COLORADO

Colorado Hemp Advancement & Management Plan C.H.A.M.P.

March 26, 2021

COLORADO

Governor Jared Polis

Department of Agriculture

Department of Public Health & Environment

Department of Regulatory Agencies

Office of Economic Development & International Trade

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CHAMP Stakeholders
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Facilitated by:

Government Performance Solutions

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Executive Summary

In response to Congress passing the Agriculture Improvement Act of 2018 (the 2018 Farm Bill), the anticipated publication by USDA of enabling regulations for the cultivation of industrial hemp, and Governor Jared Polis's stated priority for Colorado to remain a driving force in hemp production, the Colorado Department of Agriculture formed a statewide partnership known as the Colorado Hemp Advancement and Management Plan (CHAMP) in June 2019.

The CHAMP initiative represents a broad stakeholder effort that includes representatives from the Colorado Department of Agriculture (CDA), the Governor's Office, Colorado Department of Public Health and Environment (CDPHE), Department of Revenue (DOR), Department of Regulatory Agencies (DORA), Office of Economic Development and International Trade (OEDIT), Department of Public Safety (DPS), the Department of Education (CDE), the Ute Mountain Ute Tribe, the Southern Ute Indian Tribe, local governments, state institutions of higher learning, and industry experts. A list of all CHAMP stakeholders and participants is included in Appendix A.

Through the CHAMP process, stakeholders crafted economic advancement principles for the entire hemp supply chain, including research and development, seed, cultivation, testing, transportation, processing, manufacturing, marketing, and finance and insurance. The CHAMP initiative ensured that a wide range of stakeholders, including members of the public, had the opportunity to comment on and participate in shaping a variety of hemp-related policies the State of Colorado should strive to implement.

The goals of this collaborative process were to develop a robust and functional hemp supply chain; to create new, sustainable, and inclusive employment and entrepreneurial opportunities; and to expand markets for Colorado agricultural communities. At the time of this report many questions and concerns remain on what the final federal regulations will look like. Moreover, the impact of COVID-19 is currently a key factor in the development of the hemp industry as well as the state's ability to implement the stakeholder recommendations. As such, this report represents a snapshot in time, defining the general direction stakeholders felt Colorado should pursue in the future. Colorado will nevertheless continue to adjust to meet the challenges in this new industry.

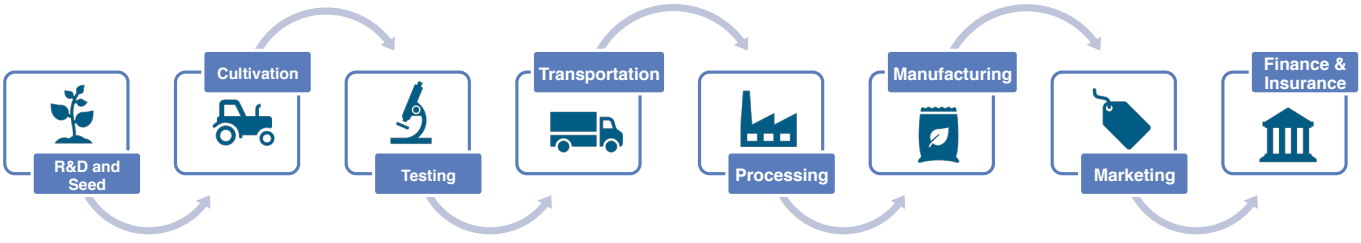
Objective Statement

The CHAMP initiative aims to promote the health and safety of the hemp industry for farmers, processors, and consumers. In doing so, Colorado hopes to set a national example for how to establish an advanced hemp industry. The state will achieve this objective through balanced regulatory policies with a focus on economic and workforce development, inclusion, education, R&D, finance, and entrepreneurship. This report is created from the CHAMP stakeholder process, which reflects a general consensus reached among stakeholders in the industry, state and local government, federally recognized Indian tribes, and higher education institutions on the steps needed to advance the hemp industry. Each recommendation was debated in an open forum, providing an opportunity for all participants to voice support or dissent and discuss as a group. In this way, the report provides a blueprint for actions needed to create and sustain a thriving hemp industry in Colorado.

Governance and Process

The CHAMP initiative is a collaborative endeavor that spans multiple agencies, federally recognized Indian tribes, local governments, and industry representatives. A board of directors provided high-level guidance for the initiative. Several other governing groups, including an executive committee, provided targeted guidance and reviewed draft materials.

Figure 1. Hemp Supply Chain



Eight stakeholder groups, each representing a distinct link in the hemp industry supply chain, met to discuss in greater detail the challenges and opportunities facing the industry. In total, 202 stakeholders participated in the effort, meeting three times from July through December 2019. Stakeholder groups included 25–30 representatives from each area of the hemp supply chain, together with representatives from the legal, financial services, and insurance industries. The eight stakeholder groups developed the policy recommendations included in Section 2 of this report.

Industry Analysis

Hemp is an emerging specialty crop that has received considerable attention from agricultural producers, consumers, manufacturing businesses, and policymakers both internationally and in the State of Colorado. Hemp cultivation may provide an alternative enterprise to improve grower profitability and a potential engine of economic development and business creation, all while contributing to the sustainability of Colorado's natural resources as a substitute crop. Hemp can be manufactured and processed into numerous industrial and commercial goods for which there is national and international demand. Hemp applications range from building materials and textiles to food ingredients and wellness products.

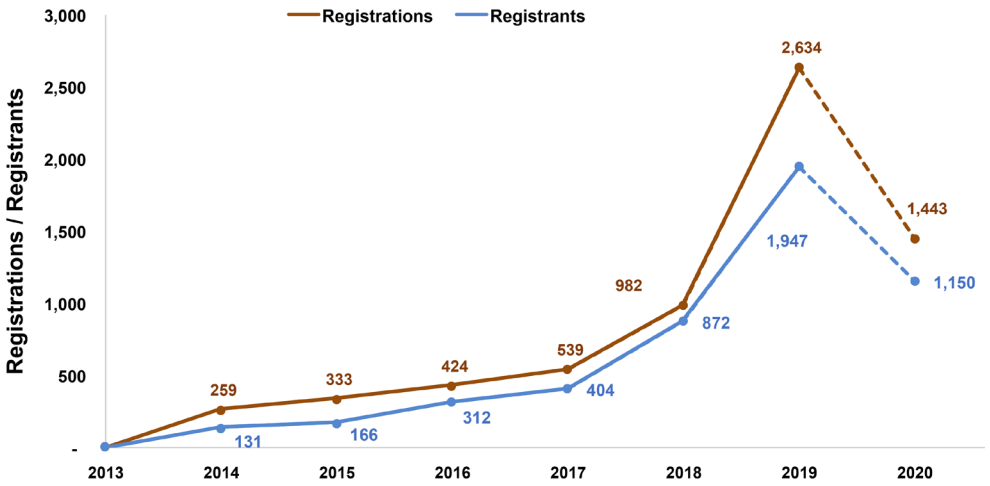
About 13 percent of all hemp acres registered and planted in 2019 in the United States were in Colorado, the most of any U.S. state. Hemp acreage increased substantially over the past three years in Colorado and the U.S. in response to reformations to its legal status, creating an increase in biomass supplies at the producer level. However, hemp acreage decreased substantially in 2020 in Colorado and across the country. CDA records provide information on the number of registrations and the registered land area between 2014 and late July 2020. Between 2014 and 2019, the number of registrants and registrations grew each year, resulting in about a ten-fold increase during that period. As of late July 2020, however, the number of registrants and registrations dropped between 40 and 45 percent below their comparable 2019 totals, respectively.

Many growers enjoyed solid returns in the 2014-2018 period of pilot programs organized under the Agricultural Act of 2014 (2014 Farm Bill). A relative scarcity of raw material and domestically produced flower available to supply the rapidly expanding cannabidiol (CBD) market helped to maintain wholesale prices for hemp and hemp products well above break-even levels. Starting in 2019, however, there was a sharp increase in production accompanied by a price collapse in the commodity market driven by both supply and demand. On the supply side, expansion of hemp production to new states and a dramatic expansion of planted acreage over a short period of time made hemp biomass relatively more abundant than it had been before. A lack of extraction and processing capacity, coupled with slower-than-expected consumer demand for CBD and other hemp products, yielded an environment in which hemp supply exceeded 2019 processing capacity or demand.

Colorado is poised to benefit, however, as the supply chain grows and matures. For this growth in demand to occur, the industry must be proactive about early-stage issues like standardization, unproven use cases and efficacy, and the accuracy of dosing for consumable products. Moreover, it is imperative that Colorado explores all potential opportunities and supports a supply chain that relies upon industrial hemp for use in textiles, polymers, and construction inputs.

Colorado can continue to lead in hemp innovation by facilitating and maintaining a favorable regulatory environment for research and development. The recommendations outlined in this CHAMP document demonstrate that the Colorado hemp industry continues to position itself as a production and manufacturing leader.

Figure 2. Colorado Hemp Registrants and Registrations, 2014-July 2020



Source: Colorado Department of Agriculture

To achieve leading status, research and development will be needed in several areas including (1) plant genetics; (2) effective uses for a variety of hemp industrial applications; (3) consumer uses and preferences for cannabinoid products; and (4) scalable and safe manufacturing practices.

Key Stakeholders

The following are key agencies and institutions involved in advancing and regulating hemp in Colorado.

Figure 3. Agency and Institution Summary

Agency or Organization	Role in Hemp Advancement and Regulation
Governor's Office	Support, coalition building and resource investment Vision—providing a roadmap to an agricultural and industrial economic engine Experience—Governor Polis offered key hemp research provision in the 2014 Farm Bill, while serving in U.S. House of Representatives.
Department of Agriculture	Registration—Cultivation registration and management of electronic registration system. Field Sampling/Testing—Conduct and certify field sampling and THC testing. Certification Support—Provide THC testing in support of the seed certification program. Market Development—Provide general support to expand the growth of the hemp through the Markets Division.
Department of Public Health and Environment	Lab Certification and testing for third-party THC testing labs. Processor and manufacturer licensing, inspection and process validation. Marketing and labeling standards, including identity statement, ingredient list, batch tracking and other information.
Office of Economic Development and International Trade	Promote hemp as a high-value agricultural commodity and a next-generation industry. Employ economic development tools and incentives where appropriate.
Office of the Attorney General	Develop hemp policy in concert with state agencies. Address legal issues surrounding hemp with federal government.
Department of Public Safety	Enforce state hemp laws. Facilitate and support CDA implementing background checks. Work with local municipal, tribal, and county law enforcement agencies to meet public safety needs. Coordinate with other law enforcement agencies to address inter- and intrastate transportation issues.
Higher Education Institutions	Colorado State University, University of Colorado, Adams State University, Fort Lewis College, CSU-Pueblo Institute of Cannabis Research, and Colorado Mesa University. Education outreach initiative for farmers, consumers, and the public through CSU. Cooperative extension service provides expertise on agriculture, water, business management. The Hemp Center of Excellence will centralize and advance hemp research, education, and grants.

Figure 3. Agency and Institution Summary (continued)

Agency or Organization	Role in Hemp Advancement and Regulation
Department of Regulatory Agencies	Liaison to the insurance industry to ensure proper coverages are available to hemp businesses. Financial services education for proper debt and other financing is available to the hemp industry. Assist financial institutions to extend services to the hemp industry.
Department of Natural Resources	Monitor hemp cultivation and processing operations to confirm legal water source and ensure proper water treatment prior to release.
Department of Revenue	Certain hemp products are sold at regulated marijuana retail stores. Certain hemp products can be used as an ingredient for regulated marijuana products.
Ute Mountain and Southern Ute Tribes	Tribes are actively monitoring the hemp market and may develop a management plan, and production and/or processing enterprises.
Local Government	Local governments may issue local occupancy permits that will be a condition of state permits where applicable. Zoning and land use ordinances for locating indoor growing, processing, and manufacturing facilities. Code enforcement, for fire safety, odor control, building safety, and other requirements.
Colorado Industry and Non-profit Organizations	COHIA propels the hemp industry forward in Colorado through information, public policy work, and market development. Hemp Feed Coalition's objective is the federal recognition of hemp as an animal feed ingredient. CSGA is the official seed certification agency and certifies hemp seed. Rocky Mountain Farmers Union is an advocate for family farmers and ranchers, rural communities, and consumers. Colorado Farm Bureau provides advocacy and various services to the agriculture community in Colorado. Colorado Bankers Association assist Colorado bankers understand the hemp industry and regulatory obstacles.

Market-Level Principles and Policy Recommendations

There were several recurring principles that emerged from the multiple stakeholder groups, documented below. These principles will are noted throughout the recommendations, and a holistic approach to each is essential in ensuring a successful hemp regulatory program.

Principle 1: Promote economic development across the supply chain

Principle 2: Chain of custody and information sharing will drive an expanding hemp industry

Principle 3: Focus on THC Control

Principle 4: Recognize the importance of Federal compatibility while also advocating for reasonable regulations

Principle 5: Recognize the importance in intergovernmental coordination

Principle 6: Promote access to finance and insurance services across the supply chain

Principle 7: Promote equity, diversity and inclusion across the supply chain

Identification of key recommended deliverables through the stakeholder process was the driving focus of the CHAMP initiative. The following stakeholder recommendations represent sensible and forward-looking deliverables intended to bolster Colorado's hemp industry. However, it is important to note that implementation is conditional on the market need, federal regulatory environment, procurement of resources, including increased staff and funding, as well the passage of legislation and production of rules and regulations. Dynamic changes are still occurring for the hemp industry, particularly regarding market conditions and federal regulations. Moreover, the COVD-19 pandemic will most likely have an adverse impact on funding, staffing, and other resources.

While these recommendations represent a general consensus of the stakeholders, including the agencies that will implement the deliverables, some of these recommendations may be difficult to implement, require adjustments, or may be delayed based on the factors mentioned above.

Figure 4. Recommendation Summary

Number	Supply Chain Area	Title	Existing/New Program	Agencies	Summary
1	R&D and Seed	Hemp Seed & Clone Certification Program	Existing program with enhancement/ expansion	CDA, CSU, CSGA, AOSCA	Support research and development to provide stable hemp genetics and increased availability of varieties that will consistently meet THC compliance regulations. Continue to allow the use of open source seeds in Colorado.
2	R&D and Seed	Cross-pollination Information	New program	CDA, Center of Excellence, Colorado universities	Allow CDA to provide limited information on the presence of hemp farms to other nearby hemp producers to help minimize cross-pollination. Research ways to mitigate cross-pollination issues (Center of Excellence and educational institutions).
3	R&D and Seed	Plant Breeding and Genetic Research Regulations	New program	CDA, Colorado universities, Center of Excellence, CSGA	Establish a separate registration program specific to hemp plant breeding and genetic research to improve the quality and uniformity of seed genetics and supply for the state's producers.
4	Cultivation	USDA State Plan Alignment	New program	CDA, CDPHE	Align state hemp regulatory practice with USDA requirements to ensure uninterrupted operations. Advocate for appropriate changes to federal law as needed to promote growth and investment in the Colorado hemp industry.
5	Cultivation	Legal Water Supply	New program	DNR, CDA	Update CDA registration process to develop a procedure and guidelines to collaborate with DNR. DNR will ensure registrants have legal access to water for cultivation.
6	Cultivation	Center of Excellence	New program	CDA, CDPHE, Colorado universities, OEDIT, tribal governments	Develop a public-private partnership between academic institutions, industry, state agencies, and private stakeholders to establish a Colorado Hemp Center of Excellence to accelerate development and research and education in hemp cultivation, science, and technology.
7.	Cultivation	Non-Compliant Plant Material	Existing program with enhancement/ expansion	CDA, CDPHE, tribal governments	Follow USDA rules for sampling, testing, and non-compliant plant material disposal. Advocate for ways to test and dispose of non-compliant plant material that retain value in the supply chain, including post-harvest testing, industrial uses, and remediation procedures. Ensure disposal regulations are operable and not overly burdensome for the state or hemp producers.

Figure 4. Recommendation Summary (continued)

Number	Supply Chain Area	Title	Existing/New Program	Agencies	Summary
8	Cultivation	Coordination of State and Local Regulatory Authority	Existing program with enhancement/ expansion	CDA, CDPHE, tribal and local governments, law enforcement agencies	Provide hemp registration information to other state and local government agencies, under a privacy restriction, to facilitate other jurisdictions' inspections, permit approvals and enforcement actions as directed by federal law.
9	Testing	Field Sampling and Sampling Agent Certification	Existing program with enhancement/ expansion	CDA	Review and improve guidance on sampling and testing hemp grown in Colorado for THC content according to USDA requirements and establish a certification program to allow third parties to collect samples in the field for regulatory use.
10	Testing	Hemp Lab Certification Program	Existing program with enhancement/ expansion	CDPHE, CDA	Develop a certification program that provides guidance to private analytical laboratories on certification requirements, appropriate analytical methods, and general testing procedures.
11	Transportation	Electronic Traceability System	New program	CDA, CDPHE, tribal and local governments, law enforcement	Implement an ETS to support an uninterrupted chain of custody for hemp products from harvest to commercial sale and to provide secure and verifiable information to various stakeholders.
12	Transportation	Transportation Protocol	Existing program with enhancement/ expansion	CDA, CDPHE, tribal and local governments, law enforcement	Develop guidance and best practices for transporting hemp and hemp products within Colorado, including proper documentation and recordkeeping.
13	Processing	Processor Registration and Inspection	Existing program	CDPHE, CDA	Continue the integration of hemp into the current Food and Supplement Manufacturer Program. Further define licensed activities as needed and provide a means for the state to register and regulate hemp processors and manufacturers in Colorado. This is an existing, active program.
14	Processing/ Manufacturing	Processor and Manufacturer Standards	Existing program	CDPHE, CDA	Clarify and develop state regulatory requirements and appropriate policy and guidance for processing and manufacturing practices related to hemp products for human consumption.
15	Manufacturing	Manufacturer Registration and Inspection	Existing program	CDPHE, CDA	Continue the integration of hemp into the current food and dietary supplement manufacturer program. Further define licensed activities as needed and provide a means for the state to register and regulate hemp processors and manufacturers in Colorado. This is an existing, active program.
16	Marketing	Glossary of Terms	New program	CDPHE, CDA	Provide a list of terms and definitions for different stages in the supply chain to create a universal understanding of the terminology used for hemp production, marketing, and other purposes.

Figure 4. Recommendation Summary (continued)

Number	Supply Chain Area	Title	Existing/New Program	Agencies	Summary
17	Marketing	Marketing and Labeling Guidance	Existing program	CDPHE, CDA	Establish guidance for retailer and manufacturer marketing and labeling which harmonize with national and international standards, when appropriate, for consumable hemp products.
18	Marketing	Quality Assurance Certification Program	New program	CDA, CDPHE	Form a quality assurance program such as a "Good Hemp Program" that defines that establishes the minimum standards which Colorado producers/manufacturers must meet to qualify for special certification/designation, the fees from which will fund hemp research and promotion.
19	Marketing	State Procurement of Industrial Hemp Products	New program	Statewide	Encourage state procurement of industrial hemp products.
20	Finance & Insurance	Guidance & Best Practices	Existing program	DORA	Provide guidance and best practices to financial services institutions and insurance carriers to facilitate increased access to financial services for Colorado hemp businesses.
21	All	Expanded Data Availability	New program	DORA, CDA, CDPHE, OEDIT	Provide aggregated registration and other information to financial institutions and insurance carriers to help expedite access to services.

Future Research and Policy Development

The following regulatory issues were identified during the stakeholder meetings and subsequent proceedings as issues or subjects that required further research and policy development.

- **Feminized seed and clone certification.** Convene a stakeholder process to develop guidance and determine the feasibility of a feminized seed certification program and for the operational model and facilities for a clonal certification program. This program will involve CSGA and CDA.
- **Cross-pollination.** Research distance, pollen viability, size, and other factors that determine risk for hemp cross-pollination.
- **Retaining value in the supply chain.** Use existing regulatory avenues for non-compliant plant material including advocating for exemption of mature stalks and seeds from destruction. In addition, convene a stakeholder process to determine the rules and procedures to develop secure supply channels that allow non-compliant plant material to be processed for non-consumable industrial uses; or to have the THC extracted and removed from the stream of commerce.
- **Co-location of hemp and licensed marijuana businesses.** Prohibit the co-location of marijuana and hemp cultivation, processing, and manufacturing businesses until federal laws allow. Explore an efficient regulatory structure to allow for the co-location of all types of cannabis cultivation and/or manufacturing facilities.
- **Electronic traceability system.** Convene a process to develop specifications, security, and documentation requirements for an ETS that will ensure a secure chain of custody for hemp products in Colorado.
- **Transport of concentrated intermediate products.** As federal law allows, determine a transportation protocol for intermediate hemp concentrates. These are business-to-business transactions where products transported will be further processed to bring THC levels into compliance before sale to consumers.
- **Non-consumable industrial hemp manufacturing.** Determine whether additional regulatory oversight of industrial products manufacturing operations is needed, and if so, establish the lead regulatory agency and most advantageous regulatory framework.

- **Inhalable and suppository hemp.** Determine the best regulatory treatment for inhalable and suppository hemp, whether direct initial regulation by the state or by deferring to the federal government timeline for hemp product regulation.
- **Quality assurance program.** Determine the costs and benefits of developing a quality assurance program that sets quality, purity, and process standards and promotes a Colorado brand of hemp products.
- **Retail Framework.** Convene a stakeholder process to develop a retail framework for hemp that integrates into an existing retail framework for food or dietary supplements.
- **Financial services and insurance data.** Determine data gaps that exist for insurance and financial institutions and the specific requirements and funding needed to expedite access to services

The items listed above may require a task force or stakeholder process to further develop the proper regulatory scope and implementation action items

Section 1.
Industry Analysis and Key Stakeholders

Introduction

In response to passing the 2018 Farm Bill, the anticipated publication of additional enabling regulations, and Governor Jared Polis' stated priority for Colorado to remain a driving force in hemp production, the Colorado Department of Agriculture (CDA) developed a statewide partnership known as the Colorado Hemp Advancement and Management Plan (CHAMP) in June 2019.

Even though Colorado has hosted a successful hemp industry since 2014, it was clear that Colorado would need to quickly establish a regulatory framework to accommodate new producers and products entering the market and to narrow regulatory gaps in the hemp supply chain not considered by the 2018 Farm Bill. In addition, with new market opportunities materializing, Colorado needed to implement initiatives to advance the growth of the industry. CHAMP was formed to develop a blueprint that would outline how the state could address the top issues related to both the advancement and management of the state hemp industry. Through the plan's development, Colorado aimed to build consensus among the different stakeholder groups that represent the industry, regulators and governmental agencies, and academic institutions.

The CHAMP initiative and this report both represent a broad stakeholder effort intended to achieve that consensus. The CHAMP initiative includes representatives from CDA, the Governor's Office, Department of Public Health and Environment (CDPHE), Department of Revenue (DOR), Department of Regulatory Agencies (DORA), Office of Economic Development and International Trade (OEDIT), Department of Public Safety (DPS), the Southern Ute Indian Tribe, the Ute Mountain Ute Tribe, Department of Education (CDE), local governments, state institutions of higher learning, and industry experts. A list of all CHAMP stakeholders is included in Appendix A.

Through the CHAMP initiative, stakeholders explored challenges and opportunities facing the Colorado hemp supply chain, including research and development, seed, cultivation, testing, transportation, processing, manufacturing, marketing, and finance and insurance. CDA created the CHAMP initiative to ensure that a wide range of stakeholders, including members of the public, would have multiple opportunities to comment on and participate in a variety of industrial hemp topics.

The goals of this collaborative policy planning process are to (1) develop a robust and functional hemp supply chain; (2) create new sustainable employment and entrepreneurial opportunities; and (3) establish a strong market for Colorado agricultural communities.

Ultimately, the resulting framework presented in this report outlines challenges faced by the hemp industry and initiatives suggested by stakeholders to maintain and build upon Colorado's position as an industry leader, representing the largest gathering of the hemp industry and government stakeholders held in any state to date.

Regulatory Context

The 21 recommend deliverables outlined in this report represent a consensus regarding hemp-related policy priorities for Colorado. Implementation is conditioned on the regulatory environment; resources, including increased staff and funding; as well as the passage of legislation and corresponding regulatory action. While every effort will be made to pursue these policies and programs, the federal government may continue its strict regulatory posture and insufficient resources may impede overall implementation; particularly with the economic impact of COVID-19. But the market-level principles and stakeholder recommendations in this report collectively represent a broad guidance document for statewide policy for the hemp supply chain. CHAMP is informed by the following laws, regulations, and policies.

State Law

Colorado citizens voted to pass Amendment 64 to the Colorado Constitution in 2012, which in part directed the General Assembly to enact legislation governing the cultivation, processing, and sale of industrial hemp.[1] Legislation adopted in 2013 delegated responsibility for most hemp-related registration and inspection oversight

1 As defined in the Colorado Revised Statutes, and in the 2018 Farm Bill, the term "industrial hemp" means the plant species *Cannabis sativa L.* and any part of that plant, including the seeds thereof and all derivatives, extracts, cannabinoids, isomers, acids, salts, and salts of isomers, whether growing or not, with a Δ-9 tetrahydrocannabinol concentration of not more than 0.3 percent on a dry weight basis.

to CDA. Statutory authority for Colorado's Industrial Hemp Program appears in Title 35 Article 61 of the Colorado Revised Statutes. In the following years, CDA promulgated a comprehensive set of rules to administer and enforce the Colorado Industrial Hemp Regulatory Program Act, which is enabled by the regulations in 8 CCR 1203-23. Under Colorado's program, interested producers and product manufacturers must register with CDA or CDPHE to produce or manufacture hemp or hemp products.

