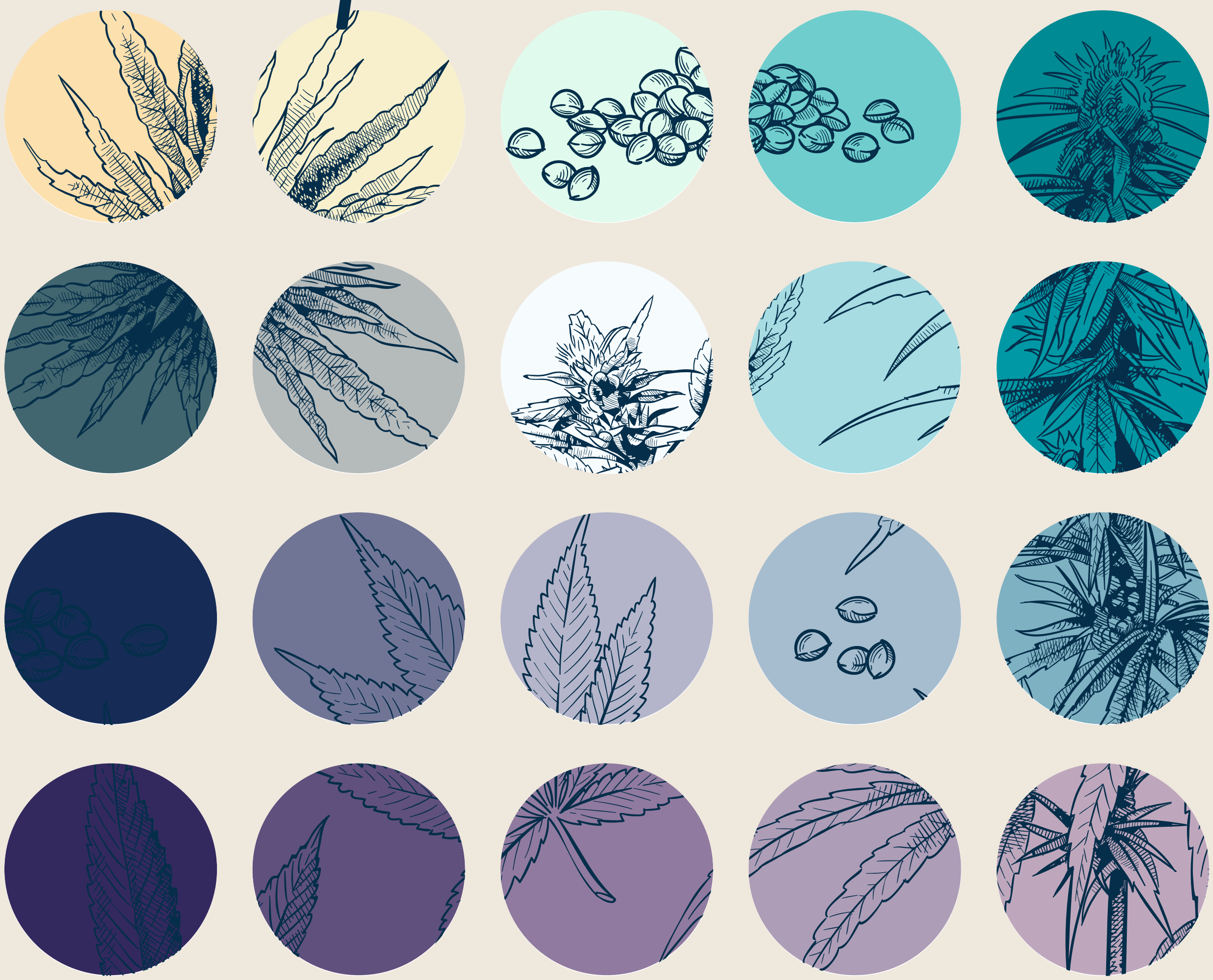
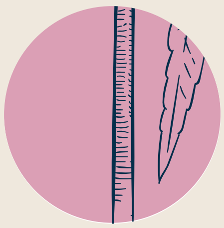
22 *for* 2022



Cannabis Industry Assertions & Predictions



New Frontier® data

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Introduction

2022 promises to be another milestone year for the cannabis industry. New key adult-use markets are poised to officially launch regulated sales in the U.S. (New York, New Jersey, and Virginia) and the seeds of full adult-use cannabis have been planted in Europe in Germany, Luxembourg, and Malta. Globally, interest in the therapeutic applications for cannabis has never been higher, and as the pandemic extends into its third year, cannabis consumer demand is soaring as consumers discover a broadening portfolio of product options.

While the industry's fundamentals remain strong, several factors could consequentially impact the market's performance going into the year ahead. As economic headwinds have gained strength, the risks of an acute market correction disrupting capital flows into the market has increased, which would slow industry expansion and operationalization, especially in newly legal markets. The dimming prospects of broad federal reform are intensifying the debate on more incremental measures to address banking and taxation. And the lack of guidance from the FDA on CBD-infused foods continues to acutely constrict the growth of the U.S. hemp market.

At the state level, the opposition of conservative lawmakers in the South and Midwest will slow or overturn enactment of regulated markets, despite broad public support. These efforts may disrupt near term market expansion, but are unlikely to be sustainable over the medium term as public approval of cannabis cements.

Beyond these macro issues, the industry will see developments in taxation, lab testing, hemp as animal feed, and roadside driver testing, all of which will materially impact the growth, opportunity, and governance of the industry in the year ahead.

In this report, we explore 22 themes to watch in 2022 and assess how each issue will impact the market.

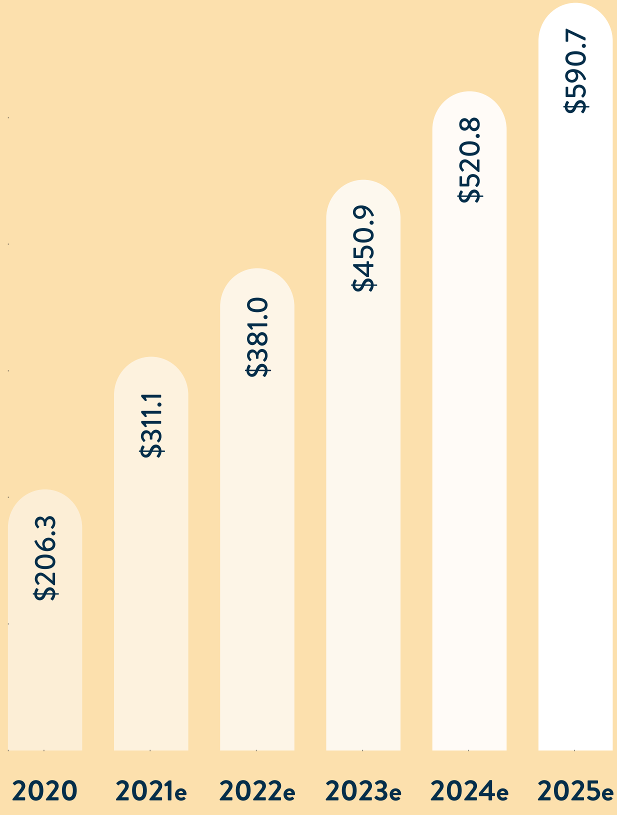
22 *for* 2022

Legalization in Germany, Luxembourg, and Malta will drive further legalization in Europe.

The establishment of regulated adult-use cannabis markets in Luxembourg, Germany, and Malta adds considerable pressure to the existing trend in national legalization throughout the EU region, while significantly increasing the global profile and visibility of cannabis. We expect a handful more countries to legalize in the next year (at least for medical use if not full adult-use), and existing countries with various forms of regulatory restrictions to continue to take amending steps that open the market to more patients and consumers. Some of the countries on the radar for new legalization initiatives and expansion on current laws include Chile, New Zealand, Belize, Croatia, Spain, and Colombia. Furthermore, as Europe's largest and most influential economy, Germany will play a particularly important role in marshalling the infrastructure and technical expertise for a regulated cannabis economy on the continent. These capabilities will then diffuse through Europe's highly porous borders, lowering the costs and speed to market for other countries that follow suit.

