2023 STATE OF THE POT

In 2021, APLD launched the Healthy Pots, Healthy Planet initiative to reduce reliance on single-use plastic horticultural pots by advocating for biodegradable, compostable and reusable, or recycled alternatives. Then, the default option was pots made from virgin plastic. Now, two years later, where do things stand? Have there been any changes from the status quo? How are concerned stakeholders kicking the plastic habit?

Here's our report on the State of the Pot: a snapshot of what we're seeing, and what we would like to see. We hope that this will serve as an update on current conditions, and will energize this community's commitment to change the paradigm. For our part, Healthy Pots, Healthy Planet will continue working with stakeholders and technical experts to refine and implement strategies for achieving our goals.

HEALTHY POTS
HEALTHY PLANET

Support the Switch to Sustainable Pots

WHO CARES

Look no farther than the hundreds of individuals and organizations from around the world who have signed on to Healthy Pots, Healthy Planet. They represent a wide range of occupations and interests, across a variety of sectors including academic, commercial, government, nonprofit, professional associations, and public gardens.
Our signers include:

- Landscape architects
- Landscape designers
- Installers
- Nurseries
- Master gardeners
- Master naturalists
- Recyclers
- Conservationists
- Horticulturists
- Educators
- Writers
- Many others, including Earth Enthusiasts who may not be in the green industry but are concerned about the proliferation of plastics.

It is clear that landscape designers and landscape architects care; they represent the majority of signers to Healthy Pots, Healthy Planet. They all have a driving role in specifying plants for projects, seeing thousands of pots in the pipeline from the nursery to installation, and are often faced with severely limited disposal options for the plastic. As landscape designers ourselves, we know this process all too well. We would like to learn more about what matters most to other consumers of pots, so we plan to survey them to get a more comprehensive assessment of what users want.

POTS TODAY

While there are companies that produce smaller, decorative pots made from alternative materials, our focus is on pots produced for the horticulture industry – the nurseries and greenhouses that grow the plants that ultimately go into landscape projects. To get a sense of the quantity of pots used in horticulture, we looked at the 2019 Census of Horticulture, conducted every five years by the National Agricultural Statistics Service of the USDA.

While the census doesn't tell us the total number of containers used in US horticulture, or what types of containers are used, it is a way to get a sense of their prevalence.

The category "Nursery Stock Sold" reveals the following for 2019:

NURSERY STOCK SOLD IN THE UNITED STATES IN 2019

Form	Total Sales in US Dollars	Percentage of Total Sales
Bareroot	$551,925,014	12%
Balled & Burlapped	$786,380,969	17%
Containers	$3,104,568,449	68%
Other	$102,401,517	3%
Total	**$4,545,275,949**	**100%**

(Nursery Stock includes Deciduous Flowering Trees, Deciduous Shade Trees, Broadleaf Evergreens, Coniferous Evergreens, Deciduous Shrubs, Fruit and Nut Plants, Ornamental Grasses, Landscaping Palms, Bareroot Herbaceous Perennials, Cacti and Succulents, Other Woody Ornamentals & Vines.)

If nursery stock in containers makes up 68% of total sales -- more than three times larger than the next sales group – then it's clear that containers dominate. And this data represents only the United States. What's more, old-school options such as bareroot and balled & burlapped are utilized less and less as some growers turn to automation for plant production. Land costs, climate, and labor shortages make container growing methods more workable, and, without consideration for disposal, more affordable.

Another interesting statistic from the census is the number of herbaceous perennials in pots. In this instance, they do provide the quantity of pots, not just the sales in dollars.

HERBACEOUS PERENNIAL PLANTS SOLD IN THE UNITED STATES IN 2019

Form	Number Sold	Percentage
Potted	241,917,000	98%
Bareroot	4,636,567	2%
Total	**246,553,567**	**100%**

Consistently, pots are the primary choice for plant packaging.

MANUFACTURING

PLASTIC POTS

Based on what we are seeing in horticulture, the majority of pots in circulation are plastic. How much of that material is virgin plastic? We don't know.

