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# 2023 NATIONAL CANNABINOID REPORT

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## DISCLAIMER

*Whitney Economics does not take a position on the legalization of cannabis nor does it take positions on proposed legislation; however, it does derive revenue from cannabis and hemp related companies and stakeholders. The views, opinions, and positions expressed in this paper are those of its author Beau Whitney, and do not necessarily reflect the views, opinions, or official positions of any of our affiliated organizations, groups or clients.*



## EXECUTIVE SUMMARY

The hemp-derived cannabinoid industry rose in prominence in the years since the passage of the 2018 U.S. Farm Bill. The Farm Bill de-scheduled hemp as a controlled substance, thereby allowing for the rapid expansion of the hemp industry. While many parts of the hemp supply chain have experienced a boom-and-bust cycle, hemp-derived cannabinoids produced from CBD have expanded significantly.

Federal regulation was not able to keep pace with the rapid deployment of hemp products on the market. While mostly self-regulated (with the exception of the cultivation of hemp), concerns arose over the potential intoxicating effect of some cannabinoid products, and the potential public safety risks associated with intoxication. State legislatures attempted to intervene and provide regulatory structure to the industry, but those efforts have generated several unintended consequences on the industry.

Currently, the total demand for hemp-derived cannabinoids is valued in excess of \$28 billion and supports the employment of 328,000 workers, who earn \$13 billion in wages. Overall, the total economic impact of the hemp-derived cannabinoid industry on the U.S. economy is in excess of \$79 billion. While they may seem large, these estimates are actually conservative, because they do not account for demand and employment from gas stations, grocery stores and convenience stores.

Industry stakeholders are asking if, from a regulatory perspective, the state-by-state system is working. While some have said that state interventions have addressed serious public safety issues, others have said that the state-by-state systems are doing more harm than good. They argue that a more enhanced federal regulatory structure is more appropriate, given the size and scale of the industry and the need for standardization at the cultivation, manufacturing and retail levels.

In order to address these issues, policy makers at all levels require data. Up to this point, there has not been a comprehensive, national assessment of the hemp-derived cannabinoid industry. Whitney Economics has taken a conservative approach to data gathering and projections. The intention of this report is to provide a baseline of data in order to help hemp industry stakeholders understand the level of economic activity associated with hemp cannabinoids, and the impact that policy changes will have on the future.

# INTRODUCTION



Since the 2018 Farm Bill was signed into law, hemp products have begun to proliferate throughout the U.S. market. While hemp fiber and grain policies are still being debated (which is impacting the development and growth of those markets), policy discussions have centered around hemp-derived cannabinoid products, which have hit the market in a significant way. Hemp derived cannabinoids initially were sold as products containing CBD, but then evolved into intoxicating products and products with potential medical applications.

The rapid pace of hemp-derived cannabinoid product deployments has outpaced the ability for policy makers to respond. While some people feel that hemp derived cannabinoid products were not the intention of the 2018 Farm Bill, others take an opposite position, arguing that hemp-derived cannabinoid sales are proof of the success that was intended by the law.

The policy debate already has lines drawn regarding intention and legality, but there has been very little data available to date on the size and impact of hemp-derived cannabinoids on the U.S. economy.

Data on sales, jobs and taxes are crucial, when it comes to making policy. If a policy is imbalanced, it may impact public safety or other important issues, or it may unknowingly displace jobs, reduce tax revenue and put operators out of business. Availability of data is essential because it allows regulators and policy makers the ability to make informed decisions.

Up to this point, data on the economic impact of hemp derived cannabinoids has been limited to single state analyses in Florida and Texas. Additional reports analyzing manufacturing in Colorado and retail in Virginia have been published. More data and analysis are in process for Illinois, Indiana and several other states. To date, a comprehensive report covering the entire U.S. hemp-derived cannabinoid market has not been published.

This report is the first of its kind: a comprehensive economic impact analysis of the U.S. hemp-derived cannabinoid industry.

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## OBJECTIVE OF THE REPORT

The objective of this report is to quantify the hemp-derived cannabinoid industry at the national level, including business revenues, jobs, wages and tax revenue potential. The report also examines the impact that a patchwork of state policies has on the national industry.

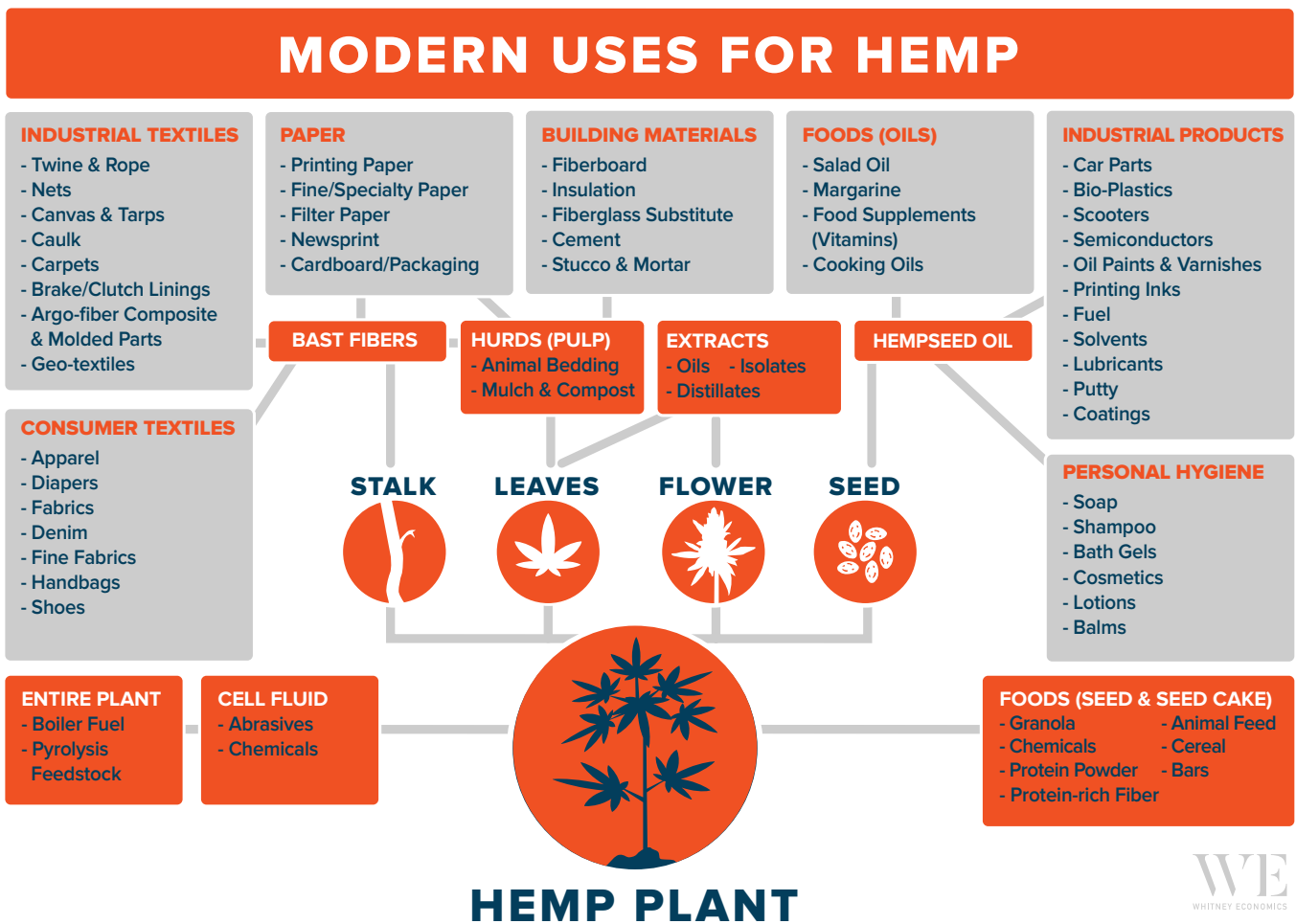


# ABOUT HEMP

## Understanding hemp: It is not just about intoxication

While the focus of this report is on the hemp-derived cannabinoid market, many legislators, regulators and other stakeholders do not always recognize that there are actually three markets within the hemp industry; 1) Fiber, 2) Grains/Seeds, and 3) Cannabinoids. Given the rapid ascension of hemp-derived cannabinoids,

policy makers tend to forget about the other sectors within the hemp industry and focus primarily on the cannabinoid sector. **The economic potential of all three hemp sub-sectors is significant, in fact it is actually larger than the adult-use and medical cannabis industry.** This report will focus only on the hemp derived cannabinoid market: the smallest of the three markets.