2018 Federal Farm Bill

The 2018 Farm Bill clarified that both hemp and hemp products are legal in the U.S., amended the Controlled Substances Act (CSA) to remove hemp from the definition of marijuana, and revised language in the 2014 Farm Bill to expressly include products derived from hemp in the legal definition of industrial hemp. The legislation also allowed commercial cultivation and manufacture of hemp outside of 2014 Farm Bill pilot projects. Under the 2018 Farm Bill, each state must submit a plan to the USDA for approval that includes a framework for regulation and monitoring of production. The 2018 Farm Bill also instructs the USDA to promulgate federal rules for commercial hemp production. Importantly, the 2018 Farm Bill does not address regulations for processing and manufacturing of hemp products into food, drugs, and cosmetics, which are still forthcoming from the Food and Drug Administration (FDA) as of the date of this report.

USDA Interim and Final Rule

The USDA issued its first set of hemp regulations in October of 2019, the Interim Final Rule (IFR), which formally addressed hemp cultivation, harvest, and testing. The IFR established a regulatory framework for USDA oversight of domestic hemp production under the 2018 Farm Bill. The IFR established requirements for approval of state or tribal plans regulating the production of hemp in their territories. Rules addressed the production, sampling, testing, and disposal of hemp plants, and set thresholds for acceptable amounts of THC. In comments submitted to USDA, the State of Colorado twice urged USDA to modify the IFR and adopt a more flexible regulatory structure to advance the development of a robust, nationwide hemp industry.[2] In January of 2021, the USDA published a Final Rule which made several changes from the IFR. Many of the changes aligned with the comments submitted by the State of Colorado. Specifically, the USDA cited the comments from Colorado as one of the reasons for increasing the time to sample from 15 to 30 days before harvest, and to allow remediation of non-compliant plants into complaint plant biomass to help farmers mitigate against financial loss.

2 See comments submitted to USDA on the IFR, https://www.colorado.gov/pacific/sites/default/files/FinalIFRComments2020_0.pdf; https://drive.google.com/file/d/1kUpA86y7oJ3tNEsVQR26olDoRdoLHrAu/view.

State Hemp Plan Submitted to USDA

The 2018 Farm Bill and the IFR require each state that desires to have primary regulatory authority over the production of hemp within its jurisdiction to submit a management plan to USDA that outlines the regulation of various aspects of hemp cultivation. The State of Colorado submitted its plan for USDA review on June 16, 2020. Many details of this plan were derived or adapted from stakeholder involvement in the CHAMP process and from the existing Colorado industrial hemp regulatory framework, which was established after the adoption of Senate Bill 13-241 in 2013. The state plan submitted to USDA pushed for several policies reflected in CHAMP that are designed to protect and advance the industry. Some of these policies were revised to address the specific requirements laid out by USDA in the IFR. Due to the changes made by the USDA from the Interim to Final Rule, Colorado will be submitting a revised plan by October 2021. CDA will continue to advocate for policies that best work for Colorado and its hemp producers while staying within federal guidelines as adopted in Senate Bill 20-197, which aligns state and federal hemp policy and regulation.

DEA Interim Final Rule

In response to the 2018 Farm Bill and the USDA IFR, the U.S. Drug Enforcement Administration (DEA) adjusted some of its rules regarding hemp and marijuana in August 2020. These changes are stated by the DEA to "merely conform" certain definitions to the 2018 Farm Bill, although there has been immediate opposition and lawsuits filed from hemp industry groups. On the surface, the IFR completes three revisions: (1) Revising the definition of "tetrahydrocannabinols" to exclude naturally occurring tetrahydrocannabinols in hemp; (2) Revising the definition of marijuana extract (a controlled substance) to include any cannabis (i.e., marijuana or hemp) extracts with a concentration of more than 0.3 percent Δ9-THC on a dry weight basis; and (3) Removing FDA approved drugs that contain CBD from the controlled substances list. The rules, if implemented as written, would limit certain hemp-derived cannabinoid production and require all hemp extracts to be kept below 0.3 percent THC for transport. These rules add further regulatory complexity and risk to hemp production and processing.

Objective Statement

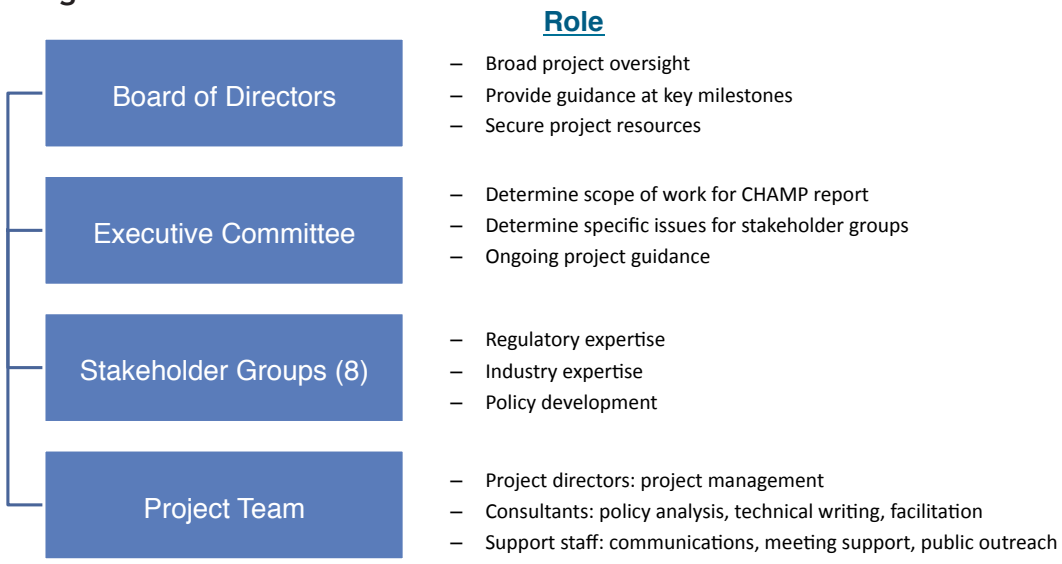
The CHAMP initiative aims to promote the health and safety of the hemp industry for farmers, processors, and consumers. In doing so, Colorado hopes to set a national example for how to establish an advanced hemp industry. The state will achieve this objective through balanced regulatory policies with a focus on economic and workforce development, inclusion, education, R&D, finance, and entrepreneurship. The strength of

this report is that it reflects a consensus view among stakeholders on how to advance the hemp industry in Colorado. The consensus was achieved through inclusive dialogue involving stakeholders in the industry, state and local government, federally recognized Indian tribes, and higher education institutions. In addition, the report functions as a blueprint for building and sustaining a thriving hemp industry in Colorado by providing a comprehensive set of recommendations for developing and implementing policies in support of each link in the hemp supply chain.

Governance and Process

The CHAMP Board of Directors provides high-level guidance for the initiative. The CHAMP executive committee provides more targeted guidance and review of draft materials. The governing structure of the project is depicted in Figure 5.

Figure 5. CHAMP Governance



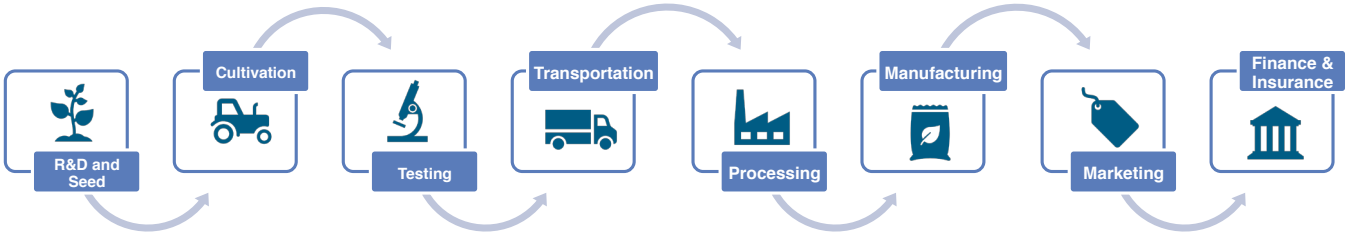
The executive committee met in July 2019 to develop the scope of work and discussion topics for each stakeholder group. There were eight stakeholder groups that met from July through December 2019. The stakeholder groups developed the CHAMP policy recommendations included in Section 2 of this report. The eight stakeholder groups each consisted of 25–30 specific state, tribal, and local officials, and industry experts in each area of the hemp supply chain. Stakeholder groups also included representatives from the legal, finance, and insurance industries. There were 202 total stakeholders across eight stakeholder groups. Figure 6 shows a description of the supply chain and stakeholder groups.

Each stakeholder group met three times and developed a number of individual recommended deliverables.

The project team compiled and combined stakeholder group work into 21 key recommendations spanning eight distinct links in the hemp industry supply chain.

Additional engagement completed as part of the CHAMP initiative includes several public meetings held across the state to solicit public input; a stakeholder meeting to discuss and solicit comment on the USDA IFR document; and submission of the state hemp plan to USDA. Throughout the process, members of the project team provided support and research on regulatory best practices, economic and market opportunity and characteristics, and a synthesis of proceedings into the recommendations contained in this report.

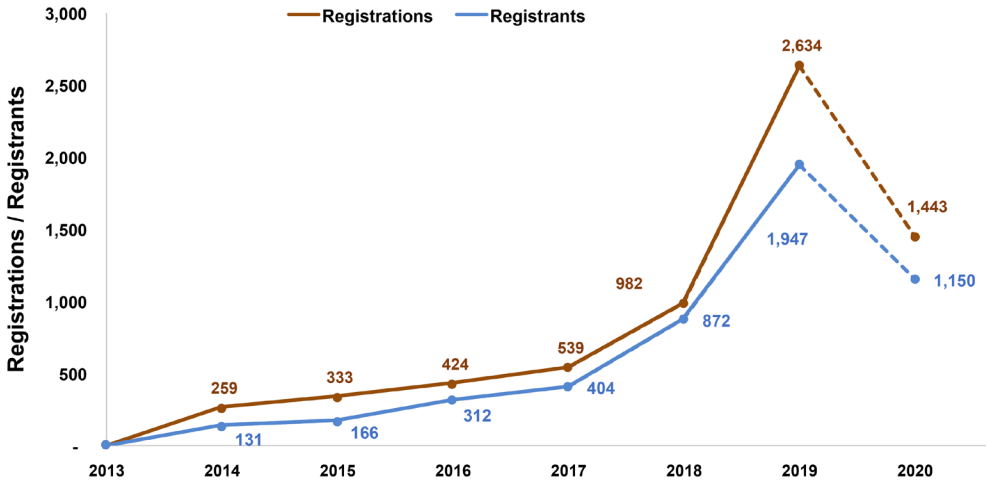
Figure 6. Hemp Supply Chain



Industry Analysis

The following is a brief summary analysis of Colorado's hemp industry; a more detailed analytical review can be found in Appendix B.

Figure 7. Colorado Hemp Registrants and Registrations, 2014-July 2020



Source: Colorado Department of Agriculture

Hemp is an emerging specialty crop that has received considerable attention from agricultural producers, consumers, manufacturing businesses, and policymakers both internationally and in the State of Colorado. Hemp cultivation may provide an alternative enterprise to improve grower profitability and a potential engine of economic development and business creation while also contributing to the sustainability of Colorado's natural resources as a substitute crop. Hemp can be manufactured and processed into numerous industrial and commercial goods for which there is national and international demand. Hemp applications range from building materials and textiles to food ingredients and wellness products.

While hemp may hold great promise for Colorado, the convergence of the hemp supply chain with the broader agricultural and economic landscape creates uncertainty and challenges. Historically, hemp has been a more regulated crop than others due to its cousin, marijuana. Other challenges include a lack of federal regulation of post-farm hemp products by the FDA and a general lack of awareness regarding the uses of hemp derivatives in consumer and industrial applications.

Nonetheless, Colorado has been a leader in virtually all measures of hemp activity. In 2019, about 13 percent of all hemp acres registered and planted in the United States were in Colorado, the most of any state in the U.S. Over the past three years, hemp acreage has increased substantially in Colorado and the U.S. in response to reformations to its legal status, creating an increase in biomass supplies at the producer level. However, hemp acreage decreased substantially in 2020 in Colorado. CDA records provide information on the number of registrations and registered land area between 2014 and late July 2020. Between 2014 and 2019, the number of registrants and registrations grew each year, resulting in about a ten-fold increase during that period. As of late July 2020, however, the number of registrants and registrations dropped between 40 and 45 percent below their comparable 2019 totals, respectively.

Many growers enjoyed solid returns in the 2014-2018 period of pilot programs organized under the Agricultural Act of 2014 (2014 Farm Bill). A relative scarcity of raw material and domestically produced flower available to supply the rapidly expanding CBD market helped to maintain wholesale prices for hemp and hemp products well above break-even levels. Starting in 2019, however, there was a sharp increase in production accompanied by a price collapse in the commodity market driven by both supply and demand. On the supply side, expansion of hemp production to new states and a dramatic expansion of planted acreage over a short period of time made hemp biomass relatively more abundant than it had been before. A lack of extraction and processing capacity, coupled with slower-than-expected consumer demand for CBD and other hemp products, yielded an environment in which hemp supply exceeded 2019 processing capacity or demand.

With producers facing oversupply due to a fragmented market, the long-term outlook suggests that consumers will continue to look for new food and dietary supplement alternatives, while businesses will continue to seek more sustainable and renewable sources of materials. So, despite recent challenges, there is undeniable potential for growth in demand for industrial and consumer hemp products in the U.S.

As the supply chain grows and matures, Colorado is poised to benefit. For this growth in demand to occur, however, the industry must be proactive about early-stage issues like standardization, unproven use cases and efficacy, and the accuracy of dosing for consumable products. Moreover, it is imperative that

Colorado explores all potential opportunities and supports a supply chain that relies upon industrial hemp for use in textiles, polymers, and construction inputs.

Overall, there is a lack of consumer education around cannabinoids, which is exacerbated by the lack of federal regulations related to cannabinoids in consumer products. On the industrial side, there is currently little applied research or proven cost-effective use cases for different hemp applications.

Colorado can continue to lead the industry in hemp innovation by facilitating and maintaining a favorable regulatory environment for research and development. The recommendations outlined in this CHAMP document demonstrate that the Colorado hemp industry continues to position itself as a production and manufacturing leader.

To achieve leading status, research and development will be needed in several areas including (1) genetics; (2) effective uses for a variety of hemp industrial applications; (3) consumer uses and preferences for cannabinoid products; and (4) scalable and safe manufacturing practices.

Key Stakeholders

Many agencies and organizations have played key roles in the overall establishment of the hemp industry in Colorado. The CHAMP initiative brought together these agencies and industry organizations to develop the blueprint for further advancement and management of hemp. What follows below describes a cross-section of the constituencies and highlights the key functions and services provided toward developing Colorado's hemp industry.

Governor's Office

Colorado became a leader in national hemp production with the passage of the 2014 Farm Bill and the subsequent roll-out of Colorado's hemp pilot program. With the changes in the 2018 Farm Bill, the Governor's Office prioritized Colorado's status as an innovative force in promoting the production of hemp as a high-value agricultural product.

The Governor's Office dedicated significant resources to the CHAMP initiative, ensuring early on that the project involved principals from key state departments. Governor Polis twice filed a joint response to the USDA's *Interim Final Rule and Request for Comments*, the first printed on Colorado-grown hemp paper and filed in partnership with the Department of Agriculture and Attorney General Weiser. More recently, the Governor issued a proclamation on June 11, 2020, also printed on Colorado-grown hemp, declaring June 6–June 13 as Hemp Week and ordered an American flag made from industrial hemp flown over the Colorado State Capitol. And on June 18, 2020, with support from the Governor's Office, the CDA filed its hemp management plan with the USDA.

Vision

Since 2014, Colorado's hemp program has grown to include over 87,000 acres of hemp and 2,600 registrations. Moving forward, the Governor's Office hopes to help the Colorado hemp industry grow and innovate while increasing good jobs and keeping Colorado as a top state for production through appropriate regulation.

What's more, the Governor's Office has sought to ensure that hemp producers and hemp-related business obtain access to banking, financial services, finance, and insurance in a manner similar to other parts of the agriculture value chain, initially through the joint publication of the *Roadmap to Cannabis Banking & Financial Services* with DORA.

Experience

In five terms as a member of the U.S. Congress, Governor Polis advanced various bipartisan bills promoting the development of hemp in Colorado. He, along with other congressional members, added the hemp research amendment to the 2014 Farm Bill that allowed state agriculture departments, colleges, and universities to grow hemp for academic and agricultural research purposes.[3] In 2017, then-Congressman Polis also helped to launch the Cannabis Caucus, intended to promote and protect hemp and marijuana. In that year, Polis hosted "Hemp on the Hill" with the Cannabis Caucus, which was the first event of its kind.

Colorado Department of Agriculture

The CDA oversees and promotes agriculture in partnership with other state departments and local governments and through specific programs authorized by the General Assembly. The Commissioner of Agriculture serves as the head of the CDA, working with members of the Colorado Agricultural Commission and other boards or bodies to formulate policy for the state.

In 2015, the CDA became the primary agency responsible for regulating hemp cultivation in Colorado with the creation of the state's pilot industrial hemp program, principally through the Plant Industry and Laboratory Services Divisions. Through those two divisions, CDA regulates producers, provides testing services, and administers a certified seed program, but does not have jurisdiction over the processing, sale, or distribution of the crop. Further, CDA serves

3 H.Amdt. 208, 113th Congress (2013-2014).

as the lead agency regarding the development and administration of the state's industrial hemp plan submitted to USDA under the 2018 Farm Bill and the IFR.

Registration

The CDA registers applicants under the 2014 Farm Bill pilot hemp program and will remain the main regulatory agency for hemp cultivation registration. When the 2018 Farm Bill produced a sharp increase in the number of registration applications, the CDA developed a secure online registration system.

Field Sampling and Testing

The CDA Laboratory Services Division conducts accurate, timely, and legally defensible analysis of various agricultural samples, including industrial hemp, on a random selection basis. The division has established standard operating procedures to handle hemp samples for THC analysis. CDA will continue in this role in sampling and testing hemp for compliant levels of THC and will coordinate and certify third-party field sampling agents to expand sampling coverage.

Seed Certification Support

The CDA Plant Industry Division created the first certified hemp seed program in the nation and helped to develop an industry-leading hemp program.

The Colorado Seed Growers Association (CSGA) is the lead certifying agency in Colorado; CDA will continue to support CSGA by providing THC verification as part of the seed certification process.

Colorado Department of Public Health & Environment

CDPHE seeks to advance the health of Coloradans, protecting the places where they live through health and environmental protection programs and activities. CDPHE has overseen the inclusion of hemp in consumable products since 2017, whether as a food ingredient or as a nutritional supplement, through a combination of regulations, policy, and licensing regimes. It is expected that CDPHE will continue to play a role in the Colorado hemp industry under the CHAMP initiative in the manner described below.

Lab Certification and Testing

CDPHE helps manage lab certification for most analytical laboratories in the state for food and environmental testing. CDPHE will serve as the main certifying agency for private labs that test for compliant THC levels in hemp. Approved and certified labs will be required to meet ongoing inspection, testing, and compliance protocols for maintaining certification.

Processors and Manufacturers

Colorado permits the inclusion of industrial hemp in food and dietary supplements, subject to compliance with CDPHE requirements. CDPHE has adopted applicable FDA regulations, specifically 21 CFR 111 (dietary supplements) and 117 (food), for hemp manufacturers and processors. In addition to these requirements, CDPHE requires that all parts of hemp used in consumable products must come from a hemp producer registered and in good standing with the laws of the jurisdiction where such producer grows hemp, THC must not be above allowable limits, finished products are required to be tested, and the product must meet state labeling requirements.

Marketing and Labeling

CDPHE sets standards for hemp-related product labeling. Hemp products must include certain standard language, including an identity statement, net weight statement, a list of ingredients, and the company name with address. Labels of these products must also clearly identify that hemp is an ingredient; list any CBD content; not make unsubstantiated health, benefit, or disease claims; and include the statement that the "FDA has not evaluated this product for safety or efficacy."

Office of Economic Development and International Trade

OEDIT works with partners to create a positive business climate that encourages dynamic economic development and sustainable job growth. OEDIT strives to advance Colorado's economy through financial and technical assistance that fosters local and regional economic development activities throughout the state. OEDIT's various divisions offer a host of programs and services designed to support the state's business recruitment efforts for domestic and foreign companies evaluating Colorado for relocation or expansion, existing Colorado companies pursuing growth and expansion opportunities, and companies requiring other retention services.

OEDIT's Global Business Development (GBD) division seeks to elevate Colorado businesses and communities by using a data-driven approach to recruit, support, and retain companies and businesses that contribute to a robust and diversified economy. The GBD division has played an integral role within the CHAMP initiative and will continue to promote the Colorado hemp industry.

Economic Development Tools and Programs

OEDIT's financing and incentive programs are comprised of cash incentives, business grants, tax credits, debt, and equity financing among other programs. Past funding and grants have been awarded to companies within the hemp industry. Examples of various OEDIT programs that can support and promote the hemp industry include Enterprise Zone Tax Credits, Opportunity Zone Initiatives, Small Business Initiatives, and other funding programs.

Office of the Attorney General

The Attorney General (AG) and the Department of Law represent and defend the legal interests of the people of the State of Colorado and its sovereignty. The AG exercises the responsibilities given to the office by the Colorado Constitution, statutes enacted by the Colorado General Assembly, and the common law. The AG is the chief legal counsel and advisor to the executive branch of state government, including the Governor, all the departments of state government, and to the many state agencies, boards, and commissions. Both the 2018 Farm Bill and the IFR both contemplate a role for the AG within the state plan; the CDA must consult with the Attorney General in formulating the plan submitted to the USDA, the AG must be notified of intentional violations of the state plan, and the AG has access to real-time data from the USDA.[4]

4 IFR at 58,532.

Colorado Department of Public Safety

The DPS has six divisions that provide public safety services for Colorado communities: Colorado Bureau of Investigation, State Patrol, Division of Criminal Justice, Division of Fire Prevention & Control, Division of Homeland Security and Emergency Management, and the Executive Director's Office. Similar to the Department of Law, the 2018 Farm Bill and the IFR contemplate a role for DPS within the framework for hemp.

Law Enforcement & Public Safety

DPS will have several areas of focus within the state hemp plan. Already, DPS coordinates with local municipal, tribal, and county law enforcement agencies to meet public safety needs, and that coordination will extend to a variety of hemp concerns, including registration and certification, fire safety, zoning, transportation, and compliance. As part of the requirements in the IFR, obtaining a hemp production license will require the completion of certain background checks, as well as enforcement of state plan elements. It is therefore expected that DPS will continue to foster interagency coordination within statewide law enforcement efforts.

Transportation

The Motor Carrier Safety section will continue to handle various aspects of hemp-related transport activity regarding commercial motor vehicles, including those related to crashes, hazardous materials handling, or any criminal violations. Further, DPS coordinates with law enforcement outside of Colorado to address interstate transportation issues.

Institutions of Higher Education

Colorado State University (CSU) is part of the CHAMP initiative and is actively involved with the collaboration of agencies, academic institutions, and other industry stakeholders in developing the hemp industry in Colorado. Further, CSU staff served with the CDA as lead authors of this report and its findings. In addition to CSU, other Colorado academic institutions will be actively involved in hemp research and workforce development, including the University of Colorado, Adams State University, CSU-Pueblo Institute of Cannabis Research, Fort Lewis College, Colorado Mesa University, Western Colorado University, and the University of Northern Colorado.

Extension Service

CSU Extension works within Colorado communities to provide education, data, and research-based information to the public. Expertise includes agriculture, water, business management, and other topics useful for understanding and building the hemp industry. CSU Extension Service has been instrumental in developing education materials to support hemp production, identifying both the risks and opportunities associated with hemp production, while also performing research intended to close knowledge gaps caused by the decades-long prohibition against hemp production in the United States.

Colorado Department of Regulatory Agencies

DORA announced, along with Governor Polis, the *Roadmap to Cannabis Banking & Financial Services*.[5] The Roadmap stated Colorado's goal, vision, and strategies for improving access to banking, insurance, and other financial services to those in the hemp industry.

With the passage of the 2018 Farm Bill and the submission to the USDA of Colorado's proposed hemp plan, DORA seeks to create a regulatory environment where financial services and insurance are offered to hemp companies on par with other industries, to provide clarity on how state hemp laws and regulations apply to service providers within the financial services and insurance industry, and encourage innovation for emerging technologies and business models that better meet the needs of Colorado's hemp industry stakeholders.

Insurance

DORA's Division of Insurance regulates Colorado insurance companies and serves as a liaison to the National Association of Insurance Commissioners and industry stakeholders. Lack of clarity and understanding of the issues surrounding insurance for hemp companies has led many insurance companies to avoid providing coverage to the industry. It is expected that the Division of Insurance will focus on two key areas under the CHAMP: educating insurance companies on providing coverage for hemp producers and other users of manufactured hemp products; and encouraging underwriters to design products tailored to the industry.

Banking and Financial Services

The Division of Banking regulates state-chartered commercial banks and trust companies, state-licensed money transmitters, and enforces the Public Deposit Protection Act. The Division of Financial Services regulates state-licensed credit unions and savings and loan associations. The Division of Banking and the Division of Financial Services are working with the Federal Reserve System, Federal Deposit Insurance Corporation, and the National Credit Union Administration to offer clarity on how to protect banks and credit unions while building a regulatory

5 Polis Administration Unveils 'Roadmap to Cannabis Banking & Financial Services'.

environment where state-chartered and licensed financial institutions, money transmitters, and insurance companies can expand services to those in the hemp industry. It is expected that these divisions will seek to partner with CDA, CDPHE, and the Colorado AG's office to ensure continued compliance with state hemp rules and regulations, as well as the continued safety and soundness of institutions that opt to offer financial services to hemp companies.

