

Food vs Fuel

....an old argument, reignited!

Alternative Title

The Perfect Storm

....why SBO is SOOOO expensive!

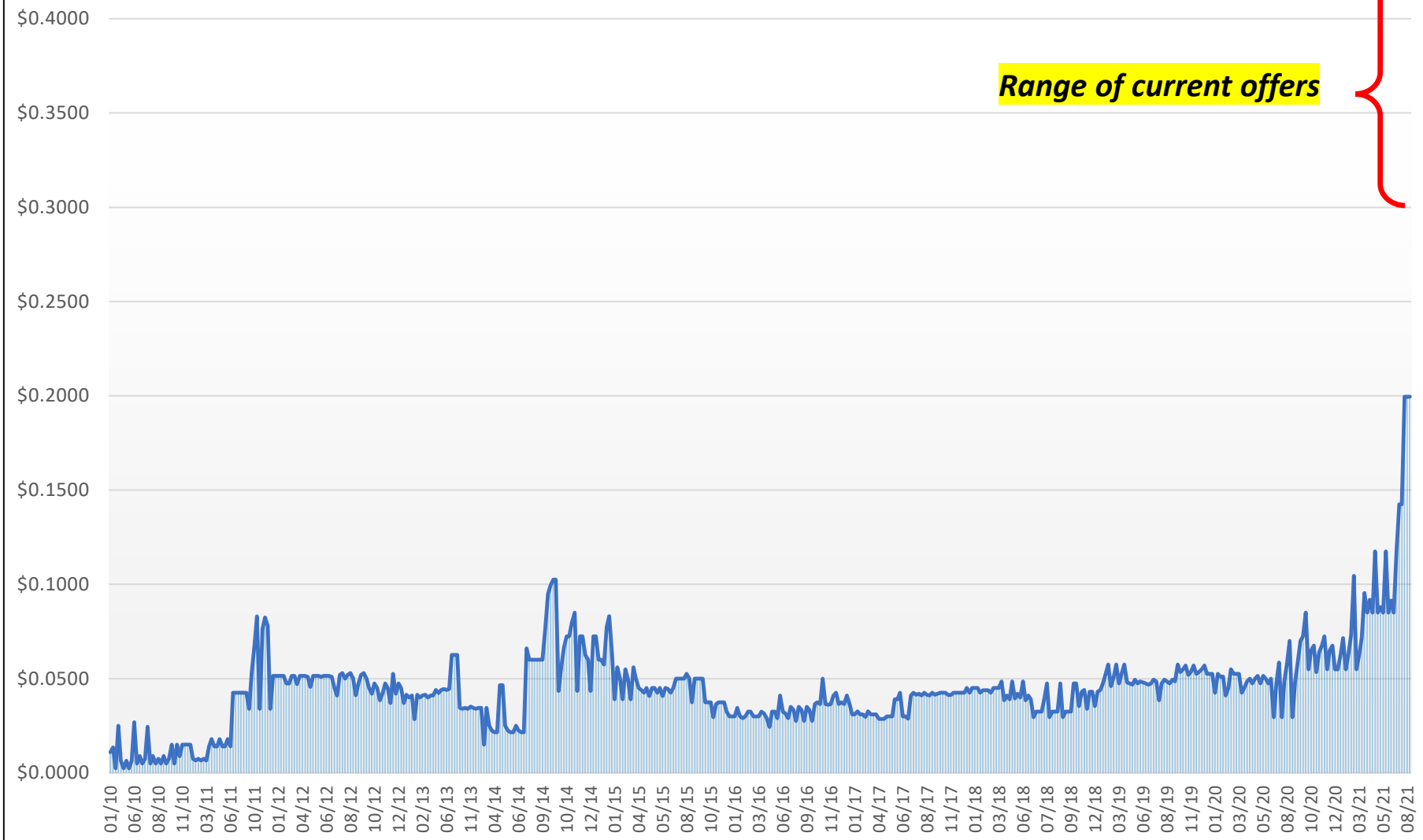
Why is SBO so expensive?

- Basis for sbo futures well above highest levels EVER!
 - Supplies of refined oil are limited due to intense competition from renewable fuels
 - At the same time foodservice demand is rebounding faster than expected
 - Vegetable oil refiners unwilling to even offer oil for future periods due to tight raw material (soybean) supplies
 - CA LCFS program has changed the economics of biofuel production & use
- CME futures at highest levels since ~~2012~~ ~~2008~~ EVER!
 - Soybean prices historically expensive
 - Palm oil prices historically expensive
- Key Risks:
 - Will we have enough crude sbo to run refineries at capacity?
 - Will the acute competition for refined oil subside?
 - When might this happen?
 - How does the market “fix” this imbalance? Short-term? Long term?

SBO CME futures (nearby)



Delivered RBD SBO Basis to Midwest... \$/lb



Global Biodiesel Policy

USA: 2020 mandate to blend 5.09 B gallons of “advanced” biofuel (4.92 M gallons in 2019) with minimum of 2.43 B gallons of biodiesel; some individual state mandates are higher, CA CARB mandates, OR, MN, IA, etc.

Canada: nationally at B2 but BC/ON at B4

Argentina: national B10 mandate started in 2016

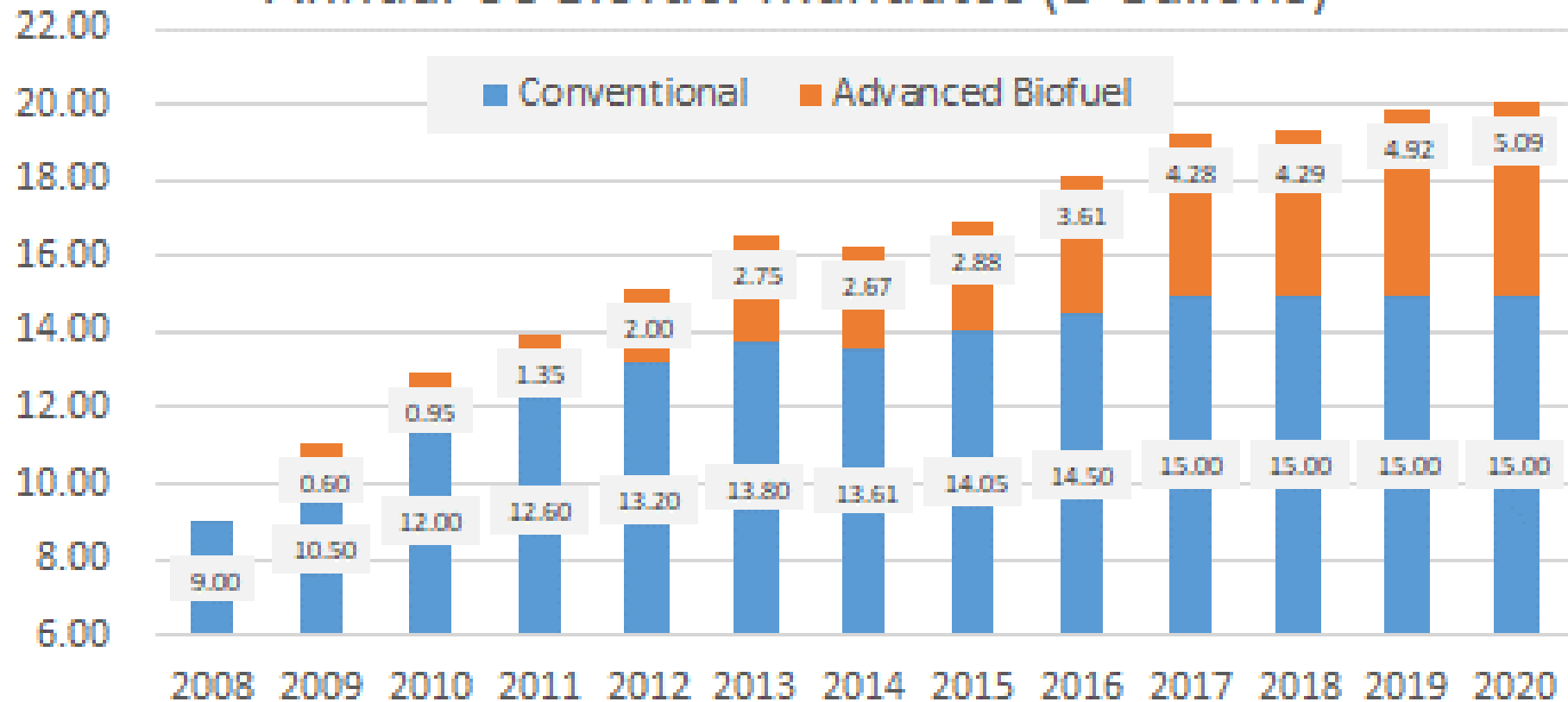
Brazil: national B10 in 2019, up from B7 in 2018

EU: B7 (max) from food or feed crops

Indonesia: B30 mandate but loose enforcement; producers receive subsidy from government through export tariffs on palm oil products

Malaysia: B10 starting December 1, 2019, prior at B7

Annual US Biofuel Mandates (B Gallons)



EISA Renewable Fuel Volume (RFS) Requirements

(Billion Gallons)