Source: credit to "www.torontoheмп.com / Toronto Hemp Company (THC) and Jack Herer"

# CANNABINOID POLICY AND ITS MARKET EFFECTS

A baseline of data on demand, employment, wages, taxes and overall impact is beneficial when it comes to policy analysis. Data enables decision makers to better understand the potential impacts of current and proposed changes to policies and regulations. This section will examine the current state of policy. We will pay attention to how federal policy gaps have created distortions in the national cannabinoid marketplace.

## U.S. Federal Hemp Policy Overview

Hemp-derived cannabinoid policy can be very complex to understand. The 2018 Farm Bill de-scheduled hemp and all of its derivative products. Some argue that this was the intention of the policy makers, while others argue that it was an unintended consequence. When the 2018 Farm Bill was signed into law, it gave a basic framework on agricultural policy. Most of the policy dealt with existing agricultural industries, with hemp being an exception.

## Conflicting Approaches by Federal Agencies

Typically, when laws are created, they provide a basic legal framework. Regulators then produce the rules and regulations to support that basic legal framework. When laws change for existing regulated industries, regulators are forced to update their current policy sets in order to conform with the laws. Hemp has had very little regulatory structure, because it is basically a new industry. With the exception of a broad base of regulations deployed by the USDA, other regulators have yet to deploy their guidance, particularly the FDA.

The deployment of federal policy has not kept up with the evolution and fast-paced changes of the marketplace. The FDA has taken a light touch approach to regulation, delaying fundamental policy decisions related to cosmetics, supplements and drug designations. The USDA has embraced hemp in general and has set up a national regulatory structure that helps to manage licensing and testing of hemp.

The key here is that once hemp is tested on the farm and passes the 0.3% THC Delta-9 by dry weight threshold, then it is defined as hemp throughout the processing, manufacturing, distribution and retail networks.

## The State and Federal Disconnect

In the 2018 Farm Bill, the law reads basically that anything derived from hemp is considered hemp. This section of the bill has been used by hemp business operators to innovate and deploy products into the marketplace. The resulting surge in products is undeniable, and has resulted in legal challenges and regulatory clarifications. Regardless of these legal actions, both the DEA and the courts have weighed in on this, affirming the legality of hemp-derived products. Essentially, the assertion that “anything derived from hemp is hemp” has been affirmed by both the DEA and the courts.

## DEA Ruling: Agency Recently Reaffirmed the Legality of Delta-8 THC, Delta-10 THC & HHC

On or about February 13, the DEA responded to an inquiry from Attorney Rod Knight regarding the legal status of THCO (only). The DEA stated that THCO is a schedule one controlled substance applying the Analogue Act. The DEA letter was solely about THCO, specifically delta-8 THCO and delta-9 THCO. It did not in any way address delta-8 THC or any other compound. **The legal status of delta-8 THC was not impacted in any way by the DEA’s letter, except to the extent that its lawful status as “hemp” was reinforced.** The DEA could have said that Delta-8-THC was unlawful or was synthetic; it did not. Instead, previously, the 9th Circuit Court of Appeals had indicated that Delta-8 ‘fits comfortably’ within the hemp definition of the Farm Bill.



## U.S. 9th Circuit Court Ruling: Hemp and Hemp Derived Products are Legal

Hemp Derived products are hemp by definition and are therefore legal to sell and productize, according to the U.S. 9th Circuit. As such, they do not require as much regulation as does federally illegal adult-use and medical cannabis. While adult-use and medical cannabis industry operators are crying foul and painting hemp-derived products in a negative light, the fact remains that until policy changes are made at a federal level, hemp derived products will remain federally legal.

Based on a survey of hemp-derived cannabinoid operators conducted in 2023, the hemp and CBD supply chain extends to all 50 states. A rule change in one state can have an adverse impact on another and cause supply chain disruptions. State-by-state enactment of laws addresses federal regulatory ambiguity, but is disrupting firms' abilities to conduct interstate commerce. Additionally, the lack of certainty about what is legal is negatively impacting investment flows into hemp. If a company is not certain that a product will remain legal in a market, it will hesitate in deploying there. Uncertainty will suppress the growth of the nascent industry, and impact the development of the infrastructure needed to support ongoing growth. Much of the uncertainty could be addressed through clear federal regulation at the product level. Meanwhile, without clarity on which products are legal and where they are legal, participation in hemp agriculture will continue to be suppressed.

### State Policy Interventions

To address the relatively light touch of federal regulations, states have begun to intervene. Because the hemp-derived cannabinoid industry is so new, states generally do not know much about it. As such, states have tended to underestimate the amount of economic activity generated by hemp. In their own self-interest, adult-use and medical cannabis operators have sometimes played a large role in influencing state policies. They have done so by characterizing hemp-derived products as a public safety threat. This has tipped policy more onto the side of public safety, without considering the significant level of economic activity that is occurring.

## State Legislatures and Regulators React

States have attempted to specifically target hemp-derived cannabinoids that may have an intoxicating effect on people. Without federal guidelines, these self-regulated products are leading to the potential for untested, unsafe products to be acquired by consumers. A lack of testing standards, labeling standards and distribution standards also can harm consumers or be accessed by minors. Concerns about youth usage are particularly important to state legislators. In some cases, proposed legislation would either re-criminalize hemp derived products or regulate them as a schedule one drug. Schedule one drugs are illegal and defined as having no currently accepted medical use, and a high potential for abuse. Hemp-industry advocates have pushed back on these proposals, arguing that while regulation is welcomed to weed out bad actors, re-criminalizing a legal product is legislative and regulatory overreach.

### Potential Solutions: Federal Guidance on Regulating by Product Intention

A simple solution to this regulatory murkiness would be for the U.S. congress to provide more definitive guidance with respect to regulating hemp products. It is expected to be addressed in the 2023 Farm Bill, but to what extent, it is uncertain. As a result of this lack of regulatory clarity, state legislatures have begun examining product intention-based legislation, particularly when it comes to intoxicating cannabinoids. **State legislatures have attempted to enact solutions to fix a federal problem.** However, there are often policies that interfere with interstate commerce, reduce employment, and close businesses without measurably addressing any stated public safety concerns.

Legislatures in 19 states have proposed laws to completely prohibit the retail sale of hemp-derived cannabinoids. This is an attempt to address these perceived public safety issues at the state level, but does not address other specific areas of concern. Other legislatures have enacted laws that allow the sale of hemp-derived cannabinoid products, but under specific conditions. These conditions include testing, proper labeling, and age verification at the point of sale. Other state-level restrictions include capping the level of THC in a given serving or package, though this is less common.

Where are hemp derived products legal? There are three state approaches to the hemp-derived cannabinoid industry:

- **Prohibited:** States that prohibit the sale of hemp-derived cannabinoids (19)

- **Restricted:** States that have imposed restrictions on the sales, but still allow them (9)
- **Legal (Unrestricted):** States that have followed the guidance of the Farm Act and have determined that the sale of cannabinoids is legal (23)

The extent to which states are developing laws can be articulated with the following statistics.

Category	Number of states
States without laws or restrictions on cannabinoids	23
States that ban hemp-derived cannabinoids	19
States with some restrictions on sales, but still allow them	9

Source: Whitney Economics

### Patchwork System of State-by-State Interventions

The patchwork of different state laws has made it difficult for operators and investors to know what is legal and what is not. It is reminiscent of the period around the 2014 Farm Bill, when each state defined hemp differently, which made commerce perilous. For example, in 2019, a person transporting legal hemp, with a certificate of analysis, a manifest and commercial invoice was arrested in Idaho, while in transit from Oregon to Colorado. He was charged with multiple felonies despite the product being legal nationally. Separately, during the same period, transporting from Arizona to California was also a violation of the law. Today, similar issues are evolving because of these state-by-state differences. Attempts to address public safety issues are being circumvented by online sellers. This does not appear to be in line with what the congress intended. **State-by-state interventions are not achieving their goals and are creating other market distortions.** With a clear divide in the number of states that have legalized and criminalized hemp-derived cannabinoids, federal clarity seems appropriate.

### Good Actors and Bad Actors

Many operators take public safety and product safety very seriously, and use sophisticated product testing and tracing systems. Other operators prefer to work in the gray areas, shipping inconsistent products,

mostly online, and with little regard for youth usage, product safety or truth in labeling. These operators are negatively impacting the image of the industry, and they are largely the reason why states have intervened. Hemp industry operators who use best practices for public and product safety are asking the federal government to provide a basic framework for regulators to use to address bad actors. This seems to be a more viable path towards addressing public safety issues in an effective manner.