Finding the information can be difficult: the census doesn't tell us, and manufacturers don't provide the information in their labeling. Disposal data, however, gives us a clue. Although "plastic plant pots" aren't specifically mentioned in descriptions of items going to waste and recycling, we think it's safe to assign plastic plant pots to the packaging category. The US Environmental Protection Agency defines packaging as "products that are assumed to be discarded in the same year the products they contain are purchased." And one could make the case, as we did in "Plastic Pots and the Green Industry," that plastic plant pots are single-use plastic packaging, because once those plants are installed, the packaging usually enters the waste stream. The Minderoo Foundation, a philanthropic organization based in Australia, studies plastics production and use. Their 2023 report, "Plastic Waste Makers Index," found that there is more single-use plastic waste globally than ever before, and that 98% of it is made of virgin petroleum feedstocks. Plastic plant pots are likely a part of that alarming group.

We do know that some manufacturers use recycled plastic. Use of recycled content in plastic pots may even be widespread, but it is difficult to know because the information is not readily available. Consumers should keep in mind, however, that pots touting recycled content may be a blend of recycled and virgin plastic. Since the specific percentages of virgin and recycled content are difficult to verify, consumers should assume a pot is 100% virgin plastic unless recycled content is confirmed.

Here are a few manufacturers that do share information on recycled content:

BLACKMORE COMPANY, in Belleville, Michigan, produces plastic trays made from up to 90% post-consumer and post-industrial recycled plastic. The company recycles used trays from participating customers and reuses them in their manufacturing processes.

EAST JORDAN PLASTICS, INC., in East Jordan, Michigan, is a large manufacturer of plastic pots for greenhouses and nurseries. The company has established an extensive collection program to pick up used plastic pots and recycle the material, which becomes feedstock for the pots they produce.

THE HC COMPANIES, in Twinsburg, Ohio, manufactures horticulture containers for the greenhouse, nursery, cannabis, and retail segments throughout North America. They report using at least 55% recycled materials in the production and manufacturing of their horticultural materials.

ROOT POUCH, in Hillsboro, Oregon, has redesigned plant pots into fabric pouches made from a blend of 100% recycled plastic water bottles and natural fibers. The pots can be washed with a mild soap, air dried, and then reused. They can also be folded and stored for future plantings.

MANUFACTURING

ALTERNATIVE POTS

Alternative pots are those made of natural materials, such as paper, fiber, or even manure. They may also be made of bioplastics, a type of plastic that derives from plants rather than fossils. Like fossil-based plastics, bioplastics contain carbon, but the difference is that the carbon comes from renewable plant-based feedstocks, such as sugar cane, canola, and corn.

Another way to describe alternative pots is "biobased," which, according to the US Department of Agriculture, means "products that are derived from plants and other renewable agricultural, marine, and forestry materials." Many growers are skeptical that alternative pots will meet their performance requirements, so producing and promoting alternatives is challenging. The pots must be durable across the growing, shipping, and installation processes. What's more, where automation is used for nursery production, alternatives need to be strong enough for use in the automation systems.

Nevertheless, manufacturers are seeing that alternatives matter to consumers, so development is underway. The greatest progress is in the smaller sizes.

Some alternatives in production include:

- CowPots, which are made from a blend of cow manure and newsprint, and certified 100% biobased by BioPreferred. Made in the United States.
- Ellepot containers, which are made from paper and intended for plant propagation. The product has achieved numerous certifications, including FSC and BioPreferred. Made in Denmark.
- Three offerings from The HC Companies
    - FiberGrow and EcoGrow, made from recycled paper and fiberboard and certified by the Forest Stewardship Council (FSC) to be 100% recycled content. The USDA BioPreferred program certified FiberGrow as 82% biobased, and EcoGrow as 100% biobased. Made in Canada.
    - BioPax, made from sustainably sourced wood pulp and certified by BioPreferred as 53% biobased. BioPax is a bioplastic made from renewable sources and not a petroleum-based plastic. It offers greater durability and consequently takes longer to break down.
- Proven Winners Eco+ containers are made from PLA (polylactic acid), a bioplastic derived from starchy renewable plants like corn, switchgrass, and sugar beets. The pots are compostable in industrial settings and are certified by the USDA BioPreferred program and BPI. Made in the United States.

All of these pots as well as others can be found on the USDA BioPreferred list.

MANUFACTURING

HOW TO IDENTIFY MORE SUSTAINABLE POTS

When the pot is petroleum-based plastic:

- ***Does it contain recycled content?***
  The percentage may not be labeled, so be prepared to ask. (Good luck, and let us know what you find out!)
- ***Is the pot being reused?***
  Many growers are reusing pots as often as possible. The more mileage you can get out of a single pot, the better.

