

## Commerce Committee Testimony of Rick Trojan

February 15, 2017

Thank you Chairman Mason & Distinguished Committee members.

I've spoken before this committee previously, and welcome the opportunity to continue our dialogue towards expanding economic options for farmers and creating thousands of jobs all across the Sunflower State. As background, I'm a member of the largest hemp farm in the USA, with over 1200 acres planted in 2016, and plans for double that, over 2500 acres, for the 2017 season. I created a project called Hemp Road Trip and toured the country last year, educating on hemp and promoting domestic hemp businesses. We toured over 40 states, giving me a good overview of the growing knowledge of, and the growing demand for, hemp and hemp based products. I'm also a Business Advisor to the National Hemp Association, on the Board of the Industrial Hemp Research Foundation and a Board Member of Vote Hemp, the largest nationwide advocacy organization specific to hemp.

In the Agriculture Act of 2014, also known as the Farm Bill, the federal government created an exception to the Controlled Substances Act for Industrial Hemp, in those states where there's a regulatory infrastructure in place. My home state of Colorado is coming up on her fourth season of cultivation, and the future for agriculture and jobs looks bright! We've created thousands of jobs and generated millions of dollars in tax revenue for Colorado.

Let me give you one example. One of the farms I'm associated with grew 300 acres in 2015, and over 1200 acres in 2016. Our first year we directly created 25 jobs, and impacted over 125 jobs. In 2016 we impacted over 200 jobs in Colorado, including jobs in transportation, processing, manufacturing, marketing, distribution and education.

Hemp can be used to make over 30,000 different products, from paper to textiles, to building materials and bioplastics, from biofuels to energy storage via supercapacitors! With such downline product versatility, Industrial Hemp provides an open canvas upon which the great state of Kansas can paint its economic masterpiece. There are two important products from Industrial Hemp that I think hold tremendous potential for Kansas, hemp seed and hemp biofuels.

#### Hemp Seed

Hemp seed is likely one of the easiest parts of the crop to harvest and process. Two main products come from the hemp seed, food and animal feed. Let's take a look at food first. Hemp seed, once dehulled, is called hemp hearts, or hemp nut. It contains all of the essential amino acids, which makes it a complete protein just like chicken, fish or beef. In fact, there's more protein in an ounce of hemp seeds than there is in an ounce of salmon! Hemp is also a rich source of a number of essential minerals, including magnesium, phosphorus, iron and zinc. It also contains omega 3-6-9 in correct ratios for human digestion. Not only is this a great product for human consumption, but also shows promise as an animal feed. Studies have shown increase in omegas with chickens eating hemp, and an increase in mineral uptake in fish and cows. Hemp is truly a superfood, for people and livestock.

### Hemp as Biofuel

The Guardian magazine explains what makes hemp a good energy source, “[Hemp] has been successfully used for many years to create bioethanol and biodiesel, is environmentally friendlier to produce than sugar beet, palm oil, corn or any of the crops... and can grow in practically any temperate to hot climate leaving the ground in better condition than when it was planted.” In addition, hemp’s shown a 97 percent conversion efficiency!! The attached exhibit (“Hemp for Fuel”) shows the minimum and maximum ethanol output from a variety of crops. As you can see, hemp outperforms every other comparable crop by a factor of at least two to one, or double that of maize or sugar beets. Kansas can utilize this technology to become the nation’s leader in biofuel and renewable energy production.

### Hemp’s Expanding Market

Hemp is a very dense and heavy crop, meaning that transport over long distances can become expensive. As such, local/regional processing centers will be build to handle the hemp locally, before transporting the end product (cereal, fiber, hurd, etc) to a larger, regional processing center. While this may seem cumbersome, it actually forces new jobs creation throughout the state, instead of in one regional processing center. Kansas has the opportunity to have 5-8 processing centers throughout the state, allowing for new job allocation statewide. This economic boom is felt directly and more immediately than economic benefits from other industrial crops.