### The Hemp-Derived Cannabinoid Industry Wants Greater Federal Oversight

Much of the confusion surrounding hemp-derived cannabinoids comes from the fact that **there is not enough federal regulation.** This sentiment is shared by nearly all stakeholders. At the state level, the absence of federal rules has agitated the conversation around public safety issues, instead of fixing them. With the exception of regulatory oversight from the USDA, much of the hemp industry remains self-regulated.

### Hemp Industry Would Benefit from Federal Uniformity in Rules

While states are re-criminalizing hemp-derived cannabinoids, industry operators generally feel that this is an overreaction. Hemp policy is complex due to a lack of federal regulation. A lower touch federal model would appear to be more effective to address public and product safety issues than the current state-by-state patchwork of laws.

**Given the extensive reach and national supply chain of hemp, federal uniformity in rules would:**

- Facilitate efficient flows of goods and services.
- Support public safety efforts
- Enable interstate commerce
- Contribute to the growth of the hemp industry
- Allow for the establishment of national standards related to cultivation, production and manufacturing of hemp-derived goods.

## DATA AND ANALYSIS: CREATING A BASELINE OF DATA

There are many questions inspired by these policy differences and legislative approaches. Whitney Economics has conducted a national survey of hemp cultivators, manufacturers, distributors and retailers in order to assess the economic impact of cannabinoids in the United States.

**The survey was designed to shed light on the following questions:**

- **What is the size of the hemp-derived cannabinoid market in the United States?**
- **What are the economic impacts of the cannabinoid industry?**
- **For those states that are following federal guidance, what is the economic benefit?**

- **How many jobs are created by hemp-derived cannabinoids?**
- **Are hemp product producers paying taxes?**
- **What is the total number of consumers?**
- **For those states imposing bans, what is the economic impact?**
- **What is the size of those state markets that have banned hemp-derived cannabinoids?**

The national survey was conducted in 2023, receiving more than 800 responses and covering 45 states. This section will examine the data and the insights gleaned therein. The complete survey question set is available in the appendices of this report.



# TOTAL DEMAND ANALYSIS

Total demand data helps operators, regulators and policy makers make informed decisions, and to understand the potential impact of those decisions. To date, very little data has been generated on the extent of demand for hemp-derived cannabinoids. This section will examine the total demand in the United States. A state-by-state breakdown is provided in the appendices of this report.

In order to assess the amount of demand activity, Whitney Economics deployed multiple surveys across the U.S. and developed multiple revenue models. The firm did this using its survey results, as well as interviews with operators and limited government data. Prior to this report, most estimates were gleaned from the projected value of hemp biomass or from revenues of CBD, based on publicly available stock market data. Previous estimates were borne from CBD production estimates from Charlotte's Web (TSX:CWEB) and other publicly available data, but not directly from surveyed businesses. Additionally early estimates do not appear to have considered the massive amount of excess CBD inventory already in the market.

## Three demand models of U.S. hemp derived cannabinoids

- **The first model examined each state's survey responses.** Average revenue per store (from only the responses), multiplied by the number of stores in the state. This model tended to under-call the demand, because it did not include sales from gas stations, grocery stores and dispensaries. (This was considered the lower bound)
- **The second model examined the average sales per store,** spread out over multiple states and geographies. Average sales figures were then applied to all stores in a given state. (This was considered the midpoint forecast)

- **The third model examined the per capita spending** for CBD and Cannabinoid products. It considered all citizens 18 years and older. The per capita spending was calculated by examining sales in known states, and then dividing the total spends by adult population. This was averaged out over several states. Then, per capita spending was applied to the adult-populations in every state. (This was considered the upper bound).

## Additional Notes on Per Capita Spending Model

- While the per capita model is considered the upper bound in this report, it is more likely the midpoint, given the other models did not include sales at gas stations, grocery stores and other distribution channels.
- By considering those, total sales estimates and average sales would all be higher, thus increasing the per capita spends.
- Per capita spending model has also been compared to data and other calculations from prior Whitney Economics unpublished research on cosmetics and beverages, and is in line with those findings.

## Results of Demand Analysis

The demand for hemp-derived cannabinoids is significantly larger than previous estimates. This should not be surprising, given that no one had previously asked businesses directly for their inputs. **Nationally, the total market for hemp-derived cannabinoids is conservatively estimated to be \$28.4 billion.** For context, hemp-derived cannabinoid sales nationally were greater than total legal sales of medical and adult-use cannabis in 2022. Also, based on data from the American Brewers Association, total sales of hemp-derived cannabinoids were roughly the same as all of the craft beer sold in the U.S. in the same year. (<https://www.brewersassociation.org/statistics-and-data/national-beer-stats/>)

Total U.S. Demand for Hemp-Derived Cannabinoids	
Low	\$21,306,596,155
Mid	\$28,425,525,322
High	\$35,831,748,581

Source: Whitney Economics

## Demand Split: Legal, Restricted, Prohibited

Demand from states that do not prohibit the sale of hemp cannabinoids account for 74.9% of the nation's total demand. Although retail sales are illegal in 19

states, consumer interest remains strong there, and is supported by other distribution channels, such as online sellers.

Total U.S. Demand for Hemp-Derived Cannabinoids	
Legal	\$14,340,444,717
Restricted	\$6,953,197,280
Prohibited	\$7,131,883,325

Source: Whitney Economics

The amount of demand coming from prohibited states is a clear indicator that market opportunities remain. Rules related to restricting cannabinoid sales for public

safety issues are not necessarily effective in stemming the flow of products in the state.



# SUPPLY ANALYSIS

Hemp-derived cannabinoid products are sold throughout the U.S. With strong demand across the country, suppliers of hemp derived cannabinoids have created new business opportunities and developed an extensive supply chain that spans all 50 states. Many

observers are surprised about the size, complexity and reach of the hemp supply chain, which includes growers, oil extractors, manufacturers, distributors and wholesalers.

## Top Sources of Supply by State (based on survey responses)

State	Count	Percentage of Responses	Rank
Florida	486	63.3%	1
California	356	46.4%	2
Colorado	318	41.4%	3
Texas	262	34.1%	4
Oregon	218	28.4%	5
North Carolina	149	19.4%	6
Kentucky	99	12.9%	7
Illinois	98	12.8%	8
New York	97	12.6%	9
Georgia	79	10.3%	10

Source: U.S. Hemp-Derived Cannabinoid Business Survey, Whitney Economics

### Data Highlights

- **63.3% of respondents (from 45 states) have Florida hem-based products in their supply chain**
- **Nearly half of all respondents have hemp or hemp-derived products from California in their supply chains.**
- **All 50 states are a source of hemp, and all states are exporting to other states throughout the country (and internationally)**
- **All regions of the U.S. contribute to the hemp supply chain**
- **The country's five largest state economies are currently also the largest suppliers of hemp-derived products: California, New York, Texas, Illinois and Florida.**

Currently, a policy change in one state will have an impact on multiple other states. Policy makers may not realize this when they implement legislation in their states. This example demonstrates the importance of national policies that govern the industry, versus the current, state-by-state, patchworked approach.

# EMPLOYMENT AND WAGE ANALYSIS

With an extensive supply chain and significant revenue generation, the hemp-derived cannabinoid industry creates employment opportunities in multiple industries. With segments including farming, biomass processing, product manufacturing, distribution and retail, the hemp-derived cannabinoid industry has proven to be a major source of employment.

### Based on survey results:

- The hemp-derived cannabinoid industry employs over 325,000 workers.
- Hemp cannabinoid operators pay in excess of \$13.2 billion in wages.

- The average hemp operator employs 12.6 employees, paying each one between \$35k - \$50k/yr.
- Distributors and manufacturers employ more people, on average, than retailers.
- The average distributor employs approximately 20 employees.
- Some distributors employ more than 200 workers
- Manufacturers employ more than 25 workers, on average.
- Some large manufacturers in WI, IN, FL and TX employ between 125 and 250 workers.

Total U.S. Hemp-Derived Cannabinoid Employment	
Forecast	\$28,425,525,322
Jobs	328,989
Wages	\$13,206,783,234

Source: Whitney Economics

Given the level of employment nationally and the level of interstate commerce, regulators and legislators are challenged to strike a balance between public safety priorities and the potential impact of lost jobs and

lower economic benefit associated with the hemp cannabinoid industry. If they do not, there will be unintended consequences that extend far beyond state borders.



