

Appendix



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The Future of Malting Barley in North America, Keeping Barley Competitive With Other Crops

IBS World Industry Report Malt Production in the US

Industrial/ Commercial Malting Companies – websites

Know Your 2013 Malting Barley Varieties

List of Montana Brewers and Contact Information

Montana Barley for Malt 2012 Marketing Year, USDA

Montana Barley Varieties 2013

Total U.S. Beer Industry, Major Brewers & Importers

USDA Barley States- Barley Price

Useful Links and Articles



American Malting Barley Association, Inc.

GLEANINGS



March 31, 2014

PROSPECTIVE PLANTINGS REPORT

Producers intend to seed 3.17 million acres of barley for the 2014 crop year, down 9 percent from the previous year. If realized, this will be the third smallest seeded area on record.

2014 Prospective Barley Planting Summary

State	Planted 2011	Planted 2012	Planted 2013	Indicated for Planting 2014	Ind. Planting 2014 as a % of 2013
	(Acres)				
Minnesota	70,000	115,000	90,000	100,000	111%
North Dakota	400,000	1,060,000	760,000	650,000	86%
South Dakota	25,000	34,000	34,000	30,000	88%
Three States	495,000	1,209,000	884,000	780,000	88%
California	100,000	120,000	90,000	95,000	106%
Colorado	66,000	58,000	63,000	64,000	102%
Idaho	520,000	610,000	630,000	660,000	105%
Montana	700,000	900,000	990,000	900,000	91%
Oregon	38,000	56,000	63,000	45,000	71%
Washington	125,000	185,000	195,000	130,000	67%
Wyoming	75,000	75,000	80,000	80,000	100%
Seven States	1,624,000	2,004,000	2,111,000	1,974,000	94%
Other	440,000	424,000	485,000	411,000	85%
Total U.S.	2,559,000	3,637,000	3,480,000	3,165,000	91%

Source: UDSA/NASS/Agriculture Statistics Board, March 31, 2014 Prospective Plantings Report.

2014 Prospective Barley Plantings – All States

State	Planted 2011	Planted 2012	Planted 2013	Indicated for Planting 2014	Ind. Planting 2014 as a % of 2013
	(Acres)				
Arizona	65,000	48,000	75,000	45,000	60%
California	100,000	120,000	90,000	95,000	106%
Colorado	66,000	58,000	63,000	64,000	102%
Delaware	35,000	38,000	43,000	30,000	70%
Idaho	520,000	610,000	630,000	660,000	105%
Kansas	9,000	10,000	17,000	10,000	59%
Maine	16,000	17,000	20,000	15,000	75%
Maryland	50,000	60,000	75,000	60,000	80%
Michigan	10,000	11,000	10,000	10,000	100%
Minnesota	70,000	115,000	90,000	100,000	111%
Montana	700,000	900,000	990,000	900,000	91%
New York	10,000	10,000	11,000	12,000	109%
North Carolina	22,000	23,000	19,000	20,000	105%
North Dakota	400,000	1,060,000	760,000	650,000	86%
Oregon	38,000	56,000	63,000	45,000	71%
Pennsylvania	65,000	65,000	75,000	70,000	93%
South Dakota	25,000	34,000	34,000	30,000	88%
Utah	35,000	44,000	40,000	48,000	120%
Virginia	90,000	65,000	67,000	58,000	87%
Washington	125,000	185,000	195,000	130,000	67%
Wisconsin	33,000	33,000	33,000	33,000	100%
Wyoming	75,000	75,000	80,000	80,000	100%
Total U.S.	2,559,000	3,637,000	3,480,000	3,165,000	91%

Source: UDSA/NASS/Agriculture Statistics Board, March 31, 2014 Prospective Plantings Report.

Application of Biotechnology to Barley Variety Development GM Barley?

Mike Davis

American Malting Barley Association (AMBA)

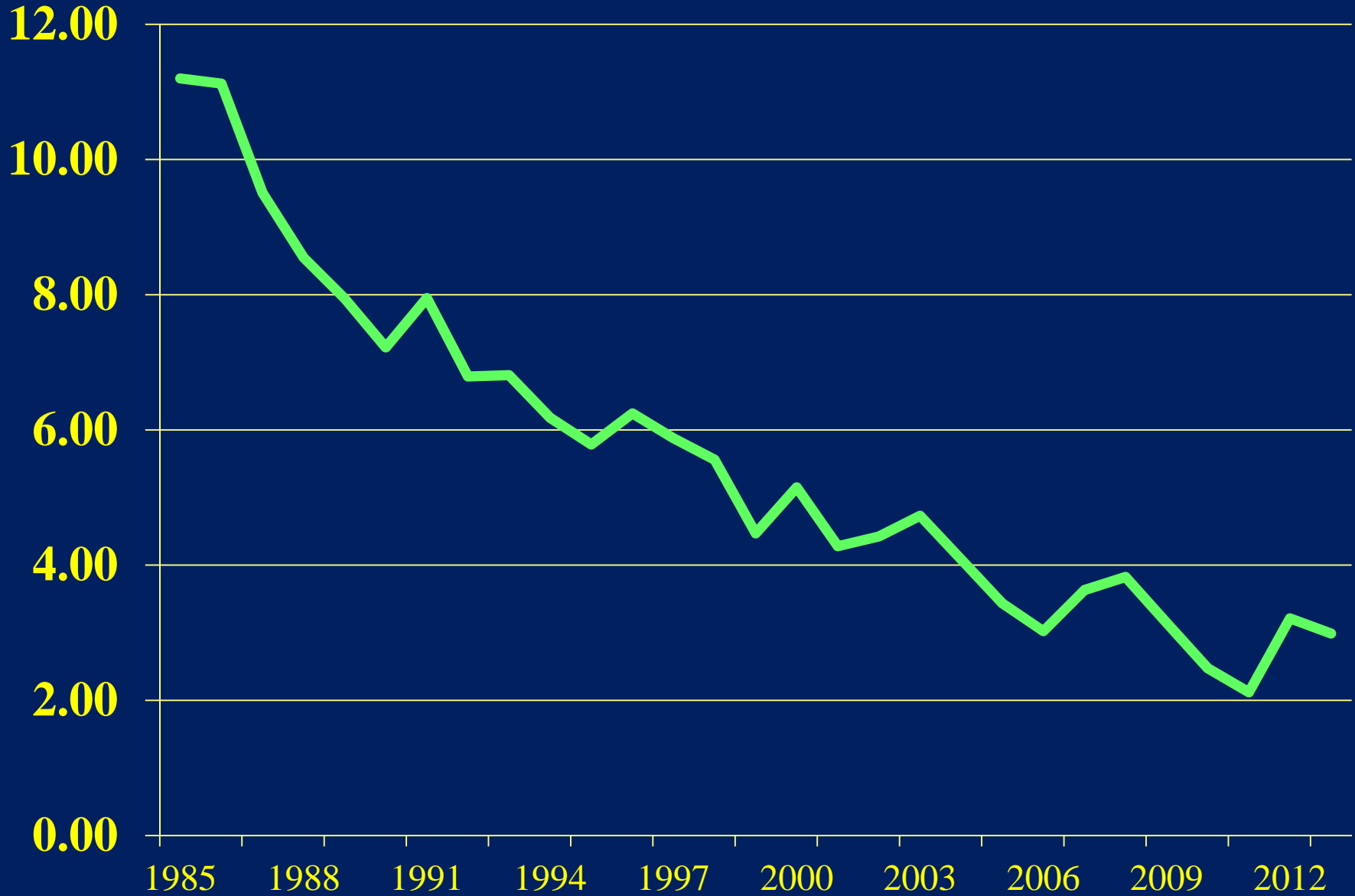
&

National Barley Improvement Committee (NBIC)

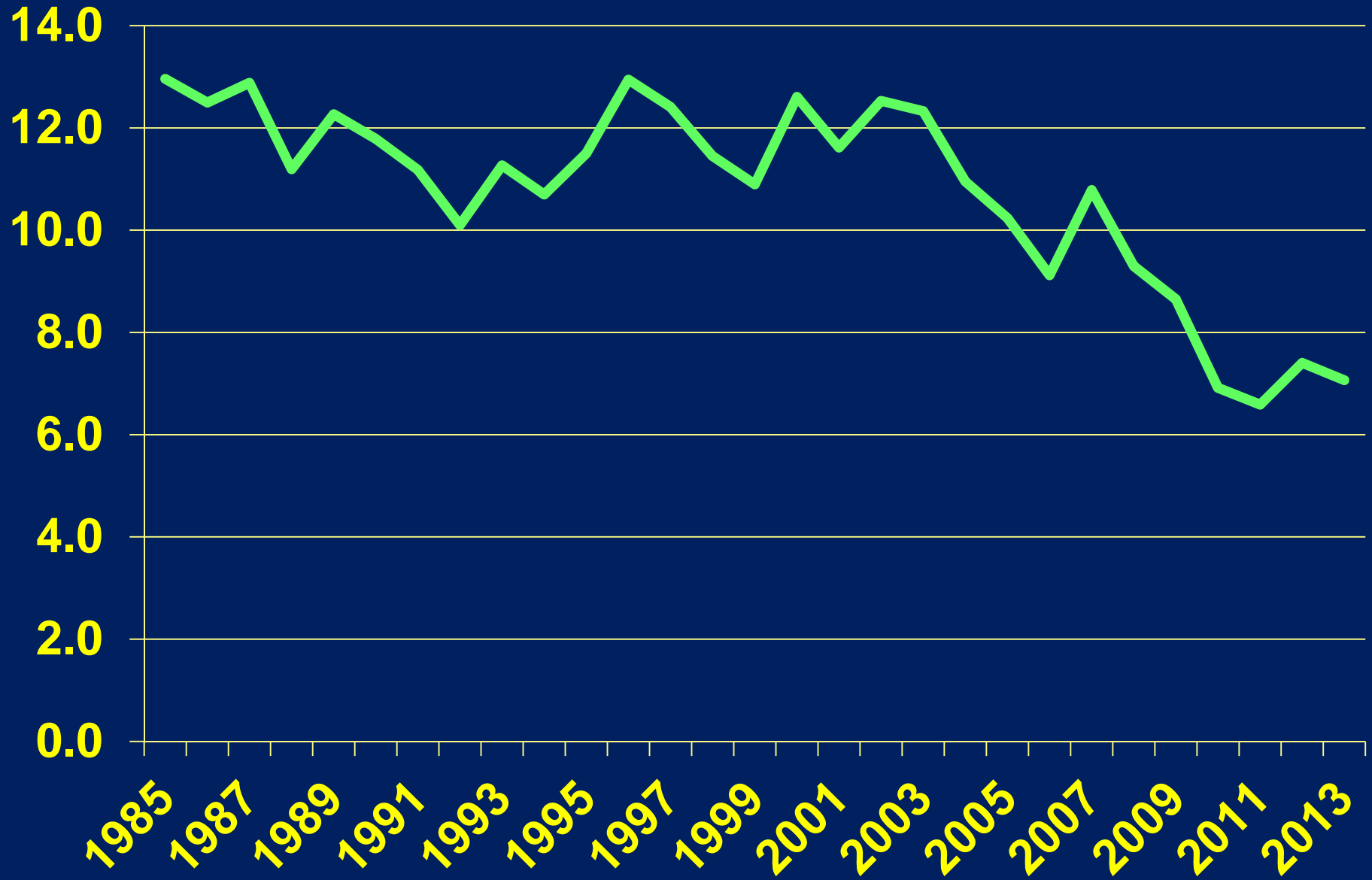
Keeping Barley Competitive With Other Crops