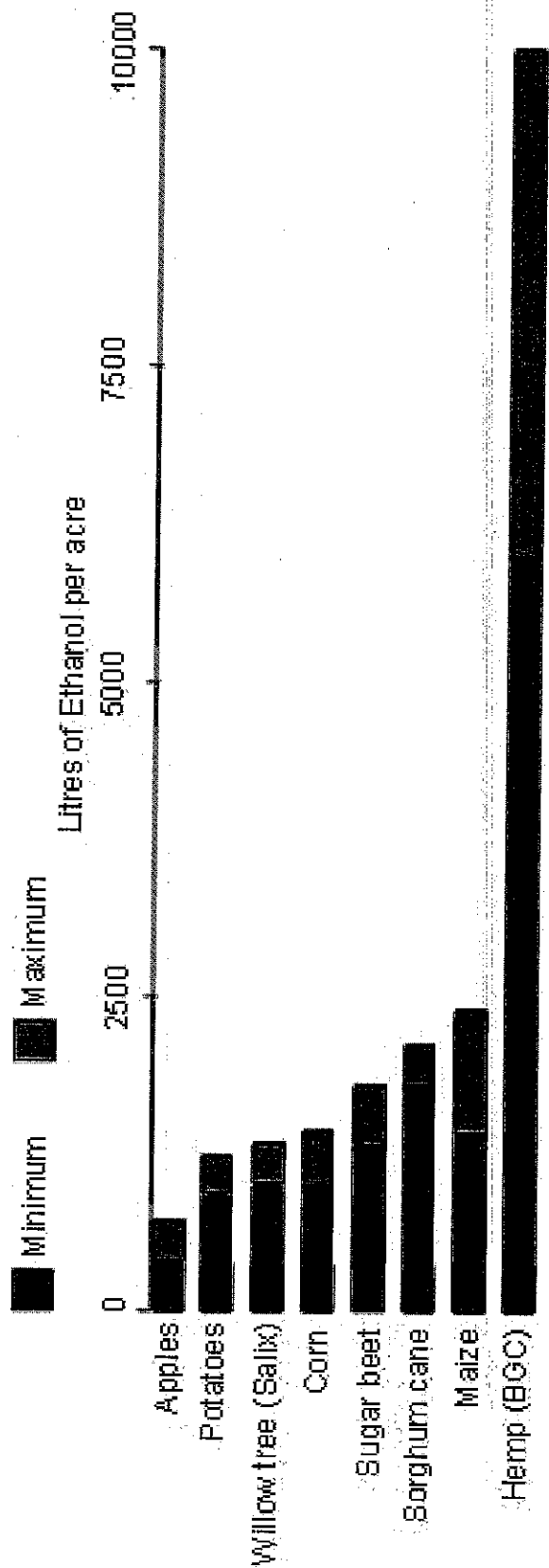
Moreover, the market for industrial hemp products is already here, and continues to expand. The Hemp Industries Association estimates that over \$600M of hemp products were imported in 2016. In fact, 90% of hemp Canada grows is sold to the United States (typically hemp hearts and hemp oil for cooking). The hemp seed market in Asia is also expanding rapidly, particularly since the Fukushima nuclear disaster. Since the fish have been contaminated with radiation, countries like Japan, Korea and China seek omegas from hemp seed instead of their traditional means, from fish oil. As you can see from the Exhibit attached (“Overview of US Hemp Seed Imports”) from our friends at SeedCX, there’s nearly a 16 times increase in hemp seed demand in the four years leading through 2016. There’s sufficient demand, at least over the next few years, to support explosive growth of domestic hemp cultivation. And that’s just the market for seed, let alone other dual crop purposes such as fiber and building materials.

### National Landscape

According to Vote Hemp, the following thirty-one (31) states have defined Industrial Hemp as distinct and removed barriers to its production: AL, CA, CO, CT, DE, FL, HI, IL, IN, KY, ME, MD, MI, MN, MT, NE, NV, NH, NY, NC, ND, OR, PA, RI, SC, TN, UT, VT, WA, WV, VA

Of these 31 states, fifteen (15) had hemp pilot programs in 2016: CO, HI, KY, IN, ME, MN, NE, NV, NY, ND, OR, TN, VT, VA, WV

As you easily note, Kansas is not on either list. As such, the state and its people are missing out on millions in revenue, and also missing out on the tremendous job creations possible through Industrial Hemp cultivation. Let’s pass this bill and allow Kansas to reap the benefits of this industrial crop.



Bio Gas Company Ltd

# HOW GREEN ARE BIOFUELS?

Biofuels are getting a bad rap as stories of rising food prices and shortages fill the news. But the environmental, energy and land use impacts of the crops used to make the fuels vary dramatically. Current fuel sources – corn, soybeans and canola – are more harmful than alternatives that are under development.

## FUEL SOURCES

CROP	USED TO PRODUCE	GREENHOUSE GAS EMISSIONS* Kilograms of carbon dioxide created per mega joule of energy produced	USE OF RESOURCES DURING GROWING, HARVESTING AND REFINING OF FUEL				PERCENT OF EXISTING U.S. CROP LAND NEEDED TO PRODUCE ENOUGH FUEL TO MEET HALF OF U.S. DEMAND	PROS AND CONS
			WATER	FERTILIZER	PESTICIDE	ENERGY		
Corn	Ethanol	81-85	high	high	high	high	157%-262%	Technology ready and relatively cheap, reduces food supply
Sugar cane	Ethanol	4-12	high	high	med	med	46-57	Technology ready, limited as to where will grow
Switch grass	Ethanol	-24	med/low	low	low	low	60-108	Won't compete with food crops, technology not ready
Wood residue	Ethanol, biodiesel	N/A	med	low	low	low	150-250	Uses timber waste and other debris, technology not fully ready
Soybeans	Biodiesel	49	high	low/med	med	med/low	180-240	Technology ready, reduces food supply
Rapeseed, canola	Biodiesel	36	high	med	med	med/low	30	Technology ready, reduces food supply
Algae	Biodiesel	-183	med	low	low	high	1-2	Potential for huge production levels, technology not ready
Hemp	Biodiesel, Ethanol, Paper, Food & more	-319	low	low	low	med/low	20	US is only industrialized country where hemp farming is illegal

\* Emissions produced during the growing, harvesting, refining and burning of fuel. Gasoline is 94, diesel is 83.