# STATE SALES TAX REVENUES

## False Narratives

There is a false narrative that has been perpetuated by operators in the adult-use and medical cannabis industries. This narrative says that by selling intoxicating cannabinoids that compete directly with cannabis products, hemp operators are not paying taxes. They argue that states are losing out on tax revenues. While it is difficult to ascertain the extent to which medical and adult-use cannabis demand is cannibalized by hemp-derived products, the narrative

that states do not derive tax revenues from hemp sales is a false one.

## Hemp Tax Revenues to States Exceed \$1.5 Billion

Hemp-derived cannabinoid sales is a significant driver of tax revenues at the state level. **Sales tax alone, excluding excise taxes, are generating in excess of \$1.5 billion in tax revenues for the states.** This does not include business and payroll taxes or any additional cannabinoid related taxation.

Total U.S. Hemp-Derived Cannabinoid Sales Tax Potential	
Forecast	\$28,425,525,322
Sales Tax Revenue	\$1,551,475,647

Source: State Departments of Revenue, Whitney Economics

Given the levels of tax revenue potential at the state level, the sale of hemp-derived cannabinoids is a significant source of state tax revenue.

# TOTAL ECONOMIC IMPACT

The total economic impact of hemp-derived cannabinoids in the U.S. can be calculated by using a multiplier. For every dollar spent on hemp-derived cannabinoid products, there is an additional \$2.8

dollars of economic activity derived from that sale.

**Based upon our midpoint forecast of \$28.4 billion in sales, the total economic impact nationally is nearly \$80 billion.**

Total U.S. Hemp-Derived Cannabinoid Economic Impact (2.8x)	
Sales Forecast (Midpoint)	\$28,425,525,322
Economic Impact (Multiplier Effect)	\$79,591,470,902

Source: Whitney Economics



# AN ANALYSIS OF THE PROHIBITION STATES

From a policy perspective, is the potential benefit to public safety enough to justify the impact those policies are having on business revenues, jobs, taxes and business creation? States that have enacted laws

prohibiting sales of hemp-derived cannabinoids have experienced a negative economic impact. This section will examine the impacts that the prohibition has had on the states that enacted them.

## Currently 19 U.S. States Ban the Retail Sale of Hemp-derived Cannabinoids:

States Prohibiting the Sale of Hemp Cannabinoids	
Alabama	Nevada
Alaska	New York
Arizona	North Dakota
Arkansas	Oregon
Colorado	Rhode Island
Delaware	Utah
Idaho	Vermont
Iowa	Washington
Mississippi	West Virginia
Montana	

Source: Whitney Economics 2023

## Total Addressable Markets in Prohibition States

Prohibiting hemp-derived cannabinoid retail sales has created some unintended consequences. Although the retail sale of hemp-derived cannabinoids is banned,

this does not mean that consumers no longer have access to these products. Many of these products can be purchased online. This availability may increase public safety issues and enable youth access.

State	Quantity	Forecast based on Survey Reports (Low)	Forecast Average Sales per Business (Mid)	Forecast per Capita (High)
<b>Prohibited Total</b>	<b>19</b>	<b>\$5,280,530,328</b>	<b>\$7,131,883,325</b>	<b>\$8,035,254,584</b>

Source: Whitney Economics

The total demand for hemp-derived cannabinoid products in these 19 prohibition states is between \$5.2 billion and \$8.0 billion. Several of these states have strong adult-use and medical cannabis programs.

Operators in the adult-use and medical industry tend to oppose the sale of hemp products, despite the positive economic impact the sale of those products would have.

## Employment and Lost Wage Impact in Prohibition States

The total employment potential in the 19 states prohibiting the sale of hemp-derived cannabinoids is 82,542 jobs. This figure does not include employment from gas stations, convenience stores or grocery

stores. Bans on the sale of hemp derived cannabinoids would see a potential reduction in payrolls by \$3.3 billion. This does not include the potential revenue reductions and the employment ripple effects of suppliers from other states.

State	Quantity	Revenue	Jobs	Wages
<b>Prohibited Total</b>	<b>19</b>	<b>\$7,131,883,325</b>	<b>82,542</b>	<b>\$3,313,544,290</b>

Source: Whitney Economics

## Reduced Sales Tax Revenues in Prohibition States

States that have enacted prohibitions on the sale of hemp-derived cannabinoids will experience reduced

tax revenues. Based on the sales tax rates in each state, the total reduction of tax revenue potential in the 19 states is \$303.7 million. This figure does not include declines in business taxes.

State	Quantity	Revenue	Sales Tax Rate	Tax Revenue Potential
<b>Prohibited Total</b>	<b>19</b>	<b>\$7,131,883,325</b>		<b>\$303,733,280</b>

Source: Whitney Economics

## Prohibition Policy Impact on Businesses

Based on survey results, half of the businesses impacted by state bans indicated that they will either go out of business or move their businesses to other states. Only 26.2% of respondents from prohibition states indicated that they would remain in business, albeit with reduced revenues.

## Lost Economic Activities Associated with the Banning of Retail Sales of Cannabinoids

The reduction of revenue potential based on the sales of cannabinoids in states prohibiting retail sales is \$7.1 billion, which in turn has a potential economic impact of \$20 billion to the 19 state economies. It is not clear if this level of reduced economic activity was the intent of the legislators in those states.

Total Lost Economic Potential and Multiplier (2.8x)	
Forecast (Prohibited Only)	\$7,131,883,325
Economic Impact (Multiplier Effect)	\$19,969,273,309

With the reduced revenues of \$7.1 billion, reduced employment, wages and tax revenues, state legislatures may have underestimated the impact of their decision to try and quickly address public

safety concerns. ***The attempt to address federal policy issues at the state level is having many different types of unintended consequences.***

# POTENTIAL IMPACTS OF FUTURE BANS ON THE SALE OF HEMP-DERIVED CANNABINOIDS

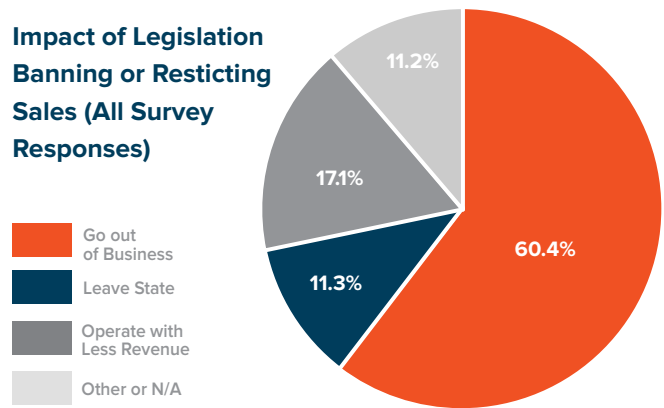
The economic damage may have already been done in states that have prohibited the retail sale of hemp-derived cannabinoids. A state potentially banning sales and production of hemp products is an ongoing existential threat to the industry. This section will examine how survey respondents view the extent of this threat to their businesses.

## Bans would have a Devastating Impact on Business Owners

Based on the survey results from all respondents, 71.7% of all businesses would either go out of business or move to another state. Extrapolated to a national level, this would reduce industry revenues by \$20.4 billion, off of \$28.4 billion in sales. If there were a

nationwide ban, total labor would be reduced by over 235,000 workers. Retailers, farmers and other ancillary businesses would also be impacted and would lose economic opportunities that were previously available.

**Impact of Legislation Banning or Restricting Sales (All Survey Responses)**



Source: Whitney Economics, U.S. Hemp-Derived Cannabinoid Business Survey

## Reduced Economic Activities

Overall, the level of economic impact increases with every state that implements a ban on the sale of hemp-

derived cannabinoids. In total, the downside risk is a potential reduction of taxable sales by \$20.4 billion and a potential loss in economic activity of \$57.1 billion.

Total Lost Economic Potential and Multiplier (2.8x)	
Forecast (Assumes Nationwide Ban)	\$20,381,101,656
Economic Impact (Multiplier Effect)	\$57,067,084,637

Source: Whitney Economics

*Given the level of economic impact that state-by-state bans are having on the hemp industry, there is a greater need for federal guidance, oversight and regulatory clarity.*

## CONCLUSION

The passage of the 2018 Farm Bill is considered by many observers to be a major success for the U.S. hemp industry. Many new opportunities were born from the de-scheduling of hemp, and from allowing for the legal sales of products that are derived from hemp.

Many new markets have been formed as a result of the Farm Bill. The hemp-derived cannabinoid market is just one of them. Few would have suspected that the hemp-derived industry would blossom into a \$28 billion/year industry that would have a national supply chain spanning all 50 states. While the emergence of this market has opened the door for many operators, a more robust federal regulatory structure is clearly needed.