Germany Legal Medical Cannabis Sales

2020-2025e, in $USD millions



Note: Exclusive of legalized adult-use cannabis sales.

Source: New Frontier Data, The Global Cannabis Report

2

2022 will begin the American race for Europe.

Canadian LPs have long been active in Europe's nascent cannabis markets, but only one major American operator—Curaleaf—has invested in European expansion, with the company's $285 million investment in EMMAC Life Sciences, a multinational European operator. The broad lack of interest in Europe among American operators was understandable—with so much untapped opportunity in the U.S., it made little sense to divert resources and focus to Europe's small and tightly constrained markets.

However, the announcement that Germany will establish a regulated adult-use cannabis market changes the calculus on the European opportunity. With a population of over 80 million, Germany will be a larger consumer market than California, New York, New Jersey, and Washington combined. With the EU having some of the world's most favorable conditions for international expansion, Germany will be a strategic launchpad for international expansion as other countries follow suit in cannabis reform. Additionally, with Germany receiving 40 million mostly European international tourists each year (pre-pandemic), successful brands in the country will have a brand-building head start among the millions of expected canna-tourists that will visit the country's operational markets.

While Germany—and Europe—will remain a secondary priority for American operators, we expect to see more investment in and acquisition of European operators in 2022 and well-capitalized and globally minded cannabis companies to awaken to the significant medium-term opportunity that Europe will present.

3

Broad economic headwinds spell uncertainty for the industry going into 2022.

With the global pandemic closing out its second year with no sign of abating, global supply chain issues, and rising inflation, the U.S. economy faces stiffening headwinds going into 2022. The likely immediate culprit will be slowing economic growth that will have cascading implications for the cannabis industry, one result of which could be heavy capital flight as investors seek lower-risk markets.

Aside from lagging federal reform, lack of access to reliable banking, and the 280E penalty which already increased the risks of investing in cannabis, further disruptions to the U.S. economy might push investors toward safe-haven markets with lower risk and more predictable returns.

Nevertheless, the cannabis industry has proven to be incredibly resilient throughout the course of the COVID-19 pandemic, operating as an essential service and continuing to expand with new legal markets across the U.S. Furthermore, cannabis consumer demand in the U.S. has remained strong throughout the economic turbulence of the pandemic. This resilience will prove to be an asset, even in the face of broader economic headwinds, and will likely reward risk-tolerant investors who are less focused on near-term performance but rather medium- and long-term returns.

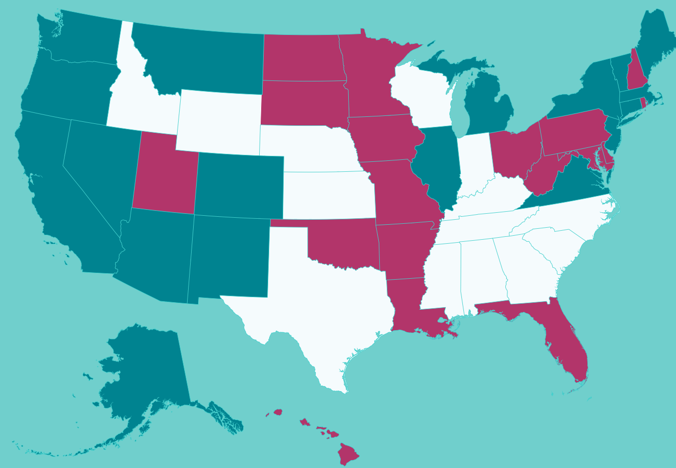
4

Expansion of new U.S. state markets will continue amid stiffening conservative opposition.

Momentum toward state legalization has been persistent over recent years and has shown no sign of slowing. Reported usage rates have been rising, bipartisan support for cannabis legalization has never been higher, and at least one new state has joined the growing ranks of legal medical and adult-use markets every year since 2006. With the recent legalization of adult-use in New York and New Jersey, the race has officially taken off in the Northeast, and the South is teed up for some key changes to medical cannabis use laws.

However, as seen with the court cases filed by conservative opponents of legalization that resulted in the overturning of voter-backed initiatives in Mississippi and South Dakota, progress in historically conservative states in the South and Midwest will not proceed unchallenged. Strong public support notwithstanding, local politics can make opposing legalization a winning issue. As a result, even in the markets where legalization advocates are able to secure victories at the ballot box, they should prepare for protracted battles in the courts before the new laws can be effected.

Legalized States



Potential New Legal U.S. State Markets

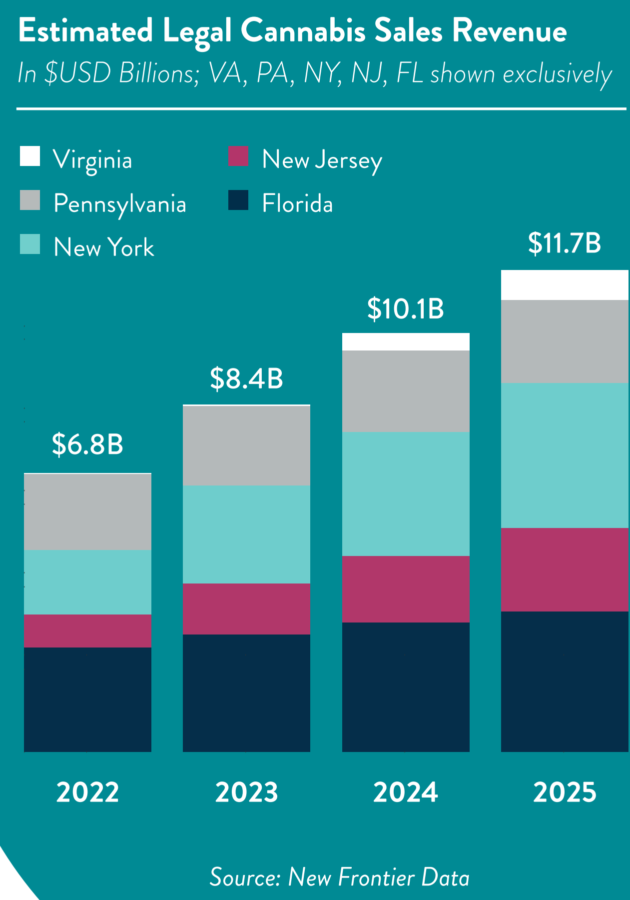
Medical	Estimated Cannabis Consumer Population
Alabama	559K
Georgia	1.2M
Idaho	226K
Kansas	358K
Kentucky	539K
Nebraska	225K
North Carolina	1.1M
South Carolina	632K
Tennessee	843K
Texas	2.6M
Total	**8.4 million**

Adult-use	Estimated Cannabis Consumer Population
Florida	3M
Maryland	840K
Minnesota	792K
New Hampshire	263K
Ohio	1.5M
Pennsylvania	1.7K
Rhode Island	189K
Total	**8.3 million**

Source: New Frontier Data, The Global Cannabis Report

5

Launch of New York, New Jersey and Virginia will shift industry's power balance to the east and reshape the national conversation of cannabis in America.



To date, recreational cannabis has been a largely West Coast phenomenon with Massachusetts and Maine being the only two adult-use markets on the East Coast. Even with the recent strong performance of the medical markets in Pennsylvania and Florida, regulated cannabis remained nascent in most of the eastern and southern states.

With New York, New Jersey, and Virginia now set to operationalize adult-use markets in 2022, recreational cannabis has now taken root in the East Coast's most influential markets. Not only does this mean cannabis is now legal in much of the Northeast (the country's most populous corridor), the activation of these three markets will also increase pressure on other states in the region to fully legalize (Pennsylvania and Florida are two markets to watch) or to approve medical use in states with strong public support but entrenched legislator opposition (North Carolina, Georgia, and Tennessee).

New York and Virginia will be especially instrumental in shaping the national and global conversation around cannabis. New York City is the most visited destination in the country, and the city will be the first point of exposure to the millions of domestic and international tourists who visit the city each year. Similarly, with Northern Virginia's border cities sitting less than five miles from the U.S. Capitol in Washington, DC—and with many members of Congress living in Virginia—many national lawmakers will now have the industry in their proverbial backyard, giving a face to an industry that, for many, has been an abstraction to date.