Sources: Marsha Green, University of Washington; Elizabeth Gray, The Nature Conservancy; Patricia Townsend, University of Washington; as published in Conservation Biology

# State of U.S. Hemp Production

## Hemp Legislation Overview

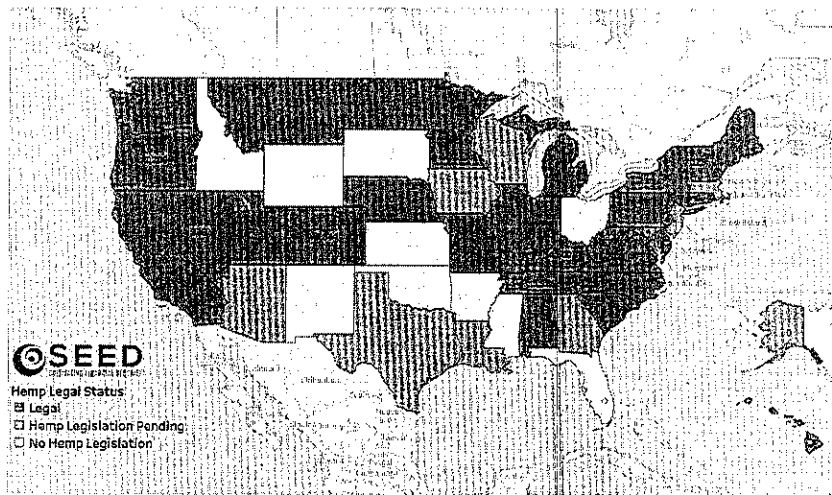
Many states have enacted laws to take advantage of section 7606 of the Agriculture Act of 2014 by establishing hemp production and research programs in various forms through legislation. As of 2 September 2016, 31 states have passed various forms of hemp legislations with legislation pending in another 9. These laws range in matter and scope. Some states, including notably Colorado, Tennessee, and Kentucky, have established hemp research and pilot programs that allow for the hemp cultivation and processing through licenses issued by the state departments of agriculture. Other states, including Indiana, Utah, and Michigan, allow cultivation only for research purposes through state university or secondary education institutes, with the sale and marketing of domestically grown hemp prohibited.

## Locating Hemp Production

Section 7606 of the 2014 Farm Bill requires detailed records of hemp production within states that have legalized cultivation. Hemp producers must be registered with state departments of agriculture or state universities and provide comprehensive data on acreage, variety, and even GPS coordinates of all hemp fields. This type of rigorous record keeping has allowed for the collection of precise data, tracking hemp acreage that is not found in other specialty crops in the United States.

The Seed research team utilized state freedom of information act<sup>1</sup> (FOIA) requests<sup>2</sup>, combined with interviews of state departments of agriculture<sup>3</sup>, to derive a precise figure for hemp acreage in 2016 of, 16,417 registered acres. Figure 1 gives a breakdown of the total registered acres in states where hemp is legal as well an overview of the legal status of hemp in each state.

Figure 1: U.S Hemp Acreage 2016 - by legal hemp state.



Acreage numbers for Colorado, Delaware, Hawaii, New York, North Dakota, Vermont, Virginia, Washington, and West Virginia, obtained through formal FOIA requests. Acreage numbers for Kentucky, Maine, Michigan, Montana, Nevada, Tennessee and Utah obtained through interviews with state departments of agriculture. All other states assumed to be zero as hemp programs have just been recently initiated.

<sup>1</sup> Since 1967, the Freedom of Information Act (FOIA) has provided the public the right to request access to records from any federal agency. It is often described as the law that keeps citizens in the know about their government. Federal agencies are required to disclose any information requested under the FOIA unless it falls under one of nine exemptions which protect interests such as personal privacy, national security, and law enforcement.

<sup>2</sup> Freedom of Information Act (FOIA) requests were submitted to state departments of agriculture requesting information regarding approved cultivators, approved processors, historical acreage figures, current acreage figures, and planted acreage figures. A total of twenty-five requests were submitted with responses from eighteen. Requests were submitted July 25, 2016.

<sup>3</sup> Interviews of state departments of agriculture were used to supplement FOIA requests that failed to return any results. These interviews were conducted from August 1, 2016 to September 2, 2016 and consisted of questions involving the structure of the state's hemp program, the acquisition of seed, the presence of any hemp processors, both historical and current officially registered acreage, and beliefs on future growth.