Million Acres

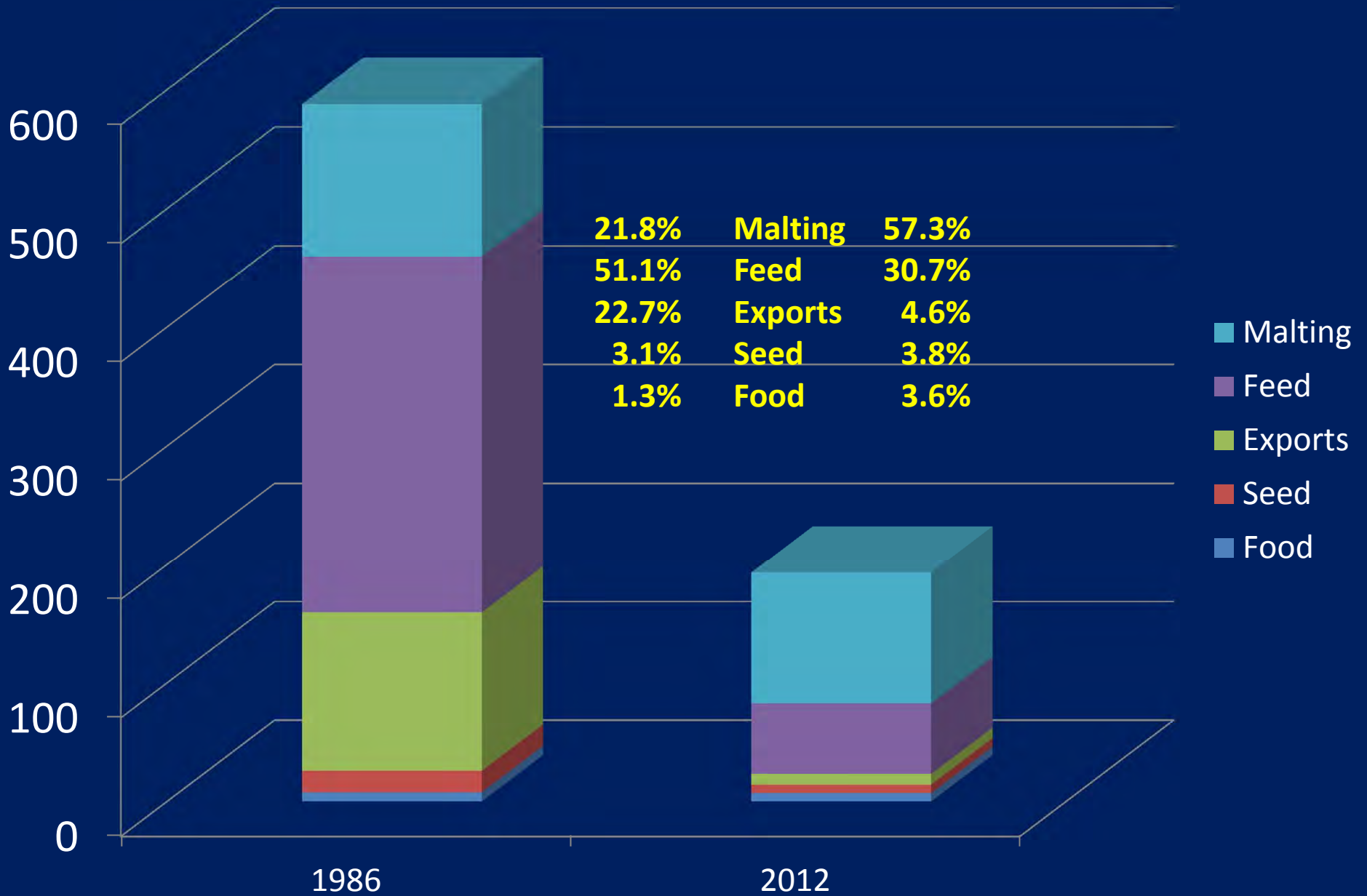
US Barley Acreage



Canadian Barley Acreage

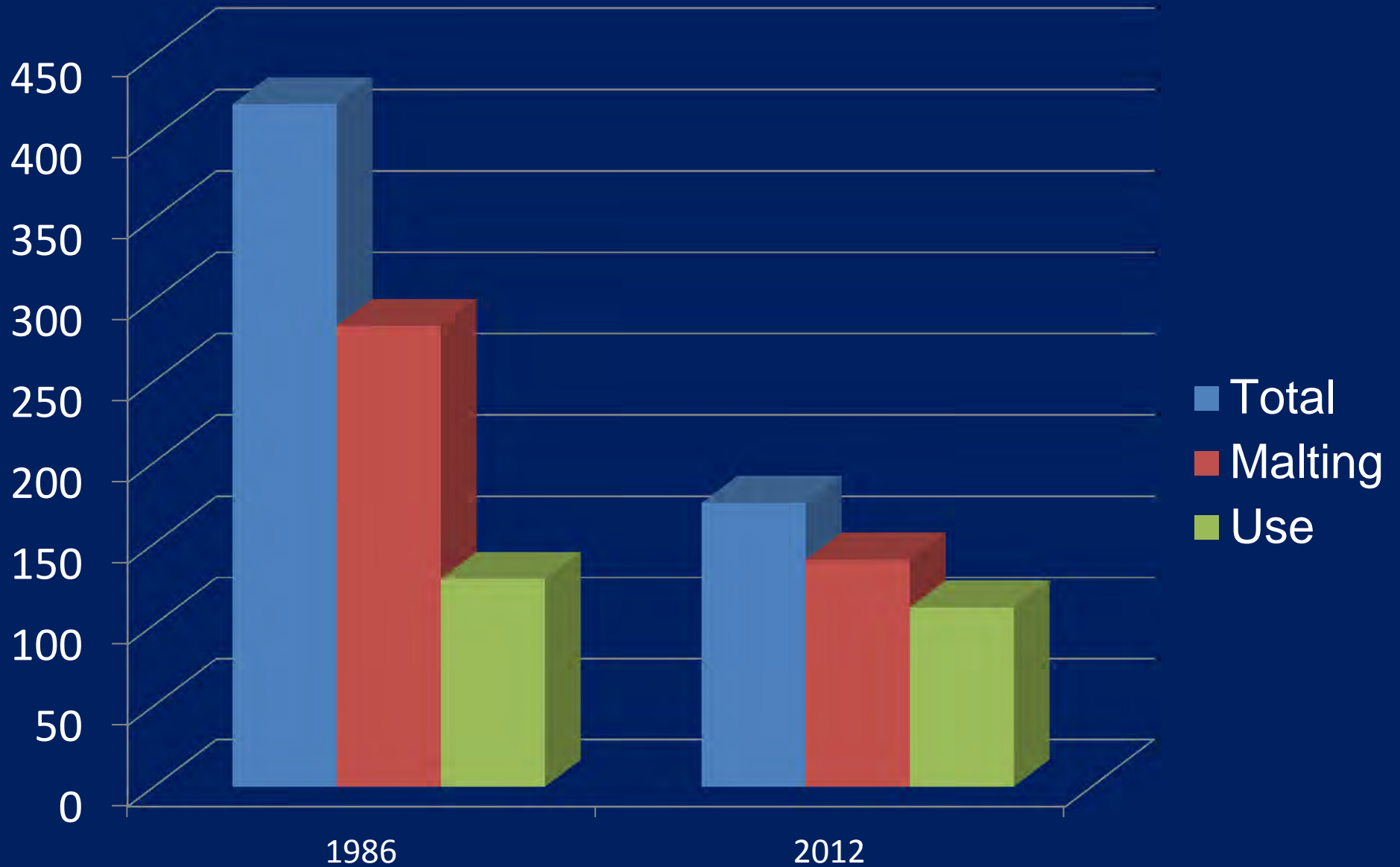


US Barley Use



US Barley Production & Malt Use

CO, ID, MN, MT, ND, WY



Why Has Barley Acreage Declined?

Static domestic malt use, limited barley & malt exports

Decline in use for feed = primary secondary use

Competition from abundant supplies of corn and dried distillers grain (DDGs)

Static & limited food use – although has FDA Healthy Heart Claim

USDA Barley Health Benefits Project – AMBA/NBIC lobbying

High risk crop – many chances for failure in making malting grade

Good return as malting, low or no return as feed

Risks: - Fusarium head blight (scab), other diseases, drought & heat stress, quality requirements

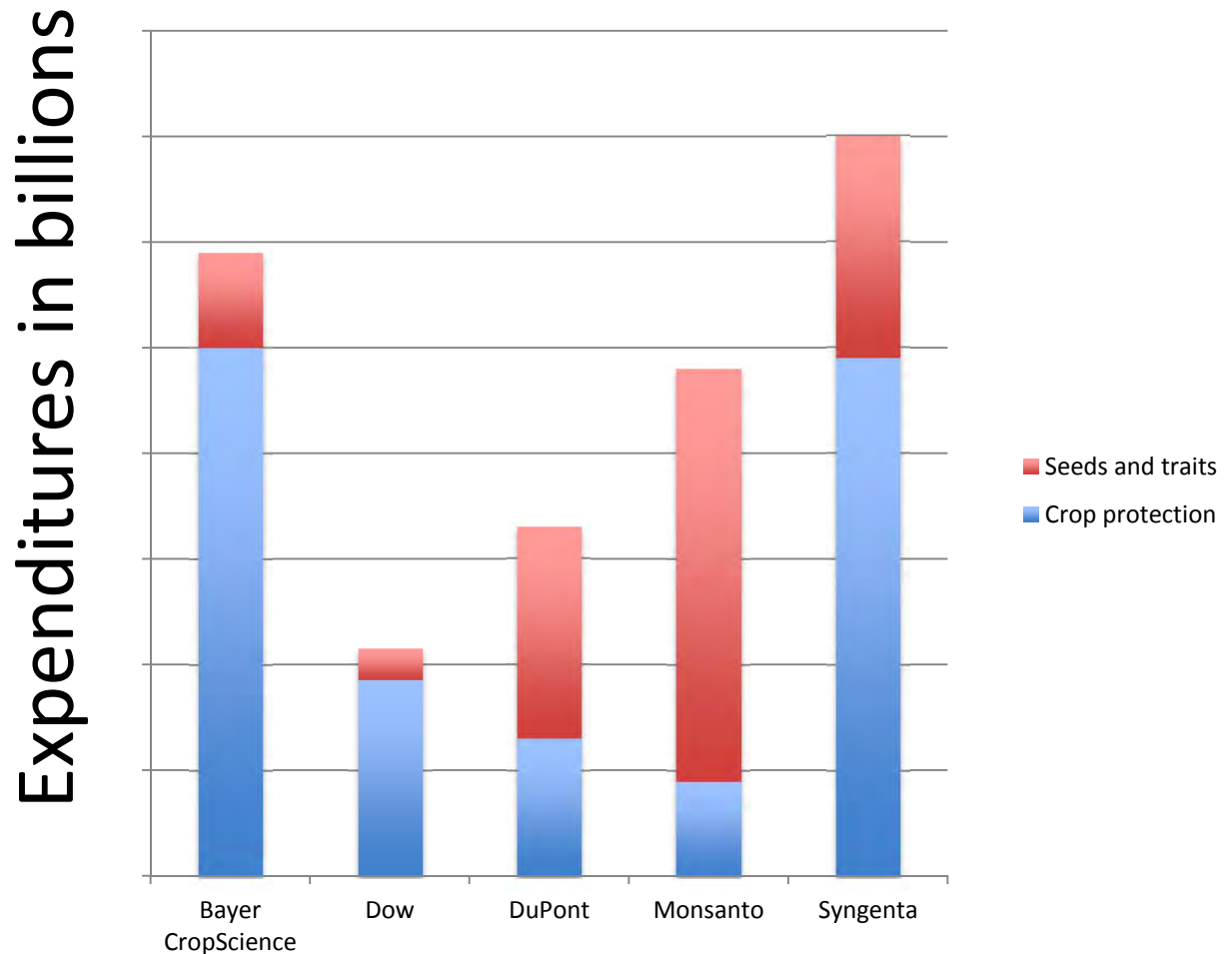
Competition with other crops – GROWERS HAVE OTHER OPTIONS

Corn, soybeans, canola = large and growing markets

Substantial investment by biotech seed companies, including GM variety development, in these crops and now wheat

Expenditures: Crop Protection and Seeds and Traits 1990-2008

- Bayer, Syngenta, BASF, DOW and DuPont were the firms that spent the most on Crop Protection R&D.
- Monsanto dominates the “seeds and traits” sector
- Comparative R&D Expenditures
 - Wheat—about 70c/acre/year
 - GM Row crops: \$10/acre/year



Slide courtesy Dr. Bill Wilson, NDSU

Why Has Barley Acreage Declined?