Colorado Department of Natural Resources—Division of Water Resources

The Division of Water Resources (DWR) administers water rights, issues well permits, represents the state in interstate water compact proceedings, monitors streamflow and water use, issues licenses for well drillers, assures the safe and proper construction of water wells, and maintains numerous databases of Colorado water information. This division ensures Colorado hemp producers obtain a legal water supply for all cultivation activities.

Colorado Department of Revenue—Marijuana Enforcement Division (MED)

The MED of the Colorado DOR regulates the cultivation, production, and sale of marijuana (medical and retail) in Colorado. Representatives from the division participated in the stakeholder meetings that occurred in connection with the development of this report. While hemp producers may not transfer plant material to MED-licensed businesses, manufacturers of hemp-derived products such as extracted cannabinoids can sell inputs to food and storage facilities registered with CDPHE. Such CDPHE-registered businesses may then in turn sell finished products containing hemp derivatives to MED-licensed dispensaries, subject to satisfaction of certain testing and product tracking criteria.

Federally Recognized Indian Tribes

Reservations of the Ute Mountain Ute Tribe (UMUT) and of the Southern Ute Indian Tribe (SUIT) adjoin one another in Southwest Colorado near Mesa Verde National Park. The portion of the UMUT reservation that overlaps with Colorado spans 575,000 contiguous acres extending into New Mexico and Utah, including the 7,700-acre UMUT Farm & Ranch Enterprise at the base of Sleeping Ute Mountain. The 1,064 square-mile SUIT reservation includes high-mountain timberlands in its eastern portion and mesas to the west (closer to UMUT), but no tribally-owned farm and ranch; rather, the Agriculture Division of the SUIT Natural Resources Department works to foster economic opportunities for SUIT members and the tribe itself on tribal and allotted lands.

Under the 2014 Farm Bill, tribes could form arrangements with state higher education and agriculture departments that would permit the production of hemp. The 2018 Farm Bill, by contrast, empowered federally recognized Indian tribes to assume primary regulatory authority over cultivation, processing, production, and marketing of industrial hemp on tribal lands. With regards to growers seeking to produce hemp on lands within reservation boundaries, the regulator to whom a grower or manufacturer is subject will depend (much like oil and gas extraction) upon whether such lands are held in fee, owned by the tribe, or allottees.[6]

Local Government

In 2019, the Colorado General Assembly clarified that local governments have the authority to regulate businesses engaged in the processing, extraction, or manufacturing of hemp. Local governments can regulate businesses involved in the sale of industrial or food products containing hemp, so long as those regulations do not conflict with state law. Local governments continue to play a critical role in the evolution and growth of the Colorado hemp economy. For example, local governments have the opportunity to address zoning, building & fire safety, and other areas that fall within their purview.

The Colorado Municipal League (CML) and Colorado Counties, Inc. (CCI) are non-profit, nonpartisan organizations providing advocacy, information, and training to Colorado's municipalities and counties, respectively. These local government agencies seek to ensure that the perspectives of municipalities and counties are included in major statewide decisions, including the evolution and growth of the Colorado hemp industry. CML and CCI are actively engaged with the primary goals of maintaining local government authority to regulate businesses and gaining more coordination with the state on issues such as permitting locations for hemp cultivation.

As noted elsewhere in this report, the first step for many cultivators and manufacturers of hemp is to properly register their crop with state agencies. Such businesses must also ensure compliance with local ordinances and zoning laws, and obtain necessary local licenses, where applicable.

Zoning, Fire Code, and Building Safety

Land use codes are implemented at the local level. Local governments can control the production of hemp through local zoning and land use ordinances in the same way they do businesses and other agricultural products. Local governments can designate where

6 See, e.g., Erin M. Erhardt, *States Versus Tribes: The Problem of Multiple Taxation of Non-Indian Oil and Gas Leases on Indian Reservations*, 38 AM. INDIAN L. REV. 533 (2014).

hemp may be grown within their jurisdictions through land use and/or zoning authority. Local noise and odor regulations may also apply to the cultivation, production, and storage of hemp products. Given the evolving nature of both the hemp industry and land use laws in Colorado, local governments may seek additional tools in the future to address issues uniquely associated with hemp and/or impacts on adjacent property owners.

Fire safety is of primary concern in the processing and production of hemp products, especially with indoor extraction of CBD oil (considered high risk due to the nature of the materials used in the process). Local governments may develop permit and inspection requirements for these operations to address fire and other safety concerns, which may impose additional requirements not currently required by state law.

Colorado Industry Associations and Other Nonprofits

Industry organizations have proven critical to the thoughtful evolution of policy and regulations enacted by federal, state, and local agencies and the reemergence of industrial hemp as a nascent industry within Colorado. Such organizations represent the concerns and interests of the stakeholder members to ensure that laws meet both the goals of various governments and the practical needs of the farmers, producers, manufacturers, and ancillary businesses within the industry, while also providing critical resources surrounding the certified seed. The following are key associations that took part in the stakeholder process, listed in alphabetical order.

Colorado Bankers Association

The Colorado Bankers Association (CBA) strives to provide banks with clarity on how to treat hemp-related businesses through ongoing education and advocacy. Banks have been left ensnared in a conflict between state and federal laws regarding their ability to serve these customers—something CBA continues to work to remedy.

Bankers associations, including CBA, recently called for changes to the USDA IFR that would help facilitate banks offering services to hemp growers and related businesses. The changes include increased ability to verify would-be borrowers legitimacy as well as more flexibility in potency testing for hemp for growers whose crops inadvertently exceed the 0.3 percent threshold, which if not changed could lead to increased financial loss for borrowers and lenders alike. Most recently, CBA advised bankers that they must tailor their anti-money laundering programs to monitor their hemp-growing customers more effectively.

CBA hosts regular forums and educational opportunities to keep its members and, in turn, their customers apprised about ongoing efforts to help them more easily serve hemp businesses, while complying with all state and federal laws.

Colorado Farm Bureau

The mission of the Colorado Farm Bureau (CFB) is "to advance the interest of the Colorado farm and ranch community" through "research and inquiry into the fields of agriculture, industry, commerce, transportation, economics and political relations." It advances the interests of its members by promoting

farming and ranching, providing member resources, and developing school farm programs. Membership representation includes farming, ranching, education, produce, retail, medical, and scientific industries. CFB is actively involved in policy development and advocacy in legislation. CFB announced that it is looking forward to working with the Governor's Office in supporting hemp production and took an active role in CHAMP stakeholder discussions.

Colorado Hemp Industries Association

The Colorado Hemp Industries Association (COHIA) "is a member-driven organization propelling the hemp industry in Colorado through reliable information, public policy work, and agriculture and market development." COHIA has a list of stated goals that include providing grassroots representation, education to the public, and various advocacy and support functions for the hemp industry. COHIA is an active member of the CHAMP initiative and provided comments to the IFR on January 9, 2020, expressing concerns and recommendations for changes that largely mirrored those of the state. The organization provides updates and industry news, conferences and education events, and other tools for supporting hemp businesses, researchers, and supporters.

Colorado Seed Growers Association

Colorado Seed Growers Association (CSGA), located on the campus of Colorado State University, is a non-profit educational and service organization operated in partnership with CSU Cooperative Extension. CSGA, a member of the Association of Seed Certifying Agencies (AOSCA), is the official seed certifying agency in Colorado and works closely with CDA on the CDA Approved Certified Seed program. Certification is expected to continue through CSGA by following standards set by the AOSCA which comply with the Federal Seed Act and Colorado Seed Act.

Hemp Feed Coalition

The Hemp Feed Coalition (HFC) emerged from the 2018 Hemp in Animal Feed Report completed by CDA. After completion of the report, the Coalition was created by multiple industry stakeholders including the hemp industry, Feed Processors and formulators, animal producers, feed regulators, and animal experts. The HFC is working to gain federal regulatory approval for hemp as an animal feed ingredient through education, research, and completion of applications submitted to the FDA and Association of American Feed Control Officials. The secondary goals of the HFC are to: establish new markets for hemp and its products and the creation of a secure supply chain; and support research into the safety and efficacy of hemp which is necessary to secure a position for hemp as an ingredient in feed, both for production animals and pets.

Rocky Mountain Farmers Union

Rocky Mountain Farmers Union (RMFU) is a cooperative enterprise described as a grassroots organization that advocates for family farmers and ranchers, communities, and consumers in Colorado, New Mexico, and Wyoming. RMFU focuses on educational, legislative, and cooperation programs, and also participates in developing legislative proposals to support member interests. RMFU was active in supporting Amendment X, a Colorado state constitutional amendment that changed the definition of industrial hemp to match federal law. In 2019, RMFU policies included support for removal of hemp from the CSA, an end to restrictions surrounding the transportation and importation of hemp seeds and live hemp plants across both state and federal boundaries, recognition of hemp as a specialty agricultural crop, research into the various potential uses of hemp, the formation of hemp cooperatives, and other legislative support in the development of the hemp industry. RMFU continues to emphasize hemp as an important topic at educational workshops and symposiums and is also actively involved in advocacy, educational outreach, and promotion of hemp as an agricultural commodity.

Section 2.
Stakeholder Recommendations

Recommendation Summary

The CHAMP stakeholder process resulted in 21 recommendations that span eight links in the hemp industry supply chain. A list of the recommendations is included below. Each recommendation in this section includes the legal basis and purpose for the policy recommendation; information on existing regulatory and supportive practices and on new regulatory programs; and guidance on implementation, including needs for new legislation, rulemaking, programs and procedures.[7]

7 At the conclusion of the stakeholder discussions the groups produced 45 draft deliverables that function as policy recommendations. These were combined to form 21 core regulatory objectives highlighted in Figure 8.

The recommendations result from an initial identification of important topics by the CHAMP executive committee, and then three meetings for each stakeholder group where stakeholders further identified and specified key regulatory topics and practices.

Each recommendation was then further refined to include the policy or position; education or research required; action items; and key resources required for implementation. Figure 8 shows the stakeholder groups and recommended deliverables.

Figure 8. Stakeholder Recommendation List

Market-Level Principles Across the Supply Chain

There were several recurring regulatory principles that emerged from the stakeholder groups, documented below. These principles will be noted throughout the recommendations, and a holistic approach to each is essential to creating a successful hemp regulatory program.

Principle 1: Promote Economic Development Across the Supply Chain

Colorado State government, primarily through OEDIT, continuously seeks to establish, recruit, support, and retain businesses that provide the right jobs for Colorado and that contribute to a robust and diversified economy. In keeping with that mission, OEDIT offers a variety of programs that seek to draw, maintain, and expand the presence of employers in Colorado.

Several of Governor Polis's "Wildly Important" Goals for Fiscal Year 2021 focus on the advancement of the hemp industry, including goals to increase Colorado hemp production space; increase business startups in rural Colorado; initiate a hemp working group with industry stakeholders to explore additional ways to support the growth of the industry in rural areas; and increase Colorado hemp producers' commodity market share through increased business partnerships. OEDIT has also sought to actively integrate hemp into its existing toolbox of incentives, technical support, and investment. Several programs could be available to hemp cultivators, processors, and manufacturers.

Hemp companies may fit into OEDIT's classification of advanced manufacturing, or may be considered a target industry that provides desirable employment opportunities, and could be eligible for many OEDIT programs. Hemp production operations may also be located in areas eligible for rural economic development incentives. OEDIT programs appropriate for hemp businesses may include (but are not limited to):

- **Skill advance Colorado.** Grants for the training or retraining of employees of businesses relocating to or expanding in Colorado; or for established companies to reinvest in their workforce to remain competitive. Awarded for net new job creation.
- **Colorado microloans.** Grants for non-profit lenders to make loans to businesses not otherwise served by traditional credit markets.
- **Job growth incentive tax credit.** Tax credit for businesses pursuing competitive expansion initiatives that provide at least 20 new jobs.
- **Enterprise zone.** State income tax credits for businesses to locate and expand in economically disadvantaged areas.

- **Opportunity zone (federal).** Tax credit for investors in low-income communities throughout the state that offers tax forgiveness on capital gains and favorable treatment of reinvested capital gains.
- **Strategic fund incentive.** An incentive program that offers an even cash match for businesses that create and maintain permanent net new jobs.
- **Advanced industries incentive/accelerator program.** Grants, tax credits, seed funding and job training programs for advanced manufacturing, aerospace, bioscience, electronics, energy and natural resources, infrastructure engineering, and technology/ information businesses.
- **Small business development center.** Fifteen technical assistance centers across the state that offer a network of mentors and consultants provide no-cost consulting and low-cost training and workshops to entrepreneurs and small businesses.
- **Venture capital authority.** Publicly supported investment funds that provide equity and debt investments in early-stage companies.
- **Promotion.** OEDIT seeks to elevate the profile of Colorado businesses and communities throughout the world. OEDIT will continue to promote the Colorado hemp industry under its mission.

The programs above may require that businesses meet several criteria, whether through a competitive application process, new job creation metrics, or locating inside specific zones targeted for economic development. Hemp companies are encouraged to participate alongside all other current or prospective Colorado companies, and all hemp companies are eligible for technical assistance and for programs designed to support new job creation, especially in disadvantaged zones targeted for economic development.

The CHAMP industry analysis (Appendix B) and stakeholder discussion underlined the need for a broad initiative to increase research and awareness of the industrial and consumer uses of hemp products and extracts. Research and development of new uses and the reinvigoration of traditional uses will drive future investment in scalable processing facilities that could locate in Colorado as national demand for hemp products increases.

Advanced manufacturing facilities can serve a national or international market and would require a reliable source of raw hemp fiber or grain as inputs, thus benefiting local agricultural communities. Intellectual property that will drive the industry through new varietals, products, and manufacturing processes is of equal importance as a key industry value component. As a result, research and development and processing capacity are all vital for the advancement of Colorado hemp. A coordinated public economic development effort like the CHAMP often will signal and incentivize further private investment in hemp production, processing, and manufacturing.

Principle 2: Chain of Custody & Information Sharing Systems Will Drive an Expanding Hemp Industry

One key item considered for registered hemp industry participants is a traceability system that creates a chain of custody beginning at harvest and continuing to the final end-product, including documentation for all transactions and transport. A traceability system that provides an uninterrupted chain of custody between registered entities could assist in federal regulatory compliance, food safety, and interstate commerce; and could allow for unencumbered interstate transportation in the future. It could also bolster consumer confidence in hemp end-products.

It is expected that chain of custody entries and documents will allow for seamless trade and transportation of hemp across the state and multiple jurisdictions, and for law enforcement to distinguish registered, compliant hemp from other cargo in transport. The traceability system would also support potential future development of the Colorado regulatory scheme which, depending on the federal regulatory environment, could include post-harvest testing, a THC remediation program, and food safety functions like food-borne pathogen identification or product recalls.

Principle 3: Focus on THC Control

Controlling THC in hemp plants and products is important to ensure compliance with federal regulations. Colorado is experienced in regulating THC as one of the first states to develop a regulated commercial cannabis framework in 2014. CDA officially regulates the control of THC for hemp products up to the farm gate to conform to the state and federal definition of hemp. In addition, Colorado has also pioneered the use of certified seed to provide farmers the choice to use known genetics with low THC level. Looking toward the future, Colorado is interested in exploring the remediation of THC (as soon as federally permissible) to produce safe and efficient options for non-compliant plant material to meet the 0.3 percent THC requirement.

Principle 4: Recognize the Importance of Federal Compatibility While Also Advocating for Reasonable Regulations

The Colorado hemp program must comply with federal laws and regulations, including any forthcoming federal laws and USDA, FDA, DEA, the Federal Trade Commission (FTC) and other agency rules; at the same time, stakeholders in Colorado will continue to advocate for the rules and policies developed as part of the CHAMP initiative. Some policies included in this report are long term objectives and are more forward-looking than current federal law and will need to be implemented as federal law and rules evolve. While federal compatibility is important to establish national standards, Colorado should continue to advocate for appropriate and reasonable federal regulations that allow for advancement of the industry, while at the same time, maintaining a level of public safety.

Principle 5: Recognize the Importance of Intergovernmental Coordination

Close coordination with state, tribal, and local governments and law enforcement agencies will ensure that compliant cultivation and manufacturing businesses can operate efficiently and transport hemp without unnecessary delay. Interstate and tribal government communications will be crucial for transport across tribal/state boundaries. Tribal and local government and law enforcement will be granted access to state electronic registration and other records, for any regulatory activity, through the establishment of a Memorandum of Understanding (MOU) that private or proprietary information will be kept confidential.

Principle 6: Promote Access to Finance and Insurance Services Across the Supply Chain

All businesses require stable access to standard finance and insurance products. Ensuring comparable access to financial services and insurance for hemp is essential for industry development and will help businesses achieve stability in its early years, where markets are often fragmented and volatile. Colorado can be a leader for guidance and outreach to institutions seeking to serve the evolving marketplace and facilitate the provision of services in a manner similar to other agricultural products.

A corollary issue arising out of stakeholder meetings may require state involvement or public/private partnerships; namely, that federal crop insurance does not cover non-compliant material like other agricultural products that banks look to for underwriting and risk management purposes. The state should deepen partnerships to resolve this issue in a manner intended to eliminate coverage shortfalls. Forward progress is expected to require multi-department coordination with support from the Governor's Office, DORA, state, and federal legislators, and as members of the Colorado Congressional Delegation and tribal leaders.

Principle 7: Promote Equity, Diversity, and Inclusion Across the Supply Chain

As the industry continues to grow, Colorado should commit to making the Colorado hemp industry a model for equity, diversity, and inclusions (EDI). Direct initiatives should be made to promote the diversity and inclusion of emerging businesses in farming, manufacturing, and retail sectors. Any large initiatives to advance the industry should be examined through an EDI lens to promote the inclusion of those who have historically been underrepresented. Colorado should focus on increasing hiring, access to funding, promoting a diverse culture, stakeholder outreach and education.

Stakeholder Recommended Deliverables

Identification of key recommended deliverables through the stakeholder process was the driving focus of the CHAMP initiative. The following stakeholder recommendations represent a general consensus among stakeholders regarding sensible and forward-looking deliverables intended to bolster Colorado's hemp industry. Alternative viewpoints for certain deliverables are noted where appropriate. However, it is important to note that implementation is conditional on the market need, federal regulatory environment, procurement of resources, including increased staff and funding, as well the passage of legislation and production of rules and regulations. Dynamic changes are still occurring for the hemp industry, particularly regarding market conditions and federal regulations. Moreover, the impact of the COVID-19 pandemic will most likely have an adverse impact on funding, staffing, and other resources.

Consequently, while these recommendations represent a general consensus of the stakeholders, including the agencies that will implement the deliverables, some of these recommendations may be difficult to implement, require adjustments, or may be delayed based on the factors mentioned above.

Each recommendation is organized as follows:

- A short concept summary
- The basis and purpose of the recommendation
- The regulatory program:
  - current program—describes a current program that will be expanded or replaced
  - existing program—describes a program that will largely remain the same
  - recommended enhancement—describes a new, expanded, or enhanced program
- Implementation steps
- Key government, institutional and industry stakeholders

Recommendations are further organized by the supply chain area and follow the product from seed to market. The following comprise the 21 final recommendations derived from the CHAMP stakeholder proceedings and from public input taken at state events held in 2019 and 2020.

R&D and Seed Recommendations

1. Certified Seed and Clone Program

Stakeholder Recommendation

Support research and development to provide stable genetics and increase the availability of varieties that will consistently meet THC compliance regulations. Continue to allow the use of open source seeds in Colorado.

Expand the current hemp seed certification program to include standard and feminized seed, encourage national adoption of THC verification as part of hemp seed and clone certification. Encourage private industry and institutions of higher education to develop state hemp varieties. While currently allowed, stakeholders recommend Colorado continue to allow the use of open source seeds.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is CRS § 35-27-102 (Colorado Seed Act). The Colorado Seed Act is implemented by 8 CCR 1203-6.

A certification program provides a path to verify identity and protect traits in the seed. Seed certification is one method used to distinguish identity, along with Plant Variety Protection certificates, patents, and utility patents. The U.S. seed certification program is part of the Federal Seed Act but is carried out by individual state agencies, state departments of agriculture or crop improvement associations. These agencies are coordinated through the AOSCA. In Colorado, the CSGA is the official seed certifying agency and an AOSCA member.

Certified seed and clones assure the buyer (and end-user) of the genetic identity and characteristics of the products being purchased. A robust certification program protects producers against inaccurate or misleading labeling, which can cause severe economic hardship due to low crop yields, high THC concentrations, poor crop quality, and the spread of noxious weed seed. Under current market conditions, Colorado producers have experienced a shortage in reliable hemp seed sources, inflated seed prices, and a concerning amount of seed sold by predatory sellers using false information.

Regulatory Program

Current Program. The hemp seed certification program is operated by CSGA. CDA provides THC testing for the program. To certify seed, a CSGA hemp varietal review board must deem the entrant to be a genetically distinct, uniform, and stable plant variety. Then, the CSU Experiment Station plants the variety in several locations across the state in trials to prove the

applicant claims in varying soil, altitude, and general environment. CDA then tests for THC content and the CSU seed laboratory tests to verify all other applicant claims (i.e., purity, yield, noxious weed presence, etc.) for variety stability. The initial single-season trial occurs at four experiment station locations throughout Colorado. Each subsequent year a variety is certified and labeled under the CDA Approved Certified Seed program, CSGA inspects every seed production field prior to harvest. THC verification, completed by CDA, will also occur annually for producers of certified seed.

Recommended Enhancement. The features of an enhanced hemp seed certification program, including the certification process and certifying agencies, will largely remain the same. Stakeholders recommended that CSGA evaluate the expansion of the certification program to include a clonal certification program (pilot starting in 2020) and a feminized seed certification program (in process). Key features of the hemp certified seed program would include:

- **Certifying agencies and general process.** Tax Hemp certification should continue to be administered by CSGA and will follow generally accepted AOSCA standards and comply with the Federal Seed Act and the Colorado Seed Act. The current process for seed certification will remain the same, including the varietal review, testing, and labeling procedures described above.
- **THC verification.** CDA and designated state-certified THC testing labs should provide THC verification and testing for the seed certification program.
- **Feminized seed.** CSGA and AOSCA certified agencies expand existing hemp certification standards to include feminized seed for accepted varietals. CSGA should work with stakeholder groups to develop and adopt standards for feminized hemp seed breeding and production, including the use of chemical applications to produce female pollen and feminized seed. Feminized seed will be certified only if it has gone through a standard AOSCA certification process for genetic identity and purity, and the additional requirements needed to verify proper feminization procedures. CSGA should harmonize their procedures with AOSCA once there are international guidelines for feminized seed.
- **Certified clone program.** CSGA should work with AOSCA certified agencies to evaluate the feasibility and enterprise structure to establish a certified clone program. A genetic certification process for clones would be similar to seed certification, where plants enter a varietal review and are grown full term, in multiple conditions over multiple seasons to verify identity, purity and select traits. Definitions for foundation, registered and certified genetic stock would be developed by CSGA.
- **Open source hemp genetics.** CDA should continue to allow hemp genetics from any source to be grown and harvested in Colorado if it meets the definitions described in 8 CCR 1203-23. Open source genetics mean any seed or clone produced by the plant Cannabis sativa L. that possesses a THC content less than or equal to 0.3 percent tested according to CDA regulations; and is not patented, certified, or otherwise protected. Any open source seed can be entered to become certified if it can pass the required trial process.

Implementation

The following action items are needed to implement this recommendation:

- THC verification program—pending any expected AOSCA action—standards development, testing and trial procedures, labeling standards;
- Feminized seed certification program—pending AOSCA action—testing and trial procedures, labeling standards;
- Clone certification program—pending AOSCA action—standards development, testing and trial procedures, labeling standards; and
- Develop task force to determine need, feasibility, operating model, and funding.

Key Stakeholders

CDA, CSU, CSGA, AOSCA, other seed certification agencies, Colorado hemp farming and seed breeding industry and associations.

2. Reduce Cross-Pollination Through Information Sharing

Stakeholder Recommendation

Allow CDA to provide limited information on the presence of hemp farms to other nearby hemp producers to help minimize cross-pollination between different varieties of hemp, and between hemp and marijuana plants, that may lead to unwanted traits or non-compliant crops. On a long-term basis, stakeholders recommend that researchers, including the Center the Excellence, explore ways to mitigate cross-pollination issues.

Basis & Purpose of Recommendation

The statutory basis for these recommendations is found in CRS § 35-61-104 and implemented by CCR 1203-23. Such laws and regulations define and describe the registration process for hemp producers, including registration requirements, information collection, and reporting requirements.

Developing cross-pollination reporting provides information to hemp producers who might be susceptible to cross-pollination from other nearby hemp fields, so they can make informed decisions about registering their lots and protecting their crops.

Seed, fiber, and cannabinoid producers choose their crop location without the ability to understand the local cross-pollination risk factors, i.e. other nearby hemp crops that may produce pollen. An information program, where producers are notified of how many hemp crops are located nearby (i.e., within a certain radius in miles) may help in risk mitigation, where pollination can significantly reduce the value of certain hemp crops.

The impact of cross-pollination will continue to be an obstacle that hemp growers face. The stakeholders determined this specific issue should be a prioritized area a Center of Excellence (described in recommendation 6) should research.

Regulatory Program

Current Program. There is no current program directly addressing information sharing to minimize cross-pollination. Anonymized information on the presence of nearby hemp registrants is provided to other registrants on an as-requested basis. CDA does not restrict or prohibit registered locations if they comply with all state and federal hemp laws.

Recommended Enhancement. The hemp producer registration program administered by CDA collects information on location, variety, and intended end use of each hemp crop. This information could be combined with GPS data to create a notification to producers whether their proposed dioecious or feminized crop is within a predetermined distance of another registered hemp lot.

Stakeholders recommended CDA establish a service to inform hemp farmers if other registered hemp fields are within a certain defined distance, thus potentially posing a cross-pollination threat. The producer could request a report during registration to see if other hemp lots are registered nearby and an update notification if another hemp lot is registered after the producer's initial registration. To maintain confidentiality requirements, the CDA would simply report to affected producers whether (and how many) other hemp fields exist within the defined distance. When possible, the stakeholders' visioned the system would be automated based on technological capabilities of the CDA database.