	Cellulosic		Biodiesel		Undiff. Advanced		Total Advanced		Conventional		Total Renewable	
	Legislated	Final	Legislated	Final	Legislated	Final	Legislated	Final	Legislated	Final	Legislated	Final
2008	-	-	-	-	-	-	-	-	9.00	9.00	9.00	9.00
2009	-	-	0.50	0.50	-	-	0.60	0.60	10.50	10.50	11.10	11.10
2010	0.10	0.01	0.65	0.65	-	-	0.95	0.95	12.00	12.00	12.95	12.95
2011	0.25	0.01	0.80	0.80	-	0.14	1.35	1.35	12.60	12.60	13.95	13.95
2012	0.50	0.01	1.00	1.00	-	0.49	2.00	2.00	13.20	13.20	15.20	15.20
2013	1.00	0.01	1.00	1.28	0.25	0.82	2.75	2.75	13.80	13.80	16.55	16.55
2014	1.75	0.03	1.00	1.63	1.00	0.13	3.75	2.67	14.40	13.61	18.15	16.28
2015	3.00	0.12	1.00	1.73	1.50	0.10	5.50	2.88	15.00	14.05	20.50	16.93
2016	4.25	0.23	1.00	1.90	2.00	0.46	7.25	3.61	15.00	14.50	22.25	18.11
2017	5.50	0.31	1.00	2.00	2.50	0.90	9.00	4.28	15.00	15.00	24.00	19.28
2018	7.00	0.24	1.00	2.10	3.00	0.82	11.00	4.29	15.00	15.00	26.00	19.29
2019	8.50	0.42	1.00	2.10	3.50	1.27	13.00	4.92	15.00	15.00	28.00	19.92
2020	10.50	0.59	1.00	2.43	3.50	0.77	15.00	5.09	15.00	15.00	30.00	20.09
2021	13.50		1.00		3.50		18.00	5.5-6.0	15.00	14.0-15.0	33.00	20.0-21.0
2022	16.00		1.00		4.00		21.00		15.00		36.00	

2021 & 2022 RFS (federal) mandates have NOT yet been proposed OR finalized!

EISA Renewable Fuel Volume (RFS) Requirements

(Billion Gallons)

	Cellulosic		Biodiesel		Undiff. Advanced		Total Advanced		Conventional		Total Renewable	
	Legislated	Final	Legislated	Final	Legislated	Final	Legislated	Final	Legislated	Final	Legislated	Final
2008	-	-	-	-	-	-	-	-	9.00	9.00	9.00	9.00
2009	-	-	0.50	0.50	-	-	0.60	0.60	10.50	10.50	11.10	11.10
2010	0.10	0.01	0.65	0.65	-	-	0.95	0.95	12.00	12.00	12.95	12.95
2011	0.25	0.01	0.80	0.80	-	0.14	1.35	1.35	12.60	12.60	13.95	13.95
2012	0.50	0.01	1.00	1.00	-	0.49	2.00	2.00	13.20	13.20	15.20	15.20
2013	1.00	0.01	1.00	1.28	0.25	0.82	2.75	2.75	13.80	13.80	16.55	16.55
2014	1.75	0.03	1.00	1.63	1.00	0.13	3.75	2.67	14.40	13.61	18.15	16.28
2015	3.00	0.12	1.00	1.73	1.50	0.10	5.50	2.88	15.00	14.05	20.50	16.93
2016	4.25	0.23	1.00	1.90	2.00	0.46	7.25	3.61	15.00	14.50	22.25	18.11
2017	5.50	0.31	1.00	2.00	2.50	0.90	9.00	4.28	15.00	15.00	24.00	19.28
2018	7.00	0.24	1.00	2.10	3.00	0.82	11.00	4.29	15.00	15.00	26.00	19.29
2019	8.50	0.42	1.00	2.10	3.50	1.27	13.00	4.92	15.00	15.00	28.00	19.92
2020	10.50	0.59	1.00	2.43	3.50	0.77	15.00	5.09	15.00	15.00	30.00	20.09
2020A		0.54		2.09		0.88		4.63		13.63		18.26
2020 RINS		0.51		3.05				5.33		12.99		18.32

Over/Under production in 2020:

0.7

(0.64)

CA Low Carbon Fuel Standard Program Summary

- Key Milestones:
 - Original adoption 2009
 - First compliance year 2011
 - Recently amended (read: reduction goals increased) September 2018
 - Amended requirements took effect January 2019
- Carbon reduction mandated, NOT gallons (like RFS)
- Energy producers are obligated parties
- Fuels produced from different feedstocks qualify for LCFS credits based on “carbon intensity” (CI) score
 - CI score based on “life-cycle” analysis of different feedstocks
 - The lower the CI score, the more LCFS credits received
 - I.E: renewable diesel made from used cooking oil garners significantly MORE credits than if made from SBO

What is the difference between biodiesel and renewable diesel?

Biodiesel or methyl ester: A mono-alkyd ester produced using a transesterification process; 100 lbs. feedstock + 10 lbs. methanol = 100 lb. methyl ester and 10 lbs. of glycerin.

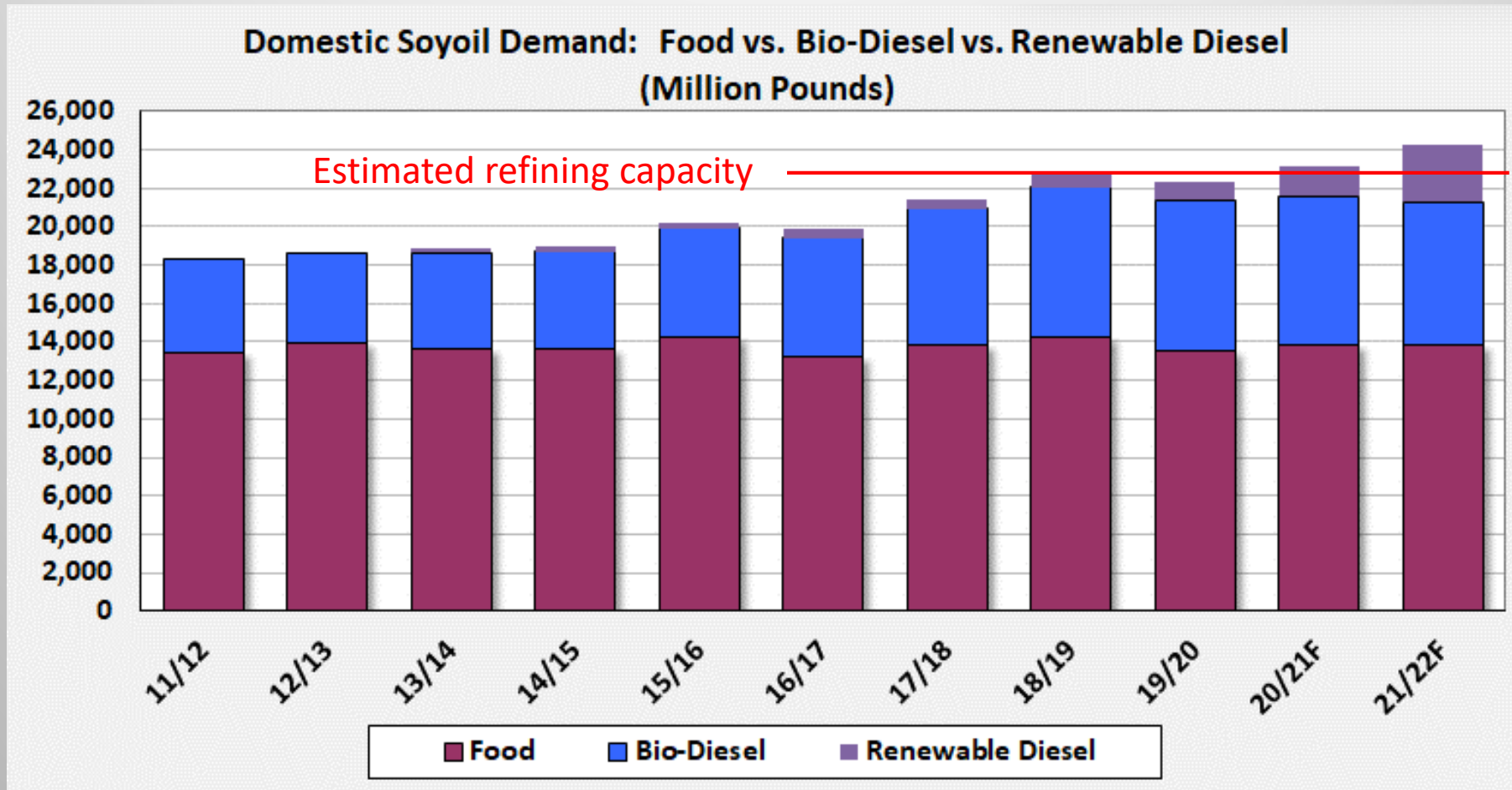
- 7.35 lbs. feedstock : 1 gallon of BD
- Shipped via bulk rail or truck
- Must be blended in limited quantities with diesel fuel in tank farms
- Cold flow problems / gels in cold temps impeding winter-time use
- Production capacity owned by feed stock producers/independents