Without federal standardization and regulatory structures, state legislatures felt compelled to intervene. This intervention has addressed some issues successfully, but also has created distortions in the market. Due to a lack of data, no one realized the impact that these policies were having on businesses. These market distortions continue to have unintended consequences that can not effectively be addressed at the state level. They must be addressed federally.

Data was provided by a statistically viable sample of more than 800 operators from 45 states. For the first time, policy makers, regulators and operators have a comprehensive dataset with which they can analyze the U.S. market for hemp-derived cannabinoids.

With data, informed decisions are possible.



# APPENDICES

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## APPENDIX 1:

# About the Author / Statement of Conflicts

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### **Beau Whitney, Cannabis Economics, Operations and Supply Chain Expert**

Beau Whitney is the founder and Chief Economist at Whitney Economics, a global leader in cannabis and hemp business consulting, data, and economic research. Whitney Economics is based in Portland, Oregon.

Serving an international clientele, Beau is considered one of the leading cannabis economists in the U.S. and globally. His applications of economic principles to create actionable operational and policy recommendations has been recognized by governments, and throughout the economic, investment, business communities. Beau recently spoke about cannabis economics at the United Nations.

His white papers analyzing the adult-use, medical and industrial cannabis markets have been referenced in the Wall Street Journal, Washington Post, New York Times, USA Today, the Associated Press, as well as in leading cannabis industry publications.

Beau Whitney is a member of the American Economic Association, the Oregon chapter president of the National Association for Business Economics, is a member of multiple regulatory advisory committees throughout the U.S. and participates on the Oregon Governor's Council of Economic Advisors.

Beau has provided policy recommendations at the state, national and international levels and is considered an authority on cannabis economics and the supply chain.



**Beau Whitney**  
**WHITNEY ECONOMICS**

### **Statement Of Conflicts**

Whitney Economics does not take a position on this issue of cannabis legalization, however there are potential conflicts while presenting economic and market analysis.

- Whitney Economics receives compensation for business and economic analysis of the cannabis industry.
- Mr. Whitney has previously held positions and licenses within the legal regulated cannabis industry.
- Mr. Whitney currently has investments in a cannabis investment fund, Mantis Growth Investments, and he is a member of the fund's Board of Directors.
- Mr. Whitney serves in an unpaid role as Chief Economist for the National Cannabis Industry Association
- Whitney Economics is a member of the European Industrial Hemp Association.
- Mr. Whitney is a founder of Every Day Hemp Company, an Oregon-based manufacturer of hemp based plastic products.

## APPENDIX 2:

# Methodology

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Whitney Economics conducted a national survey of hemp cultivators, manufacturers, distributors and retailers in order to assess the impact of cannabinoids in the U.S. The national survey received over 815 responses and covered 45 states.

### State by state revenues

Based on previous surveys, conducted by Whitney Economics, projections on the total sales of hemp-derived cannabinoids were made. The projections were then reviewed on a per capita basis. The total sales per capita was then compared to multiple states for commonality. In other words, is the per capita spending on hemp-derived cannabinoids similar from state to state.

Projections were then made with other states that did not have a statistically viable sampling, but had data nonetheless. If data was similar from state to state and in line with sampling from other states, the per capita spending was then applied to every state individually.

The state projections were then added up to make a national number. Initial projections were between \$20 - \$25 Billion based on Virginia, Florida and Texas. This figure was then challenged in the final national projections.

In order to assess the amount of demand activity, Whitney economics deployed multiple surveys across the U.S. and used the results from the surveys, interviews with operators and limited government data to develop multiple revenue models. Prior to this report, most estimates were gleaned from the projected value of hemp biomass or from revenues of CBD based on publicly available stock market data. Previous estimates were borne from CBD production

estimates from Charlottes web and other publicly available data but not directly from businesses. In addition, previous estimates did not seem to consider the massive amount of excess inventory of CBD in the market.

Three models were developed to project the demand of hemp derived cannabinoids

- The first model examined responses from the survey for each state. It took the average revenue per store from only the responses, and then multiplied this average by the number of stores in the state. This tended to under-call the demand as the model did not include sales derived from gas stations, grocery stores and dispensaries. (This was considered the lowest estimate)
- The second model examined the average sales per store spread out over multiple states and geographies. The average sales were then applied to all stores in a given state. (This was considered the midpoint forecast)
- The third model took a slightly different approach. It examined the per capita spending for CBD and Cannabinoid products. It considered all citizens of a given state aged 18 years and older. The per capita spending was calculated by examining sales in known states and dividing the total spends by adult population, then averaging this out over several states. The per capita spending was then applied to the adult-populations in every state. (This was considered the upper bound). Per capita spending was also compared to other calculations from previous unpublished research on cosmetics and beverages and is in line with those findings as well)

**Note:** While the per capita model is considered the upper bound in this report, it is more likely the midpoint, given the other models did not include sales to gas stations, grocery stores and other distribution channels. By considering those, the total sales estimates, the average sales would all be higher, thus increasing the per capita spends.)

## APPENDIX 2:

# Methodology (cont.)

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### Jobs

Jobs were also calculated on a per capita basis and a per dollar of revenue basis. For example, if the average was 100 jobs per million inhabitants, then for a state with 500k in habitants, there would be 50 jobs. Jobs were not tabulated by business type since there was not enough data to assess how many of each business type were in each state and the fact that even labor departments are unable to track this level of detail. States are unable to track down to the NAICS code level as cannabis and hemp have few NAICS codes deployed. This is a flaw in the U.S. federal market that can easily be addressed, but the U.S. federal government is unable or unwilling to make this change.

### Taxes

Taxes were based on a retail model. Based on the standard retail excise tax, the total tax revenue by state was calculated by multiplying the total projected sales by each states' tax rate. This was provided at the state level and a national roll up was simply all of the states' tax revenues added together.

### Multiplier

The multiplier effect is the amount of economic activity that is derived from each dollar of revenue gleaned from the sale of hemp-derived cannabinoids. A standard cannabis multiplier is 2.8x and this multiplier is also used for hemp derived cannabinoids.



## APPENDIX 3:

# Survey Questions

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This is a sample list of questions for the survey of CBD and Cannabinoids operators and retailers. These questions helped form the basis for the data and impacts presented in the report.

### GENERAL:

- Does your company sell or product CBD or Cannabinoid products?
- In what state is your company doing business in?
- What type of business are you?

### SALES:

- How much revenue do you generate from the sales each year related to the following:
  - CBD Only
  - Converted Cannabinoids (Delta-8, Delta-10, HHC etc.)
- What is your total revenue each year for all products?
- What percentage of sales is CBD / Converted cannabinoid related?
- Do you sell only in your state, in other states, or elsewhere?

### EMPLOYMENT:

- How many employees does your business have?
- What is the average hourly wage paid?

### SUPPLY CHAIN

- What states do you RECEIVE your products from? (Check all that apply)

### OTHER:

- What are the greatest risks to your business? (Check all that apply)
- Do you check ID's? (Y/N)
- If laws are passed prohibiting sales of CBD or cannabinoid products, what will you do?
- Any comments you would like to add about this industry or regulatory environment?

## APPENDIX 4:

# Total Addressable Market Demand Forecast

Total demand was calculated using three separate methodologies; 1) Low: An average based on inputs from surveys, 2) Mid: A forecast based on the average of sales per retailer using data from state-by-state reports, and 3) High: A forecast based on per capita spending using market data and census population statistics.