6

Top performing cannabis companies, including ancillary product and service providers, will experience strong growth even absent federal reforms.

Even with no clear end in sight for federal prohibition, the topline revenues of the U.S. companies will continue to grow, driven by continued strong consumer demand in newly established state adult-use markets. The largest publicly traded U.S. cannabis companies will continue to be the biggest beneficiaries of the state-level growth as they are now reporting positive EBITDA and exhibiting increasing operational efficiency and scale, making them an especially attractive investment opportunity in the face of looming federal reform, which would hand the largest multi-state operators a significant advantage in a fully open national market.

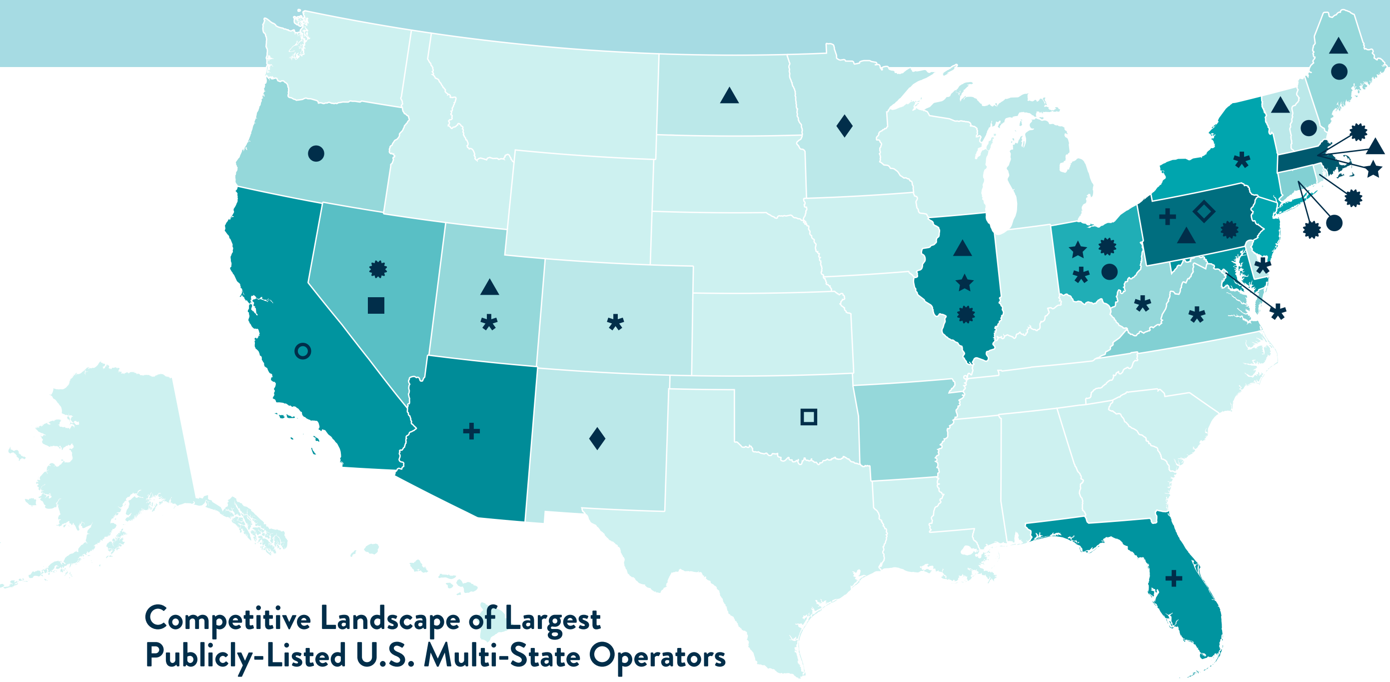
The strong growth forecast for 2022 will also drive significant revenues for ancillary product and service companies, which benefit from the industry's growth without taking on the risks and costs borne by plant-touching operators. The ancillary sector will be especially attractive for acquisition from mainstream companies seeking exposure to the industry but are not yet comfortable making plant-touching plays.

7

2022 will see accelerating consolidation as the race for scale intensifies.

Large multi-state and single-state operators (MSOs/SSOs) are aggressively pursuing acquisitions to capture scale, enter new markets, and develop novel IP. In the absence of federal legalization and with the ingress of larger companies held at bay, existing cannabis operators will be capitalizing on every minute of additional time to establish brand awareness, build consumer loyalty, and expand their geographical footprints via M&A transactions and the acquisition of licenses in newly legalized state markets.

Acquisitions to accelerate market entry will be especially important in the new East Coast markets (NY, NJ, VA) and for well-capitalized Canadian companies seeking to secure an early foothold in the U.S. state markets in anticipation of future federal reform. M&A activity will also heat up further in the supply chain, as cannabis suppliers work to capitalize on increasing economies of scale to serve a growing and globalizing market.

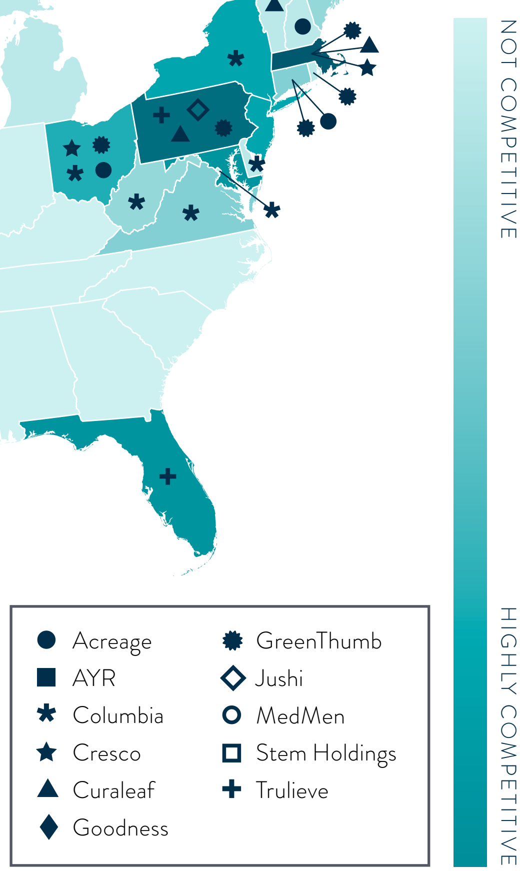


Competitive Landscape of Largest Publicly-Listed U.S. Multi-State Operators

- *High intensity of color gradation indicates high number of publicly listed MSOs with retail operations in the state.*
- *MSO-specific badges indicate an MSO has a significant leading retail presence in the state.*

Note: Relative competitive rank is determined based on the number of major MSOs that have initiated retail operations in that state.

Source: New Frontier Data, Cultivating Capital: Cannabis Finance and Investment



8

Consumer behaviors normalized amid the disruptions caused by COVID-19 will be cemented as the pandemic extends into its third year.

The pandemic has markedly shifted some consumer behaviors, including stimulating increased demand for flower, decreasing consumer's sharing of joints and other inhalables, increasing demand for non-combustibles (especially for consumers living in situations where smoking is not an option), and increasing use of delivery and curbside pick-up. As the pandemic extends into its third year with no signs of abating, these behaviors are becoming increasingly normalized, making it unlikely that once the pandemic ends consumers will fully return to their pre-pandemic behaviors. 2022 will see brands and retailers begin to fully embrace these shifts in consumer behavior, with greater investment in streamlining the consumer purchase experience, novel products which allow for shared experiences without consuming from the same joint of device mouthpieces, and more products tailored to consumers dealing with the stress, anxiety, and sleep disruptions caused by the pandemic.

With many consumers now accepting the "new normal" of their lives, agile brands will adapt to meet the consumer where they are, rather than continuing to hope that the consumer returns to their pre-pandemic behaviors.

9

The relationship between brands and cannabis will evolve, both within and outside the cannabis industry.