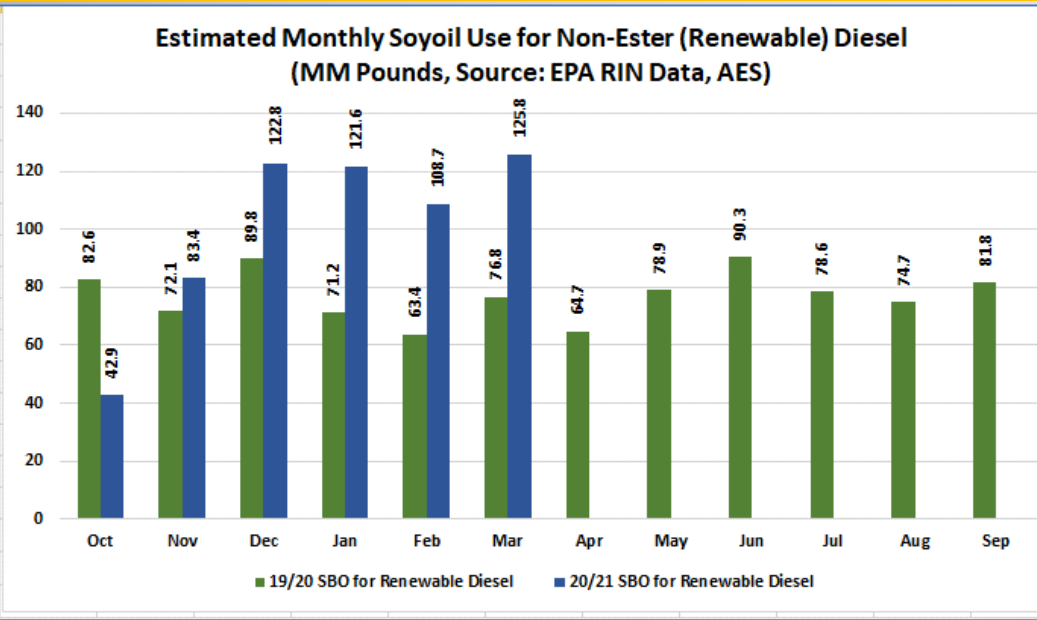
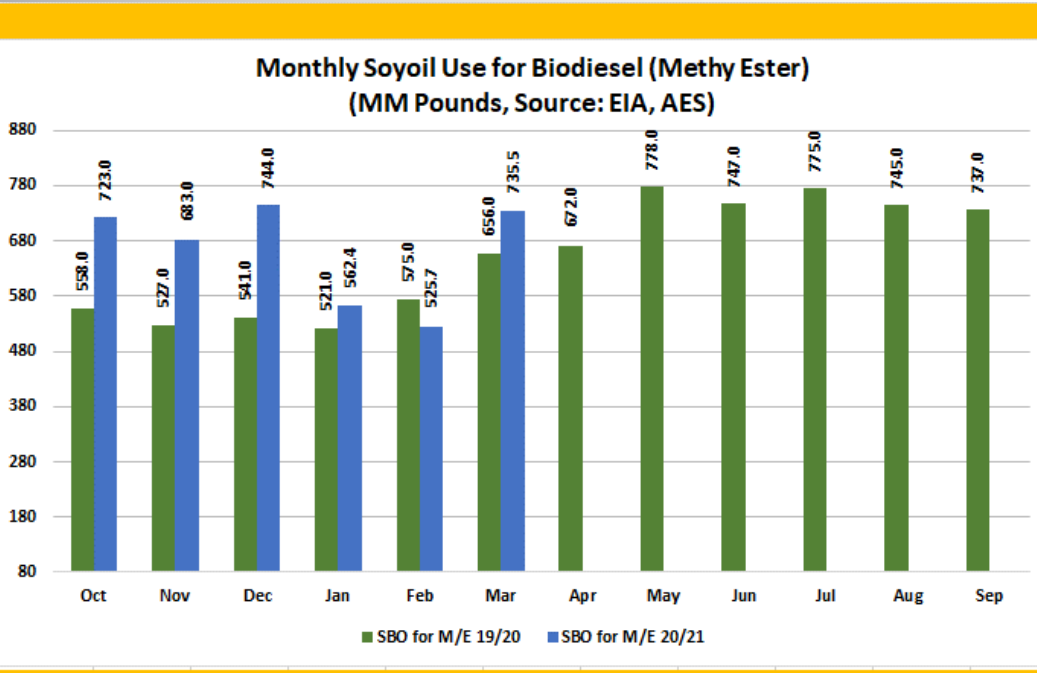
Renewable diesel: A hydrocarbon produced using a process very similar to petroleum distillates but using a renewable feedstock vs. petrol-based feedstock.

- 8 to 8.80 lbs feedstock : 1 gallon of RD
- Chemically identical to petrol diesel
- Unlimited blending capability with petrol diesel and transported via pipeline
- No cold flow problems
- Most capacity owned by or in partnership with petrol refiners
- Nearly 100% used in US (domestic and import) is in CA as favored by CA's LCFS due to ability to blend at MUCH higher rates than traditional ME
- Termed a "drop in fuel" because it has NO blend restrictions and does NOT require blending assets



U.S. SBO Domestic Demand





Monthly Soyoil Use for Biodiesel (MM Pounds) Source: EIA, AES Analysis

	19/20	20/21	% YA
Oct	558.0	723.0	29.6%
Nov	527.0	683.0	29.6%
Dec	541.0	744.0	37.5%
Jan	521.0	562.4	7.9%
Feb	575.0	525.7	-8.6%
Mar	656.0	735.5	12.1%
Apr	672.0	602.3	-10.4%
May	778.0	626.4	-19.5%
Jun	747.0	603.6	-19.2%
Jul	775.0	649.2	-16.2%
Aug	745.0	648.7	-12.9%
Sep	737.0	626.0	-15.1%
Oct-Sept	7,832	7,730	-1%
YTD: Oct- Mar	3,378	3,974	18%

Est. Soyoil Use for Renewable Diesel Use (MM Pounds) - Assumes 8.5 lbs/gallons, 20% SBO share Source: EPA RIN Data, AES Analysis

	19/20	20/21	% YA
Oct	82.6	42.9	-48.1%
Nov	72.1	83.4	15.7%
Dec	89.8	122.8	36.9%
Jan	71.2	121.6	70.9%
Feb	63.4	108.7	71.5%
Mar	76.8	125.8	64.0%
Apr	64.7	148.8	129.8%
May	78.9	148.8	88.5%
Jun	90.3	148.8	64.8%
Jul	78.6	170.0	116.3%
Aug	74.7	170.0	127.5%
Sep	81.8	170.0	107.8%
Oct-Sept	925	1,562	69%
YTD: Oct- Mar	456	605	33%

Estimate Renewable Diesel Capacity									
- assumes 8 pounds of feedstock per gallon									
			-- Annualized --						
			Cumm		Cumm		Cumm		
Project	State	MM Gal	MM Gal	Feedstk MM Lbs	Feedstk MM Lbs	Assumed % SBO	SBO MM Lbs	SBO MM Lbs	
Pre-2021	D. Green	LA	275	275	2200	2200	0%	-	0
	Sinclair	WY	100	375	800	3000	100%	800	800
	REG Geismar	LA	90	465	720	3720	0%	-	800
	E. Kansas	KS	5	470	40	3760	0%	0	800
	BP Cherry Pt	WA	40	510	320	4080	0%	0	800
	Marathon	ND	184	694	1472	5552	80%	1178	1978
Pre-2021	World Energy	CA	40	734	320	5872	30%	96	2074
Jan-21			734	0	5872	0%	0	2074	
Feb-21			734	0	5872	0%	0	2074	
Mar-21			734	0	5872	0%	0	2074	
Apr-21			734	0	5872	0%	0	2074	
May-21			734	0	5872	0%	0	2074	
Jun-21			734	0	5872	0%	0	2074	
Jul-21	CVR	OK	100	834	800	6672	100%	800	2874
Aug-21	Phillips 66	CA	120	954	960	7632	100%	960	3834
Sep-21				954	0	7632	0%	0	3834
Oct-21				954	0	7632	0%	0	3834
Nov-21	Global Clean		105	1059	840	8472	100%	840	4674
Dec-21	Ryze	NV	100	1159	800	9272	0%	0	4674
Jan-22				1159	0	9272	0%	0	4674
Feb-22	Holly	NM	110	1269	880	10152	100%	880	5554
Mar-22	Seaboard	KS	135	1404	1080	11232	0%	0	5554
Apr-22	REG Geismar	LA	250	1654	2000	13232	0%	0	5554
May-22				1654	0	13232	0%	0	5554
Jun-22				1654	0	13232	0%	0	5554
Jul-22	PBF	CA	150	1804	1200	14432	50%	600	6154
Aug-22	Global Clean		125	1929	1000	15432	25%	250	6404
Sep-22				1929	0	15432	0%	0	6404
Oct-22	Next Renew	OR	190	2119	1520	16952	0%	0	6404
Nov-22				2119	0	16952	0%	0	6404
Dec-22				2119	0	16952	0%	0	6404
Post '22	Marathon	CA	736	2855	5888	22840	0%	0	6404
	D. Green	TX	400	3255	3200	26040	0%	0	6404
	Emerald	LA	100	3355	800	26840	0%	0	6404
	Greentech	LA	336	3691	2688	29528	0%	0	6404
	Red Rock	OR	15	3706	120	29648	0%	0	6404
	Gron Fuels	LA	900	4606	7200	36848	0%	0	6404
	Next Renew	OR	575	5181	4600	41448	0%	0	6404
	Phillips 66	CA	680	5861	5440	46888	0%	0	6404
	World Energy	CA	330	6191	2640	49528	0%	0	6404

