seaweeds to harvest rockweed from our lands. Their power and deep pockets render conservation organizations like ours, that own and are responsible for these lands, powerless to fulfill their obligations to protect them. Ironically and unfairly they tout the "organic" label on their products!

"Sustainable harvest" does not protect the ecosystem.

Because of the many roles that marine algae play in the ecosystem, standards should not be based on the level of disturbance that can sustain a harvest (recovery of biomass), but on recovery of ecosystem function and structure. The rockweed industry, as described above, serves as an example. As stated by Seeley and Schlesinger,

> The measure of sustainability used by the rockweed (*Ascophyllum nodosum* L.) industry, maximum sustainable yield, accounts for neither rockweed's role as habitat for 150+ species, including species of commercial or conservation significance, nor its role in coastal and estuarine ecosystems. To determine whether rockweed cutting is "sustainable" will require data on the long-term and ecosystem-wide impacts of cutting rockweed. …Until sustainable levels of cutting and appropriate regulations are identified, commercial-scale rockweed cutting presents a risk to coastal ecosystems and the human communities that depend on those ecosystems.[13]

Mechanisms available to the NOSB for protecting marine algae include annotations of allowed synthetics and ingredients, as well as listings of prohibited natural materials. Guidance is also needed.

The National List includes synthetic aquatic plant extracts on §205.601, synthetic and nonsynthetic ingredients on §205.605, and nonorganically produced agricultural products on §205.606. In addition, marine algae that do not undergo chemical change can be used as crop inputs without limitation. Finally, certified organic marine algae that are cultivated or harvested under the wild harvest standard can be used in livestock feed and as ingredients in food without limitation.

Marine algae and their products on the National List should be annotated with the wildcrafting standard language.

[13] Seeley, R.H. and Schlesinger, W.H., 2012. Sustainable seaweed cutting? The rockweed (Ascophyllum nodosum) industry of Maine and the Maritime Provinces. *Annals of the New York Academy of Sciences*, *1249*(1), pp.84-103.

The wildcrafting standards at §205.207 requires:
(a) A wild crop that is intended to be sold, labeled, or represented as organic must be harvested from a designated area that has had no prohibited substance, as set forth in §205.105, applied to it for a period of 3 years immediately preceding the harvest of the wild crop.
(b) A wild crop must be harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the wild crop.

Requiring that marine materials be organically produced, as proposed by the MS, would apply the wildcrafting requirements in most cases. We stress the necessity of the language, "must be harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment" because, as noted above, "sustainable harvest" is not sufficient to protect the ecosystem.

The proposal by the MS to require organic certification of marine algae used as inputs in organic production is flawed.

Although we support the application of criteria used to certify wild crops to the marine algae used as inputs in organic production, those criteria are not sufficient to certify the marine algae as organic. We agree with Dr. Robin Hadlock Seeley's position that, because of ocean circulation, there is no way to ensure that any designated area has not been exposed to a prohibited substance. Thus, the conditions for certification cannot be verified. However, such criteria provide a starting point for defining areas from which organic inputs may be harvested. The NOSB should also consider further criteria suggested by Dr. Hadlock Seeley, such as language stating that the harvest area "should not have been listed as prohibited to shellfish harvest because of bacterial levels in the water, or petroleum contamination, for the previous 3 years continuously."

We are also concerned that requiring any organic inputs to be certified organic may set an unreasonable precedent for organic inputs.

Marine algae should be listed on §205.602, prohibited nonsynthetic crop inputs, with the annotation, "<u>unless harvested from a designated area that has had no prohibited substance, as set forth in §205.105, applied to it for a period of 3 years immediately preceding harvest and harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the population of the species</u>."

This listing should be broadly stated as "marine algae," rather than specific species. *Ascophyllum nodosum* (rockweed) should be specifically listed as a prohibited natural. *Ascophyllum nodosum* is singled out not because it is uniquely at risk, but because the risk to rockweed, as well as its ecological importance, has been so well documented. As we have seen, rockweed grows and is harvested in the intertidal zone, where impacts are readily visible to many people. The absence of similar comments about other marine algae should not be taken

as an indication that their populations and ecosystems are thriving. Rather, the NOSB should strictly apply the wild harvesting criteria in the case of all marine algae used in organic production –as food ingredients, processing aids, livestock feed, and crop inputs.

The NOSB should develop guidance for the application of the annotation to marine algae.

The application of such an annotation by certifiers and materials review organizations (MROs) depends on a knowledge of the ecology of the specific marine algae. It is not possible to judge whether harvest is destructive to the environment without an understanding of the ecology of the species. In order to promote consistent application of the proposed annotation, the NOSB should develop guidance for certifiers and MROs.

Guidance on the many species mentioned in the TR requires an understanding of the ecology of different species in habitats ranging from near the poles to the tropics. We agree with the recommendation for the formation of a working group that would examine the species of marine algae used in organic products and production to determine what constitutes harvest "in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production" of each species. This working group should recommend prohibition of the use in organic products and production of those species whose harvest in such a manner cannot be guaranteed. It should recommend specific methods of defining and measuring impacts and enforcing the standard that are appropriate to each species. We agree with the comments of Dr. Haldlock Seeley, "For the proposed NOSB working group on seaweed, it will be important to include conservation and wildlife professionals familiar with seaweed harvesting practices who can work through the issues listed below. The working group should be co-led by a member of industry and a conservation/ wildlife professional familiar with seaweed harvesting practices, or led by a professional facilitator."

Guidance on harvesting marine algae should also include methods of verifying the location of harvest, inputs, and methods of harvest. It should prohibit the harvest of *Ascophyllum nodosum* for reasons outlined above.

Other marine species should also be protected.

It is important to protect marine algae –species at the foundation of marine ecosystems. However, fish (and soon squid) may also be used in crop production. Like marine algae, they should be allowed only when obtained by sustainable methods that are not destructive to the environment. We encourage the NOSB to also consider restrictions on the use of fish and squid products that meet those criteria.

Conclusions

In summary, we make the following recommendations:

- The NOSB should continue its efforts to clarify the identities of species of marine algae used in organic production. Application of binomial nomenclature to marine algae needs to be clarified, and any restrictions need to be justified.
- The NOSB should investigate mechanisms for protecting marine ecology from the impacts of harvesting marine algae for use in organic products and production. The NOSB should look at natural materials in use in crops and livestock, as well as those on the National List.
- The NOSB should protect rockweed (*Ascophyllum nodosum*) by prohibiting its use in organic production.
- We support the following mechanisms for protecting marine algae:
    - Marine algae and their products on the National List should be annotated with "must be harvested from a designated area that has had no prohibited substance, as set forth in §205.105, applied to it for a period of 3 years immediately preceding harvest; must be harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the population of the species."
    - Marine algae should be listed on §205.602, prohibited nonsynthetic crop inputs, with the annotation, "unless harvested from a designated area that has had no prohibited substance, as set forth in §205.105, applied to it for a period of 3 years immediately preceding harvest and harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the population of the species."
    - The NOSB should convene a task force of marine biologists to help develop guidance for the application of the proposed annotations to marine algae and interpretation of the requirements, especially that the crop "be harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the wild crop."
- The NOSB should also protect marine animals.

Thank you for your consideration of these comments.

Sincerely,

Terry Shistar, Ph.D.
Board of Directors