When the pot is a biobased alternative:

- ***Has the pot been certified by an independent third party?***
  Many alternative pots have attained certifications verifying the products' attributes. The value of certifications works both ways: consumers can be assured that the manufacturer's claims are true, and manufacturers gain an advantage over their competitors.

  Certifications to look for include:

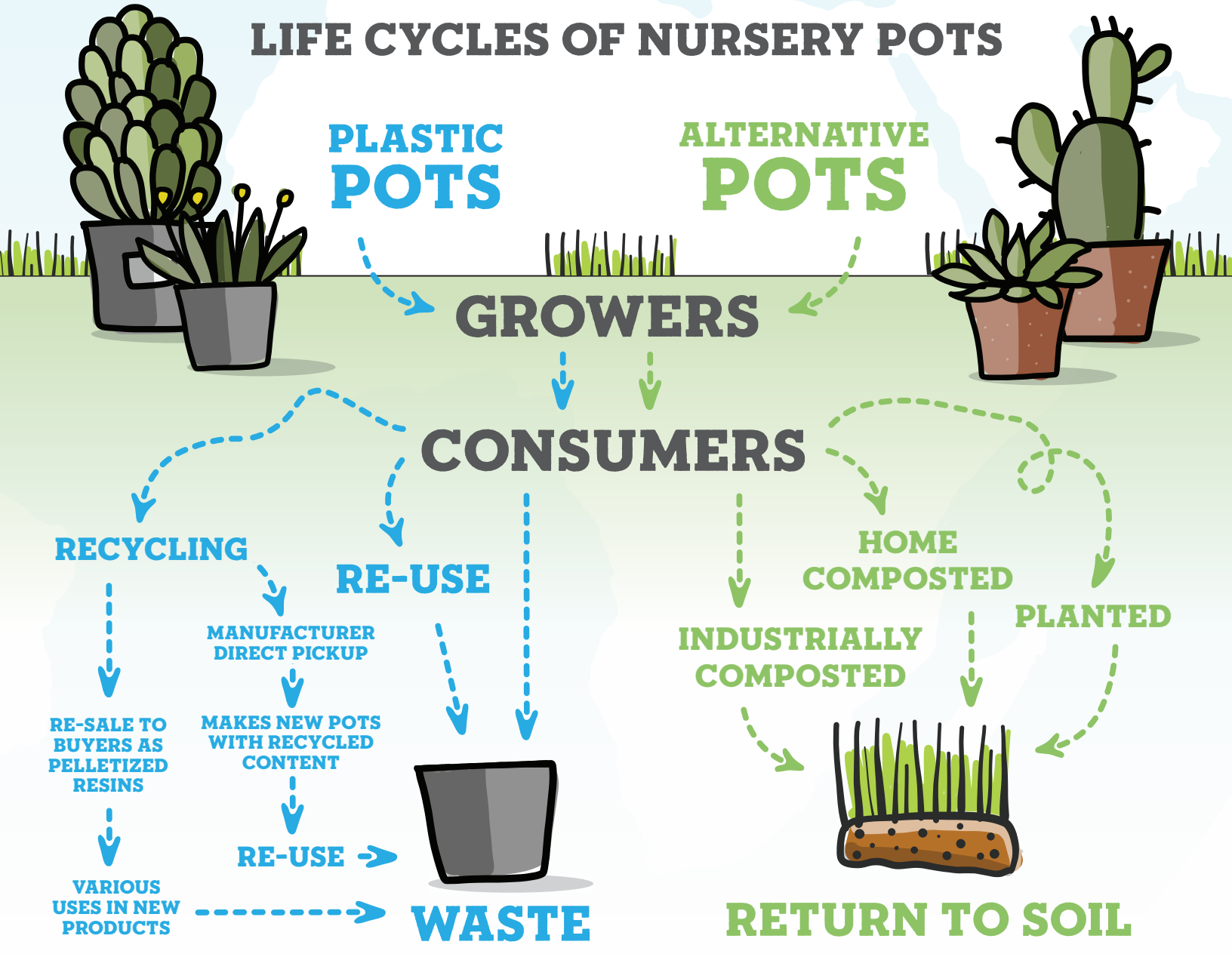
  - BPI – BPI (Biodegradable Products Institute) provides third-party verification that a product is compostable in industrial settings. Their website provides the ability to search for BPI-certified products.
  - FSC – The Forest Stewardship Council certifies chain of custody on products containing forest content according to rigorous standards.
  - OMRI – Certification from the Organic Materials Research Institute means that a product meets organic certification requirements.
  - USDA BioPreferred - A program operated by the US Department of Agriculture that certifies biobased content. It publishes an online database of certified products which can be found here.