Retail Sales: Grocery vs. Food Service (\$MM)



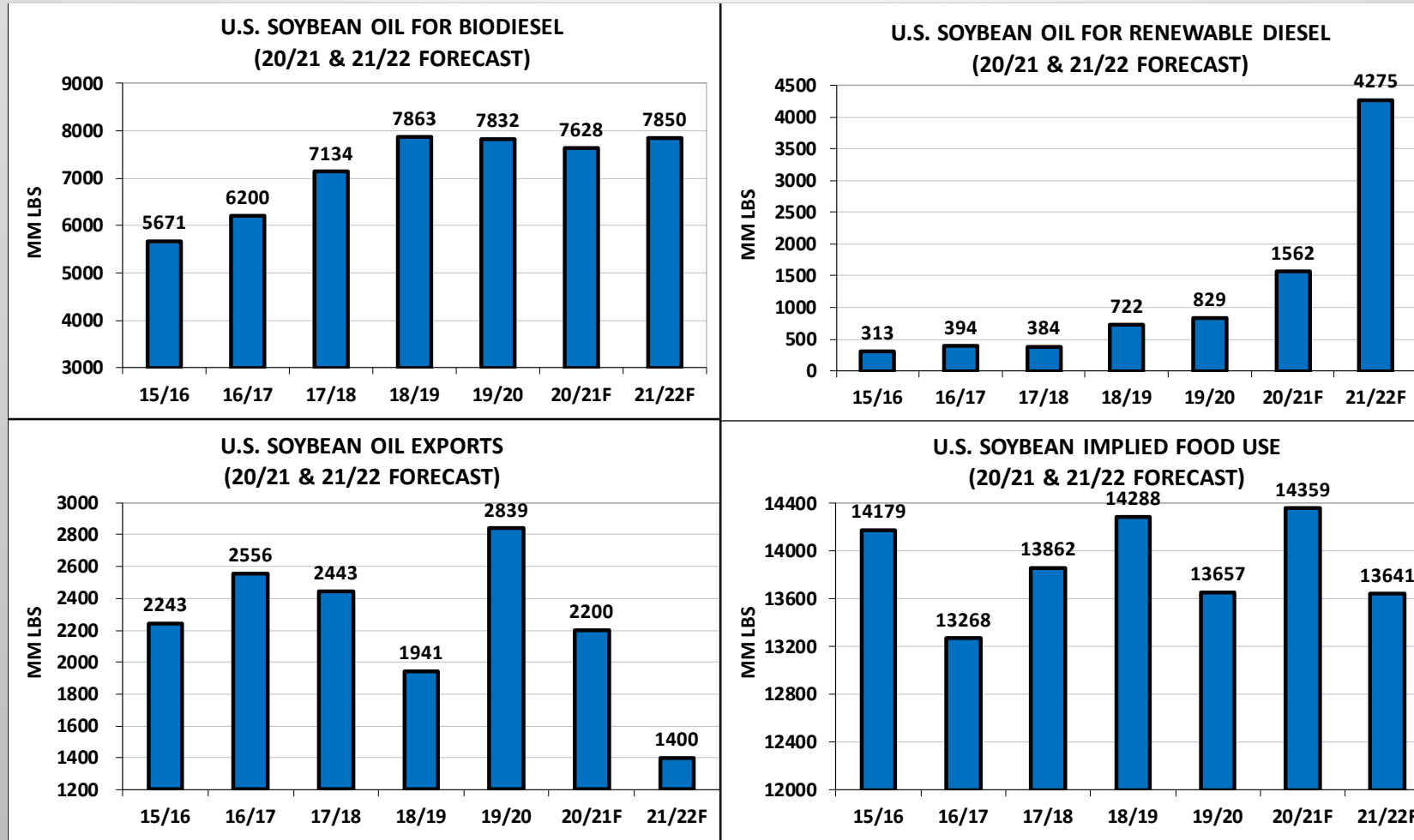
Monthly U.S. Retail Sales \$ Million)

(Source: Bureau of Labor Statistics)

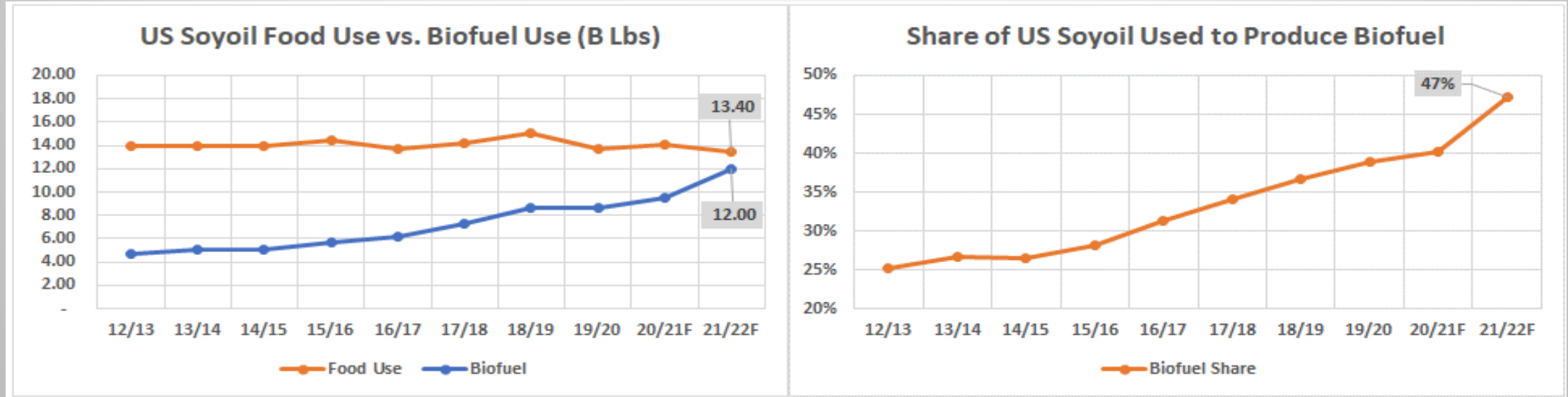
	Grocery	Food Service
Feb-20	\$57,337	\$65,359
Mar-20	\$73,714	\$45,728
Apr-20	\$63,869	\$30,032
May-20	\$64,667	\$39,430
Jun-20	\$63,454	\$50,139
Jul-20	\$63,768	\$52,224
Aug-20	\$62,666	\$54,406
Sep-20	\$62,644	\$55,695
Oct-20	\$62,292	\$55,533
Nov-20	\$63,331	\$53,535
Dec-20	\$62,510	\$51,091
Dec-20	\$62,510	\$51,091
Jan-21	\$64,045	\$54,634
Mar-21	\$63,522	\$62,170
VS. YA	-14%	36%
VS. MA	-1%	14%

U.S. SBO Usage By Category

Renewable diesel soars; traditional biodiesel maintains; we all eat less?



Surging Use of Soyoil to Produce Renewable Diesel Takes the Spotlight in USDA's May 12 WASDE