In 2016, industrial hemp states registered a total of 16,417 acres, constituting a 144% increase over the 6,712 registered acres the previous year. However, while these registered numbers are precise by law, there is no certainty that these farmers will actually plant their full allotments of acres. In fact, many of these registered acres may go unplanted leading to a large discrepancy between officially registered acres and acres in production. Additionally, in several states like Indiana, Utah, or Nebraska, hemp cultivation is limited to university research projects and does not allow for the marketing or sale of the hemp being produced. While the number of acres that fall under this latter category are currently minuscule, this policy reduces the acres harvested for commercial use. It is difficult to estimate the percentage of planted acres to registered acres, a rough estimate can be achieved. While there is no consensus, conservative estimates place the planted acreage at around 50-66%<sup>4</sup> of the total registered acres. Applying the lower bound of this conservative estimate indicates that more than 8,000 acres were planted in 2016.

**Colorado, Kentucky, and Tennessee** have been growing hemp since 2014 and comprise the majority of the registered hemp acreage in the United States. Colorado has seen hemp acreage grow significantly with 3,670 registered acres in 2015 and 8,859 in 2016, a 141% increase, and a total of 340 registered participants. Additionally, Colorado featured 1,231,093 ft<sup>2</sup> of registered indoor growing space. Kentucky has shown a similar increase with 1,742 registered acres in 2015 growing to 4,500 acres in 2016, a 158% increase, with 167 registered participants. With 1,200 registered acres in 2015 and 1,185 acres in 2016, Tennessee has not shown the same increase that Kentucky and Colorado have, but it still remains on the United States' leading hemp states in terms of registered acres.

One state that does stand out is **Oregon** with 1,200 registered acres<sup>5</sup>, compared to 20 acres in 2015. This marks a substantial increase and places Oregon in line with the other large hemp producing states. However, expectations from Oregon should be tempered. Colorado, Kentucky, and Tennessee have shown that it takes time to adapt foreign hemp cultivars to local climates and soils. While the Oregon acreage may be substantial, it will likely lag behind the other three industrial hemp states that have a head start in the creation of local cultivars.

**Nevada's** 336 registered acres also stand out. With legislation being implemented in late 2015, Nevada has shown surprising level of interest in its first year of legal cultivation. The Nevada Department of Agriculture reported 11 registered producers with 270 acres planted of the total registered spread mostly in the western half of the state.

**Vermont** has shown moderate growth in its hemp acreage with 24 registrants cultivating 129 registered acres in 2016, a 70% growth over 2015.

**Virginia** implemented an industrial hemp program in late 2015 and has issued 28 licenses for a total of 37 registered acres in approved location throughout Virginia in 2016. However, this acreage is marked purely for research purposes with three universities participating<sup>6</sup>. 2016 also marked the first year of cultivation for **West Virginia** as well. Total registered acreage in the state was 66.5 with approximately 10 of those acres in production from 8 registrants throughout the state.

Several hemp states, including **Utah, Michigan, Delaware, Illinois, and Indiana** require that any hemp cultivation take place under the umbrella of research and be conducted through a state university with the sale and market of locally produced hemp prohibited. However, this designation has stalled growth as currently there are no registered acres in several of these states despite substantial interest from private citizens. Similarly, **New York** has also limited hemp production to universities; however, one notable difference is that hemp produced on the 30 registered acre is available for commercial sale.

Other states, including **Washington** and **Minnesota** are currently in the process of developing rules and regulations to implement their recent hemp legislation with plans for growth in 2017.

<sup>4</sup> Estimates obtained through interviews with officials at state departments of agriculture in hemp producing states.

<sup>5</sup> State officials estimate that half of officially registered acres in Oregon have been planted in 2016.

<sup>6</sup> James Madison University, Virginia Polytech Institute, and Virginia State University.

## Looking Forward

As hemp legislation changes across the country, the nature of hemp production will begin to shift. As more states pass legislation and ease restrictions, hemp production will begin to grow. One state that shows promise is **Montana**. With 34 applicants for the 2017 growing season, Montana is poised to take advantage of the recent legalization within the state. While other hemp states need to take time to adapt foreign cultivars to local climates, Montana's proximity to Canada and similar climate give it a unique advantage. Canada has been growing legal hemp since 1998 and has had time to create established cultivars that fit the climate. These cultivars should be able to easily take hold in Montana, giving the state a unique head start in the creation of a viable hemp industry<sup>7</sup>. **North Dakota** finds itself in a similar situation going forward. With easy access to Canadian cultivars and an established hemp program, North Dakota looks ready to take full advantage of U.S. hemp. However, current weather conditions have taken a significant toll on the 2016 crop with heavy rains destroying research plots at North Dakota State University.<sup>8</sup> **North Carolina** also poses as an interesting piece in the future of hemp. 2017 will mark its first growing season, but several important pieces of infrastructure have already been put into place, including several hemp associations and cooperatives as well as the country's largest hemp fiber processing facility.<sup>9</sup>

As the largest agricultural state, **California** could act as a significant player in the hemp industry. While industrial hemp legislation has technically passed within the state, its implementation is contingent on federal legalization. This restriction has limited the nation's largest agricultural player to an onlooker until federal law is changed.