- ***Does the product meet any ASTM standards?***
  Currently there are no ASTM standards (international voluntary and consensus products standards developed by the American Society for Testing and Materials) for pots made with recycled plastic content, but there are standards for compostability. ASTM conformance should be indicated on the product labeling.

DISPOSAL

Recycling and reuse are the current methods of keeping used plastic pots out of the waste stream. However, effective recycling depends on conditions that can be hard to meet: the pots can be rejected by automated recycling sorters; they may be too dirty for recycling; there may not be a market for the recycled material; and recycling may not even be available in all areas, leaving users no choice but to reuse or send them to waste. While many consumers do reuse the pots, others, particularly larger growers, worry about the potential for pathogens in the used pots and avoid taking the risk of infecting crops.

A comparison of the life cycles of plastic and alternative pots reveals the effort required to recycle the plastic resins for reuse. Even so, because plastic resins can be recycled only once or twice, the material will eventually go to waste. Biobased alternatives, on the other hand, return to the soil.



DISPOSAL

We should note, however, that some of the biobased alternatives return to the soil quicker than others. All biobased pots are technically biodegradable, but due to strict legal requirements in some states, they must meet certain conditions before they can be labeled biodegradable. Some biobased pots are only compostable in industrial settings and may not break down as quickly in non-industrial situations. For instance, bioplastic pots may take longer to biodegrade because the material is stronger. ASTM standards have been developed that provide guidance on what products should be industrially composted. This is a distinction that matters when considering how to dispose of a used pot.

Compostability is something we assumed to be fairly straightforward, but when it comes to biobased pots, it's complicated. From a consumer standpoint, this needs more work, so that disposal of these items is better understood and mistakes are avoided.

Waste disposal is a dilemma when that waste does not decompose and return to natural systems – especially at the volumes we now produce. The responsibility and cost fall mainly on end users and other living things, who struggle to deal with the problem. Many users go to considerable lengths to reuse existing pots and properly dispose of those that cannot be reused.

WASTE DISPOSAL IS A DILEMMA WHEN THAT WASTE DOES NOT DECOMPOSE AND RETURN TO NATURAL SYSTEMS – ESPECIALLY AT THE VOLUMES WE NOW PRODUCE.

Here are some examples of actions that concerned consumers are taking:

DEVIL MOUNTAIN WHOLESALE NURSERY, a large grower in California, has long been concerned about plastic use and has been seeking ways to reduce it. They have had a good experience with Ellepots, a biodegradable container made of paper, for starting perennial seeds. Devil Mountain has found that this system has resulted in better root production than plants grown in plastic. The liners are easy to remove from the trays and are plantable. What's more, the process has lowered production costs, and there is less waste. It is now their preferred system for propagation.

HILLWOOD ESTATE, MUSEUM & GARDENS, in Washington, DC, returns about 75% of their plastic pots to a grower. Hillwood sanitizes and reuses the other 25%. Additionally, they have discontinued use of plastic cell packs and replaced them with biobased pots such as CowPots. As a result, over the last two years, they have not ordered any plastic pots for their production greenhouse.

PRIDES CORNER FARMS, a wholesale nursery in Connecticut, not only recycles its own pots with East Jordan Plastics, but in collaboration with the Vermont Nursery & Landscape Association, picks up pots at six locations and hands those off to East Jordan as well. They plan to expand the collections to Maine and additional nurseries in Connecticut.

MISSOURI BOTANICAL GARDEN has worked to reduce plastic pots use for years. In 1998, the Garden launched a program entitled "Pots to Planks" that collected used pots and sent them to a manufacturer which converted them to landscape planks. When the manufacturer stopped producing the planks, the Garden sent the collected pots to a local recycler. The program eventually closed in 2020 during the pandemic and has been difficult to reinstate due to fewer buyers for this type of recycled material. Nevertheless, the Garden continues to devote considerable energy to addressing its plastic pots use, currently by re-using plastic pots in its greenhouse productions.