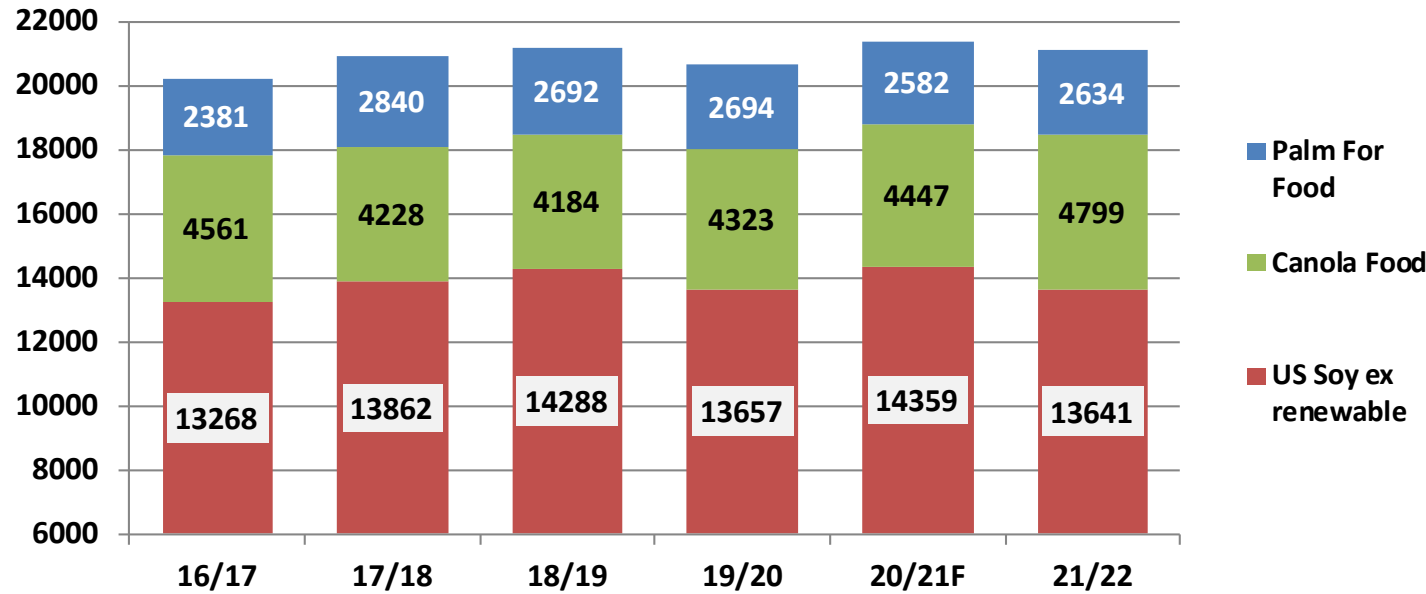


- Between 2015/16 and 2021/22, soyoil usage to produce biofuels will have risen by 58%.
- Based upon AES analysis of RIN data, the entire gain in soyoil used for biofuel is due to expansion of the renewable diesel output, tripling during this timeframe.
- Going forward, soyoil use for renewable diesel will continue to expand, as the capacity to produce renewable diesel from soyoil is projected by AES to double over the next year.
- High prices and limited supplies of soyoil are leading USDA to forecast a 5% decline in US food use of soyoil and a 0.5% reduction in food consumption of nine major vegoils during 2021/22
- High prices and limited supplies of soyoil are leading USDA to forecast a 37% decline in soyoil exports to 1.45 B pounds, which would be the smallest export total in 16 years

U.S. Vegoil Use for Food

Less SBO, more canola & palm

US Food Use: Soyoil / Canola / Palm Oil (MM Lbs, 20/21F)



Source: USDA, AES

US Vegoil Food Use (MM Lbs)

	20/21F	21/22	% Chg
Soyoil	14359	13641	-5.0%
Canola	4447	4799	7.9%
Palm Oil	2582	2634	2.0%
Total	21387	21075	-1.5%

U.S. SBO Supply & Demand Balance

Tight, and forecast to get tighter!

SBO SUPPLY & DEMAND BALANCE SHEET				
MM Bushels	USDA May 21 2020/2021	AES 2020/21	USDA May 21 2021/2022	AES 2021/22
Beginning Stocks	1,852	1,849	1,817	1,559
Production	25,514	25,181	25,944	25,872
Imports	351	278	600	1,000
TOTAL SUPPLY	27,716	27,308	28,360	28,431
- Renewable Diesel		1,562		4,275
- Bio-Diesel		7,628		7,850
Biofuel Usage	9,500	9,189	12,000	12,125
Food	14,103	14,359	13,399	13,641
Exports	2,300	2,200	1,451	1,400
TOTAL USAGE	25,902	25,749	26,850	27,166
Ending Stocks	1,817	1,559	1,513	1,266

U.S. Soybean Supply & Demand Balance

Soybean supplies are also VERY tight!

SOYBEAN SUPPLY & DEMAND BALANCE SHEET				
MM Acres	USDA May 21 2020/2021	AES 2020/21	USDA May 21 2021/2022	AES 2021/22
Planted	83.1	83.1	87.6	87.6
Harvested	82.3	82.3	86.7	86.6
Yield (Bushels/Acre)	50.2	50.2	50.8	51.0
MM Bushels	2020/2021	2020/21	2021/2022	2021/22
Beginning Stocks	525	525	120	183
Production	4,135	4,135	4,405	4,416
Imports	35	36	35	15
TOTAL SUPPLY	4,695	4,697	4,560	4,614
Crush	2,190	2,160	2,225	2,240
Seed	102	102	100	100
Residual	3	(25)	20	23
Exports	2,280	2,277	2,075	2,100
TOTAL USAGE	4,575	4,514	4,419	4,463
Ending Stocks	120	183	140	151
Stocks as % of Usage	2.6%	4.1%	3.2%	3.4%

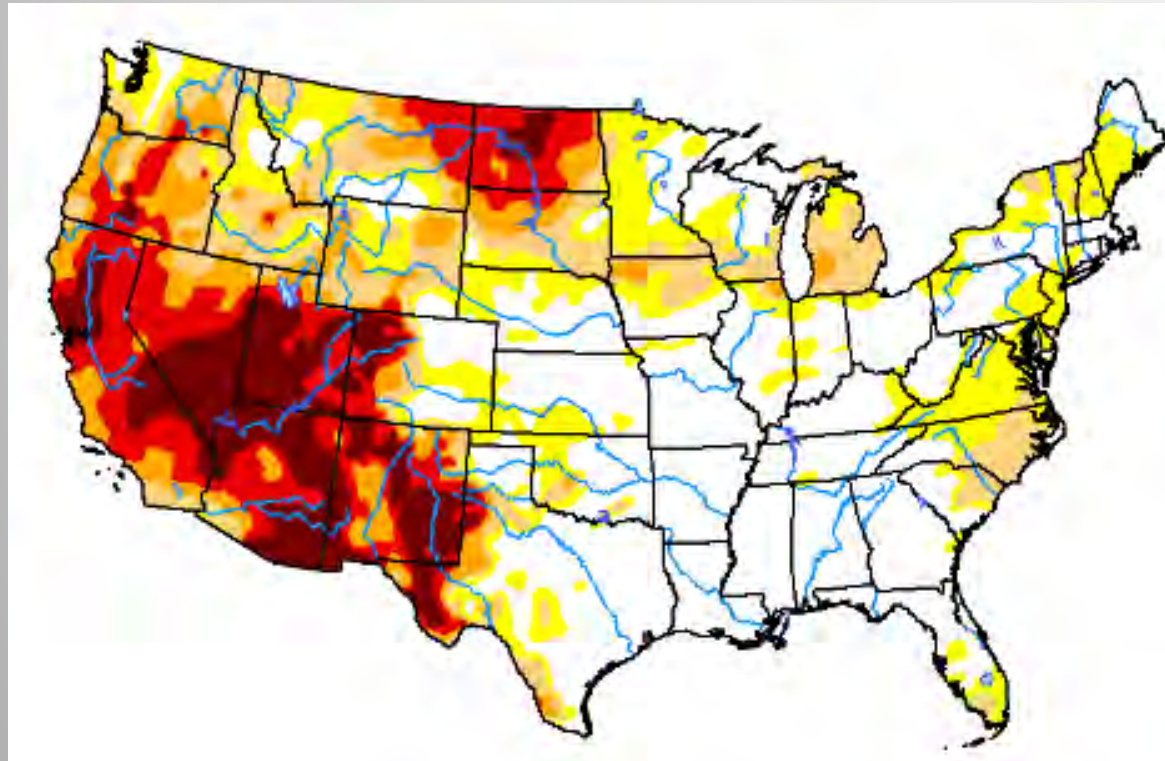
*So, what
factors could
change things?*

- Econ 101: resources will flow to their highest & best use – FOOD, but at what cost?
- RD IS the “better mouse trap”; will traditional bio slow? When?
- When will renewable “pre-treat” capacity come online?
- U.S. renewable fuel mandates: 2021 & 2022?
 - Proposed levels due out in May/June; finalized Nov
- Two problems: not enough refining cap & not enough SBO?
- What will U.S. RFS look like AFTER 2022? LCFS-style program?
- Will individual state mandates become larger than U.S. RFS?

Appendix

Very Dry in Northern Plains!

Implications for U.S. canola & sunflowers!

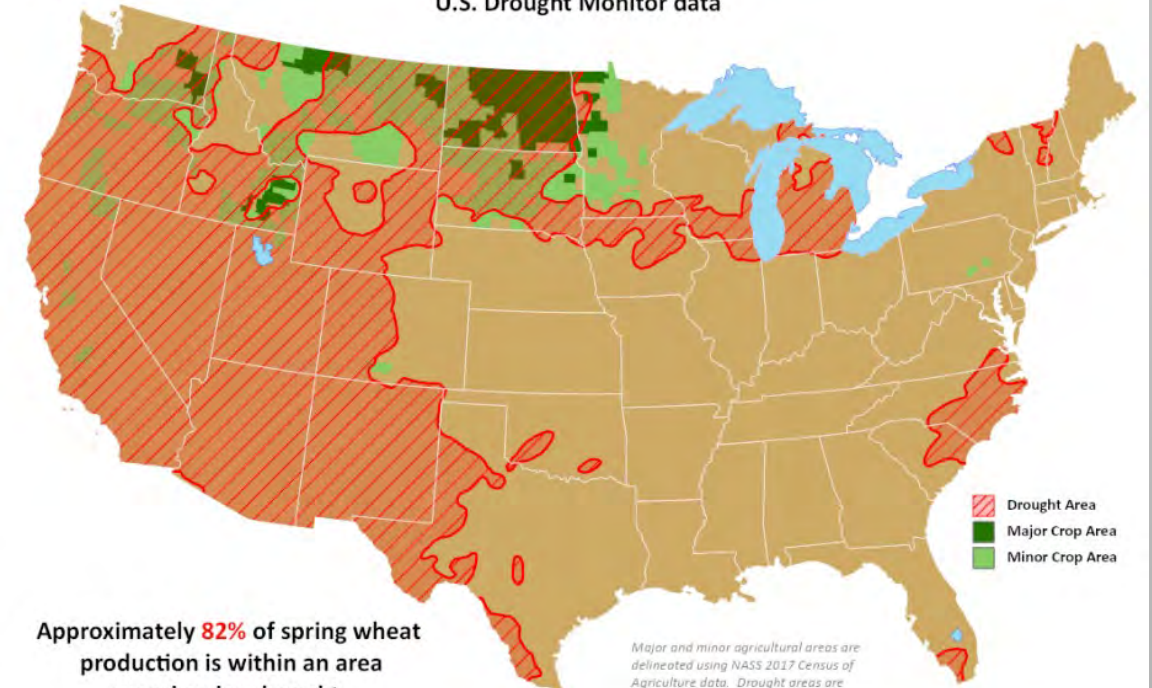


USDA
United States
Department of
Agriculture

This product was prepared by the
USDA Office of the Chief Economist (OCE)
World Agricultural Outlook Board (WAOB)