## Conclusion

Industrial hemp cultivation in the United States is currently dominated by Colorado, Kentucky, and Tennessee as these states were the first to implement the appropriate industrial hemp legislation following the passage of the 2014 Farm Bill as well as the proper infrastructure. While these states seem poised to continue this trend, as state specific cultivars are developed and yields increase, other states like Oregon, Montana, and North Dakota appear ready to join them. Other states find themselves in various stages of establishing viable hemp industries with some more equipped to produce commercial hemp while others have limited their future growth through restrictive policies.

<sup>7</sup> Legal restriction may slow Montana's growth as sale and marketing of hemp produced within the state has not been decided.

<sup>8</sup> Kutson, J. (2014, August 14). *Heavy summer rains devastate NDSU industrial hemp research plot*. Retrieved from The Bismarck Tribune: [http://bismarcktribune.com/news/state-and-regional/heavy-summer-rains-devastate-ndsu-industrial-hemp-research-plot/article\\_39772fae-f485-51c7-8be4-c6571e20046f.html](http://bismarcktribune.com/news/state-and-regional/heavy-summer-rains-devastate-ndsu-industrial-hemp-research-plot/article_39772fae-f485-51c7-8be4-c6571e20046f.html)

<sup>9</sup> Hemp, Inc (2016). *Hemp, Inc. Expected to Have 200,000 Pounds of LCMs in Inventory for Sale* [Press release]. Retrieved from <http://financialnewsmedia.com/profiles/hemp.html>

# Overview of U.S. Hemp Seed Imports

As one of the world’s leading consumers of industrial hemp, the United States serves as the major import center for various hemp products including hemp seed. Hemp seeds enter the United States in a variety of forms: whole hemp seeds ready for planting, sterilized whole hemp seeds ready for human or animal consumption, and de-hulled hemp seeds.

## Hemp Seed Import Data

One of the most cited articles regarding industrial hemp in the United States, *Hemp as an Agricultural Commodity*<sup>1</sup> by Renée Johnson of the Congressional Research Service, analyzes the U.S. importation of hemp seeds. However, Ms. Johnson only used official U.S. import data until 2013 and supplements several gaps in her research with other sources. She mistakenly notes that the U.S. stopped recording data for industrial hemp seed imports, although after further investigation Seed CX found that the Harmonized Commodity Description and Coding System, or Harmonized System (HS)<sup>2</sup> had simply been changed. As such, presented below is the most complete trade statistics of hemp seed entering and exiting the U.S. published to date, using data from *U.S.A. Trade Online*<sup>3</sup> where it can be traced using the HS system.

The HS system utilizes a coded sequence that can be narrowed down to the 4-digit level which corresponds to major commodity categories like fruits or cereals, the 6-digit level which corresponds to individual products like sunflower seeds or apples, and finally the 10-digit level which breaks down the products further. The current available trade data<sup>4</sup> for hemp seed being imported into the United States can fortunately be narrowed down as far as the 10-digits level which provide for a detailed picture. The classifications of hemp seeds fall under HS 1207990320<sup>5</sup>, which is defined as “hemp seed, whether or not broken” with a standard measure of quantity in kilograms. This definition includes three forms of hemp seeds: viable whole seed<sup>6</sup>, non-viable whole seed<sup>7</sup>, and de-hulled seeds<sup>8</sup>.

U.S. imports of hemp seeds are presented in Table 1. Imports of hemp seed have increased over the last five years with a record 35,148,821 lbs. in 2015. This upward trend has continued through the first half of 2016, with import numbers on track to exceed 40 million lbs. While this figure can include viable, non-viable, and de-hulled hemp seeds industry sources estimate that over 90% of this figure is comprised of de-hulled hemp seeds or heart hems with viable whole hemp seeds comprising the remainder and non-viable whole seeds accounting for a marginal amount.

**Table 1: U.S. hemp seed imports 2012-2016 (lbs)**

Commodity	2012	2013	2014	2015	2016	Grand Total
Hemp Seeds (HS 1207990320)	2,725,853	5,084,368	6,122,755	35,148,821	21,458,508	70,540,305

Source: USA Trade Online, United States Census Bureau, <https://usatrade.census.gov> (accessed August 1, 2016) 2016 through June

<sup>1</sup> Johnson, R. (2015) *Hemp as an Agricultural Commodity*. Congressional Research Service

<sup>2</sup> The Harmonized System (HS) codes are developed by the World Customs Organization (WCO), the codes are used to classify and define internationally traded goods. HS 6-digit codes are for universal reference, whereas 7-10 digit codes are often unique after the 6th digit and determined by individual countries of import.