In the longer term, the stakeholders recommended Colorado research institutions, including the Center of Excellence, focus on research factors that affect cross-pollination risks, such as proximity, geography, climate, pollen viability, presence of hemp genetic research facilities, and other factors to develop cross-pollination risk standards.

The consensus from the stakeholders indicated that Colorado should continue to not restrict or prohibit registered locations if they comply with all state and federal hemp laws.

Implementation

The following action items are needed to implement this recommendation. Items include responsible agencies, estimates of required budget and funding sources, and additional staff where applicable:

- New procedures establishing the by-request information program while protecting producers' confidential information;
- Adopt research-determined definitions for physical distances at which cross-pollination poses a risk; and
- Evaluate the feasibility of an automated notification system for cross-pollination.

Key Stakeholders

CDA, Colorado higher education institutions, Center of Excellence, Cooperative Extension Service, and other research institutions.

3. Expand Genetic Research and Establish Plant Breeding Regulations

Stakeholder Recommendation

Establish regulations and a registration program specific to hemp plant breeding and genetic research. This program would allow and encourage research to improve the quality and uniformity of seed genetics and supply for the state's producers, without restrictive THC content rules that would otherwise place them in violation of the broader hemp production regulations.

Basis & Purpose of Recommendation

The purpose of developing separate regulations specific to seed and clone R&D is to allow plant breeders and researchers to conduct research activities that are conducive to atypical production models and processes such as continuous planting and culling, as well as generation of plant material in possible violation of the THC requirements. Because plant breeding requires trial and error across multiple generations before genetics are stabilized and predictable, a separate set of regulations for these registrants is necessary to allow them the flexibility to conduct this research in good faith without the threat of penalties.

Current federal rules under the IFR include no special provisions for genetic research & development or for plant breeding. To implement this recommendation, the federal rules would need to allow for this to occur. CDA would implement this recommendation to the extent feasible and after consultation with the USDA.

Regulatory Program

Current Program. CDA has allowed genetic research under the rules established in the 2014 Farm Bill and by rule in 8 CCR 1203-23. This program will be impacted in the near term given the omission of specific research and development rules in the current IFR. Colorado Senate Bill 20-197 amends CRS § 35-61-104 to include a separate research and development registration and regulations "except as otherwise prohibited by law." CDA should develop specific rules for genetic research and development once compatible with federal law and USDA rules.

Recommended Enhancement. Stakeholders recommended the CDA develop an industrial hemp research and development regulatory program, once it is federally permissible, where the purpose of the research may include growing industrial hemp to provide varieties to aid Colorado's industrial hemp program.

The new program would build upon the established research and development program rules to further advance an operational regulatory framework specifically allowing for effective and innovative seed production and genetic research.

- **Policy Formation.** CDA should convene a multidisciplinary panel, which includes regulatory agents, industry experts, and research professionals, that will work with CDA to establish a set of regulations for the new hemp R&D and plant breeding program.
- **Operation and Enforcement.** CDA should integrate the new program into its operations and staff and enforce the new regulations as they do all other hemp production rules.

The program would feature tailored regulations and qualifications that allow plant breeders and genetic researchers to retain plants with non-compliant THC levels for further breeding and research if they show other desirable traits, assuming THC will be bred lower in further generations.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Rules and definitions specific to seed research and development operations, including eligibility and regulatory requirements;
- Genetic research and plant breeding registration application, inspection, enforcement, and disposal program; and
- Integration with seed/clone certification program.

Key Stakeholders

CDA, Colorado higher education and other research institutions, Center of Excellence, seed breeding and genetic research industry, CSGA.

Cultivation Recommendations

4. Create an Innovative and Flexible Colorado State Hemp Plan that Aligns with Federal Regulations

Stakeholder Recommendation

Stakeholders recommend Colorado align state hemp regulatory practice with USDA requirements to the extent that it ensures a properly functioning regulatory system for the Colorado hemp industry. However, stakeholders overwhelmingly recommend that Colorado continue to advocate for appropriate changes to federal law.

Basis & Purpose of Recommendation

During the 2019 legislative session, Colorado's General Assembly amended the Industrial Hemp Regulatory Program Act to authorize the Commissioner of Agriculture to consult with any stakeholders and to mandate the Commissioner of Agriculture to consult with private industry in drafting a hemp management plan to be submitted to USDA. (CRS § 35-61-104(6), (Colo. Session Laws 2019, ch. 350 (enacting SB19-220))).

The 2018 Farm Bill and the IFR require each state that desires to have primary regulatory authority over the production of hemp within its state to submit a management plan to USDA that outlines how the state will regulate various aspects of hemp cultivation. After the enactment of the 2018 Farm Bill, USDA published nine requirements for states that intend to develop an industrial hemp regulatory program. In October 2019, USDA issued the IFR to further specify the requirements for state hemp plans. USDA has indicated the IFR will likely be revised to create more flexibility for hemp cultivation when it issues a final rule in 2021.

The Colorado state plan describes how the State of Colorado intends to implement USDA's regulatory requirements through existing and updated statutory authorities, rules, and procedures. All authorities described in the plan are in effect or are intended to take effect after USDA approval, and are intended to govern Colorado's industrial hemp industry.

Regulatory Program

Current Program. CDA currently operates a regulatory framework for industrial hemp cultivation under CRS § 35-61-101 et. seq. and 8 CCR 1203-23.

Recommended Enhancement. Colorado Senate Bill 20-197 aligns state statute with federal Law and Colorado's state plan aligns with the IFR. However, based on stakeholder comments, Colorado submitted comments to the USDA in January and October 2020 and a draft state plan in June 2020 that outlined regulations that requested to depart from the IFR requirements in several key areas. Colorado will continue to advocate for changes in the federal rules so that hemp growers have the flexibility they need to succeed in growing their businesses.

CDA submitted the state plan to USDA on June 18, 2020 and expects federal policy will become clearer in 2021.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Legislation and rules to allow, create, and implement post-harvest sampling; remediation program (when federally legal), and third-party lab certification; and
- Procedures for post-harvest sampling, third-party field sampling, and remediation program.

Key Stakeholders

CDA, CDPHE, analytical labs, and Colorado hemp cultivators

5. Verify Registrants Have Access to a Legal Water Supply

Stakeholder Recommendation

Stakeholders recommended an update to the CDA registration process to check if hemp registrants have, or will obtain, a legal water source before planting hemp. In a coordinated and separate process between agencies, CDA could provide DWR with specific information from the registrant's application so that DWR might review the proposed water supply and provide a letter with their findings to the registrant that indicates whether the proposed water supply is legal for planned irrigation use.

Basis & Purpose of Recommendation

The basis for the hemp registration program is found in CRS § 35-61-104 and detailed in 8 CCR 1203-23-2. These statutes define and describe the registration process for hemp producers including registration requirements, information collection, and reporting requirements. DWR's exclusive authority for administering and distributing the waters of the state are described in CRS § 37-92-301(1) and 37-92-501(1). Stakeholders recommended that CDA should provide DWR information on hemp registrants under a MOU to facilitate compliance with DWR statute.

The purpose of developing this procedure is to notify registrants to have a legal water supply and to ensure that registrants may operate without potential shutdown because of orders from DWR. This new procedure will help inform new producers to secure a legal water supply before planting.

Regulatory Program

Current Program. The current registration application process does not include language or guidance regarding the legal water supply for hemp production.

Recommended Enhancement. CDA should explore ways to incorporate a process of referral to DWR during the registration application process. Stakeholders recommend that the application could specifically request the registrant state which of four types of water supplies will be used in the operation, and the registrant would provide additional information based on the water supply type selected:

- Municipal supply (Provider)
- Surface Water Right (water right and share or percent of ownership)
- Well (Permit #)
- Hauled Water (Provider)

DWR could evaluate water supplies according to their procedure and notify the registrant whether the proposed water supply is legal for industrial hemp production. DWR's comments on the registrant's water supply will not prevent CDA from issuing a registration to the producer.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Discussion between CDA and DWR on legal aspects of developing collaborative approach to gather and share information across agencies;
- Water supply data fields added to the registration application for applicants to submit their proposed water supply plans; and
- Information exchange MOU to confidentially send data from CDA to DWR.[8]

Key Stakeholders

CDA, DNR-DWR, Colorado hemp cultivators

6. Establish a Center of Excellence

Stakeholder Recommendation

The state should facilitate a public-private partnership between academic institutions, industry, state agencies, and stakeholders to establish a Colorado Hemp Center of Excellence to accelerate education, research and development in hemp science and technology.

A Center of Excellence refers to a collaboration of numerous academic, private, and government institutions that combine their skills and resources to guide the industry on innovation, best practices, novel research, market-ready applications, funding support, and educational training programs.

The mission of the Center of Excellence will be to serve as a statewide liaison for the Colorado hemp industry by fostering collaboration, resource-sharing, and communication among its regulatory, academic, and industry partners in the research development efforts. In addition, stakeholders suggested the Center will also serve as an "Educational Hub" that will provide technical assistance and educational resources for hemp growers. The Center should also share updates on the industry and findings from its research activities through a publicly accessible website that can provide links to verifiable resources and regulatory information.

Basis & Purpose of Recommendation

The basis for this recommendation follows from the recommendations of the industrial hemp advisory committee created under CRS § 35-61-103; the task force created under Senate Bill 18-235; and the consensus that emerged from the CHAMP stakeholder process.

A collaborative governing body between CDA, institutions of higher education, CSU Extension, OEDIT, the Governor's Office, and other local governmental, nonprofits, private organizations, or individuals, will identify important research areas, conduct relevant studies, and develop educational resources unique to the Colorado hemp industry.

Regulatory Program

Current Program. There is no current coordinated, dedicated research institution for industrial hemp in Colorado. However, research and development activities currently occur in private corporations, and in universities across the state.

Recommended Enhancement. Stakeholders suggested the Center of Excellence represent a flagship institution for the industry, formed as a collaboration between Colorado government, academic institutions, and private organizations to leverage their combined research capabilities and resources. The Center will serve as a statewide liaison for hemp industry stakeholders, striving to support economic vitality and advocating for industry advancement.

Government agencies that could play a major role in the foundation and operation of the Center of Excellence include CDA, OEDIT, and the Governor's Office. Other state and local government agencies may also be engaged where their expertise is appropriate.

Among Colorado's academic institutions, stakeholders believe that CSU will play a large role in the establishment and operation of the Center

8 CRS § 24-2-108 For the convenience of the citizens of this state and to promote economy in state government, it is the intent of the general assembly that all principal departments, when feasible and not contrary to federal or state law, shall share as much information as possible and, when reasonably feasible to do so, shall coordinate forms, both federal and state, and shall eliminate multiple mailings to addressees.

of Excellence; however, other universities and departments will be heavily involved in leveraging funding, research capacity, and efficiencies. Additional potential academic partners include, but are not limited to, the University of Colorado-Boulder, Colorado Mesa University, CSU-Pueblo, Fort Lewis College, Western Colorado University, Northeastern Junior College, and Adams State University. This collaborative academic model has been effective in renewable energy research in Colorado.

Hemp industry organizations, businesses, and individuals with a focus on research and development should also be selected as Center of Excellence partners as determined through the Center's governance structure.

A primary responsibility of the Center of Excellence would be to apply for federal funding and distribute matching state funds for developmental projects. Funding from the Center of Excellence could be provided for private businesses, institutions of higher learning, government agencies, tribal governments, and other qualified research organizations for qualified research programs. A research agenda could include regulatory compliance, genetic research, industrial applications, and best practices relating to the cultivation of industrial hemp fiber, seed, and cannabinoid crops.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Define a governance structure for the Center of Excellence partners. An emphasis will be placed on those with significant experience providing educational information and programs in an agricultural context.
- Define organizational structure and positions for startup and operations.
- Establish funding structure for administration, research, and educational programs; determine federal and other funding sources available

Key Stakeholders

CDA, CDPHE, Colorado universities, OEDIT, Tribal governments, Colorado hemp industry, other industries

7. Non-Compliant Plant Material

Stakeholder Recommendation

Follow USDA rules for non-compliant plant material disposal to ensure it is properly destroyed and does not enter the market. However, advocate for and adopt rules to test and dispose of non-compliant plant material that preserves value in the supply chain, including post-harvest testing, exemption of non-THC containing stalks and seeds from destruction, and explore the feasibility of further remediation procedures.

It is important to note that there were some stakeholders who were opposed to developing a process in which non-compliant plant material could become compliant and enter the market. Their concern was this option would unfairly reward producers who produce non-compliant plant material; thus, creating a disincentive for producers to ensure their crops are compliant prior to harvesting. Should the state continue to explore this recommendation, additional discussion with stakeholders is warranted.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is 8 CCR 1203-23-5, which indicates that non-compliant plant material must be "destroyed or utilized on-site in a manner approved of and verified by the Commissioner" to avoid revocation or suspension of a registration.

The purpose of the state's non-compliant plant material disposal regulations is to ensure that crops that are not compliant with all state and federal rules do not enter the chain of commerce and are disposed of under federal and state requirements. CDA should review and adopt enhanced procedures via rulemaking requiring producers to report, document, and produce evidence of any non-compliant plant material destruction as required by federal rules.

In lots that conclusively test higher than 0.3 percent THC, "non-compliant plant material" refers to the parts of the plant that are officially considered "marijuana" according to the CSA.[9] Non-compliant plant material does not refer to the parts of cannabis plants that fall outside of the federal definition of marijuana, which includes the sterilized seeds and mature stalks of the plant and any products or derivatives produced from those parts of the plant. These parts of the cannabis plant are always compliant according to the CSA, regardless of other plant characteristics. Stakeholders recommended that Colorado take a leading role and explore an exemption of seeds and stalks from the destruction of any hemp crop that exceeds the 0.3 percent THC limit.

9 21 U.S.C. § 802 (16).

If federally permissible, the state should consider creating a post-harvest sampling and testing program to protect producers against the unnecessary destruction of valuable plant material and associated economic loss. This program will be available only to qualifying producers with certified or pre-approved varieties with in-field pre-harvest test results indicating non-compliant THC content. This secondary testing program provides producers an opportunity to re-test a homogenized and representative sample of their plant material. Post-harvest sampling and testing would serve as the final determination as to whether a crop has a compliant THC content below 0.3 percent.

In addition, if USDA rules permit, CDA and CDPHE should consider establishing a program to provide effective and safe industrial processing of stalks and seeds and/or removal and remediation of THC from hemp plants that test non-compliant. This "Hemp Value Retention Program" will bring needed certainty and predictability to the industry while hemp genetics improve and stabilize. It will drastically reduce the amount of product destruction and improve investment in all facets of the hemp industry.

Regulatory Program

Current Program. Under Colorado's rules, if an in-field pre-harvest sample tests non-compliant with THC greater than 0.3 percent, CDA issues notice to affected producers describing their permissible disposal options. Communication to registrants with hemp lots that exceed the maximum THC threshold explicitly notes that under CDA rules, the crop is prohibited from:

- Leaving the registered land area;
- Entering the stream of commerce; and
- Being used for human or animal consumption.

The rules provide that all crops with non-compliant THC levels must be "destroyed or utilized on-site in a manner approved of and verified by the Commissioner." (8 CCR 1203-23, (Rule 5.2)) Approved disposal/utilization methods include disking the crop into the ground, mulching, composting, burning, and burying. These destruction methods are aligned with 21 CFR 1317.15 and 1317.90, which require that controlled substances be rendered non-recognizable and irretrievable, while also keeping environmental considerations in mind.

Recommended Enhancement. Colorado should continue to ensure legal disposal remains in compliance with federal law and appropriate enforcement action is taken. While remaining federally compliant, Colorado should advocate for alternative disposal methods that provide farmers means of economic recovery, like clarifying exemptions of mature stalks and seeds of hemp plants from destruction; and having restricted and monitored THC remediation programs. These programs will mitigate financial risk for hemp producers while ensuring that non-compliant plant material does not enter the market for human and animal consumption. While the state intends to comply with federal law, Colorado should advocate for the policies below to be federally permissible.[10]

Allowance for Post-Harvest Testing

If federal laws permit, CDA should update its rules to allow for post-harvest sampling as the conclusive determination as to whether the plant material is compliant, contingent upon the use of certified or pre-approved varieties.

CDA would create a post-harvest sampling and testing program to conclusively determine if a full representation of the plant material intended for the stream of commerce is non-compliant. If this post-harvest sample tests less than 0.3 percent THC, the result would be considered official and the crop will be considered compliant and allowed to enter the stream of commerce.

If a crop conclusively tests higher than the acceptable hemp THC level via in-field and post-harvest sampling, but below 1.0 percent THC, CDA would issue an "Options Letter" to the producer that describes the nature of the failure, informs the producer that CDA will notify the USDA of non-compliant plant material, and guides the producer on how to dispose of their non-compliant crop. Test results above 1.0 percent would result in a negligent violation. Producers will be responsible for all post-harvest sampling costs.

Development of a Hemp Value Retention Program

If federal laws permit, CDA should explore the feasibility of establishing a Hemp Value Retention program. The program could offer various options for farmers to sell their non-compliant plant material to licensed processors, which will allow them to retain more value in the crops that test conclusively above 0.3 percent THC at post-harvest, such as, but not limited to: (1) an industrial processing channel, where the mature stalks and seeds, or other plant material is used to produce non-consumable goods; and/or (2) a THC remediation channel, where THC is removed from hemp flowers during the extraction process and destroyed. Any hemp testing above 1.0 percent THC after post-harvest testing will require disposal.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Advocacy by Colorado leadership to approve disposal alternatives on a national level;

10 Under the current regulations published by the USDA under the IFR, all plant material testing higher than 0.3 percent THC must be destroyed. Producers with plant material testing higher than 0.5 percent THC will also receive a "negligent violation". The policies contained in the recommendations do not include negligence at 0.5 percent, but at 1.0 percent, and are thus not compliant with current proposed federal rules.

- New rules and definitions for post-harvest testing qualifications and implementation;
- Updated rules and definitions for allowable disposal methods and reporting requirements;
- New rules and definitions for hemp value retention program qualifications and implementation, when federal law permits;
- New standard operating procedures for collecting, transporting, processing, and testing homogenized post-harvest hemp samples;
- Secure designation for CDA as a DEA Reverse Distributor to be eligible to conduct or oversee non-compliant plant material disposal;
- New standard operating procedures for collecting, transporting, recycling, and properly disposing of non-compliant plant material; and
- New standard operating procedures for qualifying, collecting, transporting, and processing hemp for THC remediation or for industrial processing, when federal law permits.

Key Stakeholders

CDA, CDPHE, Colorado hemp cultivators, Tribal governments, processors

8. Coordination of State and Local Regulatory Authority

Stakeholder Recommendation

Provide limited hemp registration information to other state and local government agencies, under a privacy restriction, to facilitate other jurisdictions' inspections, permit approvals, and enforcement actions. This generally applies to cultivation and processing/manufacturing sites within municipalities, unincorporated areas, or indoor cultivation facilities in cities or counties.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is 8 CCR 1203-23-2, which indicates that "any information provided to the Department may be … provided to (local) law enforcement agencies (for maintaining public order and enforcing the law)".

The purpose of coordinating state and local regulatory authority is to optimize resources, agency abilities, and regulatory experience to ensure that hemp production complies with all state requirements and local zoning and land use rules.

Regulatory Program

Current Program. CDA and CDPHE share limited information with federal, tribal, state, and local government agencies, including law enforcement agencies, as requested, or on an ongoing basis subject to privacy restrictions under a MOU. CDA and CDPHE have MOUs with several agencies in place already to facilitate other governmental permitting functions.

Recommended Enhancement. The need for collaboration between state and local government is necessary to ensure hemp producers comply with all state and local laws and requirements. While CDA and CDPHE regulate for production compliance, registrants are also subject to local government regulation for zoning, water use, public health and all other local laws as enforced by local law enforcement agencies.

Stakeholders recommended CDA and CDPHE develop a communication protocol with local governments and law enforcement, under a MOU, and assist localities to facilitate compliance with all local rules and regulations. Stakeholders also visioned the development of a hemp electronic traceability system (see recommendation 11). CDA and CDPHE will provide local governments and law enforcement with limited access specific to support local government regulatory functions, while maintaining compliance with all state and local confidentiality requirements. CDA and CDPHE should work with local governments through MOU to share necessary information.

Implementation

The following action items are needed to implement this recommendation:

- State and Local MOUs to coordinate information sharing;
- Local rule changes pertaining to the agencies responsible for establishing and enforcing local cultivation requirements; and
- Continued communication between the state and local agencies on compliance issues.

Key Stakeholders

CDA, CDPHE, tribal, municipal and county governments, law enforcement agencies, Colorado hemp industry

Testing Recommendations

9. Field Sampling and Sampling Agent Certification

Stakeholder Recommendation

The CDA Hemp Program should develop guidance on sampling hemp grown in Colorado for testing THC content according to USDA requirements, and establish a certification program to allow third parties to collect samples in the field for regulatory use.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is CRS § 35-61-104 and § 35-61-105. These statutes are specified for raw hemp sampling and testing in 8 CCR 1203-23-4 and should be further specified in rule during implementation.

The purpose of establishing a field sampling program is to: (1) comply with federal regulations that require sampling of all hemp; and (2) to test hemp for THC content to ensure that crops meet the definition of industrial hemp according to CRS § 35-61-101.

Regulatory Program

Current Program. CDA has historically conducted random sampling across all registered lots each year to test for THC compliance. CDA anticipates they will increase sampling coverage from 25-30 percent of hemp lots to 100 percent to comply with the federal rule. Beginning in 2021, CDA will develop and implement a third-party sampling certification program to allow private, certified sampling agents to collect samples and deliver them to certified labs. Recently, CDA has updated its Hemp Sampling Guidelines to materially align with sampling guidance from the USDA.

Recommended Enhancement. CDA should continue to conduct sampling with its own staff, consistent with its current practices and procedures, to ensure continuity of CDA's practice of accurate, efficient, and effective sampling. In addition, CDA should also implement the following certification program.

Third-party Sampling Program

Stakeholders recommended CDA develop a certification program for individuals and businesses to become official sampling agents. To acquire certification, an applicant would register with CDA and complete a certification training under CDA's Hemp Sampling Guidelines. The certification training would permit CDA to ensure that every certified sampler follows CDA's sampling guidelines when collecting hemp samples, including sample collection, transportation, and documentation. Third-party samplers will also receive training and be required to comply with special chain of custody procedures for the collection and transfer of hemp samples to eligible laboratories. The sampler certification program would be offered to qualified agricultural service providers or to other eligible and qualified entities and individuals.

Implementation

The following action items are needed to implement this recommendation:

- New field sampling standards and procedures that include post-harvest sampling for secondary testing
- New curriculum and administrative procedures for obtaining and maintaining certification as a field sampling agent

Key Stakeholders

CDA, Third-party field sampling agents, Colorado hemp cultivators

10. Hemp Laboratory Certification Program

Stakeholder Recommendation

Develop a certification program that provides guidance to private analytical laboratories on certification requirements, appropriate analytical methods, and general testing procedures.

Basis & Purpose of Recommendation

The statutory basis for this recommendation lies in CRS § 35-61-105, § 35-61-105.5, § 25-1.5-101, § 25-1.5-104 and § 25-5-426. These statutes inform regulations for raw hemp testing in 8 CCR 1203-23-4 and should be further specified in rule during implementation.

Establishing a Hemp Testing Laboratory Certification Program would comply with the USDA rules to guarantee potency testing of all hemp lots grown in Colorado, and to protect public safety by ensuring consumable products meet standards for safety and

purity. Further, Colorado should provide an initial testing framework for food and supplement products absent federal guidelines from the FDA. Once a federal framework is in place, the Colorado testing framework would be adjusted.

Testing information from certified labs is crucial for:

- Maintaining compliance with the USDA;
- Implementing an important part of the hemp electronic traceability system;
- Assuring potency and purity to consumers and businesses purchasing hemp products; and
- Protecting businesses and the public against inaccurate or misleading product claims, product impurities, and food-borne illnesses.

Regulatory Program

Current Program. The hemp and hemp products testing program includes a random hemp testing program administered by CDA and completed by the CDA laboratory. The CDA samples about 25 percent to 30 percent of hemp program registrants per year and tests hemp growing in the field for THC content. Testing for consumable hemp products is currently completed by CDPHE-certified labs. Hemp manufacturers selling consumable products must register with CDPHE to sell into the commercial food and supplement supply.

Recommended Enhancement. The new lab certification program would include the certification process, requirements for testing methods, and a framework for when testing is required by the state. The program is expected to be a minimum framework intended to supplement rigorous voluntary testing practices that will accompany products in most transactions. Key features of certified laboratory and testing program include:

Certifying process and criteria

CDPHE will serve as the certifying agency for labs that test consumable hemp and hemp products. CDPHE will adapt its process for certifying all other clinical, food, and environmental labs to hemp testing labs. At a minimum, CDPHE will inspect and certify labs to test hemp plant material and hemp products for:

- Cannabinoids (THC and other).
- Microbials;
- Residual solvents;
- Pesticides;
- Mycotoxins; and
- Heavy metals.

Each of the above would require a separate certification from the CDPHE. CDPHE certification requires that each laboratory obtain accreditation, including but not limited to ISO 17025, from an ILAC-MRA signatory accreditation body. The laboratory would then be required to apply and submit corporate and operational documentation and go through on-site inspection and auditing for approval. An annual fee would be required for certification.

CDPHE will require these documents at a minimum:

- Proof of ISO 17025 accreditation;
- An application that specifies which methods/analytes the lab is applying for certification;
- Organizational reporting structure;
- Acknowledgment that the laboratory will comply with policies established for all certified laboratories;
- Key staff qualification information; and
- Standard operating procedures and other essential laboratory documentation.