Biotech Crops with improved traits, including GM, have pushed barley out of higher rainfall areas into more marginal, dry ones

What happens to barley when it faces competition from GM drought tolerant corn, wheat and other crops that are being developed ?

Barley research & variety development primarily in public sector

State and provincial universities; USDA-ARS and Agriculture & Agri-Food Canada

Limited and declining public sector investment

Limited variety development by companies

US = **Two brewers, one maltster**, one private sector company – all traditional breeding

- minor part of their business, driven to meet needs, not profit

- *depend on public sector for other research needs*

Little or no interest by biotech seed companies in barley

Low acreage compared to other major crops

Substantial cost to commercialize a GM variety

Discovery, Development and Deregulation Costs of a GM Trait

Category		Cost (\$ million)	Number of responses
Discovery	Early discovery	17.6	5
	Late discovery	13.4	5
	Total cost	31.0	5
Construct optimization		28.3	5
Commercial event production & selection		13.6	6
Introgression breeding and wide-area testing		28.0	6
Regulatory science		17.9	6
Deregulation and regulatory affairs		17.2	6
Total		\$136.0	\$105 w/o Discovery

Phillips McDougall, September 2011

US Malting Barley Variety Development Programs

Montana State University
North Dakota State University
Oregon State University
University of California – Davis
University of Minnesota
University of Nebraska
USDA-ARS, Aberdeen, ID
USDA-ARS, Raleigh, NC
Utah State University
Virginia Polytech & State University
Washington State University

AB-InBev
Malteurop
MillerCoors
Limagrain

AMBA member
Funded by AMBA

Other US Malting Barley Research

Biochemistry, Genomics, Molecular Biology, Physiology
Diseases, Insects, Quality, Management, Variety Trials

Programs listed for malting barley variety development plus:

Colorado State University

Cornell University (NY)

Michigan State University

North Carolina State University

Ohio State University

Pennsylvania State University

Texas A&M University

University of Idaho

University of Maryland

University of Vermont

University of Wisconsin

University of Wyoming

USDA-ARS, Fargo, ND

USDA-ARS, Madison, WI

USDA-ARS, Manhattan, KS

USDA-ARS, Pullman, WA

USDA-ARS, Stillwater, OK

USDA-ARS, St. Paul, MN

AMBA funding

Canadian Malting Barley Variety Development Programs

Primary

AAFC, Brandon, MB

University of Saskatchewan

Alberta Agriculture and Rural Development

Secondary

Sapporo Breweries Ltd.

Syngenta

US Varieties are entered into Canadian testing system for potential registration and production

Brewing & Malting Barley Research Institute (BMBRI) – AMBA's Canadian Counterpart

GM Barley?

Current Status & Considerations

Experimental GM barley lines have been developed

Lines with various genes for resistance to Fusarium head blight (scab)

USDA-ARS US Wheat & Barley Scab Initiative funded researchers

High beta-glucanase lines to improve chicken feed

Washington State University

None commercialized

GM lines grown in hydroponic cultivation in geothermal greenhouses in Iceland for commercial production of pure proteins for research (*Cell Sciences*)

No commercial field production of GM barley

Strong support for development of GM barley by barley grower

organizations - Growers are experienced in growing GM crops and feel GM barley is needed to keep barley competitive with other crops

GM Barley?

Current Status & Considerations

Growing consumer resistance and concerns about GM

Mixed views of malting, brewing, distilling, and food end-users

Strongly opposed - to neutral - to supportive

Thus no clear signal to biotech seed companies to pursue

Developmental costs of GM barley too high to recover investment

Low acreage compared to major crops and thus limited seed sale potential

A unique trait, with exclusive IP rights, and substantial economic benefits (e.g. drought tolerance, major disease resistance) that could be used worldwide, may provide viable market

American Malting Barley Association Biotechnology Policy Statement

Prior to June, 2009

The American Malting Barley Association, Inc. (AMBA) provides funding for basic barley research in plant physiology, biochemistry and fundamental genomics as well as for more applied research in barley variety development. In addition, AMBA is involved in various federal programs funding barley biotechnology research to ensure access to current science and to keep barley competitive with other crops. At this time, there are no commercially available GM barley varieties in North America. AMBA is opposed to the commercial release of GM barley varieties.

JUNE, 2009+

The American Malting Barley Association, Inc. (AMBA) provides funding for basic barley research in plant physiology, biochemistry and fundamental genomics as well as for more applied research in barley variety development. In addition, AMBA is supportive of various federal and state programs funding barley biotechnology research to ensure scientific advancement and to keep barley competitive with other crops.

GM Barley Conclusions

No commercial GM barley expected in foreseeable future

Cost of commercialization precludes public sector university or federal research agency commercialization

Would require Biotech seed company to commercialize – none appear interested at this time

If work was initiated now, and gene discovery & construction, gene transfer, and utility already demonstrated, it would still take an estimated 10 years+ to complete the process to a commercially approved GM barley

GM WHEAT

Strong grower support combined with change of view of many end-users (e.g. millers, bakers, food companies) from opposition to support due to concerns about declining wheat acreage and competition with GM crops

Accordingly, biotech seed companies are now working on wheat, often in collaboration with the public sector universities that have the varieties needed for gene trait introgression

Current estimate for first commercial GM wheat = 6 Years

Considerations for malting, brewing, and distilling industries

Production of wheat products if you want to be non-GM

Comingling of GM wheat with non-GM barley

Most barley farmers also grown wheat

Wheat & barley grown in same area move through same elevator & transportation systems

Barley Biotechnology Tool Box

X - No GM variety development

Targeted genetic improvements without being transgenic (GM)

Induce base pair gene changes by the plant not through gene transformation technology

Rapid Trait Development system (RTDS) - *Cibus*
(*considered mutagenesis technology by USDA*)

Doubled Haploid (DH) Barley Line Development

Rapid development of genetically homozygous varieties

Barley Biotechnology Toolbox

Gene tracking Technology (genotyping)

Initial methodology = one gene

Current technology = tens of thousands of genes at one time

Current major genotyping technology

Based on Single Nucleotide Polymorphisms (SNPs)

Illumina BeadXpress system (old) – Illumina iSelect system (new)

Exome capture sequencing

Next generation technology for genotyping

Genotyping by Sequencing (GBS)

Gene tracking applications

Marker Assisted Selection (MAS)

Track introgression of one or a few genes

Genomic Selection (GS)

Track thousands of genes to develop lines with desired agronomic & quality traits

Barley Biotechnology Challenge

\$\$\$ - Most all funding from limited public sector sources

vs billions being invested by biotech seed companies in other crops

State universities & USDA-ARS research locations

USDA-ARS Small Grains Genotyping Laboratories (4)

Fargo, ND; Manhattan, KS; Raleigh, NC; Pullman, WA

Created through earmarks – AMBA/NBIC & wheat stakeholder lobbying

USDA-ARS US Wheat & Barley Scab Initiative grant program

USDA-NIFA Agriculture & Food Research Initiative (AFRI) Competitive Grant Program

Grants to individual scientists

Large grants to multi-researcher, discipline, and institution coordinated projects

Triticeae (barley & wheat) Agricultural Coordinated Project (TCAP)

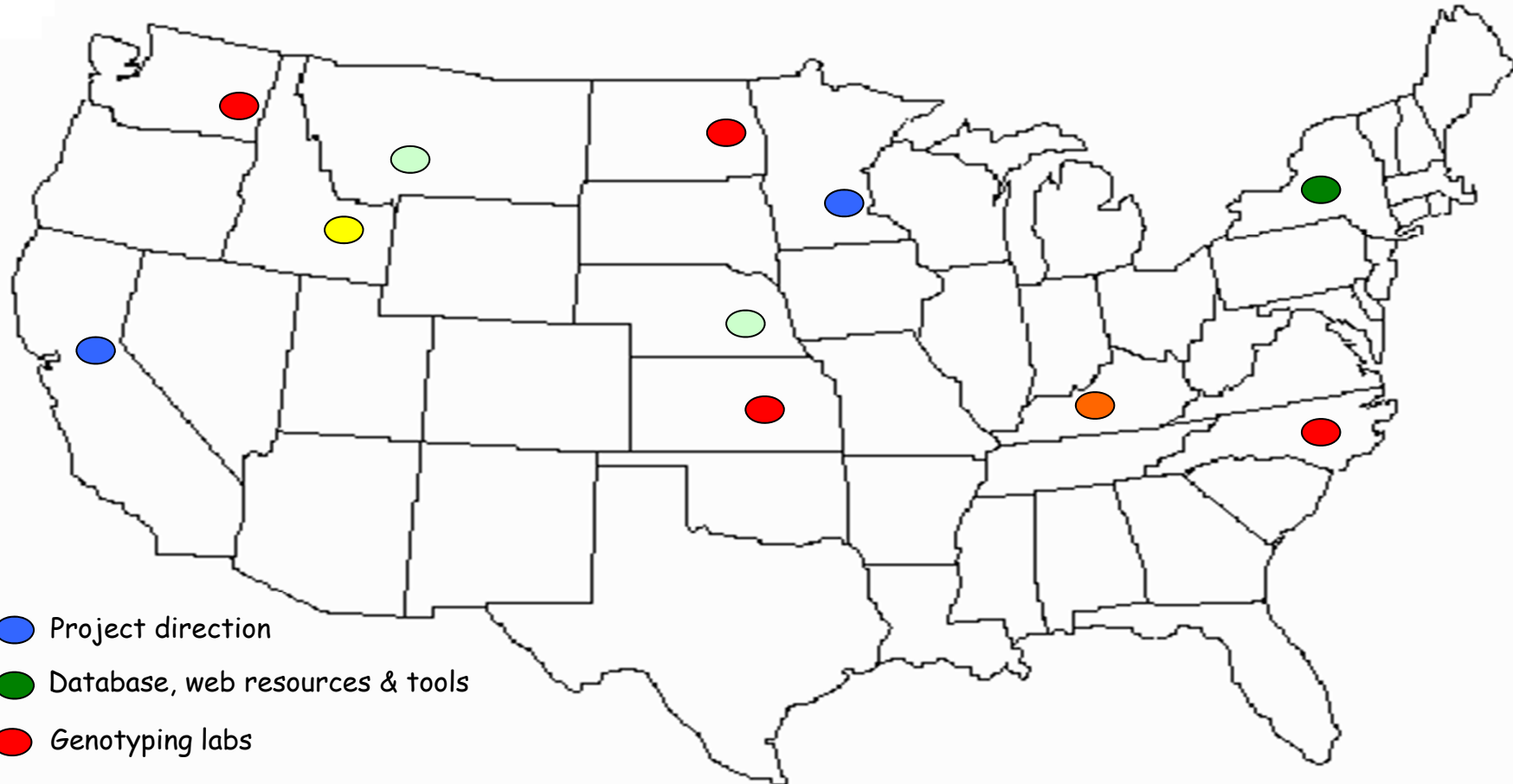
\$25 million (\$5M/year): 2011-2015

Triticeae-CAP: improving barley & wheat germplasm for changing environments

PIs Jorge Dubcovsky UC Davis and Gary Muehlbauer University of Minnesota



56 funded participants, 28 institutions, 21 states



- Project direction
- Database, web resources & tools
- Genotyping labs
- Education coordination
- Wheat and barley National Small Grain Collection
- Industry liaison coordination