State	Legal Status	Forecast based on Survey Reports (Low)	Forecast Average Sales per Business (Mid)	Forecast per Capita (High)
Alabama	N	\$400,800,000	\$272,450,480	\$521,663,067
Alaska	N	\$80,502,585	\$80,502,585	\$80,502,585
Arizona	N	\$83,986,000	\$699,072,040	\$926,607,803
Arkansas	N	\$138,800,000	\$283,054,840	\$320,488,011
California	R	\$1,222,200,000	\$3,560,617,800	\$4,193,119,539
Colorado	N	\$1,517,000,000	\$1,237,447,240	\$623,376,192
Connecticut	R	\$75,243,144	\$238,190,240	\$395,298,822
Delaware	N	\$103,960,380	\$103,960,380	\$103,960,380
District of Columbia	L	\$79,211,957	\$79,211,957	\$79,211,957
Florida	L	\$5,016,809,648	\$1,944,676,480	\$2,637,061,867
Georgia	R	\$219,665,760	\$548,163,840	\$1,141,170,104
Hawaii	R	\$56,235,693	\$92,176,360	\$151,060,196
Idaho	N	\$2,732,400	\$134,593,800	\$186,381,767
Illinois	L	\$453,934,299	\$835,297,280	\$1,392,526,718
Indiana	L	\$220,170,000	\$438,041,640	\$702,799,384
Iowa	N	\$312,551,211	\$312,551,211	\$312,551,211
Kansas	L	\$60,208,333	\$203,930,000	\$309,955,965
Kentucky	L	\$214,600,000	\$301,816,400	\$478,339,600
Louisiana	R	\$65,621,250	\$250,426,040	\$488,879,859
Maine	L	\$5,632,000	\$417,648,640	\$155,157,072
Maryland	R	\$303,513,000	\$364,626,840	\$693,557,180
Massachusetts	L	\$122,600,000	\$500,036,360	\$746,603,234
Michigan	R	\$1,133,243,065	\$1,150,980,920	\$1,133,243,065
Minnesota	R	\$395,913,857	\$294,474,920	\$620,452,569
Mississippi	N	\$40,000,000	\$163,144,000	\$314,958,010
Missouri	L	\$127,200,000	\$691,730,560	\$677,122,464
Montana	N	\$109,057,945	\$109,057,945	\$109,057,945
Nebraska	L	\$36,123,750	\$139,488,120	\$199,763,726
Nevada	N	\$91,500,000	\$447,830,280	\$377,572,286
New Hampshire	L	\$22,400,000	\$182,721,280	\$169,641,329
New Jersey	L	\$48,069,000	\$359,732,520	\$1,004,803,085
New Mexico	L	\$218,309,386	\$362,995,400	\$218,309,386
New York	N	\$1,053,000,000	\$858,953,160	\$2,091,307,920
North Carolina	L	\$941,743,718	\$759,435,320	\$1,133,650,226
North Dakota	N	\$545,400,000	\$44,048,880	\$64,544,189
Ohio	L	\$424,670,400	\$704,782,080	\$1,221,318,323
Oklahoma	L	\$301,510,000	\$2,235,888,520	\$385,412,849
Oregon	N	\$85,310,961	\$912,790,680	\$467,857,626
Pennsylvania	L	\$791,280,000	\$822,245,760	\$1,369,717,685
Rhode Island	N	\$38,817,558	\$63,626,160	\$125,853,647
South Carolina	L	\$208,254,838	\$290,396,320	\$564,738,099
South Dakota	L	\$16,500,000	\$44,864,600	\$91,857,802
Tennessee	L	\$282,662,874	\$561,215,360	\$734,637,611
Texas	L / LP	\$2,025,698,176	\$2,048,272,920	\$3,079,117,892
Utah	N	\$326,339,203	\$326,339,203	\$326,339,203
Vermont	N	\$1,897,084	\$35,891,680	\$76,669,659
Virginia	R	\$568,336,528	\$453,540,320	\$926,416,217
Washington	N	\$313,575,000	\$921,763,600	\$805,843,152
West Virginia	N	\$15,300,000	\$124,805,160	\$199,719,931
Wisconsin	L	\$323,505,150	\$379,309,800	\$641,255,581
Wyoming	L / LP	\$45,000,000	\$36,707,400	\$60,294,591
<b>USA Totals</b>		<b>\$21,306,596,155</b>	<b>\$28,425,525,322</b>	<b>\$35,831,748,581</b>

## APPENDIX 5:

# Employment and Wage Potential by State

Wage and employment potential was based on the mid-point forecast and extrapolated using data from stat-by-state surveys. Note: This does not include employment at gas stations or grocery stores.

State	Legal Status	Revenue	Jobs	Wages
Alabama	N	\$272,450,480	3,153	\$126,583,217
Alaska	N	\$80,502,585	932	\$37,402,306
Arizona	N	\$699,072,040	8,091	\$324,795,858
Arkansas	N	\$283,054,840	3,276	\$131,510,108
California	R	\$3,560,617,800	41,210	\$1,654,298,625
Colorado	N	\$1,237,447,240	14,322	\$574,930,358
Connecticut	R	\$238,190,240	2,757	\$110,665,567
Delaware	N	\$103,960,380	1,203	\$48,301,032
District of Columbia	L	\$79,211,957	917	\$36,802,667
Florida	L	\$1,944,676,480	22,507	\$903,516,133
Georgia	R	\$548,163,840	6,344	\$254,682,400
Hawaii	R	\$92,176,360	1,067	\$42,826,058
Idaho	N	\$134,593,800	1,558	\$62,533,625
Illinois	L	\$835,297,280	9,667	\$388,087,467
Indiana	L	\$438,041,640	5,070	\$203,518,525
Iowa	N	\$312,551,211	3,617	\$145,214,417
Kansas	L	\$203,930,000	2,360	\$94,747,917
Kentucky	L	\$301,816,400	3,493	\$140,226,917
Louisiana	R	\$250,426,040	2,898	\$116,350,442
Maine	L	\$417,648,640	4,834	\$194,043,733
Maryland	R	\$364,626,840	4,220	\$169,409,275
Massachusetts	L	\$500,036,360	5,787	\$232,321,892
Michigan	R	\$1,150,980,920	13,321	\$534,757,242
Minnesota	R	\$294,474,920	3,408	\$136,815,992
Mississippi	N	\$163,144,000	1,888	\$75,798,333
Missouri	L	\$691,730,560	8,006	\$321,384,933
Montana	N	\$109,057,945	1,262	\$50,669,412
Nebraska	L	\$139,488,120	1,614	\$64,807,575
Nevada	N	\$447,830,280	5,183	\$208,066,425
New Hampshire	L	\$182,721,280	2,115	\$84,894,133
New Jersey	L	\$359,732,520	4,163	\$167,135,325
New Mexico	L	\$362,995,400	4,201	\$168,651,292
New York	N	\$858,953,160	9,941	\$399,078,225
North Carolina	L	\$759,435,320	8,789	\$352,841,242
North Dakota	N	\$44,048,880	510	\$20,465,550
Ohio	L	\$704,782,080	8,157	\$327,448,800
Oklahoma	L	\$2,235,888,520	25,878	\$1,038,816,158
Oregon	N	\$912,790,680	10,564	\$424,091,675
Pennsylvania	L	\$822,245,760	9,516	\$382,023,600
Rhode Island	N	\$63,626,160	736	\$29,561,350
South Carolina	L	\$290,396,320	3,361	\$134,921,033
South Dakota	L	\$44,864,600	519	\$20,844,542
Tennessee	L	\$561,215,360	6,495	\$260,746,267
Texas	L / LP	\$2,048,272,920	23,706	\$951,648,075
Utah	N	\$326,339,203	3,777	\$151,620,456
Vermont	N	\$35,891,680	415	\$16,675,633
Virginia	R	\$453,540,320	5,249	\$210,719,367
Washington	N	\$921,763,600	10,668	\$428,260,583
West Virginia	N	\$124,805,160	1,444	\$57,985,725
Wisconsin	L	\$379,309,800	4,390	\$176,231,125
Wyoming	L / LP	\$36,707,400	425	\$17,054,625
<b>USA Totals</b>		<b>\$28,425,525,322</b>	<b>328,989</b>	<b>\$13,206,783,234</b>

## APPENDIX 6:

# State Sales Tax Potential

Sales tax potential is based on the mid-point forecast and uses only state sales taxes from each state. Some states do not have a sales tax, while others have a specific cannabinoid tax. Additional cannabinoid taxes were not included in this analysis.