2022 will see more celebrities entering the industry and using their personal brands to sell cannabis products. Many celebrities whose images have long been associated with cannabis have already entered the consumer product space, such as Snoop Dogg, Willie Nelson, Cheech & Chong, and Seth Rogen. So far, most celebrities not previously associated with cannabis who have entered the space—like Martha Stewart, Megan Rapinoe, and Kristen Bell—have stuck with CBD-only products. In 2022, as association with cannabis becomes less risky for mainstream celebrities, we will likely see some unexpected faces launching brands, even in the high-THC space.

Brands outside of cannabis, particularly from industries dominated by trends, that thrive on edginess, or mine inspiration from subcultures, will use cannabis to boost their profiles in their respective industries. With some fashion and beauty brands having already crossed over, the video game, fine dining, contemporary art, and recording industries are all likely arenas for cannabis to be appropriated as a brand intensifier.

Cannabis brands will get hyper-specific in their messaging, identities, and targeting. Within the endemic cannabis industry, as the retail shelves become more crowded, companies will use their brands to find and build loyalty among consumers. Some ways that will become increasingly common:

- Using philanthropy or advocacy to appeal to consumers with aligned values, who are compelled by causes like environmental sustainability or criminal justice reform.
- Highlighting an aspect of company ownership (veteran-owned, BIPOC-owned, disability-owned, etc.) to find consumers motivated by cooperative economics.
- Appealing to a hyper-specific target audience at the expense of a broader audience—using branding that is specifically off-putting (if only subtly) to the majority but speaks effectively to a unique subset of consumers to create an in-group, out-group dynamic.

10

The cannabis product landscape will diversify along with its expanding consumer base.

Decades ago, "good coffee" was strong coffee. Simple, strong, black coffee. Today, many coffee drinkers' favorite drinks include coffee, but may also have whipped cream, chocolate, sugar (in multiple forms), and peppermint, pumpkin, vanilla, or some other flavoring. There are still the espresso and black coffee purists, but a coffee shop's offerings—and profits—are driven by a wide variety of forms, flavors, and ingredients built around a shot of espresso but which bear little resemblance to the coffee of old.

The same expansion of flavor, form, and formulation that coffee has seen in the last few decades is starting to be replicated in cannabis.

As legal markets expand and the cannabis consumer base broadens, product forms will continue to diversify and find their niches. Most new consumers will not become heavy, multiple-times-daily cannabis users—they will more likely take up cannabis use weekly, monthly, or every few months. While they might consume less frequently, their comparative size means their total spending may eventually rival spending by the heaviest consumers, who make up a relatively small subset of all consumers.

This group of prospective light cannabis consumers will drive innovation in low-dose and non-combustible products—the "Frappucinos" of cannabis products. While many prolific consumers will continue to opt for the flower with the highest THC content, casual consumers will be more likely to select products based on a wider set of factors. Casual consumers may choose cannabis products by the flavors/ingredients in an edible or beverage, the presence of minor cannabinoids like CBD or CBN, the intended effect or mood of the product ("chill", "sleep", etc.), the form factor (like the adorably tiny "Dogwalker" joints), or simply the product branding, as with most consumers' selection of wine by the design on the bottle.

Consumer education will be an increasingly important part of brand development in 2022, as new consumers will need guidance on how to optimize their experience amid the proliferation of new product forms and ingredients. Brands will need to first intimately understand who their target audience is and what animates their cannabis use, then build carefully tailored messaging and use cases that resonate with those audiences. As the cannabis consumer base broadens and acceptance increases, the companies that most effectively appeal to the diversifying consumer base will be well positioned in 2022 and beyond.

11

Savvy brands and marketers will grow consumer awareness of minor cannabinoids.

Within the wellness product category, minor cannabinoids are showing promise. While CBD and Delta-8 THC have the lion's share of consumer attention, other cannabinoids are garnering interest.

Cannabigerol (CBG) is a nonintoxicating substance that's attracted market interest for addressing inflammation, pain, and nausea. Research has shown it also significantly reduces intraocular eye pressure caused by glaucoma. Cannabinol (CBN) is showing promise for brands formulating and marketing products that address issues related to sleep. Tetrahydrocannabivarin (THCV) is a cannabinoid that has a similar molecular structure to THC, but research has shown it may be effective for appetite suppression.

There looks to be a promising market in the years to come for supplement/nutraceutical products formulated with THCV that are marketed to consumers hoping to achieve weight loss. However, because THCV is not an abundant cannabinoid, the per-kilogram price is far more expensive than CBD, CBG, and CBN. There is also cannabichromene (CBC), which according to Cresco Labs, has been shown to encourage neurogenesis, or the production of new neurons in the brain. For any of these lesser-known minor cannabinoids to see accelerated growth, consumer education will be paramount.

While there has been limited clinical research examining the qualities and efficacy of minor cannabinoids, preliminary results and market potential look promising. In 2022, minor cannabinoids that align with commonly targeted lifestyle products, like THCv for weight loss or CBN as a sleep-aid, will grow dramatically and see wide adoption by brands looking to expand their offerings beyond CBD-based products.

The Potential of Minor Cannabinoids

POTENTIAL MEDICAL APPLICATIONS

CBG-A
Cannabigerolic Acid

- Metabolic disorders
- Colon cancer

CBD-A
Cannabidiolic Acid

- Chemotherapy-induced nausea/vomiting
- Depression
- Seizures

THC-A
Tetrahydrocannabinolic Acid

- Arthritis
- Neurodegenerative diseases
- Nausea
- Appetite loss
- Prostate cancer
- Insomnia
- Pain management
- Muscle spasms

CBC-A
Cannabichromene Acid

- Fungal diseases

CBG
Cannabigerol

- Crohn's disease
- Bowel disease
- Cancer
- Glaucoma

CBD
Cannabidiol

- Epilepsy
- Schizophrenia
- Multiple sclerosis
- Migraines
- Arthritis
- Cancer side effects

THC
Tetrahydrocannabinol

- Nausea/vomiting
- Anorexia
- Spasticity
- Parkinson's disease
- Epilepsy
- Drug dependence
- Autoimmune diseases

CBC
Cannabichromene

- Inhibit growth of cancer cells
- Osteoarthritis
- Neurological diseases
- Acne
- Depression

CBD-V
Cannabidivarin

- Seizure prevention
- Rhett syndrome
- Duchenne muscular dystrophy
- Epilepsy & autism spectrum disorder
- Nausea

THC-V
Tetrahydrocannabivarin

- Appetite suppressant
- Diabetes
- Anxiety
- PTSD
- Alzheimer's disease
- Osteoporosis

CBC-V
Cannabichromevarin

- Osteoporosis
- ALS
- Muscular dystrophy

CBN
Cannabinol

- Bacterial infections
- ALS
- Appetite stimulant
- Glaucoma
- Arthritis

Sources: Leafly; Nature; Cannabis-Med.org; NIH

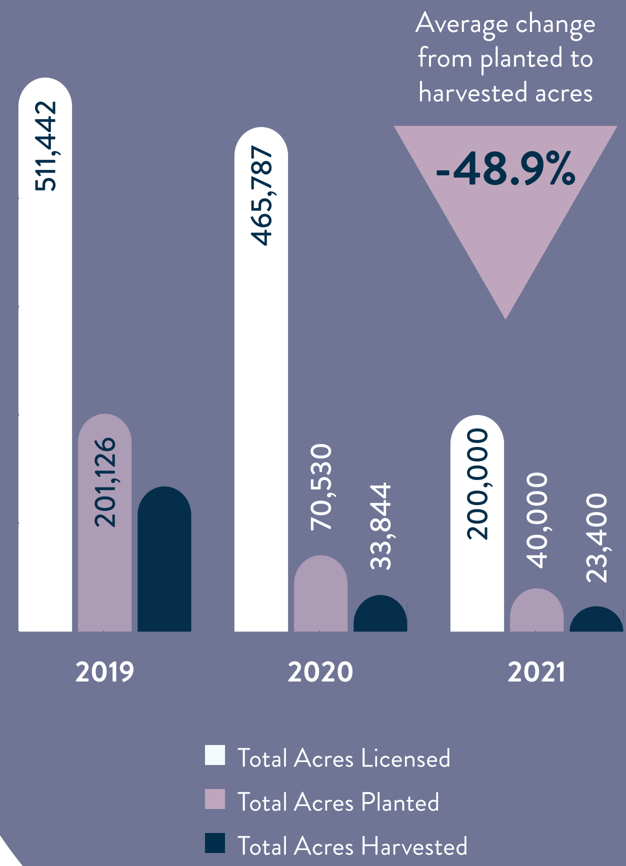
12

U.S. industrial hemp acreage will increase in 2022, but with fewer growers.