United States
Department of
Agriculture

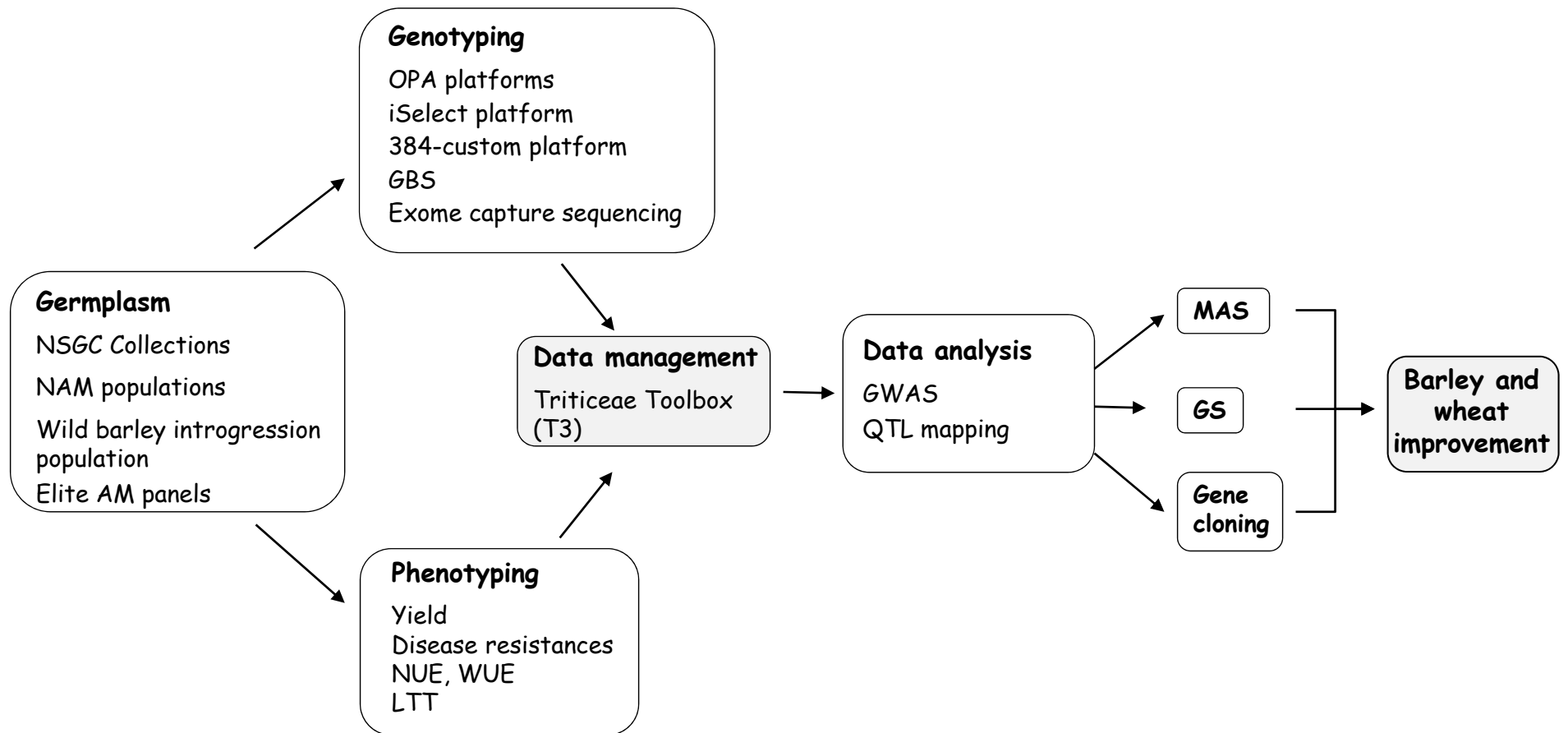
National Institute
of Food and
Agriculture

Traits

- **Disease resistance**
 - Stem and stripe rust
 - Spot blotch, spot-form net blotch and leaf scald
- **Low temperature tolerance**
- **Water and Nitrogen use efficiency, yield, agronomic traits**



Outline of TCAP work flow



Keeping Barley Competitive With Other Crops

Barley biotechnology research in of itself is not enough to keep barley competitive with biotech seed crops

Coordinated research in many disciplines is needed

Breeding, genetics, molecular biology, biochemistry, physiology, pathology, management

Adequate & effective national public sector barley research infrastructure

Stakeholder funding, direction, and collaboration

American Malting Barley Association (AMBA)

Brewing & Malting Barley Research Institute (BMBRI, Canada)

Brewers Association (BA)

Individual malting & brewing companies

State barley grower organizations

AMBA

National Coordinator of US Malting Barley Research

Facilities



Funding

AMBA, BA
Federal, State,
Growers, Brewers,
Maltsters



**Adequate & Effective National
Public Sector
Barley Research Infrastructure**



Direction



Personnel

AMBA lobbies Congress, Federal Agencies, and State Universities to positively impact all these research infrastructure components

AMBA also lobbies with barley growers for favorable federal farm program provisions (e.g. crop insurance)



American Malting Barley Association, Inc.

(Founded in 1938 as the Malt Research Institute)

MISSION: The primary purpose of AMBA is to encourage and support an adequate supply of high quality malting barley for the malting, brewing, distilling and food industries and increase our understanding of malting barley.

VISION: To be the leader in improvement, development, and understanding of malting barley in the US.

PRIMARY OBJECTIVE: Develop six-row and two-row malting barley varieties broadly adapted for the barley production areas of North America with suitable agronomic, malting, and brewing performance.



American Malting Barley Association, Inc.

REGULAR MEMBERS (21)

AB-InBev

Bell's Brewery

Boston Beer

Briess Malt & Ingredients

Brooklyn Brewery

Brown-Forman

Cargill Malt

Craft Brew Alliance

Deschutes Brewery

Dogfish Head Craft Brewery

Gambrinus Company

Great Western Malting

InteGrow Malt

Malteurop

MillerCoors

New Belgium Brewing

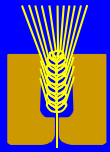
New Glarus Brewing

Rahr Malting

Schell's Brewing

Sierra Nevada Brewing

Summit Brewing



American Malting Barley Association, Inc.

ASSOCIATE MEMBERS (40)

Abita Brewing

Alaskan Brewing

Allagash Brewing

Anchor Brewing

Avery Brewing

Bear Republic Brewing

Blacklands Malt

Boulevard Brewing

Cold Spring Brewing

Corsair Artisan Distillery

Farm Boy Farms

Firestone Walker Brewing

Flying Dog Brewery

Founders Brewing

Full Sail Brewing

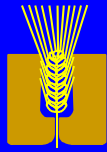
Harpoon Brewery

Langunitas Brewing

Lakefront Brewery

Left Hand Brewing

Leopold Bros Distillery



American Malting Barley Association, Inc.

ASSOCIATE MEMBERS (40)

Long Trail Brewing
Lost Coast Brewery
Malterie Frontenac
Matt Brewing
Odell Brewing
Oskar Blues Brewery
Rahr & Sons Brewing
Real Ale Brewing
Rogue Ales
Russian River Brewing

Saint Arnold Brewing
Schlafly Beer
Smuttynose Brewing
Storz Brewing
Stone Brewing
Troegs Brewing
Urban Chestnut Brewing
Valley Malt
Victory Brewing
Wachusett Brewing



BEER INDUSTRY ECONOMIC IMPACT IN Montana

NATIONAL ECONOMIC IMPACT

In 2012, the U.S. beer industry's total economic impact stood at more than \$246.5 billion. It directly and indirectly employs more than 2 million Americans, paying \$78.9 billion in wages and benefits. Of the 2 million American employees, more than 1 million are directly employed by brewers, importers, distributors and retailers.

The majority of hard-working men and women directly employed by the brewers, importers and beer distributors receive good wages and company-provided benefits, including healthcare. Beer sales also contribute to the profitability of more than 576,000 licensed retail outlets in the U.S.

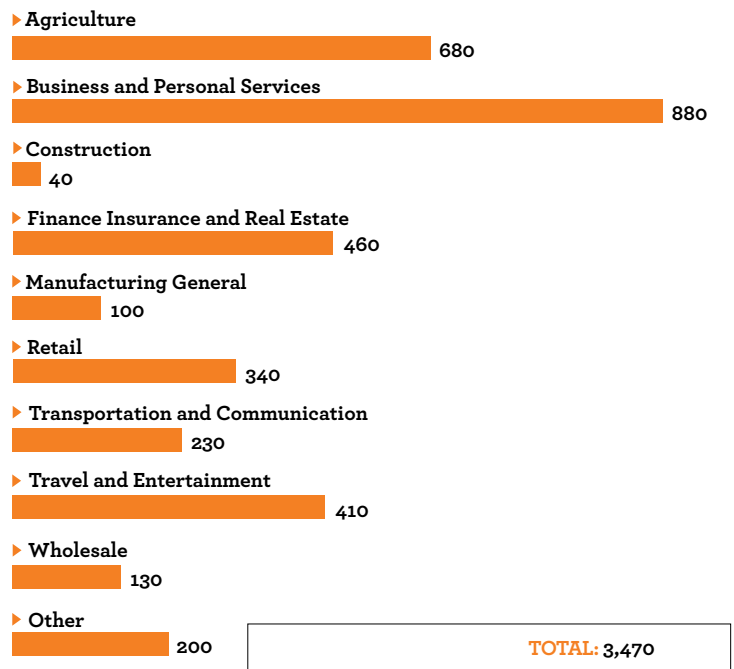
The industry contributed \$49 billion in business, personal and consumption taxes, including excise taxes and sales, gross receipts and other taxes.

BEER INDUSTRY DIRECT AND TOTAL ECONOMIC CONTRIBUTION IN MONTANA

Direct Economic Impact

	JOBS	WAGES	ECONOMIC CONTRIBUTION
Brewing	220	\$4,526,700	\$50,528,200
Distributing	830	\$32,533,400	\$73,355,200
Retail	4,010	\$77,852,000	\$161,531,500
TOTAL	5,060	\$114,912,100	\$285,414,900

Industry-Related Jobs (by thousands)



TAXES PAID

Federal Excise - \$17,329,100
 State Excise - \$4,209,200
 Other State/Local - \$0
TOTAL - \$21,538,300

TAXES GENERATED

Federal - \$54,962,200
 State/Local - \$43,646,400
TOTAL - \$98,608,600

ESTABLISHMENTS

Brewing - 38
 Distributing - 44
 Retail - 3,246

TOTAL ECONOMIC IMPACT

JOBS - 8,530
 WAGES - \$219,846,300
 CONTRIBUTION - \$655,941,300



Beer Serves America

Brewers, importers, beer distributors, and retailers are proud to serve America through economic contributions, responsibility initiatives, and community involvement.

RESPONSIBILITY

Brewers, beer importers and distributors share a longstanding commitment to help ensure that their products are enjoyed responsibly. The American beer industry has more than 130 different alcohol awareness and education programs designed to help prevent alcohol abuse, including underage drinking and drunk driving.

Government statistics show drunk driving and underage drinking have declined over the past three decades. For example, the 2012 Monitoring the Future study reports declining drinking rates among 8th, 10th and 12th graders. And 2011 drunk-driving declined to a record-low level, down 53 percent since first measured in 1982. The number of fatalities from drunk driving also continues to decline.

COMMUNITY INVOLVEMENT

The beer industry initiates and supports numerous alcohol awareness and education efforts, recycling programs and philanthropy programs.

The industry is also committed to preserving and protecting the environment. America's beer distributors have begun to use alternative fuels in their delivery trucks and renewable energy in their warehouses. Brewers and suppliers use aluminum beverage cans and promote aluminum and glass recycling programs. Today, they are implementing innovations to significantly reduce the amount of water and energy needed to produce and package beer.

These are just some of the many beer industry initiatives to enhance sustainability in communities across the nation.