The CDPHE should incorporate all CDA and USDA requirements into the certification program. The USDA will require labs that test hemp to obtain a DEA certification. The program could offer two tiers of approval for hemp THC testing laboratories in Colorado:

- Certified Laboratories have met all specific state requirements, including ISO 17025 accreditation and registration with DEA, and
- Conditionally Certified Laboratories are ISO 17025 accredited and have met all CDPHE certification requirements but are not registered by the DEA.

Testing methods

All Colorado hemp testing labs must use analytical methods approved by CDPHE to ensure consistency of results across all laboratories. The CDPHE will consult rules established for other analytical labs, USDA, and FDA rules, as well as standards available from Association of Official Agricultural Chemists, American Society for Testing Materials (ASTM), the Association of Public Health Laboratories, and other relevant institutions.

Accepted methods may include gas chromatography, gas chromatography mass spectrometry, high-performance liquid chromatography, and other validated testing methodology. Official test results reportable to the USDA must provide the percentage of total THC content.[11]

11 Calculating total THC is achieved either using a post-decarboxylation analytical method (i.e., gas chromatography) or by adding 87.7 percent of the THCA weight to the THC weight determined by a pre-decarboxylation (liquid chromatography) analytical method.

Testing framework

All raw hemp is subject to mandatory field THC testing to enter the stream of commerce as required by the USDA. Field sampling will be conducted by the CDA and by CDA-certified sampling agents. For hemp entering the industrial supply chain, no further testing is required. For hemp destined for further processing for human or animal consumption, hemp products either need to be processed or manufactured in facilities that have their processes validated by CDPHE; or subject to a mandatory testing program that includes pathogens and microbials, pesticides, heavy metals, residual solvents, and cannabinoid content.

All state-mandated[12] testing of hemp and hemp products will be conducted by CDPHE-certified labs or the CDA. The CDPHE will require mandatory testing of production batches of all finished consumable products for ingestion and topical applications, for cannabinoid content, heavy metals, pesticides, microbials, mycotoxins and residual solvents. Processing and manufacturing registrants that opt to have their processes validated[13] through consistent purity and potency tests can reduce or bypass potency and contaminant testing of every production batch. Process validation is obtained through submitting information to CDPHE on procedures and passing multiple consecutive contaminant and potency tests within a specified period. Renewal and re-inspection are required upon a process change or according to CDPHE recommended interval.[14] All testing expenses are the responsibility of the business selling hemp or hemp products.

Disposal protocol

Compliant hemp samples do not need any special disposal procedures. If necessary, certified labs should comply with DEA and/or state guidelines for marijuana disposal, i.e., excess samples that test above 0.3 percent THC is only disposed of after being "rendered unrecognizable" by mixing with dirt, compost, or similar material. Excess sample that tests below 0.3 percent THC may be disposed of as is. Hazardous waste created during cultivation, laboratory testing, and the manufacturing process will need to be disposed of per federal, state, and local laws, regulations, rules, and/or other requirements.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Obtain statutory authority to promulgate rules related to certification of hemp labs (CDPHE)
- Adopt rules for certification requirements, testing framework, based on existing programs (CDPHE)
- Adopt rules for accepted lab procedures and inspections, based on existing programs (CDPHE)
- Obtain statutory authority to collect inspection fees; to direct where the funding goes; and to and periodically adjust fee collection and disbursement procedure (CDPHE)
- Implement lab certification program, inspection procedures and system to verify field testing and finished product testing

Key Stakeholders

CDPHE, CDA, Analytical labs, Colorado hemp cultivators and processors

12 Most market participants exchanging product require a certificate of analysis that provides information on intermediate product potency, purity, and the presence of contaminants (if any). For general or R&D purposes, use of CDPHE-certified labs is not required.

13 CDPHE process validation for hemp will be the same for other food and supplement manufacturers. It is modeled after FDA process validation guidelines and unique to each facility and process introduced. Each applicant must present its procedures and certifications to CDPHE, which inspects, approves, and re-inspects on risk-based parameters. Companies with detailed safety plans in place, such as a HACCP or CAPA plan, and with an audit for compliance with cGMP standards are viewed favorably in the CDPHE assessment.

14 CDPHE renews either bi-annually, annually, semi-annually, or quarterly based on risk profile.

Transportation Recommendations

11. Electronic Traceability System

Stakeholder Recommendation

Implement an Electronic Traceability System (ETS) to support an uninterrupted chain of custody for hemp products from harvest to commercial sale and to provide secure and verifiable information to various stakeholders.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is the 2018 Farm Bill Section 12619 and Colorado Senate Bill 17-090.

The purpose of an ETS would be to collect information throughout the hemp supply chain that can be accessed and reviewed in a single application by multiple stakeholders. The ETS would create a standardized electronic database system for all required documentation such as the manifest for verification while transporting hemp; a confirmation of laboratory testing of products; and a transaction history.

Stakeholders envisioned the ETS would allow for the coordination among the many agencies that regulate hemp and intrastate and interstate commerce including but not limited to; CDOT, CDA, CDPHE, The Office of the Governor, The Office of the Attorney General, Colorado State Patrol, and local and tribal governments. The ETS will interface with databases across all involved industry businesses and agencies to create a secure and verifiable ledger for tracing hemp across the supply chain and protect the integrity of the hemp industry. It is important to note that stakeholders felt that since hemp is a legal commodity the ETS should not be used to provide unnecessary overregulation. Rather, the ETS should utilize an appropriate block-chain technology to help the industry comply with existing regulations and provide verifiable importation of the products related to compliance and quality standards.

Key users such as producers, processors, law enforcement, and government officials could use the system for a variety of purposes including, but not limited to:

- Providing hemp transporters and law enforcement a tool for real-time verification of the legality of a shipment;
- Providing banking and insurance sectors with data that allows verification of a licensed hemp grower or an ancillary business in good standing;
- Supplying compliance information, such as passed or failed, at all stages of production such as cultivation and manufacturing;
- Verifying certifications such as using certified seed or organic designation;
- Distributing information accessible to all relevant agencies including names and contact information of parties in the chain of custody; and
- Allowing consumers the ability to confirm the source of the products they are purchasing as originating within the Colorado regulated hemp system.

Regulatory Program

Current Program. There is no current ETS in Colorado for hemp. The state registration system and detailed product documentation, including manifests and certificates of analysis, are used to determine product authenticity.

Recommended Enhancement.

Intrastate transport

The creation of a new communication protocol through an ETS for tracking hemp could be modeled on existing protocols for the shipment of agricultural and non-hazardous manufactured products. CDA and CDPHE should have the final say in the provision of documents for product verification.

Required documents will likely follow those outlined for the protocol, but the standardized protocol should be expanded to provide enhanced communication and tracking across the hemp supply chain. For this to occur, the selection and development of a single platform will be essential. The following should be considered in developing the protocol:

- A process for verification when in remote areas without reliable internet access;
- Standardization anti-tampering requirements;
- Flexibility for the future implementation of distributed ledgers and associated technologies for enhanced traceability and fraud protection;
- Use of batch level tracking (not per plant) will be imperative for recall and verification purposes; and
- Creation of training materials on the protocol.

The ETS will allow any user to distinguish whether hemp or hemp products encountered in the field, in facilities, or in transit can be verified as hemp and can be traced to its origin. Without reliable and affordable mobile testing procedures, it is impossible to distinguish legal hemp from legal or illegal marijuana. In place of physically testing the product a standardized protocol, along with education, will reduce the risk of costly miscommunications.

Interstate transport

Additional documents may be required when transporting across state borders and the electronic system must provide flexibility for this. Colorado will comply with all federal documentation requirements for interstate hemp shipments. Interstate communication and coordination will be essential for the success of the Colorado hemp industry. Colorado should share the lessons learned from developing its intrastate communication protocol with other states, and work to build partnerships with other states and the USDA in developing a nationwide traceability system and serve as a leader absent federal guidelines.

System development

The ETS should be developed through an interagency workgroup to ensure buy-in and input from relevant agencies. It is recommended that this task force include representatives from the Office of the Colorado Attorney General, Colorado State Patrol, CDA, CDPHE, Office of Information Technology, Colorado Bureau of Investigation, a local government, tribal government and industry.

The duties of the task force should be to:

- Develop requirements for the protocol;
- Secure funding;
- Select the company to develop the system through a competitive request for proposal process;
- Determine required documents;
- Specify the interstate interface;
- Establish protocol for questions and verification process for the documents;
- Monitor implementation of new protocol and needed adaptations;
- Select the agency(s) responsible for the ongoing management of the system and facilitate the transition from the task force; and
- Appoint a liaison from the State of Colorado to coordinate with other states this person should work alongside the tracking systems contracted vendors to help other states develop their own tracking systems.

Implementation

The following action items are needed to implement this recommendation:

- Collaboration with the Hemp Advisory Committee and the hemp industry to confirm the direction and implementation of a tracking system is appropriate;
- Development of a taskforce among key stakeholders to evaluate options and develop implementation plan;
- Legislation to establish the creation of an ETS; a protocol to provide information to legitimate users and to protect data confidentiality of participants; and
- Creation of a funding mechanism for agency or task force to develop technical specifications and solicitation process to develop and implement the electronic tracking system.

Key Stakeholders

CDA, CDPHE, tribal and local governments, Colorado hemp cultivators and manufacturers, transportation industry, law enforcement

12. Transportation Protocol

Stakeholder Recommendation

Develop guidance and best practices for transporting hemp and hemp products within Colorado including proper documentation and recordkeeping.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is CRS § 35-61-108(3), which states that CDA "may promulgate rules to require approved shipping documentation for the transportation of hemp."

The purpose of the establishment of a protocol and industry best practices for the transportation of hemp is to develop a clear set of rules around the intrastate and interstate transportation of hemp and transportation across tribal and international boundaries. The creation of guidance will build on existing CDA rules and regulations and establish standards around the appropriate documentation, communication procedures, best practices and training protocols surrounding the transportation of hemp in Colorado.

Regulatory Program

Current Program. Transporters currently carry a manifest and a Certificate of Analysis (COA), but local law enforcement often is unclear how to verify the shipments. A successful Colorado hemp industry requires standardization of processes and documentation. Developing a coordinated protocol will take time. It is recommended that in the intermediate time frame transporters should have the following documents on-hand so that law enforcement can verify by the issuing agencies if needed:

- Travel Manifest;
- COA matching travel manifest;
- CDA Registration Number;
- Manufactured Food or Storage Facility Registration Number; and
- Commodity Handler or Farm Producer Dealer License from CDA (if applicable).

Recommended Enhancement. Develop guidance and best practices for the transportation of hemp and hemp products utilizing existing CDA rules. Due to the nature of hemp, specific protocols will need to be developed with input from numerous state agencies and hemp businesses.

The regulatory protocol will develop the following standards:

- Required transportation documentation;
- Rules for the storage, packing and transportation of hemp;
- Development of interstate compacts;
- A unified communication protocol;
- Insurance company documentation to insure hemp loads and bond drivers;
- Protocol for the transportation of hemp products (such as intermediate products or products bound for destruction) that are over 0.3 percent THC, as allowed in federal rule; and
- Protocol and procedure for a coordinated response by state law enforcement regulatory authorities.

Transportation best practices

The CHAMP process identified these best practices to include in the transportation regulatory protocol:

- Ensure shipping documents are fraud-resistant and display information such as the CDA or CDPHE registration numbers;
- Provide guidance on paper and digital records and ensure that the records match;
- Communication from all involved government agencies and local law enforcement;
- Require adherence to all state and local regulations, including storage and odor control;
- Develop a database of all key law enforcement and regulatory authorities available for contact.

Interstate considerations

One of the key aspects of the transportation protocol will be the creation of interstate compacts which should include:

- Development of a reciprocity agreement for states and tribal governments that states approved hemp and hemp products in one state will be recognized in all;
- Development of an agreement on a common set of shipping documentation to verify compliance with hemp regulations in the state of origin;
- Agreement on hemp tracing systems to assist law enforcement;
- Protocol for third-party entities transporting hemp;
- Interstate weighing requirements; and
- Appointment of a liaison to serve as the key contact for coordination with other states.

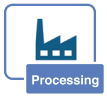
Implementation

The following action items are needed to implement this recommendation:

- Develop transportation rules and requirements for documentation, including rules to transport intermediate products;
- Develop interstate compacts for hemp transport as needed;
- CDA, CDPHE, and tribal governments should each focus on education and outreach to:
    - Assist the state in developing rules and standards for transporting hemp and hemp products;
    - Educate industry practitioners and law enforcement about hemp documentation and labeling requirements;
    - Evaluate the need for requirements to maintain registrations and for the creation of a 'fit for commerce' certification program for transporters and producers; and
- Secure appropriation and allocation of funds to develop and implement protocols.

Key Stakeholders

CDA, CDPHE, tribal and local governments, Colorado hemp cultivators and manufacturers, transportation industry, law enforcement



Processing Recommendations

13. Processor Registration and Inspection

Stakeholder Recommendation

Continue the integration of hemp into the CDPHE food and dietary supplement processor and manufacturer program. Further define licensed activities as needed and provide a means for the state to register and regulate hemp processors and manufacturers in Colorado. This is an existing, active program.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is CRS § 35-61-108, § 35-1-104, § 25-1.5-104, § 25-4-1603, and § 25-5-426. These statutes authorize CDA and CDPHE to regulate and inspect food processing facilities generally and hemp processing facilities specifically. These statutes are further specified in 6 CCR 1010-2 and 1010-21 Colorado Retail and Wholesale Food Regulations.

Maintaining a proper processing licensing system for hemp products is necessary to protect public safety and to ensure that only properly trained and supervised professionals using current good manufacturing practices create products that enter the commercial food, dietary supplement, and cosmetic supply chain. A licensing system ensures safety and accountability in processing procedures for ingredients and products that ultimately end up as food, dietary supplements, or industrial products.

Regulatory Program

Existing Program.

Hemp Processor Definition

Licensed hemp processors fall into three categories depending on their processing methods and intended market. A key distinction in processor licensing and regulation is whether the processor produces products intended for human consumption through topical, ingestible, or inhalable delivery methods:

- *Industrial processor.* Industrial processors use raw hemp inputs to make intermediate and final industrial products out of hemp bast, fiber, cellulose, hurd, and lignin. These materials are processed to make fuel, textiles, paper, plastics, building materials, and other industrial products.
- *Extraction and post-processing (consumable).* Hemp extractors and post-processors use a variety of chemical and mechanical processes to extract and separate cannabinoids, terpenes, flavinoids, and other compounds from plant fibers and waxes. CDPHE is the lead state agency for licensing and regulating hemp extractors and post-processors. Hemp extractors and post-processors must follow all state and local laws and regulations, including local fire, building, and zoning codes.
- *Finished products (consumable).* Finished products registrants include all processors that manufacture hemp products for sale to retailers and directly to consumers. CDPHE licenses and regulates Colorado food and supplement manufacturers and maintains a list of all registrants. This list includes hemp finished product manufacturers. CDPHE inspects these operations under 6 CCR 1010-21 to ensure compliance with product and process standards. Local governments inspect facilities for conformance with local fire, building, and zoning codes and ordinances. All hemp finished products are subject to safety and potency testing according to CDPHE rule (6 CCR 1010-21).

State and Local Authority

A combination of state and local governments regulates hemp processors. CDPHE regulates consumables processors for safety and technical procedures. CDA regulates farm processors for

safety. All processing facilities are subject to local government regulation for zoning, fire safety and public health, and all local laws as enforced by local law enforcement agencies. CDA and CDPHE provide hemp registration information under MOU to local governments and law enforcement and have developed a communication protocol to facilitate local enforcement and regulatory activities.

Licensing and Inspection

Licensing and inspections are already completed by CDPHE and local governments for consumable product processors. CDPHE already requires new applicants to submit documentation of occupancy permits which includes local government regulatory compliance. CDPHE uses procedural guidelines for food production in accordance with federal regulations and has incorporated the use of hemp as an ingredient in food processing. Consumable processors are expected to follow all local, state, and federal guidelines for safe and sanitary food production. License and inspection fees are required for local occupancy permits and by CDPHE. Facility inspections occur at the discretion of CDPHE and local government agencies, usually at the time of license, certificate of occupancy issuance, upon renewal, as part of a corrective action plan, or at random.

Industrial processors do not require a specific state license, other than compliance with all state and local safety regulations, and ordinances to obtain a local occupancy permit.

Implementation

Colorado state and local governments already have procedures and programs in place to regulate hemp processors or to integrate hemp into existing regulatory programs. The following action items are needed to implement this recommendation:

- Harmonize registration, statute, and regulation with definitions of terms and types of processors above;
- Develop (or renew as needed) MOU for information sharing with local governments and law enforcement; and
- Consult with ISO, ASTM, NSF, U.S. Hemp Authority (USHA), American Herbal Products Association (AHPA), and other groups developing hemp-specific processing standards.

Key Stakeholders

CDPHE, CDA, Colorado hemp processors, national processor certifying agencies

14. Processor and Manufacturer Standards

Stakeholder Recommendation

Clarify and develop state regulatory requirements for processing and manufacturing practices related to hemp products. Current Good Manufacturing Practice (cGMP) should be administered through the CDPHE Manufactured Food Program. This program is largely an existing program in CDPHE with some specific adaptations for hemp products.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is CRS § 25-5-426. This statute authorizes CDPHE to promulgate standards for food and other consumable products made by hemp processing and manufacturing operations. These statutes are further specified in 6 CCR 1010-2 and 1010-21 Colorado Retail and Wholesale Food Regulations.

CDPHE is the state licensing, certification, and food protection agency. The department is tasked with establishing minimum standards and rules for wholesale and retail food establishments to protect public health and safety. Hemp and hemp extracts are processed into food, dietary supplements, cosmetics, and other consumable products and come under CDPHE regulatory authority. CDPHE requirements for processing and manufacturing standards ensure that products are unadulterated and safe for consumption. Hemp and hemp products are already integrated into CDPHE programs for wholesale and retail food, which also includes dietary supplements. CDA provides regulatory oversight for products for animal consumption.

Regulatory Program

Existing Program. CDPHE incorporates by reference into its regulations the majority of the Code of Federal Regulations for food and dietary supplements established under the authority of the FDA.

cGMP regulations require a quality approach to manufacturing, enabling companies to minimize or eliminate instances of contamination and errors. This protects the consumer from purchasing a product that is not effective or potentially dangerous. CDPHE verifies compliance with cGMP through random inspections and through the licensing process by review of operating procedures, acceptance of 3rd party verification, and initial inspection.

Consumable Food, Dietary Supplements, and Cosmetics

All hemp processors and manufacturers defined as producing cosmetics and consumable products should follow the adopted regulations modeled after standards set by appropriate regulatory authorities, including CDPHE and FDA, and industry standards organizations such as ASTM, AHPA, Organic & Natural Health Association, NSF, and ISO. These rules include the existing CDPHE rules for wholesale and retail food producers cited above and these federal rules, included in CDPHE rule by reference or CDA authority:

- FDA cGMP for:
  - Food (and 21 CFR 117)
  - Dietary supplements (21 CFR 111)
  - Animal products (21 CFR 507)
- The U.S. Food, Drug, and Cosmetics Act, and the Fair Packaging and Labeling Program, for cosmetics and topicals (21 USC § 361-363, 15 USC § 1451-1461).

The above federal and state regulations address issues including recordkeeping, personnel qualifications, sanitation, cleanliness, equipment verification, process validation, and complaint handling, and generally allow each manufacturer to decide individually how to best implement the necessary controls in their business. In developing additional hemp-specific rules, CDPHE shall consider the inclusion of both a hazard analysis and critical control point (HACCP) assessment; and corrective action—preventive action systems (CAPA, required), which identify, evaluate, and control for safety hazards and pathogens in production facilities. These plans require batch coding, contaminant controls, pathogen mitigation and other preventive and corrective measures.

Inhalable Products

There are no state guidelines for hemp products sold for inhalation, including smokable hemp flower and oils intended for vaporization and inhalation. A statutory change will need to be initiated to provide CDPHE or another state agency the authority to adopt cGMP for these products to ensure purity and consumer safety to the greatest extent possible. For smokable flower, CDPHE could examine FDA tobacco rules (21 CFR 1140) or potentially the Colorado MED marijuana rules (1 CCR 212-3) for information on purity and safety requirements if deemed applicable. Similarly, for vaporized oils, CDPHE can refer to the FDA rules for dietary supplements (21 CFR 111) and to MED marijuana rules for infused concentrate products (1 CCR 212-3 Rule 3-335) if deemed applicable. Producers of these products are subject to CDPHE licensing and testing protocols.

Process Validation and Testing

CDPHE should incorporate hemp processors and manufacturers into existing process validation practices for food and supplement producers. Considerations should be made in the regulations that registrants that opt to have their processes validated may reduce or bypass potency and contaminant testing

of every production batch. Process validation should be renewed upon a process change or other approved interval[15] and is obtained through passing multiple consecutive contaminant and potency tests within a specified period.

Implementation

Colorado state and local governments already have procedures and programs in place to regulate hemp processors and manufacturers. The following action items are needed to implement this recommendation.

- Legislation to extend CDPHE regulatory authority to hemp products and for proper hemp integration as needed;
- Consult with FDA, other states, and other groups developing hemp-specific processing and manufacturing standards; and
- Develop education program for CDPHE to hold sessions for new and existing manufacturers for how to comply with cGMP (and other) hemp regulations.

Key Stakeholders

CDPHE, Colorado hemp processors, national processor certifying agencies

Manufacturing Recommendations

15. Manufacturer Registration and Inspection

Stakeholder Recommendation

Continue the integration of hemp into the food and dietary supplement manufacturer program. Further, define licensed activities as needed and provide a means for the state to register and regulate hemp processors and manufacturers in Colorado. This is an existing, active program.

Basis & Purpose of Recommendation

The statutory basis for this recommendation is HB 18-1295 which established that hemp food and cosmetic products shall be treated like other similar product types. Other relevant federal statutes:

- Food (21 CFR 110 and 21 CFR 117)
- Dietary supplements (21 CFR 111)
- Animal products (21 CFR 507)

The infrastructure for the creation of registration procedures for hemp manufacturers is already in place with the food manufacturing registration procedures of the CDPHE, but slight modifications will be needed, including the development of a hemp-specific registration form.

Regulatory Program

Existing Program.

Hemp Manufacturer Definition

A hemp manufacturer is defined as an industrial hemp processor or producer making hemp-derived products and is divided into two subtypes:

- *Consumable Manufacturer.* An industrial hemp manufacturer making hemp-derived products intended for human use or consumption, either as a finished good or as an ingredient/component of a finished good. This definition includes (but is not limited to) foods, beverages, tinctures, topicals, and transdermals. Inhaled products and suppositories are not covered under the registration program, a legislative change would be required for their inclusion.
- *Industrial Manufacturer.* An industrial hemp manufacturer making industrial hemp products (including but not limited to textiles, construction materials, fibers, animal/pet feed or treats) not intended for human use or consumption.

Registration Procedure

Registration of hemp manufacturers is already occurring and builds on the already existing protocols set out by the CDPHE for all food and dietary supplement manufacturers. CDPHE already has a procedure for registering manufacturers and consumable hemp product manufacturers that can fall under this existing registration process. CDPHE also has existing packaging and labeling requirements in place that can be adapted to hemp.

Considerations for potential modifications of existing procedures for hemp manufacturing regulation:

- Procedures for regulating waste processors, the potential need for registration with CDA.
- Determination on whether additional oversight of non-consumable industrial hemp manufacturers is needed, and the appropriate state and/or local government agencies to lead.
- More review and discussion to determine if there is a need to include cosmetics and topicals in the consumables procedure (currently exempt from the CDPHE procedure).

15 Most renewal intervals are either biannual, annual, or quarterly, although specific to each facility and process.

- More review and discussion to determine the procedure for vaping (currently exempt from the CDPHE procedure).
- Adherence to all local jurisdiction and tribal authority requirements will be necessary for license approval.
- Consideration of options to utilize non-compliant hemp products (but not for human consumption).

Non-consumable Industrial Manufacturers

CHAMP stakeholders determined more discussion is needed to determine whether there is the need for additional regulatory oversight for non-consumable industrial hemp production and manufacturing, and the appropriate state agency if needed. Local and tribal jurisdictions will continue to be involved in health inspections, business licenses, building permits, occupancy, and zoning regulations. CDPHE is the lead state regulatory agency for manufacturing consumable hemp products in Colorado.

Implementation

The following action items are needed to implement this recommendation:

- Continue to integrate hemp manufacturers in CDPHE licensing, inspection, and regulatory ruleslegislation will be needed to provide CDPHE with the authority to regulate inhalable products;
- Clarify the point in the hemp supply chain where regulatory authority over industrial hemp is transferred to the CDPHE when hemp-related products are intended for human consumption;
- Clarify whether there is additional regulatory oversight required of non-consumable industrial hemp;

Key Stakeholders

CDPHE, CDA, Colorado hemp manufacturers, national manufacturer certifying agencies

Marketing Recommendations

16. Glossary of Terms

Stakeholder Recommendation

Provide a list of terms and definitions for different stages in the supply chain to create a universal understanding of the hemp industry terminology.

Basis & Purpose of Recommendation

Every profession, industry, or sector has technical nomenclature. The hemp industry is no exception to this principle and uses many terms that may be misconstrued or confusing to people not directly involved in the sector. This has implications for communications, transparency, and information flows across the supply chain, where buyers, sellers, and consumers must know what they are purchasing and using.

Given the nascent status of the industry, Stakeholders suggested that a glossary of terms would be useful as a starting point to standardize how products are defined along the supply chain.

Glossary by Stage in Supply Chain

Disclaimer. The following are conceptual definitions that were developed by participants during meetings in the R&D and seed, cultivation, testing, processing, manufacturing, and marketing stakeholder groups. Official federal, state, and local regulatory terms may differ from the definitions contained herein.