State	Legal Status	Revenue	Sales Tax Rate	Tax Revenue Potential
Alabama	N	\$272,450,480	4.00%	\$10,898,019
Alaska	N	\$80,502,585	0.00%	\$0
Arizona	N	\$699,072,040	5.60%	\$39,148,034
Arkansas	N	\$283,054,840	6.50%	\$18,398,565
California	R	\$3,560,617,800	7.25%	\$258,144,791
Colorado	N	\$1,237,447,240	2.90%	\$35,885,970
Connecticut	R	\$238,190,240	6.35%	\$15,125,080
Delaware	N	\$103,960,380	0.00%	\$0
District of Columbia	L	\$79,211,957	6.00%	\$4,752,717
Florida	L	\$1,944,676,480	6.00%	\$116,680,589
Georgia	R	\$548,163,840	4.00%	\$21,926,554
Hawaii	R	\$92,176,360	4.00%	\$3,687,054
Idaho	N	\$134,593,800	6.00%	\$8,075,628
Illinois	L	\$835,297,280	6.25%	\$52,206,080
Indiana	L	\$438,041,640	7.00%	\$30,662,915
Iowa	N	\$312,551,211	6.00%	\$18,753,073
Kansas	L	\$203,930,000	6.50%	\$13,255,450
Kentucky	L	\$301,816,400	6.00%	\$18,108,984
Louisiana	R	\$250,426,040	4.45%	\$11,143,959
Maine	L	\$417,648,640	5.50%	\$22,970,675
Maryland	R	\$364,626,840	6.00%	\$21,877,610
Massachusetts	L	\$500,036,360	6.25%	\$31,252,273
Michigan	R	\$1,150,980,920	6.00%	\$69,058,855
Minnesota	R	\$294,474,920	6.88%	\$20,245,151
Mississippi	N	\$163,144,000	7.00%	\$11,420,080
Missouri	L	\$691,730,560	4.23%	\$29,225,616
Montana	N	\$109,057,945	0.00%	\$0
Nebraska	L	\$139,488,120	5.50%	\$7,671,847
Nevada	N	\$447,830,280	6.85%	\$30,676,374
New Hampshire	L	\$182,721,280	0.00%	\$0
New Jersey	L	\$359,732,520	6.63%	\$23,832,279
New Mexico	L	\$362,995,400	5.00%	\$18,149,770
New York	N	\$858,953,160	4.00%	\$34,358,126
North Carolina	L	\$759,435,320	4.75%	\$36,073,178
North Dakota	N	\$44,048,880	5.00%	\$2,202,444
Ohio	L	\$704,782,080	5.75%	\$40,524,970
Oklahoma	L	\$2,235,888,520	4.50%	\$100,614,983
Oregon	N	\$912,790,680	0.00%	\$0
Pennsylvania	L	\$822,245,760	6.00%	\$49,334,746
Rhode Island	N	\$63,626,160	7.00%	\$4,453,831
South Carolina	L	\$290,396,320	6.00%	\$17,423,779
South Dakota	L	\$44,864,600	4.50%	\$2,018,907
Tennessee	L	\$561,215,360	7.00%	\$39,285,075
Texas	L / LP	\$2,048,272,920	6.25%	\$128,017,058
Utah	N	\$326,339,203	6.10%	\$19,906,691
Vermont	N	\$35,891,680	6.00%	\$2,153,501
Virginia	R	\$453,540,320	5.30%	\$24,037,637
Washington	N	\$921,763,600	6.50%	\$59,914,634
West Virginia	N	\$124,805,160	6.00%	\$7,488,310
Wisconsin	L	\$379,309,800	5.00%	\$18,965,490
Wyoming	L / LP	\$36,707,400	4.00%	\$1,468,296
<b>USA Totals</b>		<b>\$28,425,525,322</b>		<b>\$1,551,475,647</b>

## APPENDIX 7:

# Data Specific to States that Allow Sales of Hemp-Derived Cannabinoids

Forecast, wage, employment and tax data based on legality

State	Legal Status	Forecast based on Survey Reports (Low)	Forecast Average Sales per Business (Mid)	Forecast per Capita (High)
District of Columbia	L	\$79,211,957	\$79,211,957	\$79,211,957
Florida	L	\$5,016,809,648	\$1,944,676,480	\$2,637,061,867
Illinois	L	\$453,934,299	\$835,297,280	\$1,392,526,718
Indiana	L	\$220,170,000	\$438,041,640	\$702,799,384
Kansas	L	\$60,208,333	\$203,930,000	\$309,955,965
Kentucky	L	\$214,600,000	\$301,816,400	\$478,339,600
Maine	L	\$5,632,000	\$417,648,640	\$155,157,072
Massachusetts	L	\$122,600,000	\$500,036,360	\$746,603,234
Missouri	L	\$127,200,000	\$691,730,560	\$677,122,464
Nebraska	L	\$36,123,750	\$139,488,120	\$199,763,726
New Hampshire	L	\$22,400,000	\$182,721,280	\$169,641,329
New Jersey	L	\$48,069,000	\$359,732,520	\$1,004,803,085
New Mexico	L	\$218,309,386	\$362,995,400	\$218,309,386
North Carolina	L	\$941,743,718	\$759,435,320	\$1,133,650,226
Ohio	L	\$424,670,400	\$704,782,080	\$1,221,318,323
Oklahoma	L	\$301,510,000	\$2,235,888,520	\$385,412,849
Pennsylvania	L	\$791,280,000	\$822,245,760	\$1,369,717,685
South Carolina	L	\$208,254,838	\$290,396,320	\$564,738,099
South Dakota	L	\$16,500,000	\$44,864,600	\$91,857,802
Tennessee	L	\$282,662,874	\$561,215,360	\$734,637,611
Texas	L / LP	\$2,025,698,176	\$2,048,272,920	\$3,079,117,892
Wisconsin	L	\$323,505,150	\$379,309,800	\$641,255,581
Wyoming	L / LP	\$45,000,000	\$36,707,400	\$60,294,591
<b>Total Legal</b>	<b>23</b>	<b>\$11,986,093,530</b>		<b>\$18,053,296,445</b>

State	Legal Status	Revenue	Jobs	Wages
District of Columbia	L	\$79,211,957	917	\$36,802,667
Florida	L	\$1,944,676,480	22,507	\$903,516,133
Illinois	L	\$835,297,280	9,667	\$388,087,467
Indiana	L	\$438,041,640	5,070	\$203,518,525
Kansas	L	\$203,930,000	2,360	\$94,747,917
Kentucky	L	\$301,816,400	3,493	\$140,226,917
Maine	L	\$417,648,640	4,834	\$194,043,733
Massachusetts	L	\$500,036,360	5,787	\$232,321,892
Missouri	L	\$691,730,560	8,006	\$321,384,933
Nebraska	L	\$139,488,120	1,614	\$64,807,575
New Hampshire	L	\$182,721,280	2,115	\$84,894,133
New Jersey	L	\$359,732,520	4,163	\$167,135,325
New Mexico	L	\$362,995,400	4,201	\$168,651,292
North Carolina	L	\$759,435,320	8,789	\$352,841,242
Ohio	L	\$704,782,080	8,157	\$327,448,800
Oklahoma	L	\$2,235,888,520	25,878	\$1,038,816,158
Pennsylvania	L	\$822,245,760	9,516	\$382,023,600
South Carolina	L	\$290,396,320	3,361	\$134,921,033
South Dakota	L	\$44,864,600	519	\$20,844,542
Tennessee	L	\$561,215,360	6,495	\$260,746,267
Texas	L / LP	\$2,048,272,920	23,706	\$951,648,075
Wisconsin	L	\$379,309,800	4,390	\$176,231,125
Wyoming	L / LP	\$36,707,400	425	\$17,054,625
<b>Legal Total</b>		<b>\$14,340,444,717</b>		<b>\$6,662,713,977</b>

## APPENDIX 7:

# Data Specific to States that Allow Sales of Hemp-Derived Cannabinoids (cont.)

State	Legal Status	Revenue	Sales Tax Rate	Tax Revenue Potential
District of Columbia	L	\$79,211,957	6.00%	\$4,752,717
Florida	L	\$1,944,676,480	6.00%	\$116,680,589
Illinois	L	\$835,297,280	6.25%	\$52,206,080
Indiana	L	\$438,041,640	7.00%	\$30,662,915
Kansas	L	\$203,930,000	6.50%	\$13,255,450
Kentucky	L	\$301,816,400	6.00%	\$18,108,984
Maine	L	\$417,648,640	5.50%	\$22,970,675
Massachusetts	L	\$500,036,360	6.25%	\$31,252,273
Missouri	L	\$691,730,560	4.23%	\$29,225,616
Nebraska	L	\$139,488,120	5.50%	\$7,671,847
New Hampshire	L	\$182,721,280	0.00%	\$0
New Jersey	L	\$359,732,520	6.63%	\$23,832,279
New Mexico	L	\$362,995,400	5.00%	\$18,149,770
North Carolina	L	\$759,435,320	4.75%	\$36,073,178
Ohio	L	\$704,782,080	5.75%	\$40,524,970
Oklahoma	L	\$2,235,888,520	4.50%	\$100,614,983
Pennsylvania	L	\$822,245,760	6.00%	\$49,334,746
South Carolina	L	\$290,396,320	6.00%	\$17,423,779
South Dakota	L	\$44,864,600	4.50%	\$2,018,907
Tennessee	L	\$561,215,360	7.00%	\$39,285,075
Texas	L / LP	\$2,048,272,920	6.25%	\$128,017,058
Wisconsin	L	\$379,309,800	5.00%	\$18,965,490
Wyoming	L / LP	\$36,707,400	4.00%	\$1,468,296
<b>Legal Total</b>	<b>23</b>	<b>\$14,340,444,717</b>		<b>\$802,495,676</b>