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www.beerinstitute.org

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1101 King Street, Suite 600
Alexandria, VA 22314
703.683.4300
www.nbwa.org

www.beerservesamerica.org

State	Craft Beer Production (Barrels)	Malt Consumption (pounds)	Malt Consumption (Short Tons)	Specialty Malt (pounds)	Specialty Malt (Short Tons)	Spent on pale malt	Spent on specialty malt
California	2,453,793	144,773,787	72,387	21,716,068	10,858	\$43,070,202	\$17,372,854
Pennsylvania	1,626,116	95,940,844	47,970	14,391,127	7,196	\$28,542,401	\$11,512,901
Colorado	1,291,771	76,214,489	38,107	11,432,173	5,716	\$22,673,810	\$9,145,739
Ohio	980,969	57,877,171	28,939	8,681,576	4,341	\$17,218,458	\$6,945,261
Oregon	764,226	45,089,334	22,545	6,763,400	3,382	\$13,414,077	\$5,410,720
New York	724,984	42,774,056	21,387	6,416,108	3,208	\$12,725,282	\$5,132,887
Texas	713,712	42,109,008	21,055	6,316,351	3,158	\$12,527,430	\$5,053,081
New Hampshire	588,111	34,698,549	17,349	5,204,782	2,602	\$10,322,818	\$4,163,826
Michigan	438,383	25,864,597	12,932	3,879,690	1,940	\$7,694,718	\$3,103,752
Wisconsin	398,811	23,529,849	11,765	3,529,477	1,765	\$7,000,130	\$2,823,582
Minnesota	308,370	18,193,830	9,097	2,729,075	1,365	\$5,412,664	\$2,183,260
Massachusetts	291,206	17,181,154	8,591	2,577,173	1,289	\$5,111,393	\$2,061,738
Washington	291,107	17,175,313	8,588	2,576,297	1,288	\$5,109,656	\$2,061,038
Missouri	268,003	15,812,177	7,906	2,371,827	1,186	\$4,704,123	\$1,897,461
Maine	249,158	14,700,322	7,350	2,205,048	1,103	\$4,373,346	\$1,764,039
Vermont	204,693	12,076,887	6,038	1,811,533	906	\$3,592,874	\$1,449,226
Delaware	180,794	10,666,846	5,333	1,600,027	800	\$3,173,387	\$1,280,022
Alaska	170,610	10,065,990	5,033	1,509,899	755	\$2,994,632	\$1,207,919
Louisiana	169,484	9,999,556	5,000	1,499,933	750	\$2,974,868	\$1,199,947
North Carolina	159,033	9,382,947	4,691	1,407,442	704	\$2,791,427	\$1,125,954
Maryland	154,650	9,124,350	4,562	1,368,653	684	\$2,714,494	\$1,094,922
Georgia	153,218	9,039,862	4,520	1,355,979	678	\$2,689,359	\$1,084,783
Montana	118,528	7,000,000	3,500	1,050,000	525	\$2,082,500	\$840,000
Utah	110,025	6,491,475	3,246	973,721	487	\$1,931,214	\$778,977
Arizona	93,103	5,493,077	2,747	823,962	412	\$1,634,190	\$659,169
Florida	92,512	5,458,208	2,729	818,731	409	\$1,623,817	\$654,985
Illinois	87,993	5,191,587	2,596	778,738	389	\$1,544,497	\$622,990
Indiana	87,321	5,151,939	2,576	772,791	386	\$1,532,702	\$618,233
Virginia	84,059	4,959,481	2,480	743,922	372	\$1,475,446	\$595,138
Tennessee	54,077	3,190,543	1,595	478,581	239	\$949,187	\$382,865
New Mexico	48,213	2,844,567	1,422	426,685	213	\$846,259	\$341,348
Nevada	45,761	2,699,899	1,350	404,985	202	\$803,220	\$323,988
Connecticut	40,947	2,415,873	1,208	362,381	181	\$718,722	\$289,905
New Jersey	37,468	2,210,612	1,105	331,592	166	\$657,657	\$265,273
Kentucky	36,532	2,155,388	1,078	323,308	162	\$641,228	\$258,647
South Carolina	34,496	2,035,264	1,018	305,290	153	\$605,491	\$244,232
Idaho	31,000	1,829,000	915	274,350	137	\$544,128	\$219,480
Hawaii	27,906	1,646,454	823	246,968	123	\$489,820	\$197,574
Kansas	27,063	1,596,717	798	239,508	120	\$475,023	\$191,606
Iowa	21,754	1,283,486	642	192,523	96	\$381,837	\$154,018
Nebraska	21,228	1,252,452	626	187,868	94	\$372,604	\$150,294
Oklahoma	16,123	951,257	476	142,689	71	\$282,999	\$114,151
Mississippi	14,589	860,751	430	129,113	65	\$256,073	\$103,290
Wyoming	14,000	826,000	413	123,900	62	\$245,735	\$99,120
Alabama	7,274	429,166	215	64,375	32	\$127,677	\$51,500
Arkansas	5,639	332,701	166	49,905	25	\$98,979	\$39,924
South Dakota	3,934	232,106	116	34,816	17	\$69,052	\$27,853
West Virginia	3,752	221,368	111	33,205	17	\$65,857	\$26,564
North Dakota	858	50,622	25	7,593	4	\$15,060	\$6,075
Total	13,747,357	811,100,911	405,550	121,665,137	60,833	\$241,302,521	\$97,332,109

BY CHARLIE PAPAIZIAN

The Big Picture of Small Brewers

By the time you read this, the number of brick and mortar breweries in the U.S. will probably surpass 2,700. That's a "wow" number for sure, and in the minds of everyone who assesses this indicator there are thousands of ways to imagine what it means now and for the future.

Earlier this year I received an invitation from Sen. Max Baucus (D-Mont), chair of the Senate Committee on Finance, to participate in the Economic Development Summit in Montana in mid-September. I accepted the opportunity to lead a panel discussion titled "Exploring Growth in Montana's Craft Beer Industry." With the help of the Senator's staff and Montana Brewers Association executive director Tony Herbert, we put together a panel that included Jim Devine of Wibaux's Beaver Creek Brewery, Max Pigman from Helena's Lewis and Clark Brewing Company, and Neal Leathers from Missoula's Big Sky Brewing Company. Also invited to participate were Ed Brandt of Bozeman's Cardinal Distributing (Anheuser-Busch In-Bev, MillerCoors, and craft house) and Mark Black, field manager for Malteurop's Great Falls malthouse.

Here is a snapshot of my introduction of the panel.

I've been at this Association business since 1978. For 35 years, every year I hear soothsayers warn that small brewing is doomed to failure, collapse, or has a gnat's ass chance of succeeding. One of these years

Nowhere else in the world do you see marketing directors from different breweries discussing strategies and tactics together in a panel discussion.

they'll get it right and they'll gloat and tell us, "I told you so." Meanwhile...

There are many reasons small businesses fail. Most of them have to do with the management, or rather mismanagement, of growth, employees/people/workplace, cash, debt, expectations, quality, customer loyalty,



Montana Brewers Association executive director Tony Herbert and Charlie Papazian.

and relations. This is the case for small brewers as well as all small companies.

But the odds for small breweries succeeding as a business are much better than your average small business. Why? My thoughts on this aren't new. One of the most important reasons is the development of a craft beer and brewers' community. The collaborative spirit of the American small brewing community is the envy of the entire world of small brewers. Nowhere else in the world does the competitive spirit of the marketplace co-exist so positively with the

world do you see marketing directors from different breweries discussing strategies and tactics together in a panel discussion. Nowhere else in the world are brewers as welcome in competing breweries.

Small, but Big Enough

The differences in economies of scale between the 100-million-barrel international brewing corporations and small brewers are so immense as to be incomprehensible. If individual small companies were adrift with no tangible community to represent their best national and regional interests, small business breweries would be overwhelmed. I have no doubt about this, having observed what has happened to other small business sectors that have been swallowed or compromised; having no collaborative community to help make a stand and lend moral and practical support.

Small brewers have developed an effective system of collaboration and communication. At the same time, they remain competitive with each other and have a great deal of respect, awareness, and "street smart intelligence" of the dynamics of the marketplace's horizontal tier and vertical tier.



A standing-room-only crowd attended the panel discussion in Montana.

By horizontal tier, I mean other breweries large and small with whom small brewers compete. By vertical tier, I mean the incoming supply chain of materials, technology, and services, and the downstream tiers of distribution, retail, and the customer/beer drinker.

The Extended Economic Impact

American small brewers have created more than 110,000 jobs in the U.S. Beer in America is a \$99 billion business. In 2012, American craft brewers produced 6.5 percent of the 200 million barrels of beer enjoyed in the U.S. They generated 10.2 percent of the dollars, or \$10.1 billion of the \$99 billion.

The Montana Brewers Association reports from 2011 data that the state's brewers created (mostly directly) 434 jobs, and brewery-related output accounted for about \$50 million to the Montana economy.

But the extended economic impact is far greater than the direct impact—consider merchandise manufacturers, mobile cooks at events, T-shirt and merchandise printing, glassware, tap handles, beer snacks, order fulfillment, software development, hardware, vehicles, restaurant success, hop farms, barley farms, harvesting equipment, brewery tour companies, the lunch shop next door, etc.

More recent data and assessment by the Brewers Association indicates that Montana's small breweries had a much larger impact. In 2012, the impact was more than \$300 million for the state, creating more than 3,500 jobs and generating around \$100 million in wages. This impact is calculated by looking at direct contribution of craft brewers, beer distributors, and retail sales. Also included is the indirect supplier and induced impacts of the direct contributions, both in-state and out-of-state influences (for example 70 grain farming jobs in Montana created by craft brewers in other states).

Numbers are simply indicators. They do not reveal why small brewers are succeeding. For every brewery location in the U.S., there is a unique set of circumstances that helps brewers set their course. The extent of their success is how well they navigate those circumstances, challenges, and opportunities.

Snapshot of Small Brewery Businesses

To put things in a more accurate and local perspective, if you take the top 50 small and independent brewers out of the statistics:

- The average production of an American brewpub is 769 barrels a year.
- The average production of a small American packaging brewery is 1,704 barrels a year.

Principally there are two different kinds of small brewery business models:

1. Breweries that aspire to grow.
2. Breweries that aspire to simply make a living.

Every brewery must make the decision at some point: to export or not to export. There are varying degrees of exporting beer:

1. Exporting beer in growlers for take-home enjoyment from the brewery.
2. Exporting a keg out of the brewery to the restaurant or bar across the street.
3. Exporting beer into the immediate community's retail opportunities.
4. Exporting beer to other points within the state.
5. Exporting beer to other states.
6. Exporting beer to other countries.

In 2012, American craft brewers exported 189,000 barrels of beer outside of the U.S. That represented \$94.5 million and about 75-percent growth over 2011.

Whether a brewery exports their beer across the street or to another continent, both the brewing company and the brew-

master must succeed in addressing dramatic challenges in order to maintain quality and succeed in continued sales of their beer. These challenges cannot be overlooked or minimized.

Brand Development

Almost all breweries export to some degree. The importance of brand development is important. There are several kinds of brands that are important to develop:

1. The brewing company's own brand.
2. The town/city brand (I've often heard that Missoula is the craft beer center of Montana, for example.)
3. The brand of Montana beer and Montana craft brewers—"brewed in Montana."
4. The brand of "American craft beer" from American craft brewers.

Branding is a necessity at all levels. Companies have their own brand strategy. American craft brewers have successfully collaborated to attract regional, state, and national recognition. The development of various brand recognition has an economic impact on city, state, and national tourism; think brewery tours and thematic craft beer tastings. With developed regional pride, other extended businesses are aided: small scale hop farming, barley growing, malting, extended tap handles at retail, packaging, promotion and advertising, and distribution.

Revitalizing America

Five recent headlines highlight the role craft brewers have in revitalizing Main Street America.

1. "Six cities breweries helped transform." (AP)
2. "Build a craft brewery, urban revival will come." (*USA Today*)
3. "Craft breweries help transform cities across the country." (*Huffington Post*)
4. "Small Batch Beer Co.: Revitalizing 5th Street, Winston-Salem." (Kickstarter)
5. "Oakland: Craft beer trend helps rebuild neighborhoods." (*Mercury News*)

Montana brewers had plenty of their own community revival/transformational stories that they shared with the standing-room-only attendees during the "Exploring Growth in Montana's Craft Beer Industry" panel discussion.

The panel of three brewers, a beer distributor, a malting company, and Herbert continued the discussion, providing unique real-life experiences and insight about how small brewers as small businesses are manufacturing economic development and jobs in their state of Montana.

Charlie Papazian is president of the Brewers Association. ■

Contacts Referenced

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Bozeman, MT

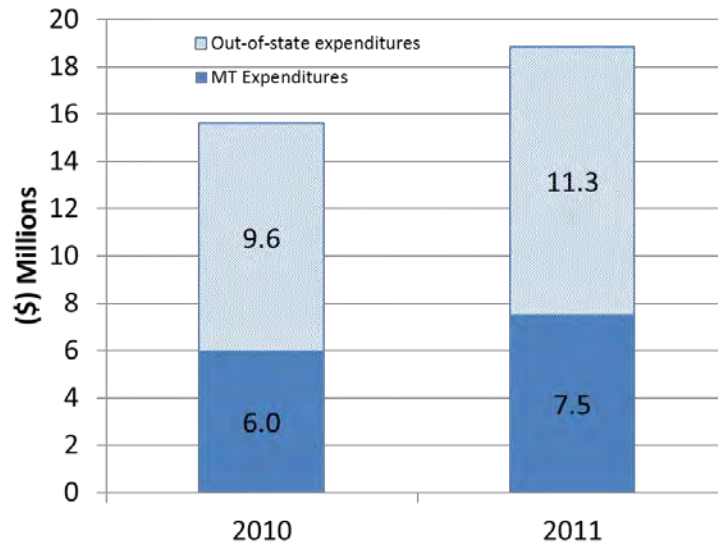
info@406brewingcompany.com

Todd Daniels – Montana Manufacturing Extension Center

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that they would prefer to buy more supplies from within Montana, but they were unable to obtain some of their inputs locally.