<sup>3</sup> Provided by the U.S. Census Bureau, USA Trade Online is a dynamic data tool that gives users access to current and cumulative U.S. export and import data. With multiple data sets and capabilities, USA Trade Online can assist different types of customers from a wide range of industries and fields. Manufacturers and other businesses wishing to expand their business globally can utilize USA Trade Online to identify new markets, evaluate existing markets, and perform other market research tasks. The data available through this tool can also support economists in interpreting economic news and performing academic research, as well assist governments and federal agencies in analyzing domestic and international trade policies. <https://usatrade.census.gov/>

<sup>4</sup> While trade data can often be severely biased due to under reporting or mislabeling of products and often does not correspond to export data from the countries of origin, U.S. hemp seed import data does align perfectly with reported Canadian export data.

<sup>5</sup> Prior to 2012, hemp seed imports were classified under HS 1207990220

<sup>6</sup> The importation of viable hemp seed also requires a DEA import permit

<sup>7</sup> Hemp seeds are rendered non-viable through a variety of sterilization processes that often involve to a specific temperature.

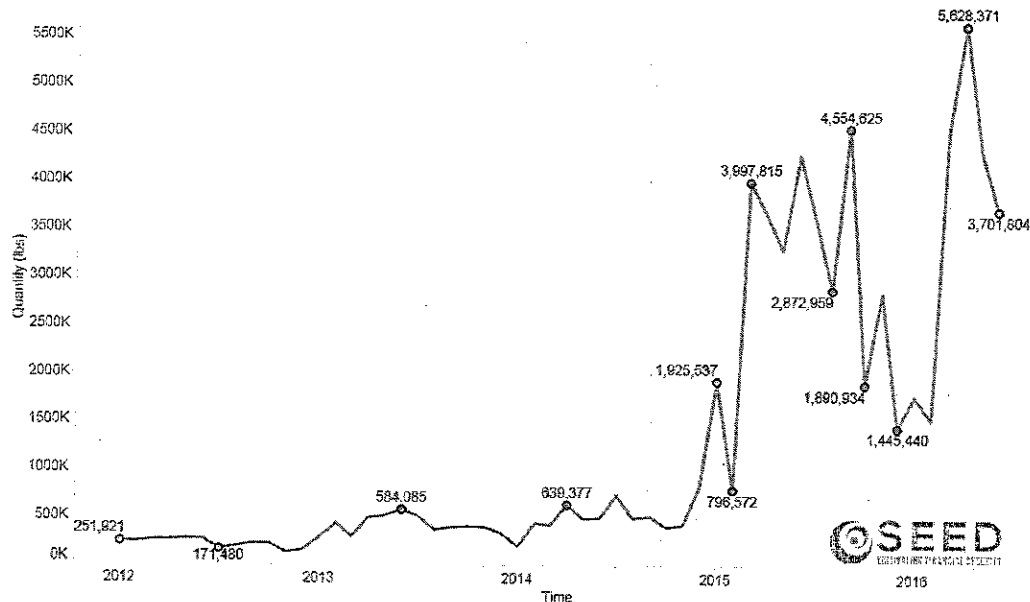
<sup>8</sup> Often referred to as hemp hearts, hulled seeds, or hemp nut.



## Monthly Imports

While Table 1 provides a general overview of hemp seeds entering the United States, it is important to break down the data further to determine the presence of any seasonal trends and provide additional insight into the nature of hemp seeds entering the U.S. Figure 1 gives a breakdown of hemp seed imports by month and clearly shows a significant increase in imports starting in 2015.

**Figure 1: U.S. hemp seed imports 2012-2016 (lbs) - by month**



Source: USA Trade Online, United States Census Bureau, <https://usatrade.census.gov> (accessed August 1, 2016) 2016 through June

These surges can be attributed to the large increases in hemp acreage of the United States' major hemp trading partner, Canada. According to Health Canada<sup>9</sup> in 2014 Canadian hemp seed registered acreage increased to an all-time high of 108,502<sup>10</sup> acres, with a decrease in 2015 to 84,663 registered acres. This expansion in Canadian acreage likely lead directly to the surges in hemp seed imports into the U.S. in 2015 and 2016. Additionally, Figure 1 can also give some insights into the seasonal nature of hemp seed imports. Prior to 2015, hemp seed imports appear relatively stable throughout the year. However, the beginning of 2015 and 2016 show decreases in imports in late fall and early winter. These dips may be attributed to the growth patterns of hemp in North America. As an annual crop, hemp is typically planted in early to middle summer and harvested in September or October. This decreases in exports may be due to these harvest patterns as supplies dwindle towards the end of fall, just prior to the next season's harvest.

<sup>9</sup> Health Canada acts as the administrative and regulatory body of the industrial hemp program under the Industrial Hemp Regulations provision of the Controlled Drugs and Substances Act.