Stakeholders should ultimately rely on federal definitions of hemp and marijuana, and on definitions published in the Colorado Revised Statutes or Code of Colorado Regulations for reference.

State agencies should strive to adopt standardized definitions when developing official regulatory definitions, and the following can provide a basis.

Biology and Chemistry of Plant Compounds

Bioavailability—This term refers to the degree and rate at which a drug is absorbed by the body's circulatory system. It's an important measurement tool because it determines the correct dosage for drugs, supplements, and herbs administered non-intravenously, such as through consumption, inhalation, or topical application. Bioavailability measurements denote the fraction of the ingested dose that gets absorbed by the body.

16 Note: Every cannabinoid has an "acid" precursor form. These acid precursors are produced by the plant and are converted into their non-acid form in a process known as decarboxylation, which we will describe later. Acid precursors have their abbreviation appended with an "-A" or "A." (IE: THCA / THC-A, CBDA / CBD-A)

Cannabinoid(s)—(also "phytocannabinoid(s)") A group of compounds that can be found in cannabis, other food-producing plants, and in the human endocannabinoid system. There are many different cannabinoids, and they are often written in their abbreviated form.[16] Below is a (non-exhaustive) list of cannabinoids.

- Delta-9 Tetrahydrocannabinol (Abbrev: THC): THC is the primary psychoactive compound in cannabis
- Cannabidiol (Abbrev: CBD) CBD is valued for several medical properties and is non-psychoactive
- Cannabinol (Abbrev: CBN)
- Cannabigerol (Abbrev: CBG)
- Cannabichromene (Abbrev: CBC)
- Cannabicyclol (Abbrev: CBL)
- Cannabivarin (Abbrev: CBV)
- Cannabielsoin (Abbrev: CBE)
- Cannabicitran (Abbrev: CBT)
- Tetrahydrocannabivarin (Abbrev: THCV)

CB1/CB2 Receptors—The CB1 and CB2 receptors are endocannabinoid receptors found in the human body that are responsible for interacting with different cannabinoids. CBD and THC often interact directly with these receptors.

Decarboxylation/Decarb—Decarboxylation is a chemical process that relies on heat (often from combustion or cooking) to eliminate a carboxylic acid group from the cannabinoid. Decarboxylation is how the acid forms of cannabinoids are converted into their non-acid forms. For example, THCA is converted to THC by decarboxylation.

Delta-9 tetrahydrocannabinol (THC)—This is the primary cannabinoid responsible for psychoactive effects. It interacts with endocannabinoid receptors in the brain to release dopamine.

Endocannabinoid System—The endocannabinoid system is a signaling system responsible for regulating a variety of hormones and chemical signals. In humans and most animals, constituents of cannabis act upon the endocannabinoid system and may affect some functions of the body and/or how sensations such as pain are experienced.

Industrial Hemp—Federal Definition[17]—(also "hemp") Is the plant *Cannabis sativa* L. and any part of that plant, including the seeds thereof and all derivatives, extracts, cannabinoids, isomers, acids, salts, and salts of isomers, whether growing or not, with a delta-9 tetrahydrocannabinol (THC) concentration of not more than three-tenths of one percent (0.3%) on a dry weight basis.

Marijuana—Federal Definition[18]—All parts of the plant *Cannabis sativa* L., whether growing or not; the seeds thereof; the resin extracted from any part of such plant; and every compound, manufacture, salt, derivative, mixture, or preparation of such plant, its seeds or resin. Marijuana does not include— hemp, as defined above; or the mature stalks of *Cannabis sativa* L., fiber produced from such stalks, oil or cake made from the seeds of such plant, any other compound, manufacture, salt, derivative, mixture, or preparation of such mature stalks (except the resin extracted therefrom), fiber, oil, or cake, or the sterilized seed of such plant which is incapable of germination.

Terpene(s)—Terpenes occur naturally in many plant families and create the wide variety of smells and flavors associated with cannabis and other botanicals.

Seed Testing and Certification

Certified seed—Certified seed designation validates a variety's genetic purity, weed absence, uniformity for harvest, and yield standards for each crop. The seed certification process includes specific varietal review, testing and labeling procedures.

THC verification—A CDA-approved trial process (separate from AOSCA certification) that occurs alongside the seed certification process to test THC level in mature hemp plants entered for seed certification. This process will be harmonized with AOSCA once there are international standards for THC verification.

Feminized seed—Feminized seeds are seeds with a very high likelihood to produce female hemp plants. Feminized seeds are specially bred or separated from male seeds using genetic testing. Cannabis as a plant is dioecious, which means plants can be male, female, or a hermaphrodite (showing traits of both sexes). Female plants are most desirable for cannabinoid and oilseed production. Feminized seeds are made by essentially crossing one female with another. Breeders use techniques to force female plants to produce "female" pollen. They then fertilize another female; whose flowers produce a generation of feminized seeds.

Certified clone program—A genetic certification program for plants used for cloning, similar to seed certification. Under a certified clone program, plants enter a varietal review and are grown full term, in multiple conditions over multiple seasons to verify identity, purity and select traits. Definitions for foundation, registered and certified genetic stock will be developed by CSGA.

Open source hemp genetics—Any seed or clone used for breeding, produced by the plant *Cannabis sativa* L. that possesses a THC content less than or equal to 0.3 percent tested according to CDA regulations; and is not patented, certified or otherwise protected.

Plant and Cultivation Terminology

Aeroponics—A hydroponic cultivation method where the plant's roots are suspended in air and sprayed regularly with a fine mist of nutrient solution. Unlike other hydroponic methods, aeroponically grown plants do not have their roots suspended in water.

Bud/Nugget/Flower—Terms that refer to the flower of female cannabis plants. Unlike other flowering plants, cannabis flowers are dense and concentrated.

Dry weight—The weight of plant material with no greater than 13 percent moisture content.

Flowering—A late stage in the life cycle of cannabis where buds become dense, trichomes appear with greater frequency, and the cannabis plant prepares for reproduction. After flowering, cannabis plants will die.

17 7 U.S.C. § 1639o (1)
18 21 U.S.C. § 802 (16)

Hydroponics—A growing method that does not rely upon traditional soil. Plants can be grown in a variety of media and fed nutrients dissolved in water using different methods, including ebb-and-flow, aeroponics, and deep-water culture.

Integrated Pest Management—A pest control strategy that focuses on preventive and proactive techniques, rather than reactive pest control.

Medium—A substance in which plants are rooted if not in soil in the ground. This can be traditional soil, coco coir, rockwool, clay, sand, pebbles, or other material.

Mother Plants—Also known as stock plants, cannabis plants kept permanently in a vegetative state for growers to take cuttings or clones from them. Mother plants serve as the genetic basis for clones in a growing facility.

Propagation—Early plant life cycle phase in which plants are cloned or grown from seed. This is the most delicate phase of growth.

Vegetative State—The period in-between propagation and flowering. It is a period where the cannabis plants have a sturdy root system and focus photosynthetic energy on growth.

Processing and Manufacturing

Acceptable Potency Level—A hemp crop or product with a delta-9 THC concentration of 0.3 percent or less by weight.

Broad Spectrum Extract/Product—Extracts and products from hemp which contain multiple cannabinoids but have THC effectively removed. Broad spectrum products have a non-detectable level of THC & have detectable levels of other cannabinoids & terpenes.

CBD Isolate—The purest form of CBD, which is produced by removing all other compounds found in the plant including, terpenes, flavonoids, plant parts, and other cannabinoids. CBD isolate comes in a granular or powder form and is odorless and tasteless. The end-product contains no (or non-detectable) levels of THC or other compounds. No specific identity threshold currently exists to define purity required to use the term 'isolate'.

CO_2 extraction—The carbon dioxide extraction process uses changes in temperature and pressure to create phase changes in carbon dioxide, gently drawing out the plant's beneficial components. The result is clean, pure oil with a long shelf life.

Concentrates/Distillates/Extracts/Isolates—These terms describe compounds made by extraction, concentration, distillation, and isolation processes that separate compounds that are recognized as useful and beneficial from other plant compounds.

Ethanol extraction—Extraction using cold or hot, high-grade alcohol that detaches all the active compounds from the cannabis plant's cellulose material, resulting in pure, full spectrum hemp oil. Oils extracted using this method are further refined via centrifugal chromatography to remove all remaining traces of ethanol.

Full Spectrum Extract/Product—Extracts and products from hemp that contain the full cannabinoid profile and all other compounds including terpenes, flavonoids, proteins, phenols, sterols, and esters, naturally occurring in the cultivar from which it was produced.

Non-detectable THC—Term used to describe a hemp product, usually a broad-spectrum product, with THC removed and reduced to levels undetectable by common testing methods. A specific detection threshold needs to be established. This term can be used on any hemp product with THC removed.

Potency—A measure of drug activity expressed in terms of the amount required to produce an effect of given intensity in the body. A high-potency drug evokes a larger response even at a low dose, while a low-potency drug evokes a small response at low concentrations and requires higher doses for a similar effect.

THC Free Extract/Product—An intermediary or final product that when tested, shows no or a non-detectable level of THC. This term should only describe cannabinoid (usually CBD) isolate or isolate products. Lab results must show the presence of terpenes, CBD, & other minor cannabinoids. A specific detection threshold definition needs to be established to determine a product as free of THC.

Whole Plant Extract/Product—This is a term used for extract or products using the entire plant, stems, leaves, roots, and flowers in the extraction process, and is also commonly called a botanical extraction. Full spectrum is implied if a product is a whole plant extract. The product retains the terpenes, cannabinoids, vitamins, minerals, fatty acids, phytonutrients, and any other materials naturally occurring in the cultivar from which it was produced.

Figure 9. Primary Hemp Crops: Fiber, Seeds, and Flowers

Characteristic	Fiber	Seed/Grains	Flower/Cannabinoids
Desired Plant Material	Stalks (bast fibers and hurd/core fibers)	Dried (high in oil and protein)	Dried and cut (flower bud and floral material)
Planting Density	Dense spacing to discourage branching and flowering (35–50 plants/ft2)	Dense spacing to discourage branching and flowering (35–50 plants/ft2)	Well-spaced (typically planted 3–4 feet apart on a 3–5 foot center)
Physical Characteristics	Tall plants with small stalks and less leafy material	Plants with small stalks and less leafy material	Bushy plant with wide branching to promote flowers/buds (selecting female plants is ideal)
Harvest Height	10–15 feet	6–9 feet	4–8 feet
Harvesting Considerations	Typically using hay equipment (mow, field retting 2–3 weeks, then roll balling)	Must be harvested within a short window due to seed scatter issues	Harvesting is highly labor intensive, in part given possible degradation of plant material related to efforts to preserve the chemical properties of the plant's flowering heads; also requires drying down to 10 percent moisture

Source: Congressional Research Service: https://fas.org/sgp/crs/misc/R44742.pdf

Regulated Marketing Claims and Medicinal Foods

Regulated Marketing Claim—There are four major categories of marketing claims regulated by the Federal government (FDA and FTC) including:

Authorized Health Claim. Food ingredients for which there is significant scientific agreement on specific health benefits may receive formal approval from the FDA to make claims that consuming a certain amount of the ingredient may improve certain health conditions (such as eating rolled oats to reduce heart disease).[19]

Drug Claim. Any product that claims to diagnose, prevent, mitigate, treat, or cure a disease is a drug. Typically, any mention of a disease on labels or marketing materials (print or digital) triggers the product's status as a drug. Drugs must be approved by the FDA prior to being marketed.[20]

Health Benefit Claim. The federal standard for making a health benefit claim requires the marketer to have "competent and reliable scientific evidence" produced by "qualified professionals" using "procedures generally accepted in the profession to yield accurate and reliable results."[21]

Structure/Function Claims. Structure and function claims may describe the role of a nutrient or dietary ingredient intended to affect the normal structure or function of the human body, for example, "calcium builds strong bones." In addition, these claims may characterize the means by which a nutrient or dietary ingredient acts to maintain such structure or function, e.g., "fiber maintains bowel regularity," or "antioxidants maintain cell integrity."[22]

Medicinal Foods—There are two types of medicinal foods regulated by the FDA including:

Functional Foods and Nutraceuticals. These terms are used often in the marketplace, but there is no statutory definition. The FDA regulates functional foods (e.g., oatmeal) and nutraceuticals (e.g., milk with added vitamin D) like any other food: if it contains a drug ingredient, makes a disease claim, or makes a health benefit claim without proper substantiation, the agency will act accordingly.[23]

Medical Foods. A food which is formulated to be consumed or administered enterally under the supervision of a physician and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional requirements, based on recognized scientific principles, are established by medical evaluation.[24] Medical foods must be administered under the supervision of a physician.

19 There are only a handful of Authorized Health Claims for food ingredients with health benefits. Many of these claims required extensive clinical trials and lawsuits to secure. FDA Guidance

20 Drug approvals and claims require FDA approval, extensive research, clinical trials, and safety reviews.

21 See further FTC guidance.

22 See further FDA structure/function claims guidance.

23 FDA perspective on functional food from the American Journal of Clinical Nutrition.

24 21 U.S.C. 360ee (b) (3)

End-User and Retail

Edibles—Edibles are a large variety of different foods created using cannabis concentrates including infused sugar, infused oil, or infused butter. Common products include:

- Gummies/lollipops/taffy/candy
- Brownies/baked goods
- Sodas/drinks
- Infused oil or butter mixed in with other food items such as popcorn or salad dressing

Hemp Seed Oil—Non-psychoactive oil obtained by pressing hemp seeds. Cold-pressed, unrefined hemp oil is dark to clear light green in color, with a nutty flavor.

Inclusion Rate—A measure, expressed as a percentage by weight or volume, that quantifies the concentration of hemp extract or cannabinoids in a food product or dietary supplement. An inclusion rate allows for the creation of recommended daily intake values for humans and animals in food and supplement products.

Tincture—Tincture is a term used to refer to cannabis extracts/concentrates typically delivered under the tongue (sublingually) or in a mucous membrane via an eyedropper. Tinctures are intended to be a fast delivery method without smoking or swallowing.

Topicals/Transdermals—Topicals and transdermals are consumption methods that use a lotion or patch to apply the cannabinoids to your skin.

Vape/Vaporizer/Vape Pen/Vape Cartridge—A consumption method that uses heat to vaporize concentrated oil, which is then inhaled.

25 21 U.S.C. § 301 et seq.

17. Marketing and Labeling Guidance

Stakeholder Recommendation

Continue to establish guidance for retailer and manufacturer marketing and labeling which harmonize with national and international standards, when appropriate, for consumable hemp products.

Basis & Purpose of Recommendation

The FDA maintains oversight of hemp-derived consumer products under the Federal Food, Drug, and Cosmetic Act.[25] FDA jurisdiction includes hemp and hemp-derived products as a food and food ingredients, and an ingredient for body products, cosmetics, dietary supplements, and therapeutic products. Analogous guidance made for other supplements and products provides the basis for the guidance presented here.

Although hemp-derived products are relatively new to the marketplace, there are several precedents for other products with unique ingredients. Guidance on marketing and labeling requirements has evolved to assure that consumers and buyers are not misled. This federal guidance will apply to consumable hemp products.

Regulatory Program

Existing Program.

The Role of the FDA

FDA is a federal agency within the Department of Health and Human Services charged with protecting and promoting public health through oversight of a broad range of products. The Farm Bill, by preserving FDA authority while removing other restrictions under the CSA, made FDA much more practically relevant to many hemp stakeholder, including those who may not have experience dealing with the FDA.

The FDA has discovered many hemp products (including CBD products) being marketed with claims of therapeutic benefit, or other drug claims, without having gone through the drug approval process. These include CBD products marketed for serious diseases and conditions like cancer, Alzheimer's disease, opioid use disorder, and pain. In response, the FDA actively oversees the sector and sends warning letters to companies unlawfully marketing such products.

Guidance for the Manufacturing Sector

Unlike drugs approved by FDA, the manufacturing processes of hemp-derived products is not subject to FDA review as part of the drug approval process, and FDA has not evaluated whether these products are effective for their intended use, proper dosages, interactions with other FDA approved drugs, or potentially dangerous side effects or other safety concerns.

Outside the drug space, enterprises are also marketing hemp products, including human and animal foods, as well as dietary supplements and cosmetics: each has a different regulatory framework. Unlike drugs, foods, dietary supplements, and cosmetics rarely need to be approved by FDA before they can be marketed in interstate commerce. One exception is food additives, which the FDA must determine to be safe for specified conditions before they can be added to foods unless the substance is "generally recognized as safe" (GRAS) by qualified experts.

Similarly, for production and companion animal feed, the process for approval is overseen by the FDA Center for Veterinary Medicine. Animal by-products or animals fed unapproved ingredients may not enter the stream of commerce and it is not legal to feed unapproved animal feed ingredients. For dietary supplements, if the product contains a new dietary ingredient—meaning a dietary ingredient that was not marketed in the United States before October 1994—the manufacturer generally must notify FDA before coming to market.

Approved food additives can be found on the FDA list of GRAS ingredients. Most recently added to this list (effective December 20, 2018) are hulled hemp seeds, hemp seed protein, and hemp seed oil. The GRAS recognition also included a statement that *Cannabis sativa* L. oil seeds do not naturally produce cannabinoids. These items can now be included in human foods provided they comply with all other requirements and do not make disease treatment claims.

Guidance on Broader Cannabinoid Products

Two statutory provisions have relevance for cannabinoid products:

1. Under the Federal Food, Drug & Cosmetic Act, it's prohibited to add a substance into food if that substance has been approved as a drug, or if that substance has been the subject of public clinical investigations; and
2. A product that includes such a substance is excluded from the definition of a dietary supplement.

These provisions have an exception for substances in foods (including supplements) before they were ever approved or studied as drugs. So, for example, substances like caffeine and baking soda have this type of grandfathering in foods and beverages. For cannabinoids and CBD, the FDA has concluded this exception does not apply.

Guidance for the Retail Sector

The top FDA regulatory priority is to protect public health. This priority includes alerting consumers when products pose health and safety risks, such as when product manufacturers make claims to prevent, diagnose, treat, mitigate, or cure serious diseases.

For example, the agency has warned companies to stop selling CBD products claimed to prevent, diagnose, treat, mitigate, or cure serious diseases such as cancer, Alzheimer's disease, psychiatric disorders, and diabetes. Misleading, unproven, or false claims associated with CBD products may lead consumers to put off getting important medical care or to ignore symptoms associated with serious diseases.

Unapproved CBD products, which could include cosmetics, foods, products marketed as dietary supplements, and any other product making therapeutic claims, generally have not been subject to FDA evaluation for:

- Indication and efficacy for treating a specified disease or medical condition;
- Proper dosage;
- Interactions with other drugs or foods; or
- Presence of dangerous side effects or other safety concerns.

Besides safety risks and unproven claims, the quality of many CBD products may also be in question due to a current lack of processing controls and practices. For example, the FDA has tested some products, and many were found to not contain the levels of CBD claimed on the label. There are also reports of CBD potentially containing unsafe levels of contaminants (e.g., pesticides, heavy metals, THC).

FDA has not approved CBD for any use in animals and the concerns regarding CBD products with unproven medical claims and of unknown quality equally apply to CBD products marketed for animals. In addition, hemp seeds and other hemp by-products are not currently approved by the FDA for use with animals. The FDA recommends pet owners talk with their veterinarians about treatment options with CBD for their pets.

Implementation

In general, CDPHE already has a framework in place that adopts related FDA policies. The following action items are needed to implement this recommendation.

- Continue to guide packaging and labeling for hemp products that extend FDA guidance where appropriate; and
- Develop programs as needed to support public health and consumer safety related to hemp products.

Key Stakeholders

CDPHE, CDA, FDA, Colorado hemp manufacturers and retailers

18. Quality Assurance Certification Program

Stakeholder Recommendation

Develop a quality assurance program, such as a "Good Hemp Program", that establishes minimum standards for Colorado producers/manufacturers to qualify for special certification/designation. The program will collect fees to fund hemp research and promotion.

Basis & Purpose of Recommendation

Certification provides a marketing alternative to commodity and unbranded markets that allows individual producers to be included under an established umbrella program and label, organized, and overseen by a third-party. The program establishes criteria to promote a set of differentiated characteristics. Third-party certification provides independent verification of product or production claims. Securing a reputable third-party certifier is a way to differentiate Colorado grown hemp products from others on the market.

Another potential motivation for having a state certification program is that it allows for Colorado to maintain control over its standards for product integrity. For example, the USDA organic program has an integrity database,[26] that consumers and buyers can use to identify reputable suppliers. A similar system could support the Colorado hemp industry.

Regulatory Program

Current Program. There is no current state-level certification and promotion specific to hemp products. Hemp and hemp products can currently qualify for any other similar agricultural or locally produced product initiative.

Recommended Enhancement. Certification programs and labels depend on establishing a set of production processes and quality standards that verify whether the certified product have certain qualities or attributes valued by consumers.

A certification process offered by the USHA covers several stages of production including cultivation, processing, and manufacturing.[27] This program offers a sensible starting point for to examine key features of a quality assurance program.

Relevant components include:

- Cultivators
    - Registration, personnel guidance, sampling and handling practices, contaminant testing and hemp cannabinoid quantification (pre-harvest and post-harvest), transportation and storage guidance, and checklists for best practices
- Processors, Manufacturers and Brand Owners
    - Similar guidance topics as those for cultivators (employee and facility guidance),
    - Post-harvest material handling under process controls and testing to maintain potency and assure purity.
    - Quality Management Systems including clear direction on any point, step, or stage in the manufacturing process where control is necessary to ensure the quality of the hemp product, very similar to HACCP in food products.
    - Guidance on product packaging, labeling, and storage that aligns closely with other third-party certification programs, such as the U.S. organic program.
    - Importance of recordkeeping, supplier specifications, know your supplier practices, and packaging and labeling best practices.
- Retailers
    - There is no current USHA guidance for retailers.
    - Retailers in organic foods often become certified by USDA as a branding resource and to demonstrate their commitment to delivering organic foods to their customers.
    - License or accreditation for retailers to assure hemp products have been correctly handled from production through delivery to the customer.

Implementation

The following action items are required to implement this recommendation:

- New rules and definitions for a Colorado hemp quality assurance program; and
- Procedures for audit services to verify compliance at several stages of the supply chain.

Key Stakeholders

CDA, Colorado hemp cultivators, processors, manufacturers, retailers

26 https://organic.ams.usda.gov/Integrity/Default.aspx

27 https://ushempauthority.org/assets/uploads/USHA-Guidance-Procedures-Version-2.0-WEB-VERSION-Rev-3-25-20_200504_141204.pdf

19. State Procurement of Industrial Hemp Products

Stakeholder Recommendation

Encourage state procurement and use of industrial hemp products.

Basis & Purpose of Recommendation

With industrial hemp, there are concerns among Colorado hemp industry stakeholders there may be less than optimal investment in the processing and manufacturing of hemp industrial products until the market is "proven." Yet, the market may not grow if there continues to be a few industrial hemp product options to purchase. This is an expected challenge for a sector prohibited for so long, and where there is little historical market data or supply chain expertise to support an emerging product market.

The state of Colorado can support the Colorado hemp industry through encouraging procurement and use of hemp products by state agencies and institutions.

Regulatory Program

Current Program.

Colorado Procurement Overview

Procurement in Colorado is decentralized—most state agencies conduct their own solicitations. Businesses wanting to sell goods or services to the state government must promote themselves to individual state agencies and actively search for opportunities on the state procurement website. Colorado currently has a preferred purchasing program for recycled products that can serve as a model for a hemp product preference.[28]

Reciprocity Considerations

Colorado law mandates that resident bidders be given preference over non-resident bidders equal to the preference given by the state in which the non-resident bidder is a resident, i.e. if a non-resident bidder is 4 percent lower than the resident bidder but the state of residence of the non-resident bidder awards a 5 percent preference to in-state bidders, then the Colorado bidder becomes the lowest bidder by 1 percent.

Sustainability Considerations

Purchasing agencies may utilize life cycle costing and/or value analysis in determining the lowest responsible bidder. In bids where life cycle costing or value analysis is to be used, the specifications shall indicate the procedure and evaluative factors to be considered. When appropriate, specifications issued and/or used by the federal government, other public procurement units, or professional organizations may be referenced by the State of Colorado. Bidders may have to certify these standardized specifications have been met.

Recommended Enhancement.

State Preferential Practices

Stakeholders recommended the state could include hemp as part of a preferred product program. A range of "price preferences" from 3-10 percent across states for products that would fall under other policy-driven "preferred" categories. Among sectors, agriculture, forestry, and fishery products are commonly mentioned, for sustainability outcomes, local site preferences, recyclables, and other sustainable products as evaluated by life cycle analyses, renewable fuels, corn-based plastics, and printing were common across states.

Implementation

The following action items are needed to implement this deliverable. Items include:

- Modify the Procurement Code through legislative action and rulemaking process;
- Encourage the State Purchasing and Contracts Office (SPCO) to include hemp-based products on the state pricing agreement list;
- Integration of industrial hemp products into current initiatives:
    - Colorado Procurement Technical Assistance Center (PTAC)
        - The purpose of the Colorado PTAC is to generate employment and improve the general economic condition of the state by assisting Colorado companies in obtaining local, state, and federal government contracts.
        - PTAC provides procurement technical assistance to help in selling products or services to government agencies.
    - HUBZone Small Business Administration Empowerment Contracting Program
        - The HUBZone Empowerment Contracting program provides federal contracting opportunities for qualified small businesses in federally designated distressed areas.

Key Stakeholders

Department of Personnel and Administration, SPCO, Colorado hemp industry

28 CO Procurement Code & Rules 24-103-903(5): When purchasing any product with public funds, any procurement agent may purchase products or materials with recycled content, that have been source reduced, that are reusable, or that have been composted

Finance and Insurance

20. Develop Guidance & Best Practices

Stakeholder Recommendation

Provide guidance and best practices to financial services institutions and insurance carriers to encourage them to provide services to Colorado hemp businesses. Colorado can be the bellwether for guidance and outreach to institutions seeking to serve the industrial hemp marketplace. Guidance can include written materials and direct stakeholder engagement, rulemaking, or general outreach.