Spring Wheat Areas in Drought

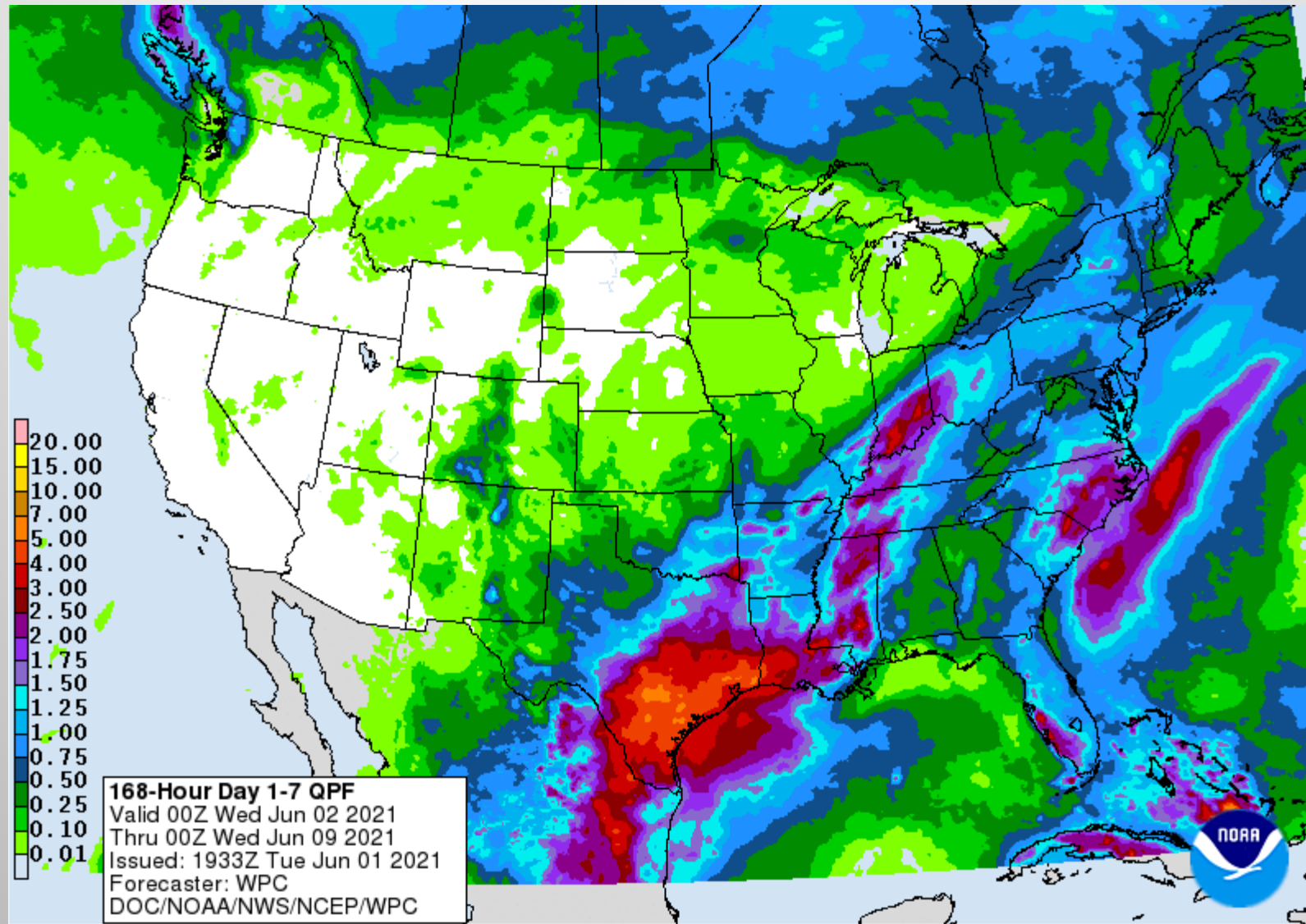
Reflects **May 25, 2021**
U.S. Drought Monitor data



Approximately **82%** of spring wheat
production is within an area
experiencing drought.

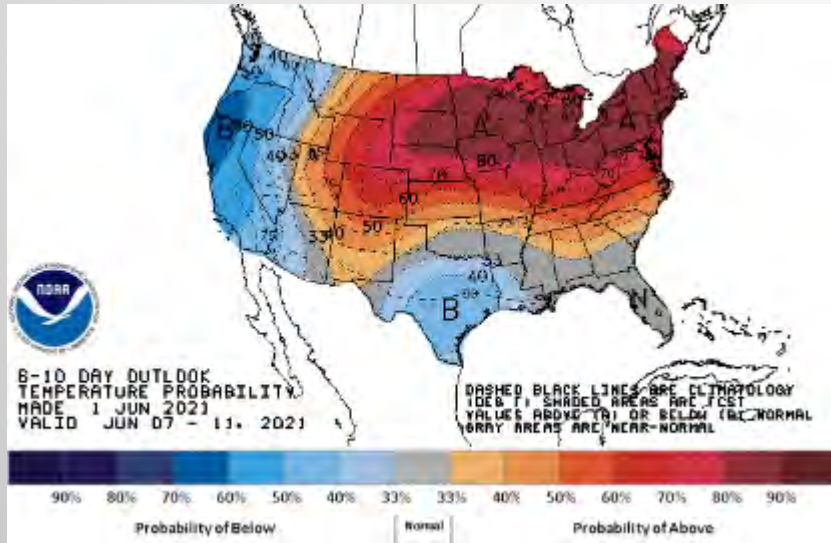
Major and minor agricultural areas are
delineated using NASS 2017 Census of
Agriculture data. Drought areas are
identified using the U.S. Drought Monitor
product.

US – 7-day forecast

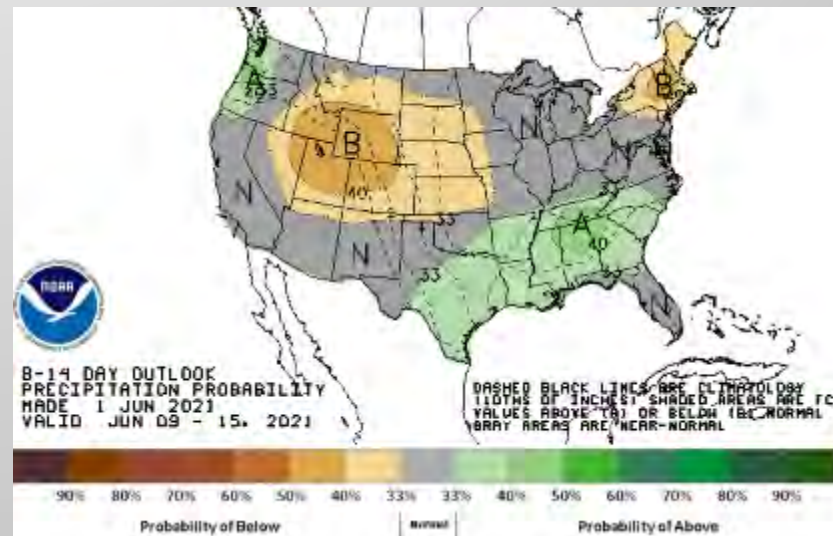
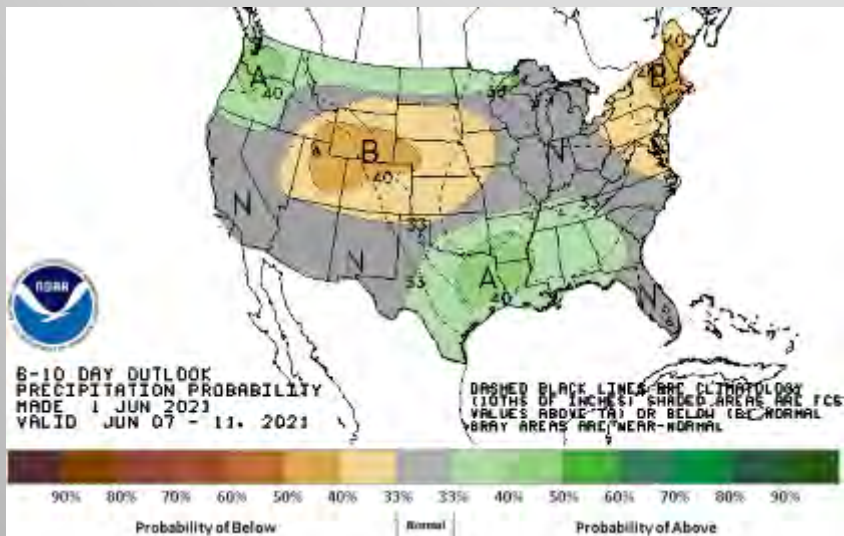
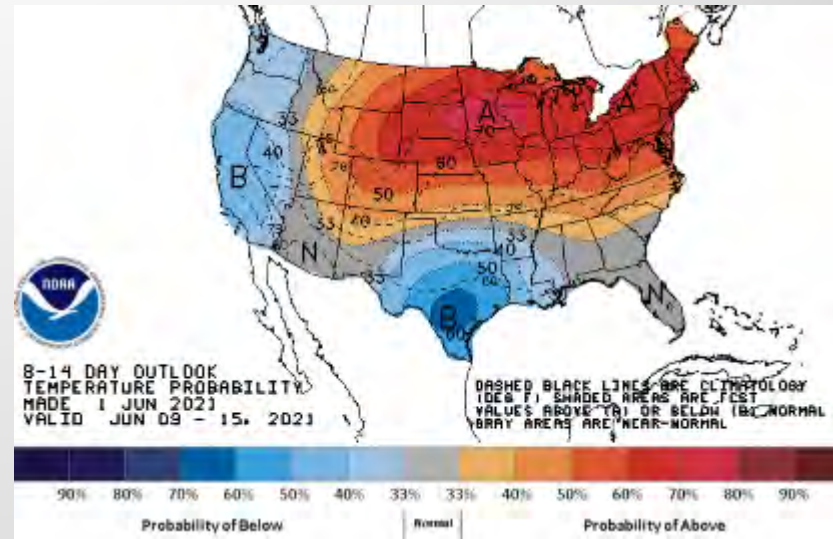