<sup>10</sup> Official acreage reported by Health Canada. Accessed through Canadian Hemp Trade Alliance. <http://www.hemptrade.ca/>

## Imports by Country

Table 2 gives a breakdown of hemp seed imports by country and while Canada comprises the vast majority of imports in the United States, several other countries export hemp seed to the U.S.

**Table 2: U.S. hemp seed imports 2012-2016 (lbs) - by exporting country**

Exporting Country	2012	2013	Time		2016	Grand Total
			2014	2015		
Canada	2,710,836	4,997,495	5,629,955	34,701,851	20,914,404	68,954,543
China			279,919	167,218	117,085	564,225
Romania		83,292	164,120	209,000	85,300	541,772
India					300,177	300,177
Netherlands				38,966	17,061	56,027
Ireland	2,775	1,478	46,561	4,180		54,995
Italy				660	19,820	20,480
Lithuania				17,424		17,424
Germany			2,200	9,522	2,970	14,692
Mexico	11,141					11,141
United Kingdom	1,098	2,103			528	3,729
France					1,100	1,100
<b>Grand Total</b>	<b>2,726,853</b>	<b>5,084,368</b>	<b>5,122,755</b>	<b>35,148,821</b>	<b>21,458,508</b>	<b>79,540,305</b>

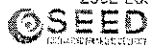
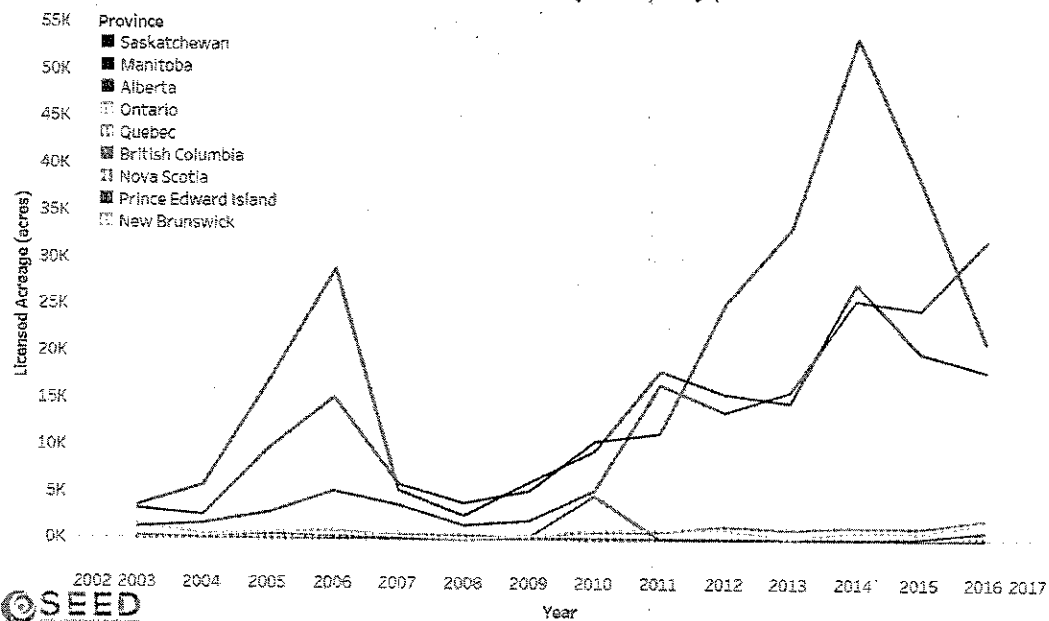
Source: USA Trade Online, United States Census Bureau, <https://ustrade.census.gov/> (accessed August 1, 2016)  
 \*2016 through June

In 2015, Canada exported 34,701,851 lbs. of hemp seeds to the United States which makes up approximately 99% of total U.S. imports for that year. Even though Canada continues to be the number one source of hemp seeds, the U.S. receives deliveries from increasingly more countries. China is the next largest source of hemp seeds, accounting for 0.8% of imports over the five-year period. Romania is the third largest source, entering the U.S. hemp seed market in 2013 and accounting for 0.8% in the same time frame. In addition, imports from India increased from zero to 300,177 lbs., and became the second largest hemp seed source for the U.S. for the first half of 2016. Several European Union countries, including the Netherlands, Italy, Germany, and to a lesser extent The United Kingdom and France, have recently begun hemp seed exports to the United States.

## A Look into Canadian Hemp

As the primary exporter of hemp seeds to the United States, it is important to locate Canadian production. This analysis can provide a better understanding of the points of origin and import channels that hemp seeds entering the U.S. must travel through. While the official U.S. Census Bureau data does not record point of origin nor the exporter, this information can be determined through surveys and interviews with hemp seed market participants as well as through inference. Figure 2 gives a breakdown of officially registered, historical hemp acreage in Canada by province which can help inform us as to where this hemp seed is coming from.