While the decline of U.S. hemp production acreage in 2021 might suggest that hope for a domestic hemp industry has fizzled, overall acreage does not capture the fluctuations in different production and market categories. In the past three years, we estimate that 80%-90% of acreage planted in the U.S. had been singularly dedicated to CBD production. The 2021 decline of hemp acreage was indicative of the industry's attempt to balance CBD supply with the as-yet unrealized market demand. In fact, both grain and fiber acreage increased from 2020 to 2021.

While 2021 served as a pilot year for producers to dial-in the agronomics of successfully growing a hemp crop for grain and/or fiber, significant expansion in production will be necessary in 2022 to feed the processing capacity of grain and fiber processors that have come online around the country in the last 12 months. While overall U.S. hemp acreage will increase in 2022, it will be with fewer producers, who are growing on a larger scale. Thus, fewer hemp production licenses will be issued in 2022, but the output per license will increase.

U.S. Hemp Production Acreage



Source: Vote Hemp

This fall, the National Agricultural Statistics Service surveyed about 20,000 American hemp farmers to gain insight to the hemp market that has formed since the crop was federally legalized under the 2018 Farm Bill. The results of the survey, which are expected by mid-2022, will shape the benchmark for hemp acreage and production, and better inform regulatory agencies about their program-support responsibilities related to domestic hemp production. It should likewise provide key market insights to producers, state governments, processors, and other industry stakeholders.

13

2022 will be the year of dual-purpose (grain and hurd) hemp production.

The ending of the China–U.S. trade war and the impact of the COVID-19 pandemic have caused commodity prices of staple agricultural crops to skyrocket. This presents an added challenge to hemp production in the U.S. Two years ago, corn and soybeans were not yielding a high return on investment (ROI), and farmers were eager to experiment with hemp as a new crop that promised potentially higher profits. Today, as spot prices for staple agricultural commodities like corn and soy approach record highs, growers are less likely to take a risk adding hemp as a rotational crop on their farm.

With agricultural commodity prices nearing record highs, farmers will need to maximize their return on investment from growing hemp. As a result, hemp production ROI will be under increased scrutiny in 2022, with farmers more carefully structuring their cultivation approaches to maximize their yields and returns. While there is a developing market in the U.S. for hemp grain and hurd, growing a single-use crop for one of these purposes may not yield an ROI that justifies allocating acreage to hemp that could be allocated to a staple agricultural commodity. With the price of hemp grain historically between \$0.45-\$0.55 for conventional and \$1.00-\$1.20 for organic, and the average price of hemp bale at \$150, many farmers will target dual-purpose production of grain and hurd to ensure the highest return possible.

Nevertheless, successful dual-purpose hemp production requires the right genetics, the right harvesting equipment, and proximity to regional processors that can handle both grain and fiber material. Further, this is only possible with a production contract. The states where this model is most likely to gain traction in 2022 are Kansas, Montana, North Dakota, Minnesota, and Colorado, as a supply chain for both hemp grain and fiber processing is maturing in these states.

14

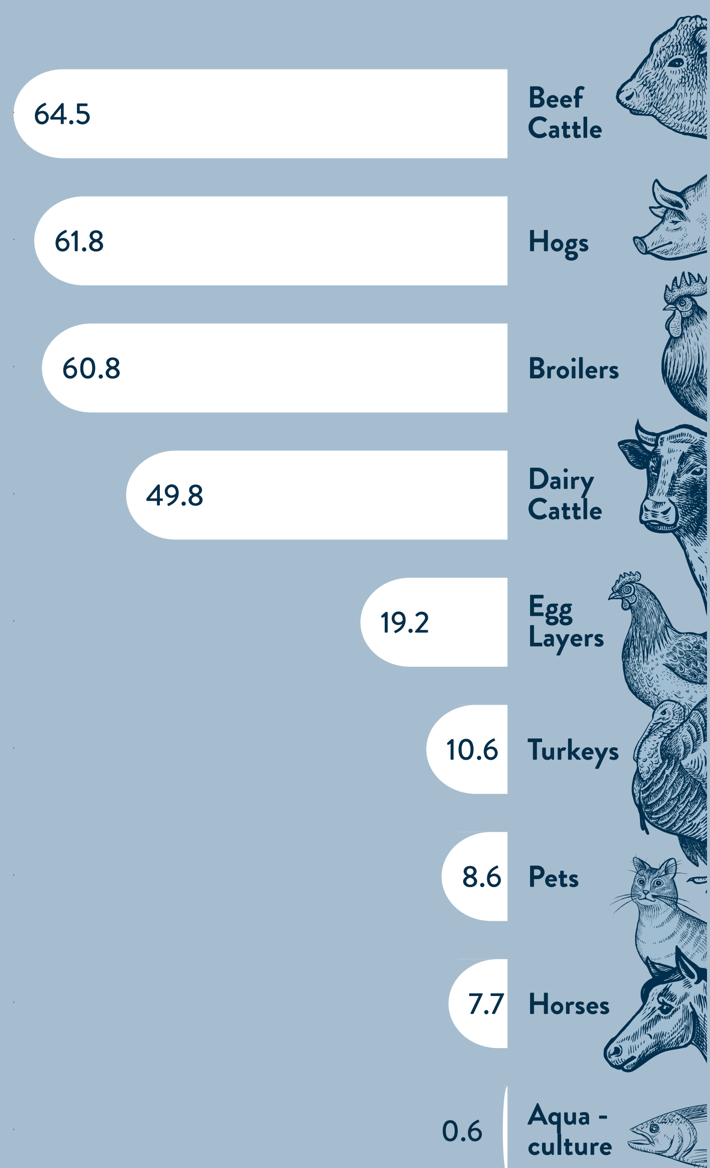
Hemp grain as poultry feed will be approved in 2022.

In February of 2021, the Hemp Feed Coalition (HFC) made a submission to the Association of American Feed Control Officials (AAFCO) and the Food and Drug Administration's Center for Veterinary Medicine to allow hemp seed meal and cake to be legally used as commercial feed for laying hens and broiler chickens. In response, AAFCO published a position paper in September urging stakeholders to continue advocating and sponsoring thorough scientific research to ensure the safety and nutritional benefits of utilizing hemp ingredients for animal feed. Further, AAFCO warned against sidestepping the existing channels, regulatory agencies, and American livestock organizations in getting hemp feed formally approved.

The Hemp Feed Coalition (HFC), a non-profit organization advocating for hemp's approval as animal feed has helped raise funding for clinical feed trials at several universities across the U.S. to study the safety and efficacy of hemp and its byproducts. In August 2020, HFC earned an Agricultural Products Utilization Commission grant from the North Dakota Department of Agriculture to help fund a study of hemp-

Animal Feed: Quantity Fed by Species

In Millions of Tons



Sources: Decision Innovation Solutions and the Institute for Feed Education and Research

Industry insiders are confident that broiler chickens will be the first livestock that hemp grain is allowed to be fed to as their shorter lifespan has made it possible to conduct more expeditious research.