Basis & Purpose of Recommendation

This recommendation seeks to destigmatize opening and holding accounts for hemp and hemp-related businesses. With enhanced guidance and stakeholder engagement, it is hoped that providers will serve the industrial hemp industry similar to other agricultural industries.

Regulatory entities and associated authorizing statutes involved with this recommendation are:

- CRS § 10-1-101, et seq. (Insurance)
- Division of Insurance Protocol for Engaging Stakeholders in Rulemaking
- CRS § 11-101-101, et seq. (Banks)
- CRS § 11-110-101, et seq. (Money Transmitters)
- CRS § 11-30-101, et seq. (Credit Unions)
- CRS § 11-40-101, et. seq. (Savings and Loan Associations)

Regulatory Program

Current Program.

Since the passage of Colorado Amendment 64, federal and state regulators published cannabis-related guidelines for banks, credit unions, and money services businesses. More recently, Colorado regulators published a variety of guidance on marijuana and hemp that includes:

- Division of Financial Services, April 4, 2019, "BSA Expectations for Industrial Hemp"
- DORA, January 2020 "Roadmap to Cannabis Banking & Financial Services"
- Division of Banking, January 31, 2020 "Hemp Industry Guidance"

Similarly, the National Association of Insurance Commissioners maintains a cannabis insurance working group, of which the Colorado Insurance Commissioner is a member. As most insurance is not a single-state enterprise, Colorado works with regulators across the country to encourage the introduction of innovative products, particularly in the admitted market (as opposed to surplus lines), to cover industrial hemp and to remove any barriers to the offering of such products.

Despite more recent changes to industrial hemp laws at the federal level, providers of financial services and insurance remain uncertain about the degree to which they can serve hemp-related companies and the compliance and reporting practices that such relationships require. Some federal banking regulators have issued helpful clarifications regarding hemp accounts, but banks remain subject to a complex set of federal legal requirements and regulatory expectations, requiring specific guidance to ensure they act appropriately. Representatives from the American Bankers Association have thus encouraged banks to wait until more guidance is set forth before providing financial products to hemp-related businesses.

In response to the need for additional guidance, on June 29, 2020, the Financial Crimes Enforcement Network (FinCEN), a division of the United States Treasury, released FIN-2020-G001, Guidance Regarding Due Diligence Requirements Under the Bank Secrecy Act for Hemp-Related Business Customers, will help clarify a bank's regulatory requirements if it provides banking services. In addition, on July 6, 2020, the Conference of State Bank Supervisors (CSBS), released the CSBS Cannabis Job Aid, a resource for both bankers and bank examiners, that provides information and risk assessment guidance for banks that wish to provide banking services to the hemp industry.

Recommended Enhancement.

Developing a guidance program informs and de-stigmatizes industrial hemp, hemp products, and hemp-related businesses through facilitated sessions for state and local regulators; state-chartered financial institutions, domestic insurers; and the general public, whether for producers, vendors, or other stakeholders, as determined necessary.

The proposed enhanced outreach program builds upon existing efforts of DORA and the work of cross-functional groups like the cannabis insurance working group of the National Association of Insurance Commissioners. Such efforts would focus on three constituencies: regulators, industry, and the public. Regarding the Division of Insurance, guidance and education may also focus on the need for multi-state admitted lines specifically focused on coverage thresholds built into the 2018 Farm Bill for industrial hemp; that is, the division may wish to engage in further discussions with regulatory colleagues in other states and industry stakeholders regarding insurance products that would cover industrial hemp with THC levels over statutory limits.

Implementation

The following action items are needed to implement this recommendation. Items include:

- Development of targeted meetings with federal and state banking, financial services, and insurance regulators
- Development of targeted meetings with banking & financial services institutions and their respective trade associations

Key Stakeholders

DORA (Divisions of Insurance, Banking, and Financial Services), banking and insurance trade groups, and other key identified groups

21. Expanded Data Availability

Stakeholder Recommendation

Make available aggregated industry registration data and other information to financial institutions and insurance carriers to expedite access to account services.

Stakeholders recommended CDA and CDPHE provide aggregated registration information in structured formats, subject to development of key standards and norms, to the finance and insurance industry to help these institutions expand services to all qualified participants in the hemp supply chain. Moreover, stakeholders recommended that Colorado should allow CDA and CDPHE to release or verify specific application information to a financial or insurance institution upon the written request of the registrant to facilitate and expedite account servicing.

Basis & Purpose of Recommendation

Accurate de-identified information and standardized figures are key for risk management, insurance industry actuaries, underwriting, and pricing, whether in the hemp industry or otherwise. Data points of significant interest included registration, testing, and regulatory compliance information. Making such data available would encourage coverage of commercial risks in the same manner as other industries and emphasize that providing coverage to hemp businesses requires the same application of general commercial insurance principles as other agricultural concerns. Access to such information can also serve as one tool among others in a holistic underwriting process, much like other sources of public data relied upon to understand a specific business' overall efficiency and competency compared to similarly situated businesses.

Making a limited set of registration data available serves two goals. First, financial institutions and insurance carriers can more easily determine whether a registrant complies with state and federal law when opening and maintaining an account on their behalf. Second, if registrants opt to provide more detailed information, account holders and service providers can use that data to reduce costs associated with ongoing servicing of hemp-related accounts. Transitioning toward access to structured data is also expected to facilitate better understanding and analysis of data in the aggregate.

Regulatory Program

Current Program.

CDA and CDPHE periodically publish information that shows active registrations. CDA periodically updates the list but does not include underlying information regarding changes in license status (if any) nor any other data. CDPHE updates their information regarding the number of processors registered. Regularly published aggregated statistical data on hemp is currently lacking in Colorado.

Recommended Enhancement.

Initially, Colorado should develop uniform standards for hemp-related data so information can be accurately collected and provided both to the USDA under the IFR, and through a public application platform. With the foregoing, CDA should make aggregated de-identified data available both in terms of structured information and in an analysis performed and provided through partnerships among CDA, CDPHE, CSU, and OEDIT.

Implementation

The following action items are needed to implement this recommendation:

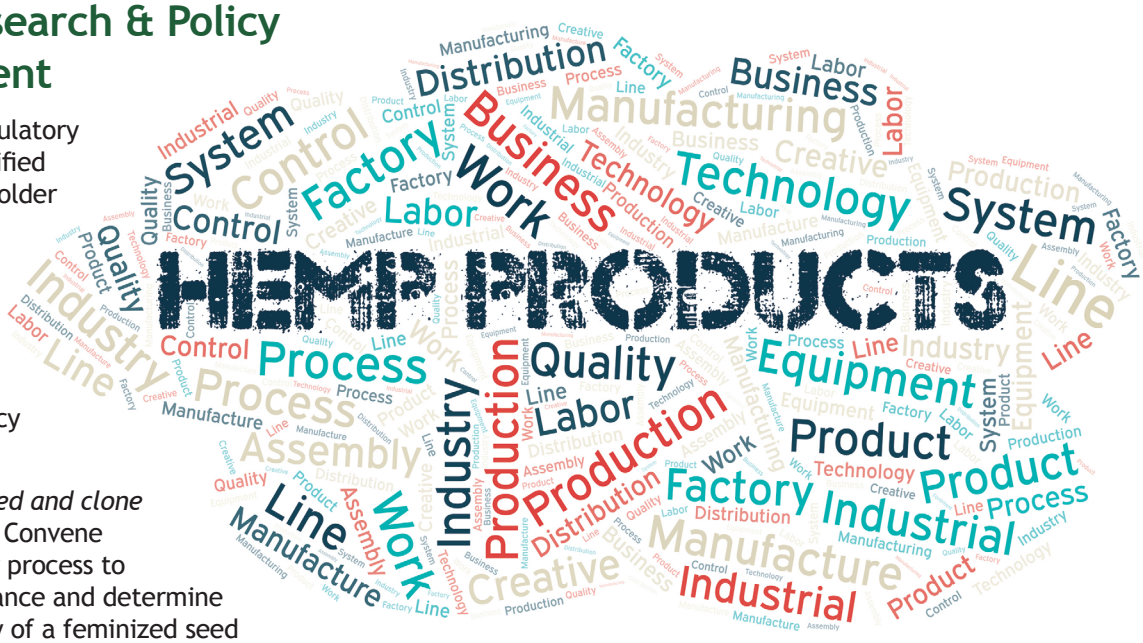
- Establish a platform to provide aggregated data under Colorado Open Records Act and standards in which the date will be collected and provided;
- Modification to CDA rules to provide for platform-specific disclosures and opt-in that allows CDA to verify registration information as the request of the registrant
- Convene a stakeholder group if needed to define the data requirements, privacy concerns, and program operational characteristics

Key Stakeholders

CDA, CDHPE, DORA, CSU, Office of the Attorney General, hemp industry associations, banking, and insurance trade

Future Research & Policy Development

The following regulatory issues were identified during the stakeholder meetings and subsequent proceedings as issues or subjects that needed further research and policy development.



- *Feminized seed and clone certification.* Convene a stakeholder process to develop guidance and determine the feasibility of a feminized seed certification program and for the operational model and facilities for a clonal certification program. This program will involve CSGA and CDA.
- *Cross-pollination.* Research the distance, pollen viability, size, and other factors that determine risk for hemp cross-pollination and recommend thresholds for notification.
- *Retaining value in the supply chain.* Convene a stakeholder process to determine the rules and procedures to develop secure supply channels that allow non-compliant plant material to be processed for non-consumable industrial uses; or to have the THC extracted and removed from the stream of commerce. In addition, use existing regulatory avenues for non-compliant plant material including advocating for exemption of mature stalks and seeds from destruction.
- *Co-location of hemp and licensed marijuana businesses.* Prohibit the co-location of marijuana and hemp cultivation, processing, and manufacturing businesses until federal laws allow. Explore an efficient regulatory structure to allow for the co-location of all types of cannabis cultivation and/or manufacturing facilities.
- *Electronic Traceability System.* Convene a process to develop specifications, security, and documentation requirements for an ETS that will ensure a secure chain of custody for hemp products in Colorado.
- *Transport of concentrated intermediate products.* Determine a transportation protocol for hemp concentrates with THC over statutory limits. These are business-to-business transactions where products transported will be further processed to bring THC levels into compliance before sale to consumers.
- *Non-consumable industrial hemp manufacturing.* Determine whether additional regulatory oversight of industrial products manufacturing operations is needed and if so the lead regulatory agency and most advantageous regulatory framework.
- *Emerging cannabinoid analytes, inhalable and suppository hemp.* Monitor and address new cannabinoid analytes, such as Delta-8 THC, as they are identified and be prepared to address in policy and regulation. Assure Colorado's approach aligns with federal hemp/cannabis laws and State marijuana laws. Determine the best regulatory treatment for inhalable and suppository hemp, whether direct initial regulation by the state or by deferring to the federal government timeline for hemp product regulation.
- *Quality assurance program.* Determine the costs and benefits of developing a quality assurance program that sets quality, purity, and process standards and promotes a Colorado brand of hemp products.
- *Retail Framework.* Convene a stakeholder process to develop a retail framework for hemp that integrates into an existing retail framework for food or dietary supplements.
- *Financial services and insurance data.* Determine data gaps that exist for insurance and financial institutions and the specific requirements and funding needed to expedite access to services

The items listed above may require a task force or stakeholder process to further develop the proper regulatory scope and implementation action items.

Appendices

Appendix A. CHAMP Stakeholders and Participants

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Appendix B. Detailed Industry Analysis

Hemp is an emerging specialty crop, both nationally and in Colorado, that has received considerable attention from producers, consumers, private businesses, and policymakers. Cultivation of the crop may serve as an alternative cropping enterprise that improves grower profitability and as an engine of economic development. Hemp can be manufactured and processed into numerous industrial and commercial goods for which there is a national and international demand. Industrial applications range from building materials and textiles to food ingredients and wellness products. However, given limited research and development examining domestic uses, there is potential for many other applications to emerge.

While hemp may hold promise for Colorado, integrating this sector into the state's agricultural and economic landscape also creates challenges. The CHAMP initiative is one step that Colorado has taken to identify and address potential obstacles. This section provides context for understanding hemp markets, cultivation, and processing in Colorado and nationally, and discusses possible future directions for the industry.

Background

The terms "industrial hemp" and "hemp" both refer to a plant of the *Cannabis sativa* L. species and any part of that plant (including the seeds, stalks, leaves, and flowers whether growing or not) and all extracts and compounds derived from the plant (such as cannabinoids, terpenes, isomers, or acids) with a delta-9 tetrahydrocannabinol, or THC, concentration of 0.3 percent or less on a dry weight basis. THC is the primary intoxicating component of cannabis. Cannabis plants, plant parts, and derivatives with THC levels that exceed 0.3 percent are considered marijuana, which remains a Schedule I controlled substance and is regulated by the DEA.

Hemp is not a new crop for Colorado or U.S. producers. Before and during World War II, the U.S. grew hundreds of thousands of acres, reaching 220,000 acres in 1943.[29] Such production was largely for manufacturing rope and sailing cordage and was highly incentivized via federal government price supports such as the war-era Hemp for Victory campaign. Removal of price supports following the war led to a sharp decline in prices and widespread closure of processing mills followed. That, coupled with increased domestic taxes for hemp production under the Marijuana Tax Act and imports from parts of Latin America, Caribbean, and Asia, made growing and processing hemp unprofitable. Production remained largely negligible thereafter until it was officially prohibited in 1970 under the CSA due to its' similarity to marijuana.

Following over four decades of prohibition, hemp was reintroduced as a legal crop in the United States under the 2014 Farm Bill.[30] The 2014 Farm Bill allowed for the establishment of state, tribal, or territory hemp pilot programs and did not require state production plans to be approved at a national level by the USDA. Colorado was an early mover, being among the first states to establish a hemp program, and one of only four states to report acreage in 2014. The 2018 Farm Bill[31] allowed for hemp production in all states, tribal entities, and territories on the condition these programs obtain approval from the USDA and meet requirements in the IFR.[32]

Market Context

Hemp in the United States is, and will likely remain, highly regulated compared to other commodity crops. This stems from the finely drawn distinction that separates hemp from marijuana based on THC level, combined with the inability to visually distinguish between these variants of the cannabis plant. Producers or entities intending to grow, handle, or process hemp must generally obtain a license, or other types of registration permit, for these purposes. The licensing requirements are necessary for inspection and enforcement purposes, but also have the added benefit of making available some market-related information on cultivation and processing at the national and state levels.

In 2019, U.S. land area registered for industrial hemp cultivation surpassed 500,000 acres, with Colorado accounting for over 13 percent of the total.[33] While this more than doubles previous peak production in 1943, not all registered acres are planted. To put this distinction in context, one recent hemp production study put 2019 U.S. planted acres closer in line with that previous peak at 200,000 acres (Hubbard, 2020). It furthermore estimated that most acres (>90 percent) were planted to produce hemp flower for cannabinoid extraction. Just under 80% of the total area was intended primarily for CBD extraction and another 14 percent was intended primarily for CBG extraction,

29 Johnson, N. 2019. American Weed: A History of Cannabis Cultivation in the United States. EchoGeo 48.

30 Agricultural Act of 2014, Public Law 113-79.

31 Agricultural Improvement Act of 2018.

32 Federal Register, Vol. 84, No. 211.

33 Drotleff, Laura. 2020 Outlook: Licensed US hemp acreages fall 9% from 2019 but grower numbers increased 27%. June 19, 2020. Hemp Industry Daily, https://hempindustrydaily.com/2020-outlook-licensed-u-s-hemp-acreage-falls-9-from-2019-but-grower-numbers-increase-27/?fbclid=IwAR1I_o2xTgULcmhUx9whZmYOml-AAnsYEXrqBWlsweBQnji8HnbsO1PjDYo (last visited July 22, 2020).

another cannabinoid compound that has formed some traction among consumers. Hemp intended for oil seed and fiber accounted for much smaller areas, representing 3.6 percent and 2.5 percent of total planted area, respectively. As the market for CBD and other cannabinoids stabilizes, acreage planted for oil seed, fiber, and other uses is expected to increase.

Many growers received healthy profits in the early years of the hemp pilot programs. A relative scarcity of raw hemp material and domestically produced hemp flower to supply an expanding CBD market helped to maintain wholesale prices for hemp and hemp products well above break-even levels. Production budgets for hemp floral material in 2019 showed variable costs exceeding $10,000 per acre, with clones or transplant plugs alone representing 70–80 percent of this total.[34] In mid-2019, however, industry benchmark reports showed a steep decline in national wholesale prices for raw and processed hemp products of up to 80 percent,[35] resulting in reduced to negative profitability for many growers.

The decline in wholesale prices was due to both supply and demand factors. On the supply side, expansion of hemp production to new states and dramatic growth in planted acreage over a short period in pilot program states made hemp biomass relatively more abundant than it had been earlier. Total U.S. hemp production had been only 1,866 acres in 2014,[36] as compared to the 200,000 acres estimated for 2019.

At the same time, extraction and processing plants faced hurdles in keeping up with the supply of raw hemp material. In a 2020 study of over 200 hemp cannabinoid extraction facilities, over 70 percent of respondents had a daily input capacity of 1,000 pounds of hemp floral material or less, including about one-third with a capacity under 100 pounds per day. For reference, a generous estimate of national yield per acre for hemp floral material in 2019 is 1,520 pounds per acre.[37] Consumer demand for CBD and other hemp-based products grew at a slower pace than anticipated in early 2020 due to COVID-19 related disruptions and the stagnating economy that followed.

Growers produced more hemp in 2019 than could be processed or sold. As of mid-2020, there are many reports of unsold raw and processed hemp products remaining in storage from the 2019 production year. National hemp acreage in 2020 is estimated to decrease, with one study estimating a 9 percent overall decline as compared to 2019.[38] While hemp commodity prices declined sharply, downward price movement for inputs like clones and transplant plugs was slower to follow. Nevertheless, some producers have reported lower costs for these items in 2020 and wholesale prices appear to be stabilizing from their recent drop for the time being.

A further consideration is a global market for hemp-based industrial and commercial processed goods besides produced raw hemp materials. There is a large and established global market for around 25,000 hemp-based products including textiles, recycling, automotive, furniture, food and beverages, paper, construction materials, and personal care and wellness products including cosmetics. While there is little information on U.S. retail sales of hemp products, reports estimate that as early as 2016 hemp product sales amounted to almost $700 million.[39] Domestic retail sales were concentrated in a variety of categories such as CBD and supplements, personal care products, textiles, foods, and other applications and consumer products.

Hemp production is permitted in around 30 countries with an estimated aggregate acreage of around 225,000 acres as of 2016. In 2017, the U.S imported $67.3 million worth of hemp material. Trade data is not available for finished products (such as textiles, construction materials, and paper products), thus the $67.3 million dollars consists only of hemp seeds, oil, solids, and fibers used as inputs in further manufacturing.[40] In 2018, the largest supplier of U.S hemp imports is Canada which accounts for 90 percent of the value of imports, followed by China and Romania.

Growth in global hemp production and relative costs of production across countries is expected to be a significant determinant of U.S. hemp land area expansion, especially for hemp fiber which is already widely traded in international markets[41] and used primarily for industrial applications rather than consumed as a food ingredient or supplement.

34 Mark and Shepard. 2019. Industrial Hemp Budgets 2019. University of Kentucky Extension, Lexington, KY, https://agecon.ca.uky.edu/budgets#Specialty_Crops (last visited July 7, 2020).

35 Hemp Benchmarks. 2020a. U.S. Hemp Extraction Survey May 2020, https://www.hempbenchmarks.com/special-reports/ (last visited July 20, 2020). Hemp Benchmarks. 2020b. Price Commentary. April 2020 Hemp Spot Price Index Report, https://www.hempbenchmarks.com/special-reports/ (last visited May 21, 2020).

36 Mark, Tyler, Jonathan Shepherd, David Olson, William Snell, Susan Proper, and Suzanne Thornsbury. February 2020. Economic Viability of Industrial Hemp in the United States: A Review of State Pilot Programs, EIB-217, U.S. Department of Agriculture, Economic Research Service.

37 Hubbard, Chase. 2020 Hemp Crop Production Survey Results. The Jacobsen Publishing, https://thejacobsen.com/wp-content/uploads/2020/05/2020-Hemp-Survey-Results.pdf (last visited July 22, 2020).

38 Drotleff, Laura. 2020 Outlook: Licensed U.S. hemp acreages fall 9% from 2019 but grower numbers increased 27%. June 19, 2020. Hemp Industry Daily, https://hempindustrydaily.com/2020-outlook-licensed-u-s-hemp-acreage-falls-9-from-2019-but-grower-numbers-increase-27/?fbclid=IwAR1I_o2xTgULcmhUx9whZmYOml-AAnsYEXrqBWlsweBQnji8HnbsO1PjDYo (last visited July 22, 2020).

39 Johnson, Renee. Hemp as an Agricultural Commodity. June 22, 2018. Congressional Research Service Report. 7-5700. RL32725, https://fas.org/sgp/crs/misc/RL32725.pdf (last visited July 22, 2020).

40 Johnson, Renee. Hemp as an Agricultural Commodity. June 22, 2018. Congressional Research Service Report. 7-5700. RL32725, https://fas.org/sgp/crs/misc/RL32725.pdf (last visited July 22, 2020).

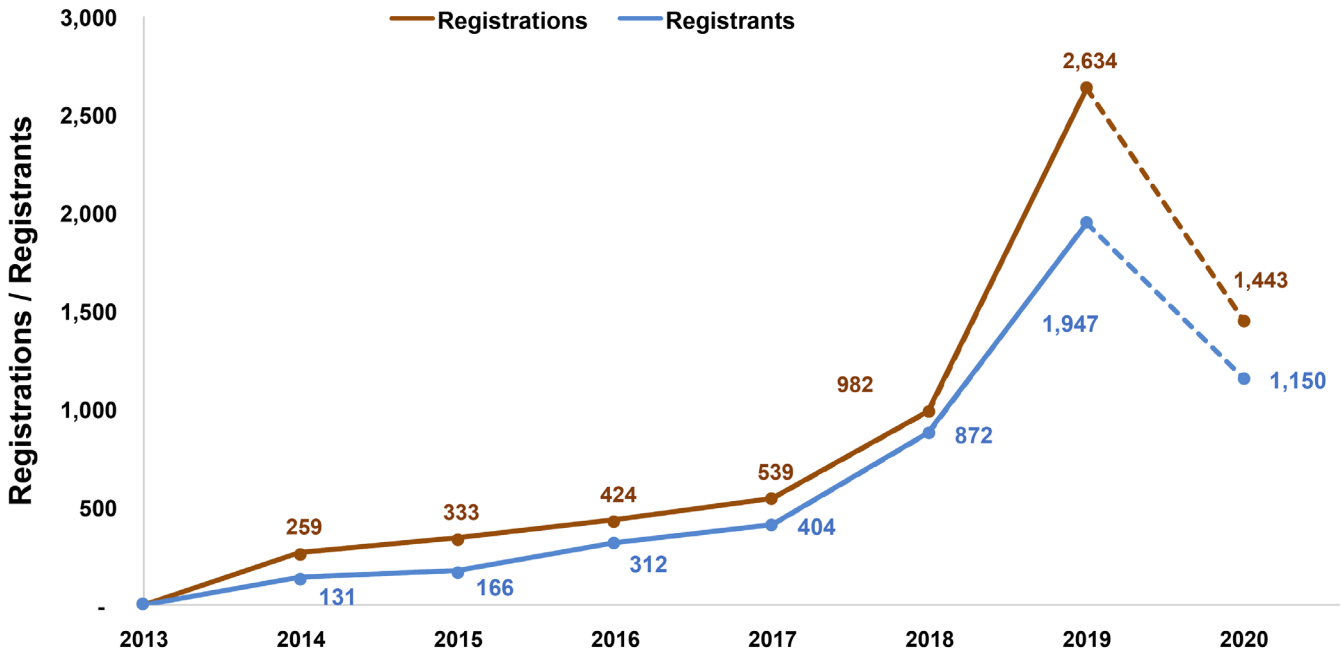
41 OED. 2020. Hemp Fibers Profile. Organization for Economic Complexity, https://oec.world/en/profile/hs92/hemp-fibers (last visited July 30, 2020).

Hemp Cultivation in Colorado

This section provides further context on hemp cultivation in Colorado. Despite being an early mover, the sector is yet to mature and there are numerous market information gaps. In this section, we summarize the available data to provide a picture of the industry and characterize some recent trends within the sector. All hemp growers must register with the CDA. Annual registration costs are $500 plus an additional $5 per acre and an additional $0.30 per hundred square feet of hoop house, greenhouse, or other indoor space. If the registered land area (in acres) includes the hoop house, greenhouse, or other indoor space within its boundaries, then both the outdoor acreage and indoor square footage can be filed under a single registration.

CDA records provide information on the number of registrations and registered land area between 2014 and late July 2020. Between 2014 and 2019, the number of registrants and registrations grew each year (solid lines), resulting in about a ten-fold increase during that period (Figure B1). As of late July 2020 (dashed lines), the number of registrants and registrations were 40 percent and 45 percent below their comparable 2019 totals, respectively. The numbers shown represent lower bounds on the number of registrants and registrations for 2020, however, because some registrations that are set to expire in fall 2020 will be renewed. The final numbers will depend on the registration renewal rate in the coming months. An analysis of 2019 records indicated that 54 percent of registrations included outdoor area only, 15 percent included hoop house, greenhouse, or other indoor areas only, and 31 percent included both outdoor and indoor areas.