Smaller nurseries are addressing the proliferation of plastic pots as well. A few examples include **BONA TERRA,** in Washington, DC, a nursery that has not purchased pots since 2020 because of pot returns and donations; **EARTH SANGHA,** in Springfield, Virginia, which accepts and reuses pots; and **WATERMARK WOODS,** in Hamilton Virginia, which reuses pots.

ENVIRONMENTAL IMPACT

In "Plastic Pots and the Green Industry," we described the environmental impacts of plastic pots: greenhouse gas emissions; toxins that damage human, animal, and plant life; and pollution in soils and waterways. Unfortunately, this has not changed, so the imperative to reduce the volume of plastic in the environment is as strong as ever.

RECYCLING AND INCINERATION HAVE NOT KEPT UP WITH THE GENERATION OF PLASTIC WASTE, SO MORE OF IT IS GOING INTO LANDFILLS.

And the volume is high: according to the Minderoo study, single-use plastics comprise the largest plastics application category, and constitute a third of all plastics consumed globally. A recent study by the National Academy of Sciences revealed the following sobering facts:

- Over 99% of plastic resins produced globally are made from fossil-based feedstocks; less than 1% are biobased.
- Despite representing only 4.3% of the world's population, in 2016, the US was the top generator of plastic waste globally.
- Recycling and incineration have not kept up with the generation of plastic waste, so more of it is going into landfills.
- Fossil-fuel industries in the United States receive tax subsidies that make plastic products cheaper.
- In the US in 2018, 75.6% of plastics were landfilled; 8.7% were recycled; and 15.8% were incinerated.

The environmental impact is broad and deep, damaging to people and the planet. This reliance on plastics hinders the green industry's potential to be a significant positive force in healthier environmental conditions. The horticultural industry contributes to urban food production, livability, carbon capture, clean air and water, and mitigation of rising temperatures. The need for retail, public and commercial plant material will only increase, but must be met with less damaging fallout.

WHAT WE'D LIKE TO SEE

- Decreased use of virgin plastic in plant pots.
- An end to the tax subsidies to the US fossil fuel industry.
- Labeling of Post Consumer Recycled (PCR) content in plastic pots.
- ASTM standards for plastic pots with recycled content.
- Phasing out use of polystyrene (PS, resin #6) in plant pots. According to the Minderoo Foundation study, PS has the highest cradle-to-grave emissions of all the resins. PS is often used in cell packs or flats, and alternatives could replace that.
- Carbon footprint data, such as CO2e (carbon dioxide equivalent, a unit of measurement that is used to standardize the climate effects of various greenhouse gases) on both plastic and biobased pots.
- Avoidance of incineration for plastic waste until there is clear data that the advantages of incineration (converting waste to energy) outweigh the disadvantages (increased emissions, material loss, air pollution, residual toxic ash requiring management).
- Improved recycling for plastic waste that is more efficient, reduces leakage of plastic waste during the processing, and is as simple as possible for consumers to comply with. Minderoo projects a 30-40% reduction in emissions when plastic is recycled. As most emissions occur during the upstream process, recycling eliminates those emissions.
- Pots designed not only for use, but also for end-of-life disposal.
- Clear product-specific guidance on whether a pot can be composted, and what conditions are necessary.
- Broad, extensive establishment of industrial composting sites.
- Heavy consumer demand for better options.

WHAT YOU CAN DO

Demand matters. In research studies and in real life examples, we've seen that consumers want greener options and that producers will try to provide those options if demand is strong. Recycled plastic content in pots may not be labeled because manufacturers may not realize it's important, so let's tell them. Designers should use the leverage they have in choosing plants for projects, and specify plants grown in more sustainable containers (see our suggested language for the specification here.) Use the Healthy Pots, Healthy Planet logo on all your correspondence and social media. If you haven't already, sign on to Healthy Pots, Healthy Planet, and encourage your colleagues, suppliers, and other organizations to sign on as well.

Above all, we would like to see the day when better options than virgin plastic pots are readily available, affordable, and the norm. Let's fossilize virgin plastic!

DEMAND MATTERS.

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HEALTHY PLANET

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