## APPENDIX 8:

# Data Specific to States that Restrict Sales of Hemp-Derived Cannabinoids

Forecast, wage, employment and tax data based on states that prohibit sales of cannabinoid products

State	Legal Status	Forecast based on Survey Reports (Low)	Forecast Average Sales per Business (Mid)	Forecast per Capita (High)
Alabama	N	\$400,800,000	\$272,450,480	\$521,663,067
Alaska	N	\$80,502,585	\$80,502,585	\$80,502,585
Arizona	N	\$83,986,000	\$699,072,040	\$926,607,803
Arkansas	N	\$138,800,000	\$283,054,840	\$320,488,011
Colorado	N	\$1,517,000,000	\$1,237,447,240	\$623,376,192
Delaware	N	\$103,960,380	\$103,960,380	\$103,960,380
Idaho	N	\$2,732,400	\$134,593,800	\$186,381,767
Iowa	N	\$312,551,211	\$312,551,211	\$312,551,211
Mississippi	N	\$40,000,000	\$163,144,000	\$314,958,010
Montana	N	\$109,057,945	\$109,057,945	\$109,057,945
Nevada	N	\$91,500,000	\$447,830,280	\$377,572,286
New York	N	\$1,053,000,000	\$858,953,160	\$2,091,307,920
North Dakota	N	\$545,400,000	\$44,048,880	\$64,544,189
Oregon	N	\$85,310,961	\$912,790,680	\$467,857,626
Rhode Island	N	\$38,817,558	\$63,626,160	\$125,853,647
Utah	N	\$326,339,203	\$326,339,203	\$326,339,203
Vermont	N	\$21,897,084	\$35,891,680	\$76,669,659
Washington	N	\$313,575,000	\$921,763,600	\$805,843,152
West Virginia	N	\$15,300,000	\$124,805,160	\$199,719,931
<b>Prohibited Total</b>	<b>19</b>	<b>\$5,280,530,328</b>		<b>\$8,035,254,584</b>

State	Legal Status	Revenue	Jobs	Wages
Alabama	N	\$272,450,480	3,153	\$126,583,217
Alaska	N	\$80,502,585	932	\$37,402,306
Arizona	N	\$699,072,040	8,091	\$324,795,858
Arkansas	N	\$283,054,840	3,276	\$131,510,108
Colorado	N	\$1,237,447,240	14,322	\$574,930,358
Delaware	N	\$103,960,380	1,203	\$48,301,032
Idaho	N	\$134,593,800	1,558	\$62,533,625
Iowa	N	\$312,551,211	3,617	\$145,214,417
Mississippi	N	\$163,144,000	1,888	\$75,798,333
Montana	N	\$109,057,945	1,262	\$50,669,412
Nevada	N	\$447,830,280	5,183	\$208,066,425
New York	N	\$858,953,160	9,941	\$399,078,225
North Dakota	N	\$44,048,880	510	\$20,465,550
Oregon	N	\$912,790,680	10,564	\$424,091,675
Rhode Island	N	\$63,626,160	736	\$29,561,350
Utah	N	\$326,339,203	3,777	\$151,620,456
Vermont	N	\$35,891,680	415	\$16,675,633
Washington	N	\$921,763,600	10,668	\$428,260,583
West Virginia	N	\$124,805,160	1,444	\$57,985,725
<b>Prohibited Total</b>	<b>19</b>	<b>\$7,131,883,325</b>		<b>\$3,313,544,290</b>

## APPENDIX 8:

# Data Specific to States that Restrict Sales of Hemp-Derived Cannabinoids (cont.)

State	Legal Status	Revenue	Sales Tax Rate	Tax Revenue Potential
Alabama	N	\$272,450,480	4.00%	\$10,898,019
Alaska	N	\$80,502,585	0.00%	\$0
Arizona	N	\$699,072,040	5.60%	\$39,148,034
Arkansas	N	\$283,054,840	6.50%	\$18,398,565
Colorado	N	\$1,237,447,240	2.90%	\$35,885,970
Delaware	N	\$103,960,380	0.00%	\$0
Idaho	N	\$134,593,800	6.00%	\$8,075,628
Iowa	N	\$312,551,211	6.00%	\$18,753,073
Mississippi	N	\$163,144,000	7.00%	\$11,420,080
Montana	N	\$109,057,945	0.00%	\$0
Nevada	N	\$447,830,280	6.85%	\$30,676,374
New York	N	\$858,953,160	4.00%	\$34,358,126
North Dakota	N	\$44,048,880	5.00%	\$2,202,444
Oregon	N	\$912,790,680	0.00%	\$0
Rhode Island	N	\$63,626,160	7.00%	\$4,453,831
Utah	N	\$326,339,203	6.10%	\$19,906,691
Vermont	N	\$35,891,680	6.00%	\$2,153,501
Washington	N	\$921,763,600	6.50%	\$59,914,634
West Virginia	N	\$124,805,160	6.00%	\$7,488,310
<b>Prohibited Total</b>	<b>19</b>	<b>\$7,131,883,325</b>		<b>\$303,733,280</b>



## APPENDIX 9:

# Data Specific to States that Restrict Sales of Hemp-Derived Cannabinoids

Forecast, wage, employment and tax data based on states that impose restrictions on sales of cannabinoid products

State	Legal Status	Forecast based on Survey Reports (Low)	Forecast Average Sales per Business (Mid)	Forecast per Capita (High)
California	R	\$1,222,200,000	\$3,560,617,800	\$4,193,119,539
Connecticut	R	\$75,243,144	\$238,190,240	\$395,298,822
Georgia	R	\$219,665,760	\$548,163,840	\$1,141,170,104
Hawaii	R	\$56,235,693	\$92,176,360	\$151,060,196
Louisiana	R	\$65,621,250	\$250,426,040	\$488,879,859
Maryland	R	\$303,513,000	\$364,626,840	\$693,557,180
Michigan	R	\$1,133,243,065	\$1,150,980,920	\$1,133,243,065
Minnesota	R	\$395,913,857	\$294,474,920	\$620,452,569
Virginia	R	\$568,336,528	\$453,540,320	\$926,416,217
<b>Total Restricted</b>	<b>9</b>	<b>\$4,039,972,297</b>		<b>\$9,743,197,552</b>

State	Legal Status	Revenue	Jobs	Wages
California	R	\$3,560,617,800	41,210	\$1,654,298,625
Connecticut	R	\$238,190,240	2,757	\$110,665,567
Georgia	R	\$548,163,840	6,344	\$254,682,400
Hawaii	R	\$92,176,360	1,067	\$42,826,058
Louisiana	R	\$250,426,040	2,898	\$116,350,442
Maryland	R	\$364,626,840	4,220	\$169,409,275
Michigan	R	\$1,150,980,920	13,321	\$534,757,242
Minnesota	R	\$294,474,920	3,408	\$136,815,992
Virginia	R	\$453,540,320	5,249	\$210,719,367
<b>Restricted Total</b>	<b>9</b>	<b>\$6,953,197,280</b>		<b>\$3,230,524,967</b>

State	Legal Status	Revenue	Sales Tax Rate	Tax Revenue Potential
California	R	\$3,560,617,800	7.25%	\$258,144,791
Connecticut	R	\$238,190,240	6.35%	\$15,125,080
Georgia	R	\$548,163,840	4.00%	\$21,926,554
Hawaii	R	\$92,176,360	4.00%	\$3,687,054
Louisiana	R	\$250,426,040	4.45%	\$11,143,959
Maryland	R	\$364,626,840	6.00%	\$21,877,610
Michigan	R	\$1,150,980,920	6.00%	\$69,058,855
Minnesota	R	\$294,474,920	6.88%	\$20,245,151
Virginia	R	\$453,540,320	5.30%	\$24,037,637
<b>Restricted Total</b>	<b>9</b>	<b>\$6,953,197,280</b>		<b>\$445,246,691</b>

## APPENDIX 10:

# Sources

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### USDA Farm Bill

[https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/2019/arc-plc\\_farm\\_bill\\_comparisons-fact\\_sheet-aug-2019.pdf](https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/2019/arc-plc_farm_bill_comparisons-fact_sheet-aug-2019.pdf)

### Idaho

<https://www.ktvb.com/article/news/crime/truck-drivers-sentenced-for-transporting-hemp-through-ada-county-idaho/277-48d9ec07-b224-4623-b556-2291f5bcd3b>

### Beer Comparison

<https://www.brewersassociation.org/statistics-and-data/national-beer-stats/>