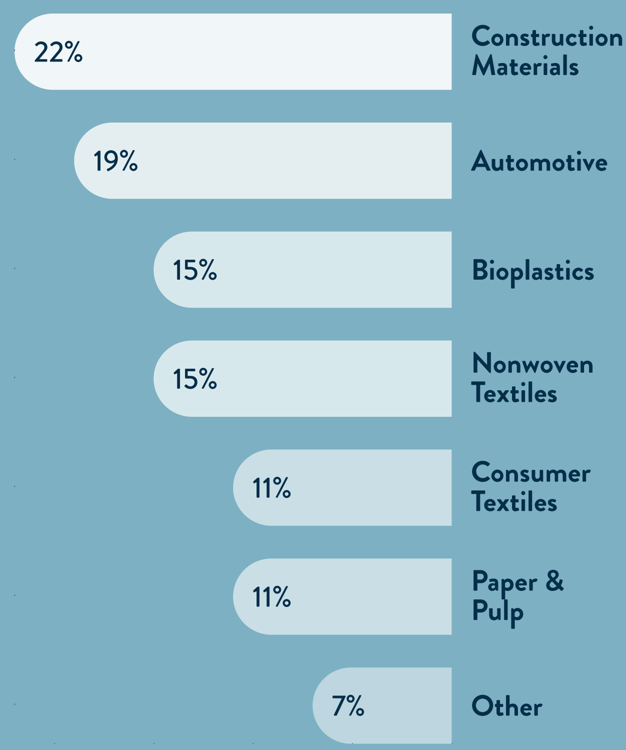
seed cake and meal in chicken feed. Likewise, researchers from Kansas State University were awarded a $200,000 federal USDA grant to study cannabinoid transference in the meat, milk, and eggs of hemp-fed animal byproducts in cattle feed. In March, the USDA's National Institute of Food and Agriculture (NIFA) granted nearly $300,000 to Oregon State University for research into feeding residual processed hemp biomass to cattle. In addition to those, Colorado State University is studying hemp seed meal for lambs, Tuskegee University is studying the impact of hemp seed meal on goats, and North Carolina State University is studying the effect of hemp seed oil on horses.

Industry insiders are confident that broiler chickens will be the first livestock that hemp grain is allowed to be fed to as their shorter lifespan has made it possible to conduct more expeditious research. While cattle feed is the largest market by volume, their long-life span greatly extends the amount of time needed to collect research data.

15

Hemp fiber-based building materials and bioplastics will see a boom in 2022.

Expert Survey: Which hemp fiber applications have the greatest 5-year growth potential?



Source: New Frontier Data, U.S. Hemp Market Landscape: Cannabinoids; Grain & Fiber

2021 laid the foundation for the North American hemp fiber market. While fiber has been hemp's slowest growing sector since the passage of the 2018 Farm Bill, new investments in regional processing infrastructure have been spurred by the myriad end uses of hurd and bast fibers from the stalk of the industrial hemp plant.

In the past 12 months, a handful of regional fiber processors have broken ground, including South Bend Industrial Hemp in Kansas, IND Hemp in Montana, BioPhil Natural Fibers in Pennsylvania, and Formation Ag in Colorado.

For now, most hemp fiber-based products trade at a premium, but prospects are more promising as manufacturing capacity increases, and the cost of finished products falls. By November 2021, the National Association of Home Builders estimated that U.S. building materials prices had increased 12.2% since that start of the year. Further, they estimated the price of all inputs to residential construction (including energy) rose 14.5% from January to November of 2021, more than eight times more than it did over the same period in 2020. The dramatic cost increase in products for which hemp can be used as a substitute will further strengthen the investment thesis in hemp manufacturing capacity.

Based on the increasing demand for ESG products and rising costs for building materials, we expect hemp hurd-based building materials (insulation, flooring, drywall, cement, and concrete) and bioplastics will grow dramatically in 2022.

16

The lack of guidance from the FDA on CBD will continue to leave the hemp sector without a regulatory framework, significantly curtailing investment and commercialization.

As the cannabis industry endeavors to grow in the U.S. it remains hampered by the lack of federal reform. With a three-year head start since the passage of the 2018 Farm Bill, hemp should be thriving, driven by the market for CBD. Nevertheless, this sector also finds itself obstructed by a lack of regulatory guidance with little clarity on the horizon.

In July 2021, the FDA reconfirmed its position that CBD is subject to the drug preclusion language in the federal Food, Drug, and Cosmetic Act, per objection letters posted regarding New Dietary Ingredient Notifications (NDIN) filed by Charlotte's Web and Irwin Naturals citing a lack of clinical research. In essence, this ruling meant that CBD-infused products would need to undergo a clinical research trial to demonstrate safety prior to federal approval for sale.

While it is typical for larger food and pharmaceutical companies to fund the necessary clinical research to get new food, drug, or nutraceutical ingredients through the FDA approval process, few CBD companies have the financial resources to fund these types of clinical research trials. With no clear guidance from the FDA and without the industrial infrastructure to fund the clinical research needed to support a New Dietary Ingredient application, CBD manufacturers exist in an ambiguous regulatory space that only serves to impede growth in what should be a thriving sector.

In late 2021, the FDA announced plans for a Data Acceleration Plan for cannabis-derived products, to include CBD. This plan includes government partnerships with research institutions and the collection of data from both traditional and "novel" sources including social media platforms all under the guise of gaining insight into the safety and efficacy of cannabis-derived products. However, the Data Acceleration Plan only represents a starting point, rather than clear progress, toward the development of reliable agency guidance. The FDA has broadly resisted engaging with the cannabis industry, resulting in clear deficits in its institutional understanding of the nature of cannabis products or how to effectively create a robust and functional regulatory framework. In the coming year, the FDA will need to make significant progress developing reliable rules for CBD. Once the market has clarity about how CBD will be regulated moving forward, companies can innovate more freely and grow efficiently, creating an environment more welcoming to investment.

The FDA has broadly resisted engaging with the cannabis industry, resulting in clear deficits in its institutional understanding of the nature of cannabis products or how to effectively create a robust and functional regulatory framework.

There are two bills (one in the House, one in the Senate) that seek to federally regulate products containing hemp-derived CBD. H.R. 841 is a bill currently in the House that would regulate hemp-derived CBD as a dietary supplement. As of publication, the bill has the support of 35 members of the U.S. House with 22 Democrats and 13 Republicans from across 21 states cosponsoring the legislation. S. 1698 is a similar bill currently moving through the Senate that would regulate hemp-derived CBD as a dietary supplement or food and beverage additive. Originally sponsored by Sens. Ron Wyden (D-OR), Rand Paul (R-KY), and Jeff Merkley (D-OR), the bill has recently received further support from Sen. John Hickenlooper (D-CO) who signed on as a cosponsor. These four Senators alone represent three of the top hemp producing states.

The expectation that the industry will regulate itself or provide significant funds for clinical research would be a tall order but given that retail sales of CBD-infused foods, beverages, and supplements saw a sharp decline from June 2020 to June 2021, it seems more likely that brands will prioritize survival in the absence of much needed regulatory clarity.