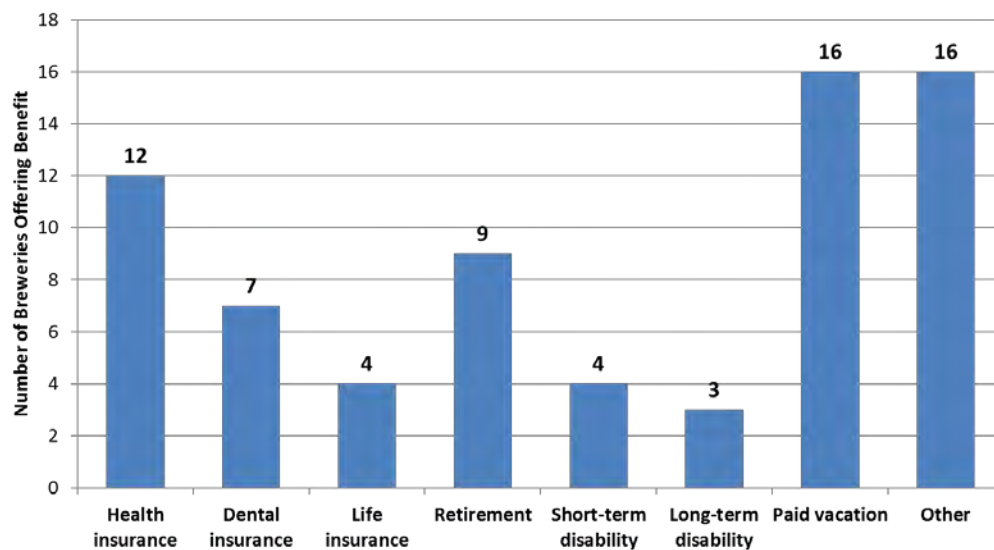
Figure 2.
Montana Brewery Expenditures



Providing health insurance and other benefits is clearly a high priority for many breweries in the state.

Figure 3 shows the number of breweries that offer various benefits to their employees.

Figure 3.
Montana Brewery Employee Benefits



Paid vacation is the most common employee benefit, which is offered by 16 of the breweries in Montana. Health insurance is offered by 12 breweries. The next most common benefit is retirement, followed by dental insurance, life insurance, short-term disability, and long-term disability. While many benefits are not offered at a majority of breweries, the larger and more established breweries tend to offer more comprehensive benefits packages. Therefore, the majority of employees working in the industry are employed at breweries that do offer benefits. For example, of the 320 Montana employees working in the industry in 2011, 78 percent worked at breweries offering health insurance, 65 percent worked at breweries offering retirements benefits, and 57 percent worked at breweries offering dental insurance. However, the survey did not identify the number of employees receiving benefits at each brewery, and it should be noted that not all employees at breweries that offer benefits work enough hours to qualify for benefits. Other benefits offered at breweries include funds for health savings accounts, ski passes, cell phones, merchandise discounts, and flexible work schedules.

Economic Impact Results

Results from the REMI economic impact simulation are summarized in Table 2. This study finds that because the craft brewing industry exists in Montana, the state economy is larger and more prosperous. Government revenues are also higher as a result of the industry. Because of the operations of the craft brewing industry:

- There is an employment impact of 434 jobs across various sectors of the state economy;
- In addition to the jobs in the manufacturing sector, there are significant impacts in the construction, health care, and retail trade sectors;
- There are employment and output (private sector sales) impacts throughout the five regions of the state, though they are concentrated in the northwest region;

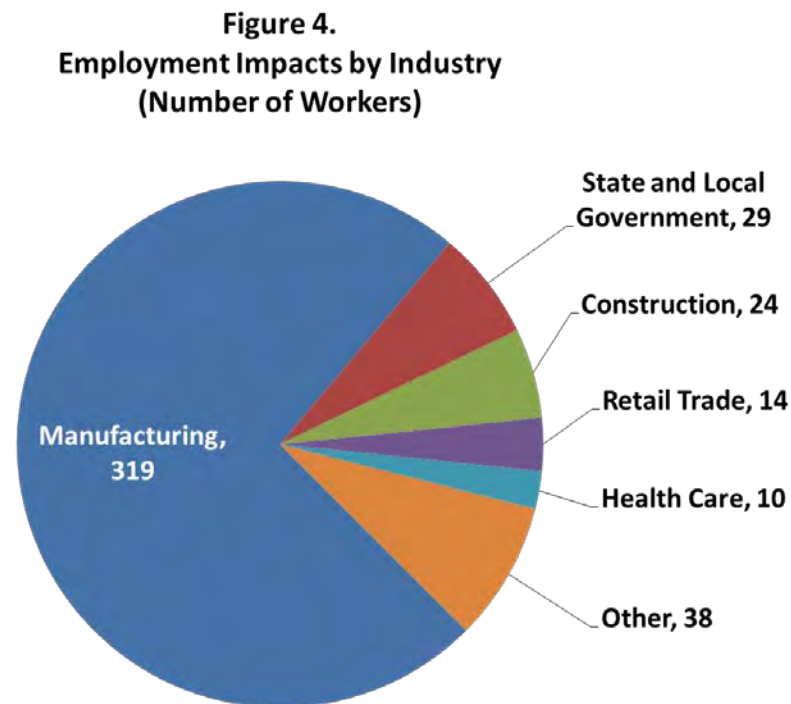
- Because of the brewing industry, output (private sector sales) is \$48.4 million higher than would otherwise be the case;
- Private non-farm compensation and government compensation are \$9.8 and \$1.8 million higher, respectively, than they would be without the existence of craft brewing in Montana;
- Population in the state is 36 people higher than it would be without the Montana craft brewing industry;
- State government revenues are \$1.5 million higher than they would be without the Montana craft brewing industry.

Table 2.
Economic Impacts of Beer Brewing in Montana

Category	Impact
Total Employment	434 Jobs
Output (Private Sector Sales)	\$48.4 Million
Compensation (Private Non-Farm)	\$9.8 Million
Compensation (Government)	\$1.8 Million
Population	36 People
State government revenues	\$1.5 Million

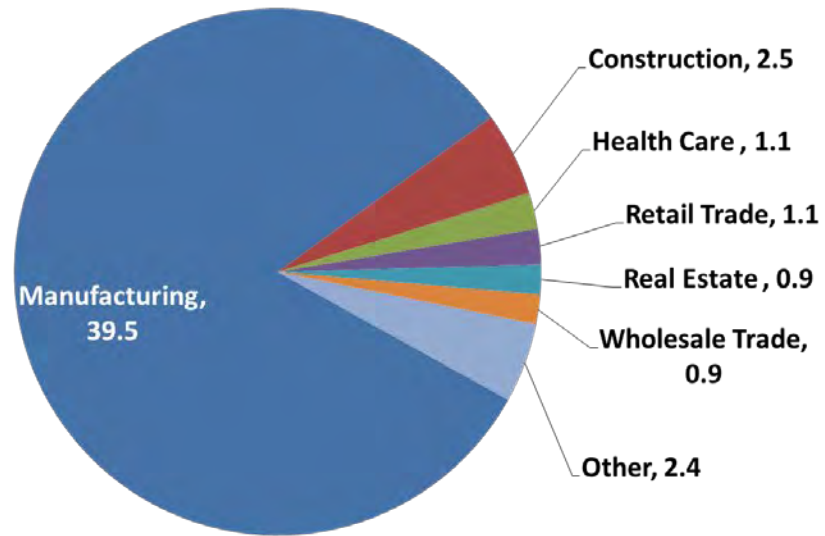
Impacts by Industry Sector and Montana Region

Economic impacts of the brewing industry are spread across several industry sectors and also dispersed across the state. Clearly, the manufacturing sector, which includes the brewing industry, holds the largest share of the employment impacts, as shown in Figure 4.



However, the employment impacts of the brewing industry are revealed in several other sectors as well. This includes 29 jobs in state and local government, 24 jobs in construction, 14 jobs in retail trade, 10 jobs in health care, and 38 additional jobs in other sectors. Output impacts (Fig 5.), measured by private sector gross sales total \$48.4 million, \$39.5 million of which can be attributed to the manufacturing industry.

Figure 5.
Output (Gross Sales) Impacts by Industry
(Private Sector, \$Millions)



While concentrated in the more populous regions of the state, economic impacts due to craft brewing extend into each region of the state. For the purpose of the analysis, impacts were split into five Montana regions (Figure 6). As of the end of calendar year 2011, there were 12 breweries in northwest Montana, seven in southwest Montana, four in north central Montana, eight in south central Montana, and two in eastern Montana. Figures 7 and 8 show output and the employment impacts by region, respectively.

Figure 6.
Economic Regions & Number of Active Breweries, 2011
(33 total)