US Forecasts

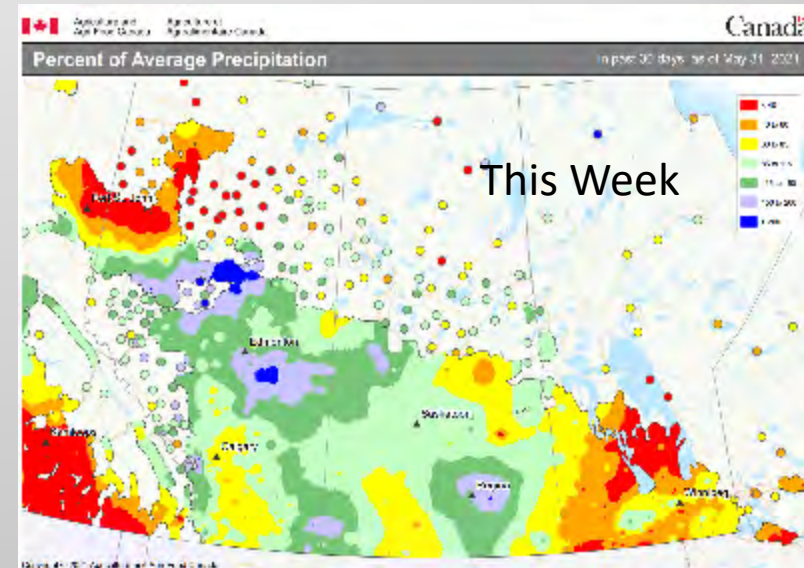
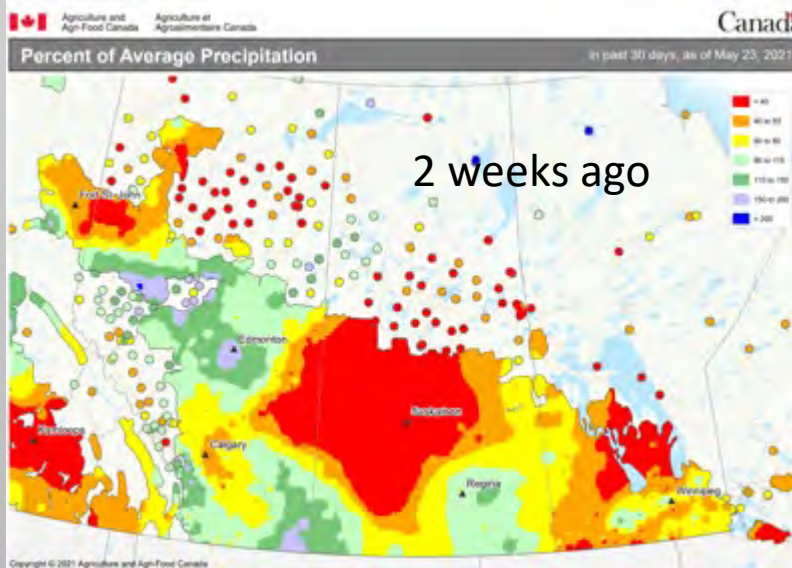
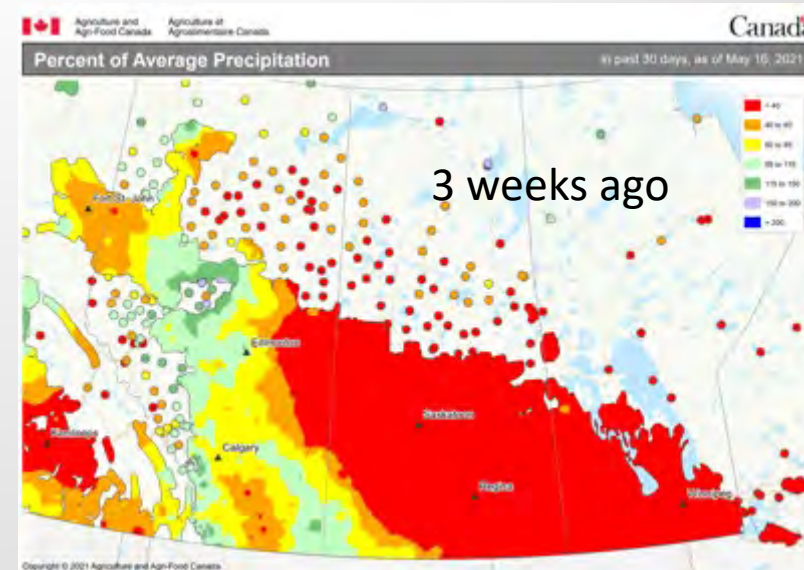
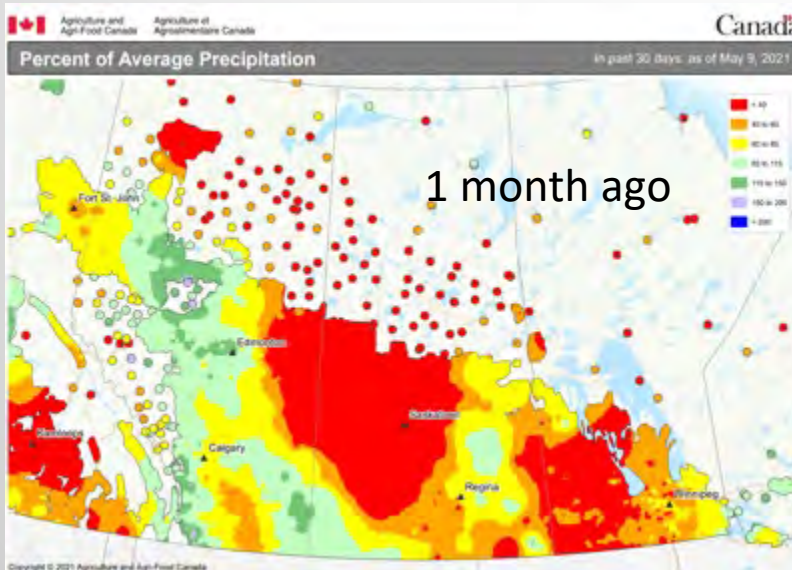
6-10 day