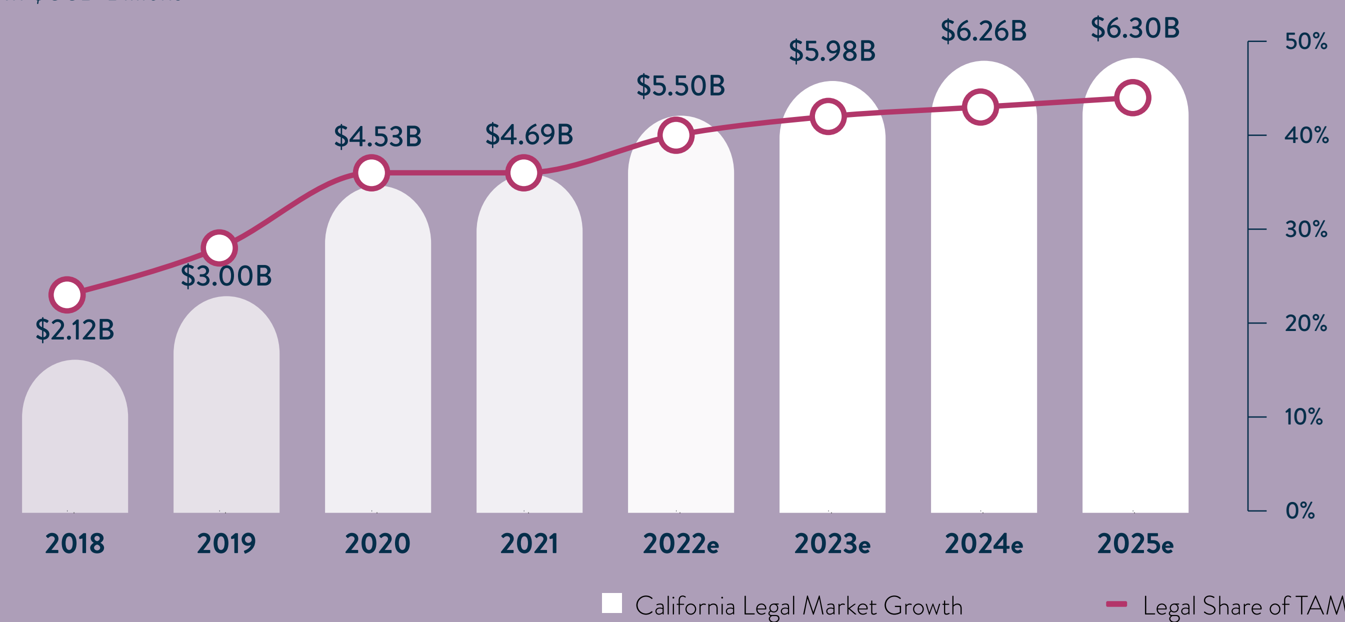
17

Excessively high—and rising—taxes in California will add fuel to the already-thriving unregulated market.

California has the largest adult-use market in the world. It also has a thriving unregulated market, built on the immense volume of cannabis flower cultivated there for decades, and honed over the 20 years of its loosely regulated medical-only program. Finding the 2018 adult-use regulations overly burdensome, many well-established operations from the medical-only days have continued to operate outside of the regulated industry. Many are indistinguishable from regulated businesses, with the customers, branding, and high-quality products of legal operations.

One of the only salient differences between regulated and unregulated operations is the end cost to the consumer.

California Legal Market Growth & Share of Total Addressable Market
In $USD Billions



Source: New Frontier Data

For many purchasers, a typical haul at a regulated dispensary can incur 50% in combined state and local taxes, resulting in $200 worth of products costing $300 at the register. If customers can get nearly identical products at two-thirds the price, what incentive do they have to source from the regulated market? While it may seem counterintuitive, lowering the tax rates would ultimately increase overall tax revenue for the state by attracting the large swath of consumers who continue to eschew the legal market for the less expensive unregulated market.

California will continue to constrict the revenue potential of its legal market by driving more price-sensitive consumers to the unregulated market and underperforming relative to other fully legal state markets.

But as of January 1, 2022, California's cannabis tax rates have increased again. The cultivation tax—initially $9.25 per dry ounce of flower, then raised to $9.65 in 2020—now stands at $10.08 per dry ounce. Since it is applied at the beginning of the production chain (where it can already represent roughly 25% of the wholesale cost of flower), the cultivation tax is compounded at every step of production, each of which has an additional tax.

Whether California will continue raising its cannabis tax rates to try to solve its endemic fiscal problem remains to be seen. In the meantime, the state will continue to constrict the revenue potential of its legal market by driving more price-sensitive consumers to the unregulated market and underperforming relative to other fully legal state markets.

18

California to standardize testing, potentially creating a national framework for for quality control.

Laboratory test results are a key factor influencing the purchase of cannabis & cannabis-infused products. In New Frontier Data's most recent consumer survey, potency/THC levels was ranked higher than a product's price when it came to factors influencing a consumer's product selection (77% vs. 73%). More than half of consumers (54%) cited test results for pesticides/mold/fungus as an important factor impacting their purchasing decisions.

There are immediate and quantifiable commercial benefits to proper testing, as manufacturers can ensure product quality and safety. However, the premium customers are willing to pay for potent flower and the lack of standardization across the testing landscape creates incentives for cultivators and producers to "shop around" for labs that might score their products more favorably. Such practices undermine consumer confidence by raising doubts about the accuracy of test results and the ability to compare results of products tested by different labs.

Recently, the Department of Cannabis Control (DCC) in California designated two state-run labs to establish operating procedures that would serve as a blueprint for the other labs in the state. California joins states including New Jersey and New York in standardizing cannabis testing methods, a key step in ensuring that quality metrics and test results can be compared across all products in the market. The establishment and adoption of standards and practices are becoming increasingly vital to better facilitate manufacturing, measurement, communication, and commerce.

19

The race for cannabis roadside testing will heat up under acute legal scrutiny.

Drugged driving remains a key policy consideration in the establishment of regulated cannabis markets. Thirty-eight states (and Washington, D.C.) have now legalized cannabis in some form for medical use, and 18 of those states (and D.C.) have legalized adult-use programs. Across the country, lawmakers, scientists, police, and consumers not only disagree about a precise level at which THC concentration constitutes functional impairment, but whether any single limit exists.

For most states, there is no set limit, but drivers who test positive for THC are assumed to be driving under the influence of drugs (DUID). Twelve states have enacted zero-tolerance laws specifically prohibiting driving with any amount of THC and/or its metabolites in the body. Five

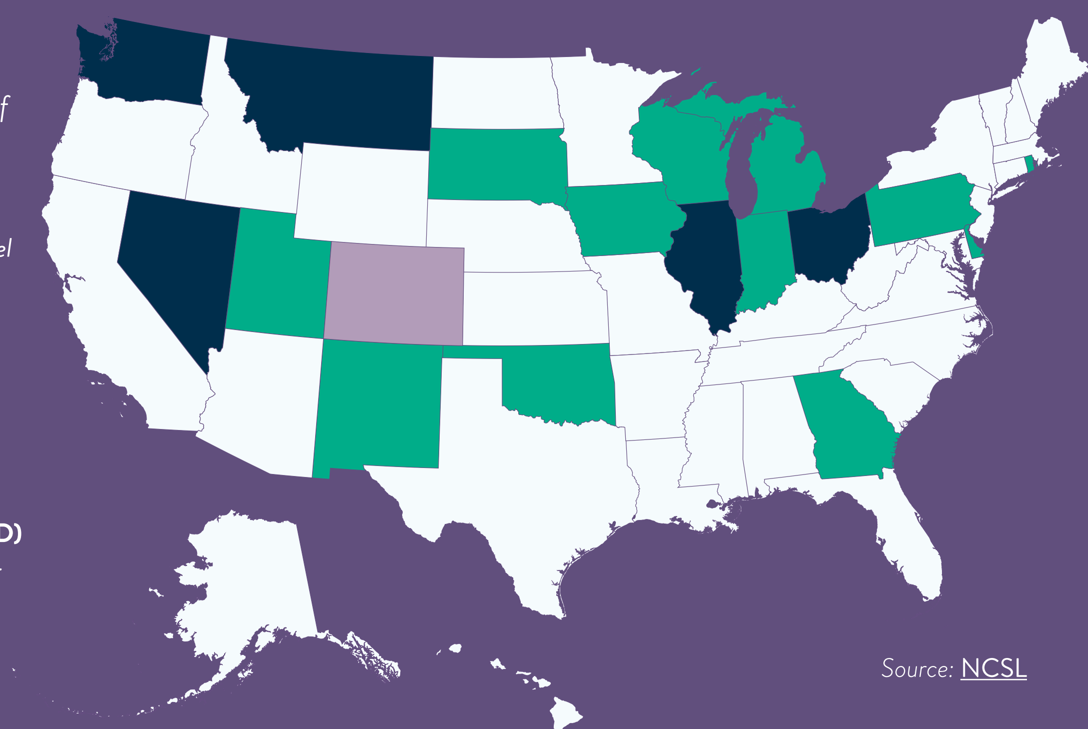
State Marijuana-Impaired Driving Laws

Zero Tolerance Law*
Prohibits driving with any level of THC present.

Per Se Law
Prohibits driving with a THC level over a set limit.

Permissible Inference
Driver with a THC level of 5ng/ml or higher is presupposed as affected by/under the influence.

Under the Influence (DUID)
Driver tests as affected by/under the influence of THC.



Source: NCSL

states (WA, MT, NV, IL, and OH) have per se laws prohibiting driving with a detectable amount of THC in the body exceeding the legal limit. Colorado operates under a permissible inference law; if THC is identified in the driver's blood in quantities of 5ng/ml or higher, it is permissible to assume the driver was under the influence.