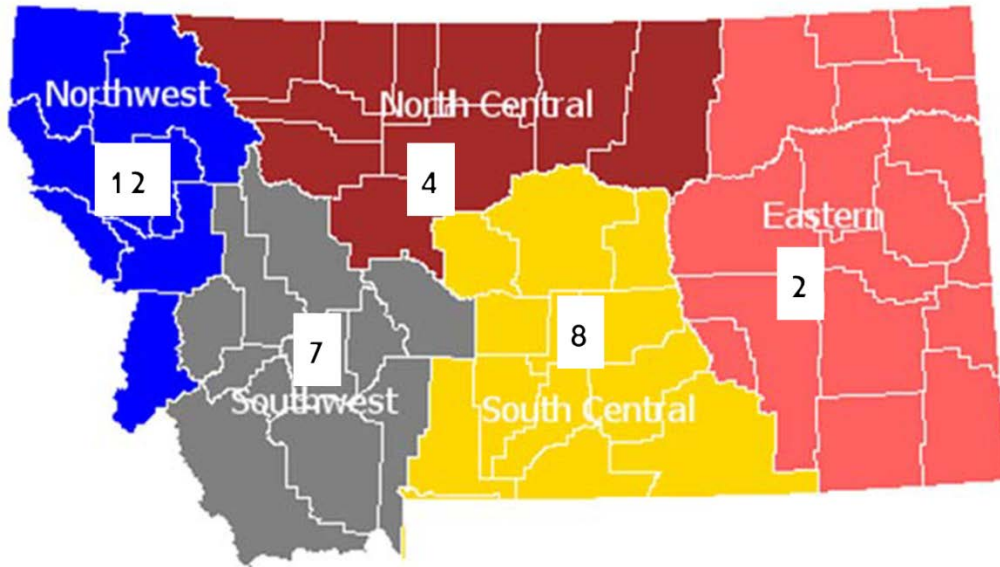
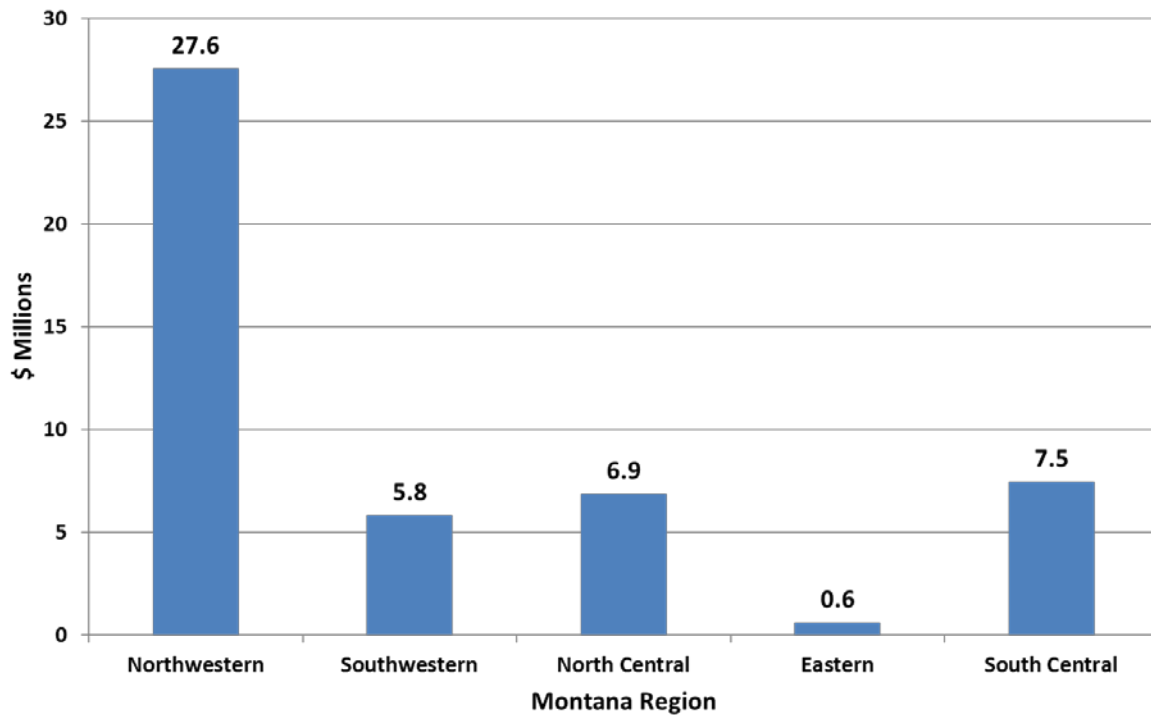
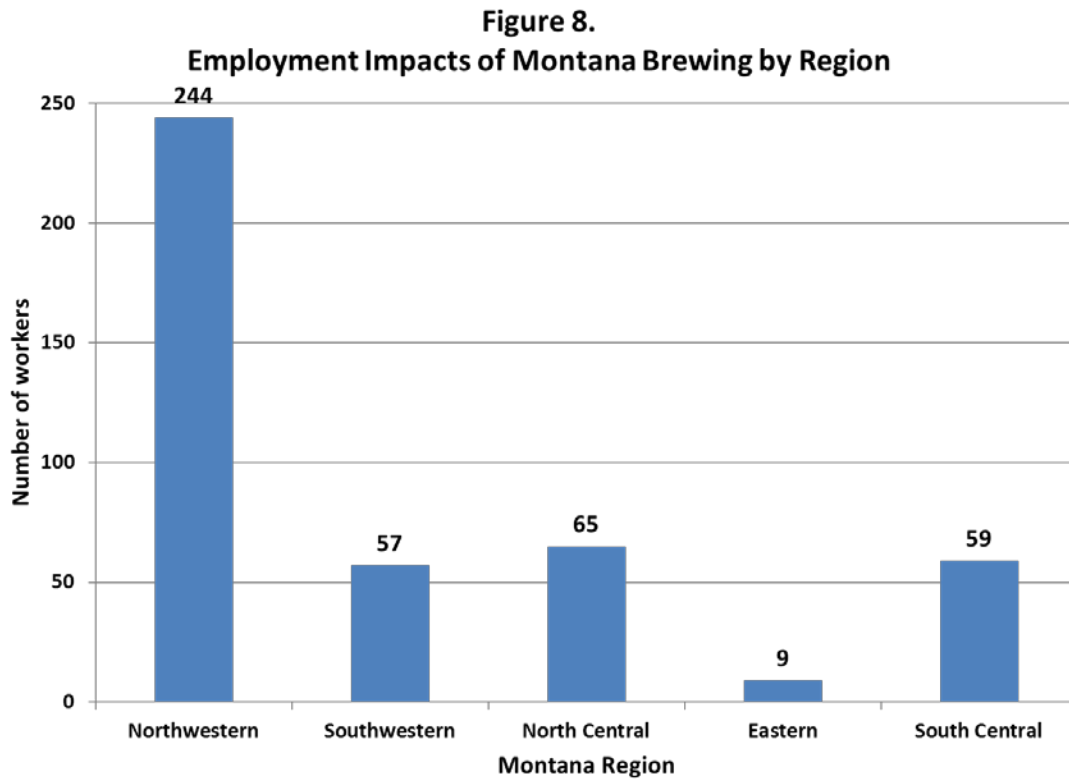


Figure 7.
Output (Gross Sales) Impacts of Montana Brewing by Region





Conclusion

Based on the data collected from Montana breweries, the industry grew rapidly from 2010 to 2011.

Production rose 18 percent, sales were up 20 percent, employment (both full- and part-time) was up 39 percent, compensation increased 23 percent, and expenditures were up 21 percent. Operations of craft brewers produce a significant impact on the state economy. More than 430 jobs, nearly \$50 million in private sector sales, \$9.8 million in private non-farm compensation, \$1.8 million in government compensation, and \$1.5 million in state government revenues exist in the economy due to craft brewing operations in Montana. Jobs are spread across a wide spectrum of the economy, and impacts recur every year the brewing industry operates.

This work has developed a baseline economic impact of the brewing industry on Montana's economy. In the future, additional research could be conducted to monitor changes in the economic impact of the industry over time. Furthermore, the effects of legislative changes could be modeled to inform policy-makers on the impact of changing legislation on the Montana economy.

Appendix – Montana Brewing Survey

Montana Brewing – Economic Impact Study

The Montana Brewers Association has commissioned a study on the economic contribution of brewing in the state of Montana. The study is being conducted by the Bureau of Business and Economic Research (BBER) of the School of Business Administration at The University of Montana.

To be able to estimate the commercial craft brewing industry's economic impact in Montana, the BBER needs to ask a few questions regarding your business' income and expenditures. **Our goal is 100% participation by Montana brewers.** Your participation is appreciated and very important because it will allow us to accurately present the economic impact of the brewing industry in Montana. Individual firm responses will be kept confidential by the BBER and only aggregated results will be presented.

Please return survey by Aug 6, 2012 via email, fax, telephone, or the post.

Note: if you have more than one brewing location, please provide the total for all locations.

If you have questions, please contact Colin Sorenson or Todd Morgan at 406-243-5113.

1) Brewery name: _____

2) Contact person: _____ **Title:** _____

3) What was your company's total beer production (barrels)?

2010 _____

2011 _____

4) What was the sales value from your beer sales?

2010 _____

2011 _____

5) What was the average number of employees who worked for your company? Count as the average number of individuals both full and part-time—not FTEs.

2010 _____

2011 _____

6) What were your total compensation costs (payroll + benefits)?

2010 _____

2011 _____

7) What were your company's total expenditures, excluding labor but including vendor purchases and capital costs?

2010 _____

2011 _____

8) Please estimate the percentage of your total expenditures, excluding labor, that occurred in Montana. This includes direct purchases from an office or warehouse in Montana, despite where goods were ultimately sourced.

2010 _____%

2011 _____%

9) Does your business offer employees these benefits? Please indicate YES or NO for each.

YES NO

	YES	NO
Health Insurance		
Dental Insurance		
Life Insurance		
Retirement		
Short-Term Disability		
Long-Term Disability		
Paid Vacation		
Other		

Please describe "other" benefits:

Thank you for your participation in this important study. All participating Montana brewers will receive a copy of the final report, and we will be presenting the results at the October 7-8, 2012 Montana Brewers Conference in Missoula.

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Ken Richardson – CTA Missoula
Kenr@ctagroup.com
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Marty Byrnes – CTA Great Falls
martyb@ctagroup.com

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The Economic Contribution of Craft Brewing in Montana

October 2012

By:
Colin B. Sorenson
Todd A. Morgan

Prepared for:
Montana Brewers Association

BUREAU OF
BUSINESS
AND ECONOMIC
RESEARCH



The University of
Montana

Introduction

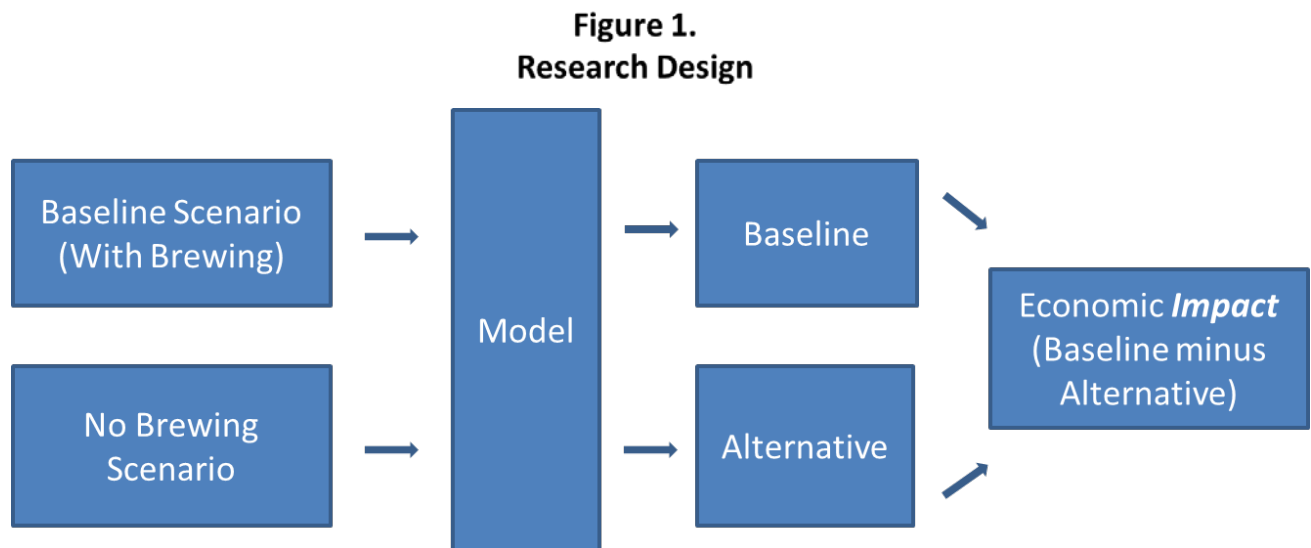
The Bureau of Business and Economic Research (BBER) was commissioned by the Montana Brewers Association (MBA) to study the economic contribution of the craft brewing industry, a growing sector of manufacturing activity in Montana. The project involved working with MBA as well as member and non-member breweries to gather data on production, compensation (wages and salaries plus benefits), expenditures, and other basic operating information for craft breweries in Montana. These data were used in conjunction with an economic impact modeling software package. The research culminated with summarizing and presenting the overall economic impact of craft brewing in the state.

The research was designed to answer the question, “What does the craft brewing industry contribute to the Montana economy?” To begin the analysis, it was critical to obtain accurate data on the income flows that the industry itself produces. The BBER utilized a well-respected economic model, Regional Economic Models, Inc. (REMI), to project the economy with and without brewing industry activities.

A nine-question survey was administered during summer 2012 via email and phone to all Montana brewers. Data were collected for 2010 and 2011 production, sales, employment, compensation,

expenditures, and benefits, with 97 percent of brewers (30 of 31) that were in operation by the end of 2011 responding to the survey¹. Survey data were aggregated and input into REMI by economic region within the state.

As depicted in Figure 1, this research compares an economy where the industry never existed in Montana (Alternative) versus the economy with brewing (Baseline). All impacts presented compare a “with brewing” scenario to a “without brewing” scenario. The differences between the Baseline and Alternative economies represent the total contribution of the operations of craft brewers to the Montana economy.



¹ This does not include 2 breweries that began operating in December 2011, but did not have operational data to report for that month, so they were excluded from the survey data collection process. There were actually 33 breweries in business in Montana by the end of calendar year 2011.

Survey Data

The survey data collected by BBER are presented in Table 1. Production increased from just over 87,000 barrels (bbl) to nearly 103,000 bbl from 2010 to 2011 – an 18 percent increase. Beer sales increased from just under \$22 million to more than \$26 million from 2010 to 2011 – a 20 percent increase.

Employment, including both full- and part-time jobs, increased from 231 to 320 from 2010 to 2011 – a 39 percent increase. Compensation (wages and salaries plus the value of benefits packages) increased from \$5.2 million to \$6.4 million from 2010 to 2011 – a 23 percent increase. Expenditures (excluding labor) increased from \$15.6 million to \$18.8 million from 2010 to 2011 – a 21 percent overall increase.