8-14 day

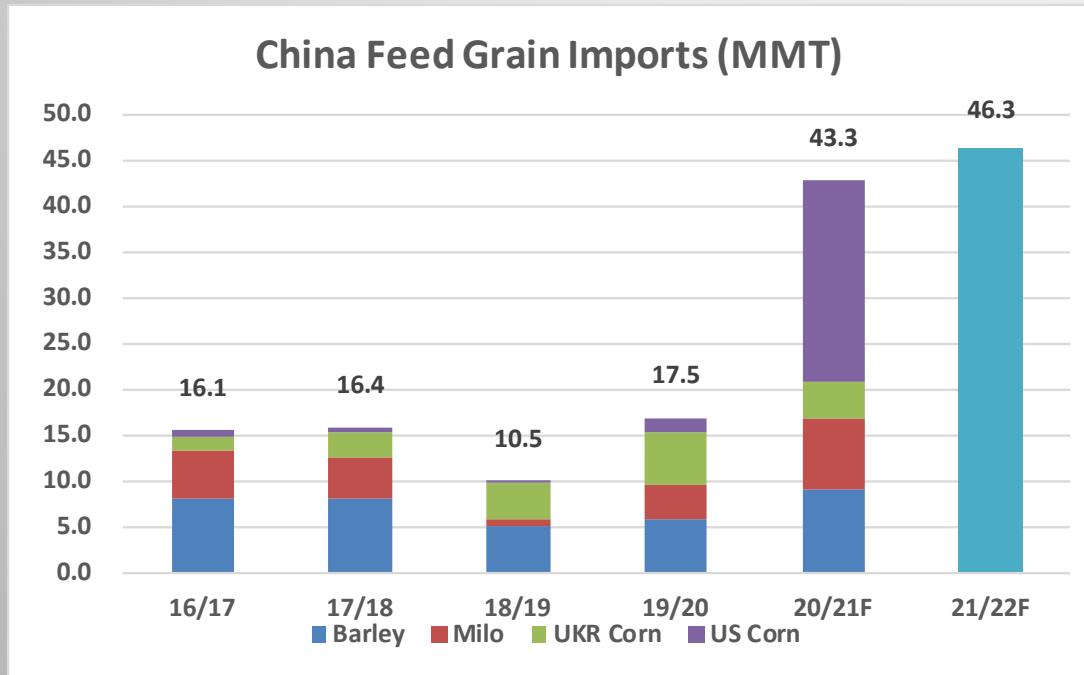


Canada weather



Record 20/21 China Feed Grain Imports

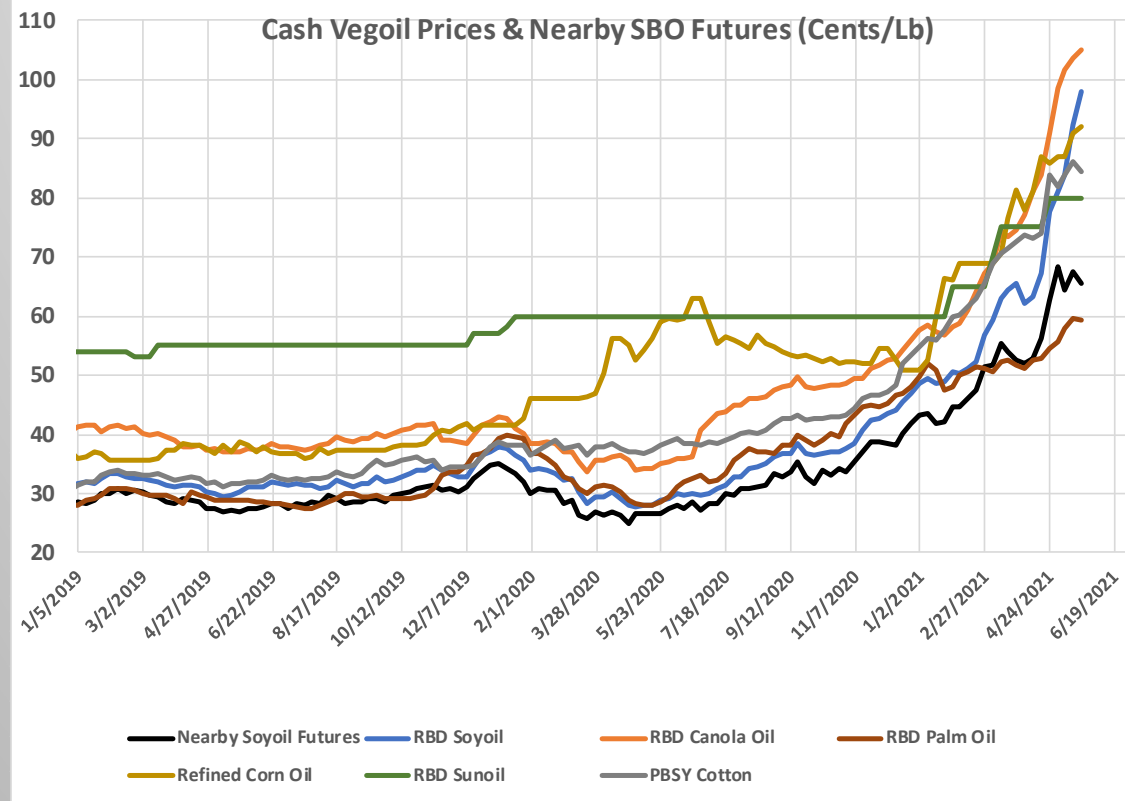
- *Why you should care about the corn market!*



Key Unknown is 21/22: Lower imports, steady or larger imports??

U.S. Cash Vegoil Prices

- When SBO goes up, so does everything else!



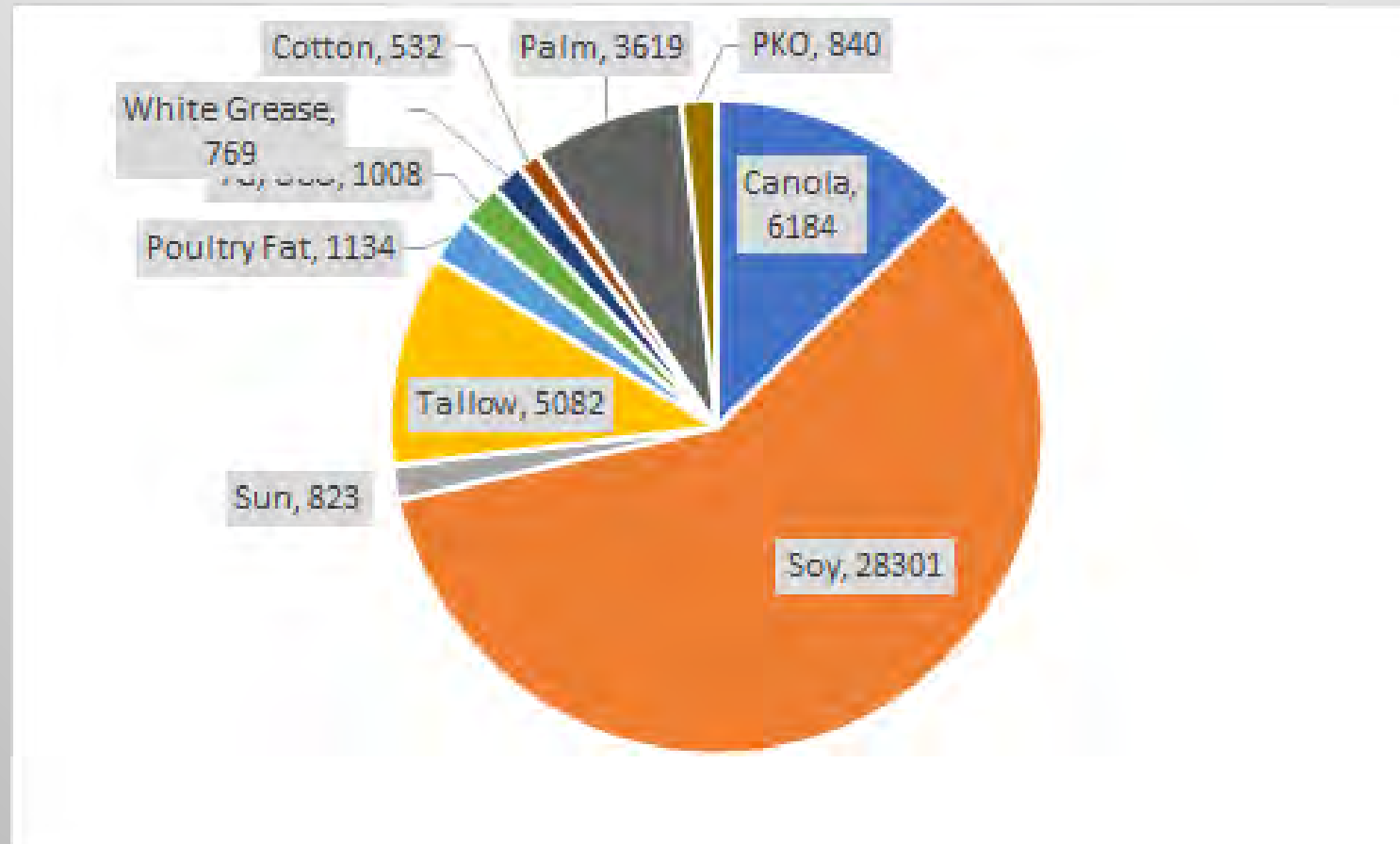
Weekly Vegoil Prices (Cents per Pound)

As of: 5/21/2021

Source: The Jacobsen

	This Week	Last Week	Yr Ago	LT Ave
Futures	65.5	67.6	26.6	38.7
RBD Soyoil	98.1	92.3	28.8	41.8
RBD Canola	105.1	103.7	35.2	48.4
RBD Palm	59.4	59.6	28.6	40.2
Refined Corn	92.0	91.0	59.1	52.7
PBSY Cotton	84.6	86.2	38.1	44.0
RBD Sun	80.0	80.0	60.0	63.9
Edib. Tallow	62.0	62.0	42.0	35.9
Tech. Tallow	62.0	62.0	41.8	38.0
Chkn Fat	53.5	53.1	28.0	31.4
Cash +/- Futures:				
RBD Soyoil	32.6	24.7	2.2	3.1
Canola	39.6	36.1	8.5	9.8
RBD Palm	(6.1)	(8.0)	2.0	1.5
Refined Corn	26.5	23.4	32.5	14.1
PBSY Cotton	19.1	18.6	11.5	5.4

U.S. Fats & Oils Supply



Once RD pre-treat capabilities get built, SBO share to this sector should decline.