The key issue with all these approaches is that they do not make a distinction between active impairment—which assesses whether the driver is under the influence at the moment they were intercepted—versus having cannabis metabolites in the system which can remain in the blood for weeks after consuming cannabis. The latency of cannabis metabolites in the bloodstream long after the 'high' has worn off has resulted in innumerable drivers being charged with DUID when they were not high.

The latency of cannabis metabolites in the bloodstream long after the 'high' has worn off has resulted in innumerable drivers being charged with DUID when they were not high.

As the market matures and new consumers are introduced to an evolving range of cannabis-infused products, including a range of low-dose products, it becomes increasingly imperative that uniform thresholds are developed for impairment, and law enforcement can effectively monitor and administer impairment tests for drivers. Given the natural social comparisons to alcohol, and law enforcement's long familiarity with deploying breathalyzers in the field, manufacturing developers have largely focused on devising a breathalyzer-style device.

These manufacturers claim that the technology has advanced to the point where such a device is feasible and may be introduced to the market sooner rather than later. Defining cannabis impairment will require active educational efforts and involvement from the industry. Given the patchwork of regulations that characterizes the cannabis industry in the U.S., there remains high risk of outmoded assumptions or biases relative to consumption and intoxication influencing the rulemaking endeavor.

20

The CBD market will remain lukewarm in 2022; Delta-8 THC's heyday has come and gone.

In 2018 and 2019, farmers across North America, eager to ride the CBD wave, jumped into speculative production without a contract. This was a leading factor responsible for the current oversupply of CBD hemp biomass. On the other hand, the lack of federal regulatory clarity from the FDA on products containing hemp-derived CBD has limited access to mainstream retail distribution channels for brands and manufacturers. In turn, the market for CBD products has fallen far short of the growth rates that some predicted. In 2021, the CBD sector continued to suffer from a lingering bust after the market overheated in 2020.

Overall, demand for non-intoxicating cannabinoids has not exhibited the growth that was predicted in 2018 and 2019. Month-over-month CBD biomass prices fell for most of 2021. While there was a slight uptick in Q4, prices remained well below the premiums that were being fetched in Q4 2020. Meanwhile, the rise of Delta-8 THC suggests that consumers are willing to

Falling Price of Delta-8 THC

Average Price per Kilogram

Source: Hemp Benchmarks

spend money on hemp products that produce a more discernible effect. While the first half of 2021 saw the explosive rise (and gradual fall) of Delta-8 THC, a compound derived from CBD that produces a milder high than Delta-9 THC, and whose sedative effects have been likened to Indica strains of cannabis, the last few months of 2021 saw the rise of Delta-10 THC, which is molecularly similar to Delta-9 but has been likened to the energizing effects of a Sativa cannabis strain. Practically no clinical research has been done to support these claims, but the lack of affirmative science has done little to quell rising consumer interest in this new compound.

In March of 2021, New Frontier Data reported that the average price of Delta-8 THC biomass had fallen 45% since August 2020, though full-year projections for U.S. sales of Delta-8 THC exceeded $10 million. The average per-kilogram price of Delta-8 THC rose 4% in May, reaching a height of $1,227.15. However, by July prices fell by a whopping 12%, down to $1,069.20. In November of 2021, prices dropped another 5%, to $1,015.74. Following more than a dozen states banning the sale of Delta-8 THC in the spring and the FDA's stern public health warning, the commercial optimism for Delta-8 THC is fizzling.

Overall, demand for non-intoxicating cannabinoids has not exhibited the growth that was predicted in 2018 and 2019.

Overall, the market has become saturated, and companies manufacturing CBD products have struggled to grow revenues, resulting in many businesses shuttering. The lack of regulatory guidance from the FDA has critically undermined the market's growth, slowing the investments required to build the industry's core infrastructure and limiting the availability of CBD products in mainstream outlets. For now, the CBD businesses that are thriving are those that are successfully distinguishing themselves from the competition through branding and marketing and those that are capitalizing on growth categories, especially cosmetics and wellness. While state-level legislature like California's AB45 has raised hopes for CBD sales, barring clear federal guidance, the growth of the CBD market in 2022 will remain cool.

21

U.S. federal legalization will be the key catalyst for ending global prohibition of cannabis. Calls for change are growing louder, but a path to bipartisan agreement on a framework for U.S. cannabis policy will remain elusive.

Over the course of 2021, both major U.S. parties released proposed legislation to regulate cannabis. Senate Majority Leader Schumer (D) presented the Cannabis Administration and Opportunity Act while freshman South Carolina Representative Mace (R) introduced the States Reform Act. Both pieces of legislation articulated a framework for decriminalization over legalization, the inclusion of an excise tax, investment in cannabis research, the release of currently imprisoned non-violent cannabis offenders, and the expungement of criminal records related to cannabis convictions.

Nevertheless, there is still significant disparity between the two parties on issues including appropriate tax rates, criteria for taxation, social equity programs, federal investment in cannabis entrepreneur programs, determining which agencies will oversee the industry's myriad verticals, and who is eligible for exoneration. While many of these issues represent—at least superficially—policy differences, deeply held ideological positions on how each party approaches cannabis legalization remain. For Democrats, addressing social equity, remedying the disparities caused by America's War on Drugs, and funding programs to create greater access to the industry are philosophically as important as creating a legal regulatory framework for cannabis. Republicans—traditionally resistant to expanding the power and scope of regulatory agencies, often opposed to social welfare programs, and advocates of minimal taxation—are similarly constrained by the party's ideological positions. Overcoming these differences will be a significant challenge for legislators who are compelled to satisfy the interests of their parties and constituents while trying to find sufficient common ground on which to establish a regulatory framework for a newly legal industry.

22

While interest in federal reform is high, intraparty disagreement and midterm-year political partisanship will continue to impede collaboration on substantive reform.

Beyond the ideological differences that inform the rulemaking process, broader political divisions and dysfunction in Washington make it even more challenging to bring both sides to the table on this issue. Yet in some instances, it is intraparty disagreement that threatens to derail legislation rather than divisions between Democrats and Republicans. While some Democrats view passing cannabis banking legislation as a higher priority than overall decriminalization, others fear that it would undermine more sweeping cannabis legislation, particularly in the areas of social equity and criminal justice reform.

As the 2022 midterm election approaches, we can expect to see even less bipartisan collaboration. With some Republicans that voted in favor of President Biden's infrastructure bill being primaried, political risks associated with bipartisan collaboration are rising as partisan purity increasingly becomes a litmus test for electability. While broader social, state-level, and cannabis industry trends suggest that the U.S. is inevitably moving toward federal reform, progress toward that goal will be stymied in 2022 by the increasingly divisive political climate.

About New Frontier Data

New Frontier Data is the premier data, analytics and technology firm specializing in the global cannabis industry, delivering solutions that enable investors, operators, advertisers, brands, researchers and policy makers to assess, understand, engage and transact with the cannabis industry and its consumers. New Frontier Data's global reach and reputation is evidenced by research and analysis citations in more than 85 countries. Founded in 2014, New Frontier Data is headquartered in Washington, D.C. with a presence in Europe, Latin America and Africa.

Mission

New Frontier Data's mission is to inform policy and commercial activity for the global legal cannabis industry. We maintain a neutral position on the merits of cannabis legalization through comprehensive and transparent data analysis and projections that shape industry trends, dynamics, demand and opportunity drivers.

Core Values

- **Honesty**
- **Respect**
- **Understanding**

Vision

To be the nexus of data for the global cannabis industry.

Commitment to Our Clients

The trusted one-stop shop for cannabis business intelligence, New Frontier Data provides individuals and organizations operating, researching, or investing in the cannabis industry with unparalleled access to actionable industry intelligence and insight, helping them leverage the power of big data to succeed in a fast-paced and dynamic market. We are committed to the highest standards and most rigorous protocols in data collection, analysis, and reporting, protecting all IP and sources, as we continue to improve transparency into the global cannabis industry.

For more information about New Frontier Data, please visit: NewFrontierData.com.

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