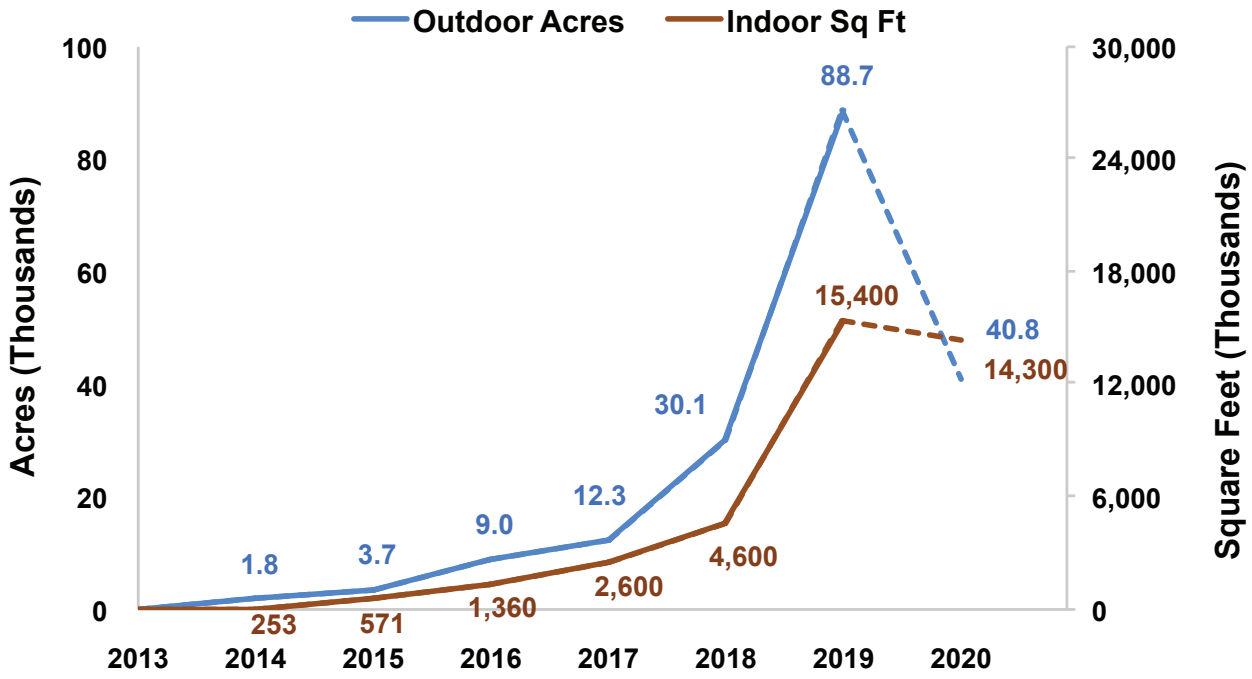
Figure B1. Colorado Hemp Registrants and Registrations, 2014-July 2020



Source: Colorado Department of Agriculture

The total registered land area also increased annually between 2014 and 2019, but at a more rapid pace than registrations (Figure B2), indicating operations increasing in size. In terms of both registered acres and indoor square footage Colorado saw a forty-fold increase. Records for 2019 show a median land area of around 20 acres for registrations with an outdoor area only. Indoor only registrations had a median area of about 3,600 square feet. Registrations with both indoor and outdoor areas had median land areas of 7 acres and 3,000 square feet, respectively. As of late July 2020, registered acres were down over 50 percent as compared to 2019. Registered square feet were similarly down about 41 percent. The number of registered acres is unlikely to change substantially given that the main outdoor planting window has passed. Square footage is more likely to rise given that indoor cultivation can occur later into fall and winter to produce clones, transplants, or seeds, or potentially other off-season or niche production.

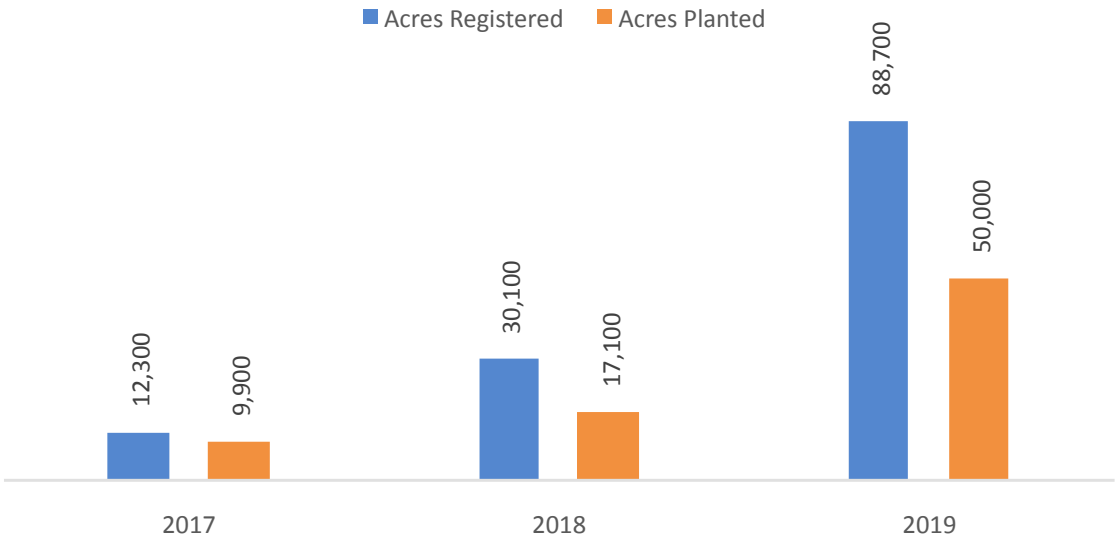
Figure B2. Registered Hemp Cultivation Space, 2014-July 2020



Source: Colorado Department of Agriculture

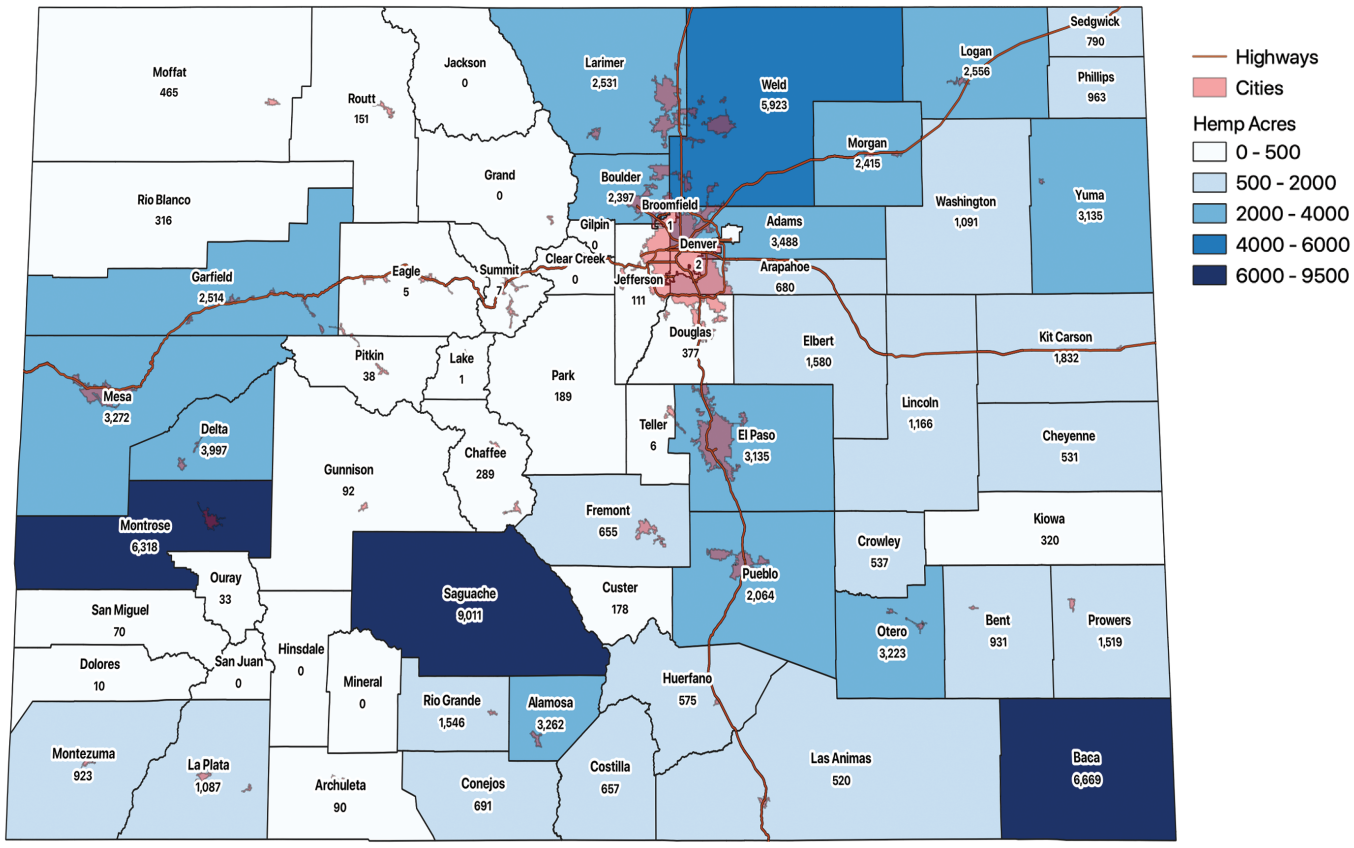
Actual acres and indoor square footage planted and harvested is consistently lower than the registered acres (Figure B3). There are many reasons that producers may register for hemp production but not actually plant such as grower inexperience, a lack of financing, or the inability to secure inputs like seed or clones. There are even fewer acres harvested than are planted but statewide data on acres harvested are not available. As shown in Figure B4, the majority of Colorado counties had some registered hemp acreage in 2019. Hemp production appears to be relatively well-distributed across the state, with some regional concentrations and a few counties with no registered acreage.

Figure B3. Colorado Hemp Acreage, Registered and Planted, 2017-2019



Source: Colorado Department of Agriculture

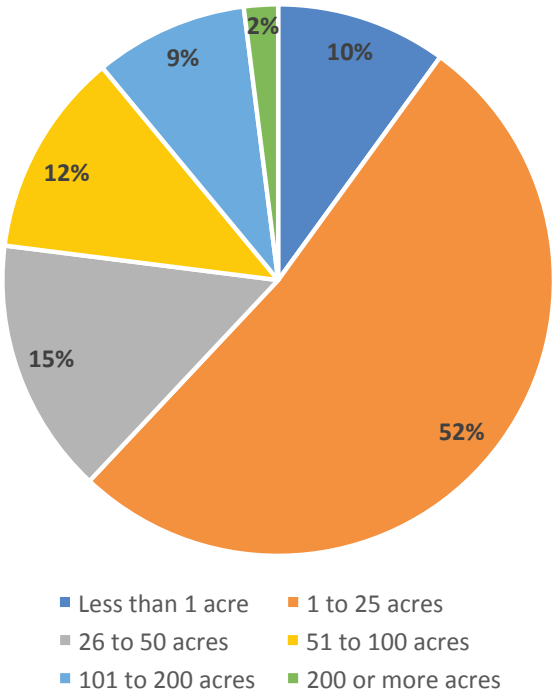
Figure B4. Colorado Registered Hemp Acres by County, 2019



Source: Colorado Department of Agriculture

Many of the hemp registrations are for small parcels (Figure B5); over 60 percent of hemp registrations were for less than 25 acres whereas just over 2 percent were for 200 or more acres. Since the launch of Colorado's pilot program, hemp acreage in Colorado has also heavily tilted toward production for floral material to the same, or perhaps an even higher, degree as compared to the national picture.

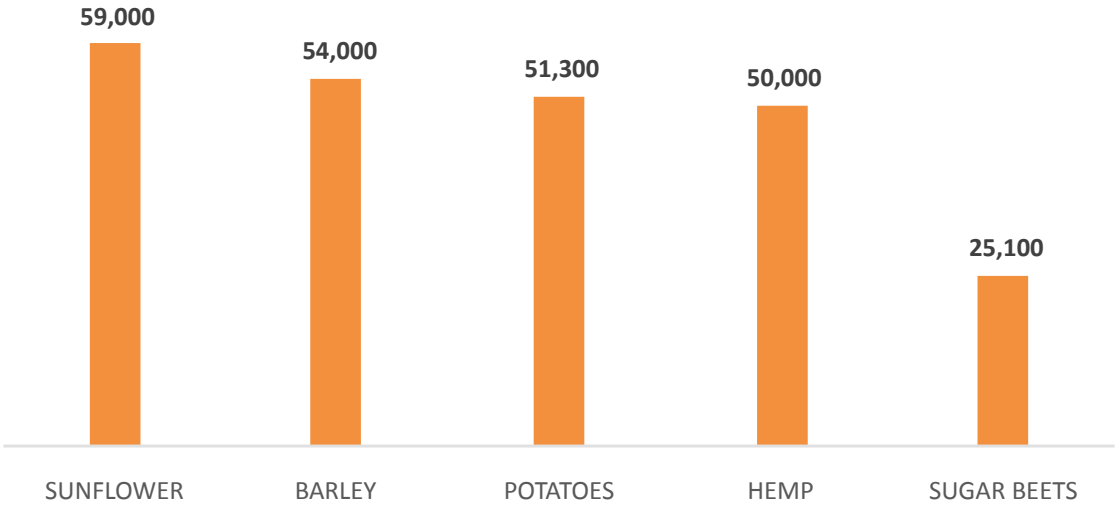
Figure B5. Hemp Registration Size (Acres), 2019



Source: Colorado Department of Agriculture

One way to understand the relative footprint of hemp cultivation within Colorado's agricultural sector is to compare its planted acreage with other crops (Figure B6). While planted hemp acres in 2019 (50,000) were well below those for Colorado's top field crops such as corn (1,550,000 acres) and wheat (2,150,000 acres), they were comparable to other specialty crops within the state. Planted hemp acreage was very similar to sunflower, barley, and potatoes, and nearly double that for sugar beets. This illustrates that, at its 2019 planted acreage level, hemp has grown to become an important specialty crop for Colorado.

Figure B6. Colorado Planted Acres by Crop, 2019



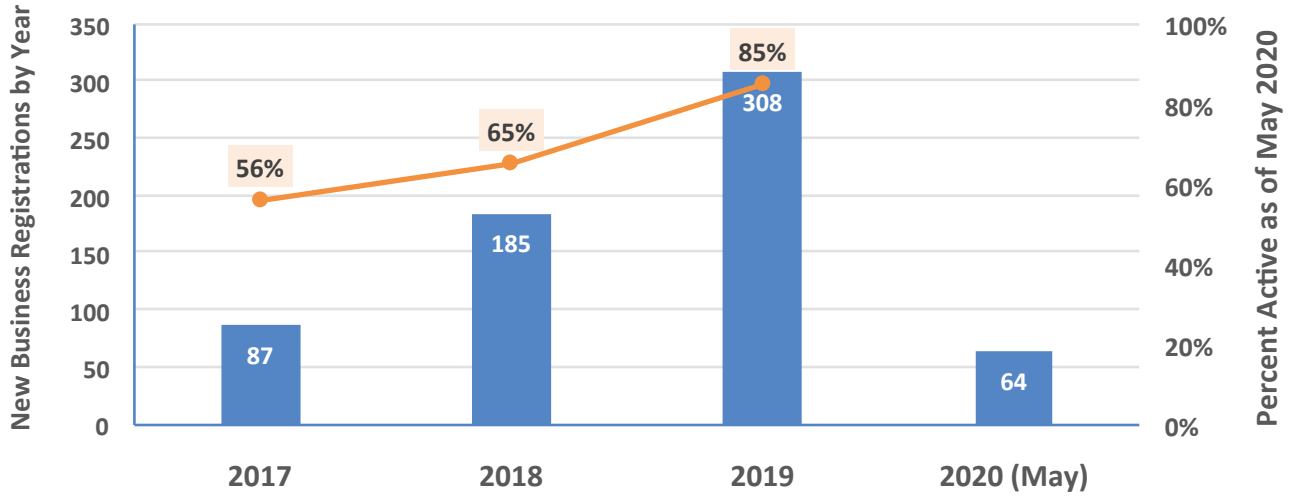
Source: National Agricultural Statistics Service, 2019

Colorado's hemp sector extends beyond cultivation and handling to include processing and manufacturing. The number of processors and manufacturers using hemp or its derivatives (oils, extracts, concentrates, isolates, resins, seed meal, flour, etc.) as a food ingredient or nutritional supplement has grown rapidly in recent years. This includes existing businesses that have expanded their product lines to include hemp-based ingredients and new business creation. Using hemp in food and supplement manufacturing is allowed in Colorado under state statutes and is regulated by the CDPHE. The hemp ingredients used in the manufacturing process must come from an approved source, remain below allowable THC thresholds, and be appropriately labeled.

CDPHE maintains a list of registered hemp food and supplement manufacturers and approved storage facilities, such as warehouses and packing facilities, from which hemp may be sourced. Figure B7 gives more insights into new hemp business registrations by year and survival rates as of May 2020. Starting in 2017, when records first became available, the total registered by CDPHE rose from just under 90 to over 640 by the spring of 2020. Before 2020, these numbers approximately doubled year over year. In 2020, the number appears lower, however, it represents only a partial year through May of 2020. The number of new hemp processing and manufacturing business starts is expected to continue to slow, as these measures usually start high after a new federal or state business regulatory program is announced as entrants rush to a new market and then slow as the market becomes saturated.

As of spring 2020, about three-fourths of all businesses registered continued to handle hemp materials. This represents just over half of the businesses first registering in 2017, two-third of the businesses first registering in 2018, and well above three-quarters of businesses first registering in 2019. Overall, the number of food and supplement manufacturing businesses continued to grow in the first few years of Colorado's pilot program with more new businesses registering each year than closed or discontinued hemp processing.

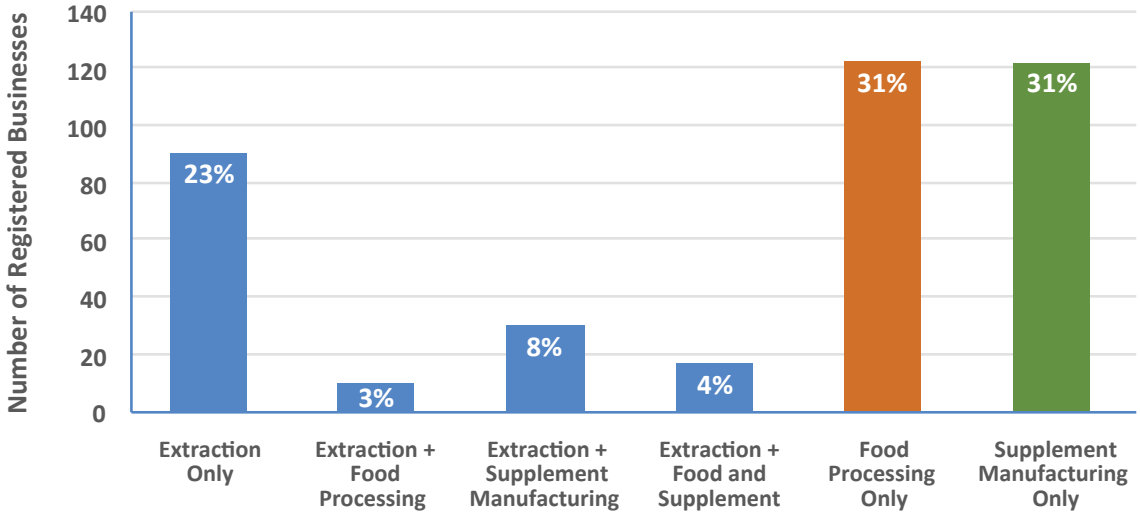
Figure B7. Colorado Hemp Extraction, Processing, and Consumable Manufacturing Business Growth, 2017-May 2020



Note: *Includes all businesses that process and manufacture hemp for human or animal consumption.*

Source: Colorado Department of Public Health and Environment

Figure B8. Colorado Hemp Extraction, Processing, and Manufacturing Business Summary, 2017-May 2020



Note: *Includes all businesses that process and manufacture hemp for human or animal consumption.*

Source: Colorado Department of Public Health and Environment

As of May 2020, the number of active CDPHE hemp registrants were relatively evenly distributed across extraction, food processing, and supplement manufacturing activities (Figure B8). Nearly 40 percent of the 392 active registrants were involved in extraction. About 60 percent of these extraction businesses were specialized within that processing activity alone whereas 40 percent were also involved in food processing, supplement manufacturing, or both. Additionally, businesses specialized in hemp food processing or supplement manufacturing activities, respectively, also represented large shares of the CDPHE registrants at just over 30 percent each. These businesses largely focused on hemp flower processing for CBD and other cannabinoid extraction; however, several food manufacturers incorporate hemp protein and oils from hemp seed into their processes.

This discussion highlights the growth in hemp processing and manufacturing activities related to the extraction, food, and supplements. Other hemp processing and manufacturing activities such as non-food industrial applications like textiles, paper, polymers, building materials, and specialized equipment manufacturing are also present in the state. These hemp processors represent a currently small industry in its early stages with unknown capacity, but with the potential to grow and establish itself as a significant agricultural and manufacturing industry and employer in the state. No comprehensive source of information on these sources was identified and therefore not summarized here.

Anecdotally, there are a relatively small number of industrial manufacturing facilities, operating at a relatively small scale in the state. Companies in their early stages have perfected methods to manufacture a diverse array of products, including concrete, insulation, plastics, animal bedding, and textile fabrics. These companies are in different stages of growth and scale. The industrial hemp products manufacturing sector represents a potential opportunity for growth and investment as demand and the industrial supply chain for hemp products in the U.S. matures. In that case, acreage in the state devoted to fiber and oil seed would be expected to increase.

Future Opportunities

Hemp has the potential to diversify farm incomes and drive economic growth in Colorado. Future levels of hemp production will be influenced by a multitude of factors that can be difficult to predict including the number of hemp growers, the hemp area planted, growth and diversification of intended end use, and processing and retail capacity. Most important, hemp enterprises must remain profitable relative to other agricultural alternatives. Industrial and consumer hemp products must also remain competitive with established and new alternatives.

The appropriate scale of production also remains an open question. Many hemp registrations under the pilot program were for small- or micro-sized areas (10 percent of 2019 registrations were less than 1 acre, for example, Figure B5). Business turnover will also play a role in the number of registrants producing hemp into the future. Many producers may simply experiment with hemp and decide not to continue with its cultivation. In addition, growers will need to understand the risk management tools at their disposal and be able to take advantage of them. Currently, there is a lack of information and confusion around crop insurance which needs to be clarified going forward.

While the industry is experiencing an oversupply of hemp biomass at the farm level there is anecdotal evidence suggesting that contracts (production and marketing) have played a role in grower access to processing and therefore profitability. If processing capacity remains relatively small scale this trend may continue, and producers would be discouraged from growing hemp for the spot market. The sector is also likely to be shaped by developing vertical relationships among extractors, processors, and industrial users or retailers. There will likely be continued supply chain issues related to uncertainty, such as around testing and processing, as the industry continues to grow and develop. These growing pains should ease, however, as innovation pipelines increase yields, make THC levels more predictable and stable, and potentially reduce other risks such as those associated with cross-pollination.

In Colorado, the vast majority of industrial hemp cultivation is for CBD or other cannabinoid production. As an early mover, Colorado may have an advantage in cannabinoid production, but the state needs to consider whether other industrial hemp applications would be profitable for producers in the state. As the industry grows, hemp production for fiber and oil seeds or dual purposes may increase, but the supply chain will need to grow alongside increased cultivation. The supply chain is immature, but there is potential interest in industrial hemp materials in transportation and construction for example by auto manufacturers for vehicle interiors or by major home building and aerospace manufacturing corporations. Research and development by major end-users or by materials manufacturers are still necessary to determine if hemp-based materials are an advantageous alternative to current materials. Given Colorado's history of hemp cultivation, the state could attract a major decortication facility or other mid-stream manufacturing plants if demand for industrial hemp products materializes.

The lack of reliable information on hemp marketing channels and other hemp-related data will continue to improve; providing valuable information as this emerging industry grows. While we have current information on registered hemp processing and manufacturing businesses, in the future the compilation of further data on processors and manufacturers that produce non-industrial items like textiles or building materials (that do not fall under CDPHE's purview) will be helpful in informing the industry.

While farms are experiencing a frictional oversupply due to a fragmented market, consumers are looking for new food and dietary supplement alternatives; and businesses are looking for sustainable and renewable energy and building materials. Despite the recent challenges on the supply side, there is undeniable potential for growth in demand for industrial and consumer hemp products in the U.S. As the entire industrial hemp supply chain grows and matures, Colorado is poised to take advantage of this growth in demand if it materializes. For this growth in demand to occur the industry needs to be proactive about addressing quality issues, unproven medical efficacy claims, and the accuracy of dosing. It is imperative that Colorado explores any potential opportunity and develops the supply chain for the emergence of industrial hemp for textiles, polymers, and building materials.

Overall, there is a lack of consumer education around cannabinoids, which is exacerbated by the lack of federal regulations related to cannabinoids in consumer products. On the industrial side, there is a lack of applied research and proven cost-effective use cases for different hemp applications.

Colorado can continue to lead the industry in hemp innovation by facilitating and maintaining a favorable regulatory environment for research and development. The recommendations outlined in this CHAMP document demonstrate that the Colorado hemp industry is eager to position the state to be a production and manufacturing leader.

To achieve leading status, research and development will be needed in several areas including (1) plant genetics; (2) effective uses for a variety of hemp industrial applications; (3) consumer uses and preferences for cannabinoid products; and (4) scalable and safe manufacturing practices.

Notes:

A Partnership of the Colorado Departments of
Agriculture, Public Health & Environment, Regulatory Agencies,
and Office of Economic Development and International Trade