Figure 2: Canadian hemp acreage 2003-2016 (acres) - by province



Source: Health Canada. Accessed through Canadian Hemp Trade Alliance. <http://www.hemptrade.ca>

The overwhelming majority of hemp acreage is located in the Canadian Prairie provinces of Alberta, Saskatchewan, and Manitoba with an upward trend in acreage in recent years. It is not surprising to find hemp flourishing in these regions as these locations comprise a large majority of their production of more traditional grain like wheat and rye. Hemp can slot easily into the crop rotation of these traditional grains like winter wheat as it is a summer crop that can suppress weeds and loosen soils prior to the planting of winter cereals. In Canada, hemp is exclusively harvested for its seed largely for regulatory reasons. Hemp derived CBD cannot currently be harvested or extracted in Canada. Fiber is not currently considered widely economically viable due to a lack of processing facilities within an economic radius (in interviews, an 'economic radius' was considered to be a distance of within 100 miles) and stiff competition from Asia, principally China.

Through an economic concentration analysis conducted by Seed, two companies, Manitoba Harvest Hemp<sup>11</sup>, Hemp Oil Canada<sup>12</sup> and Hemp Production Services<sup>13</sup>, stood out as the largest processors and wholesalers of hemp seeds in the Canadian Prairie region. Exports from these companies enter the U.S. in a variety of packages, including 2000 lbs grain bags, 50 lbs bags, and an assortment of Consumer Packages Goods (CPG). With Canada comprising the majority of hemp seed exports to the United States and Manitoba Harvest Hemp and Hemp Oil Canada comprising the majority of those exports, these two firms act as the two largest suppliers of hemp seed products in the United States.

<sup>11</sup> As the world's largest vertically integrated hemp food manufacturer. Manitoba Harvest is involved in every aspect of the hemp production process, from "seed-to-shelf." The company's hemp-exclusive, consumer-facing 100% all-natural product lineup includes hemp hearts, protein powder, and snacks. Manitoba Harvest has developed longstanding relationships with hemp suppliers and currently maintains relationships that provide access to over 60% of the hemp acreage in Canada. <https://manitobaharvest.com/>

<sup>12</sup> One of the world's largest bulk wholesale producer, private label packager, and custom processor of hemp food products and ingredients. Hemp Oil Canada exports globally to more than 15 international destinations including the European Union, UK, Asia, South Africa, and throughout North America. <http://www.hempoilcan.com/>

<sup>13</sup> HPs offers a "complete supply chain solution for sourcing hemp bulk food ingredient". <http://www.hempproductionservices.com>.

## Entry Points

Hemp seed imports enter the United States through a variety of channels and import locations. Table 3 provides a breakdown of hemp seeds passing through major U.S. border checkpoints.

Table 3: U.S. hemp seed imports 2012-2016 (lbs) - by import district

Import District	Time					Grand Total
	2012	2013	2014	2015	2016	
Pembina, ND	1,784,575	3,360,016	3,937,906	32,516,719	19,684,142	61,283,252
Detroit, MI	476,903	767,333	610,337	1,019,508	522,536	3,396,617
Seattle, WA	374,227	722,589	568,056	604,246	468,353	2,735,471
Great Falls, MT	35,146	98,184	336,816	452,809	375,499	1,351,454
San Francisco, CA		19,492	316,639	210,588	61,206	609,925
New York City, NY	744		41,800	185,284	143,082	370,890
Buffalo, NY	46,128	48,378	66,856	100,429	26,643	288,435
Miami, FL				23,199	149,688	172,887
Los Angeles, CA		83,600	85,800	13,207	9,966	172,773
Baltimore, MD	3,130	3,581	46,561	4,180	528	57,980
Duluth, MN			42,489			42,489
Ogdensburg, NY			19,585	5,786		25,371
Norfolk, VA					12,815	12,815
Chicago, IL				8,085	2,970	11,055
Cleveland, OH				3,791	1,100	4,891
St. Albans, VT				990		990
<b>Grand Total</b>	<b>2,725,853</b>	<b>5,084,398</b>	<b>6,122,755</b>	<b>35,148,521</b>	<b>21,458,508</b>	<b>70,540,305</b>

Source: USA Trade Online, United States Census Bureau, <https://usatrade.census.gov> (accessed August 1, 2016) 2016 through June

Pembina (ND), Detroit (MI), Seattle (WA), Great Falls (MT), and San Francisco (CA) have been the top five entry points of hemp seed imports during the five-year period. In 2015, the top destination of hemp seed import was Pembina, North Dakota, with a quantity of 32,516,719 lbs, counting for nearly 93% of the entire imports in 2015 and 61,283,252 lbs over the five-year period, which accounts for 87% of all import within that time frame. With Manitoba Harvest Hemp and Hemp Oil Canada headquartered just across the border in Winnipeg, it is no surprise that Pembina is the major U.S. import location.

## Conclusion

Currently, an overwhelming majority of 35 million lbs. of hemp seed products entering the United States originates from several large Canada companies. While this import data help provides some insights into the nature of hemp seed entering the U.S., Seed CX is currently conducting a more detailed supply chain analysis.