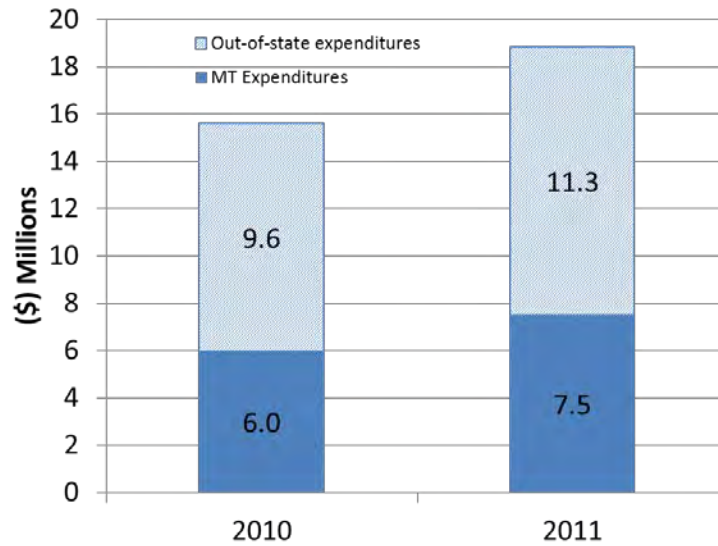
Table 1.
Montana Brewery Survey Data Summary

Category	2010	2011	Percent Change
Production	87,442 Barrels	102,925 Barrels	18%
Beer sales	\$21.8 Million	\$26.1 Million	20%
Employment	231 Jobs	320 Jobs	39%
Compensation	\$5.2 Million	\$6.4 Million	23%
Expenditures <small>(excluding employee compensation)</small>	\$15.6 Million	\$18.8 Million	21%

As shown in Figure 2, brewers were asked what portion of their expenditures, other than employee compensation, occurred in Montana. Overall, expenditures rose by 21 percent, from \$15.6 million to \$18.8 million. The Montana portion of expenditures rose from \$6 million (38 percent of total expenditures) in 2010 to \$7.5 million (40 percent of total expenditures) in 2011. The percentage of expenditures made within the state varied widely amongst brewers, and brewers reported that anywhere from 2 percent to 90 percent of their expenditures were in Montana. Some brewers noted

that they would prefer to buy more supplies from within Montana, but they were unable to obtain some of their inputs locally.

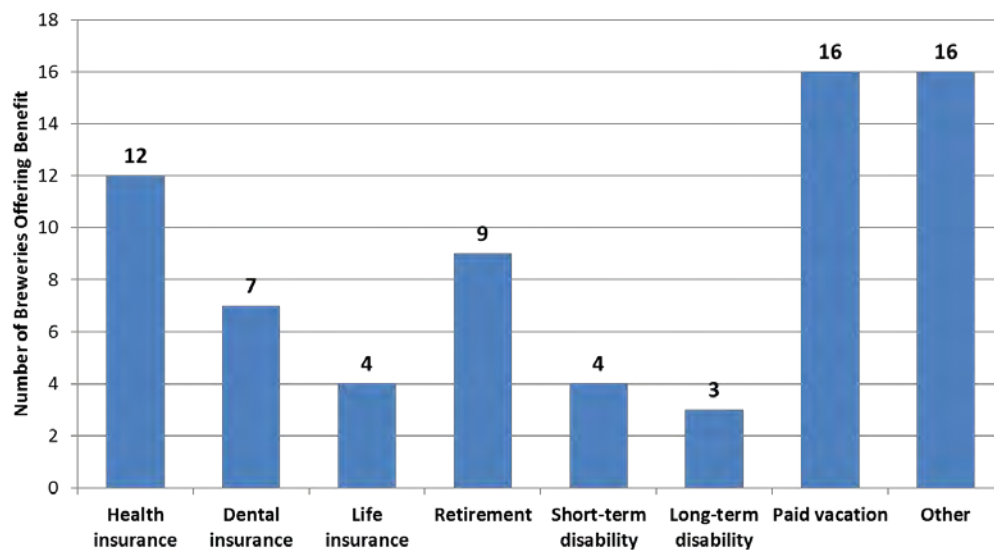
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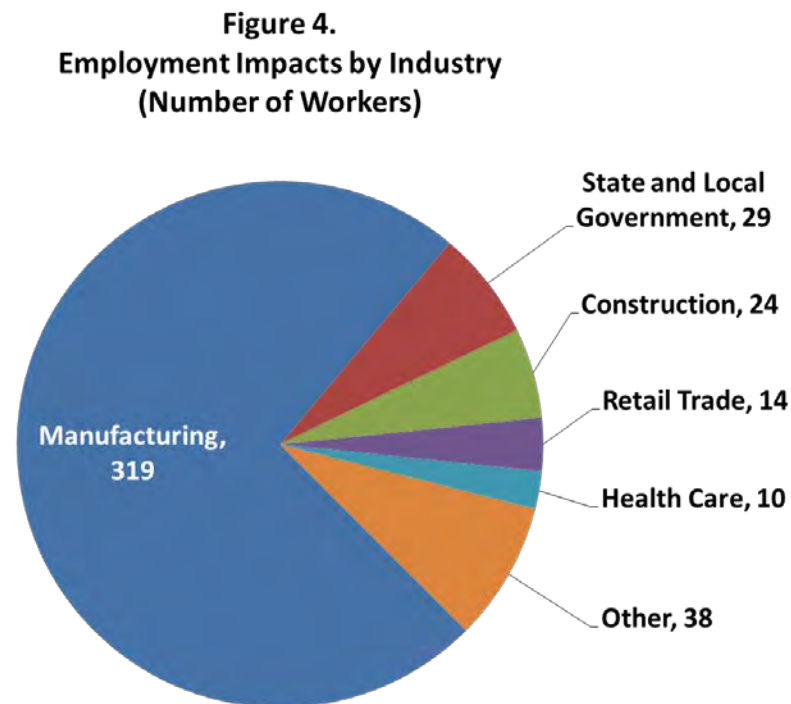
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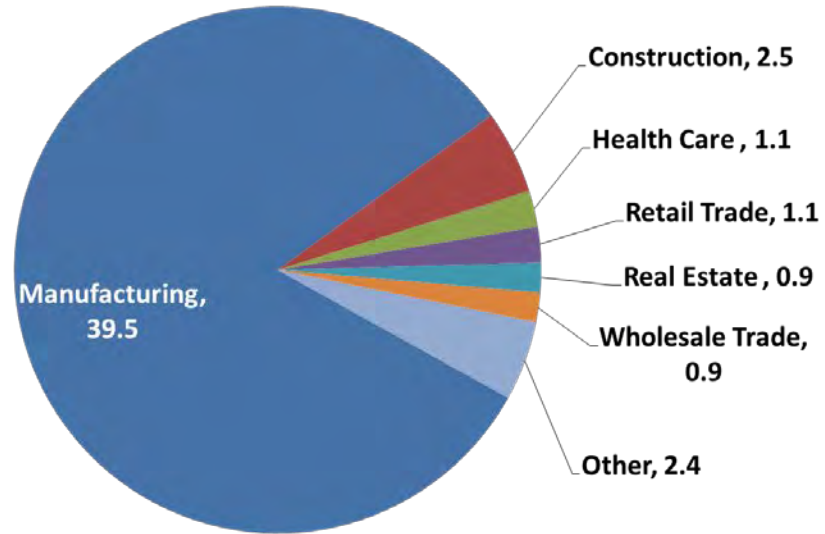
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Economic Regions & Number of Active Breweries, 2011
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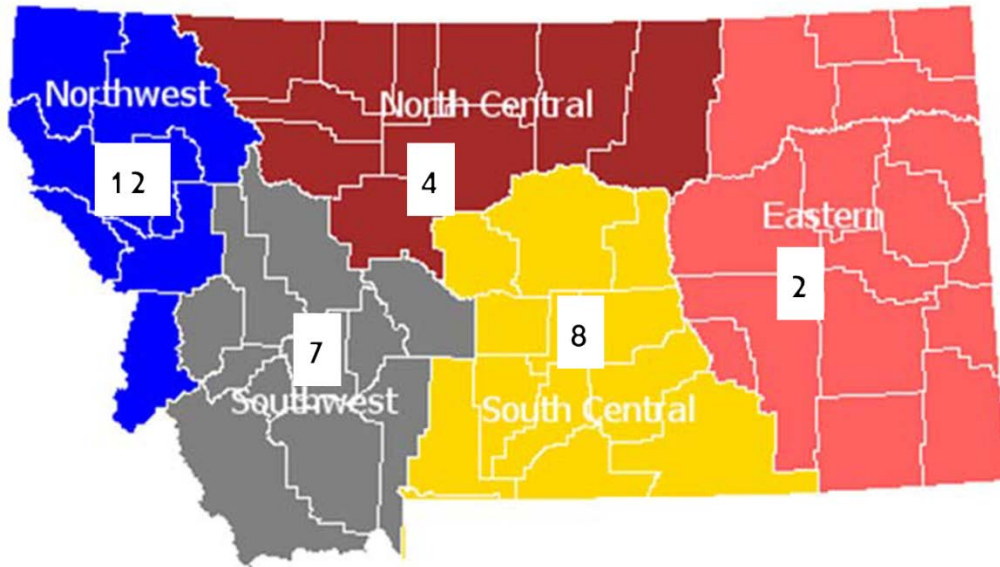
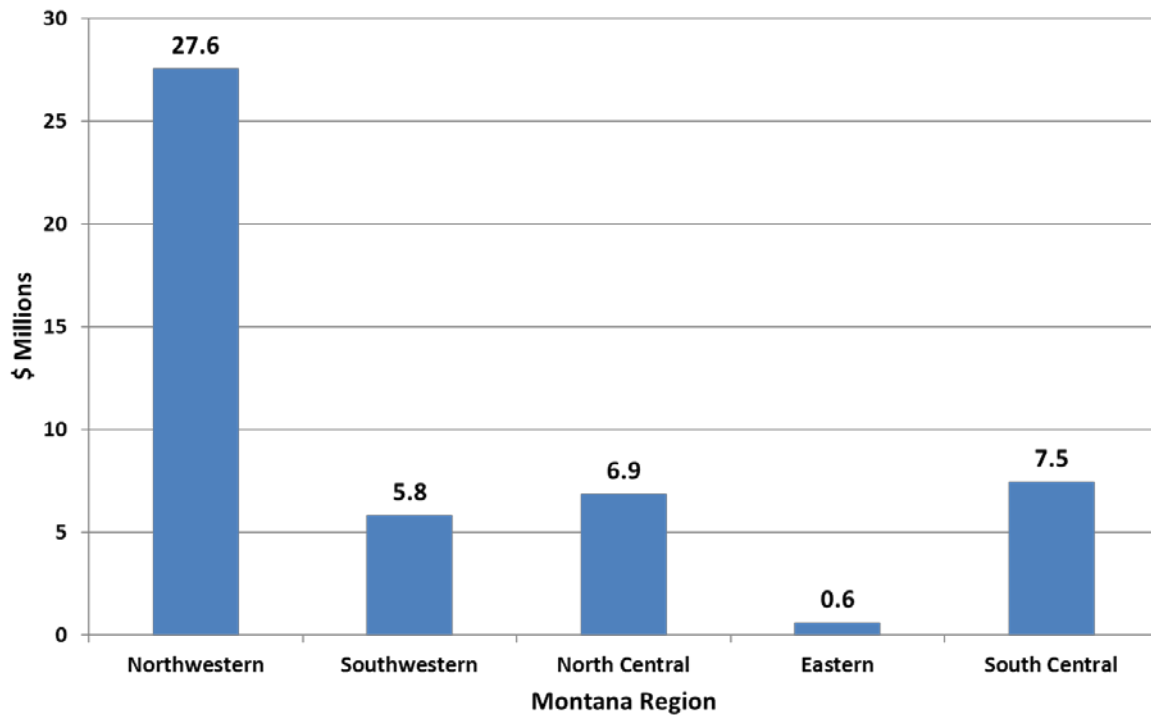
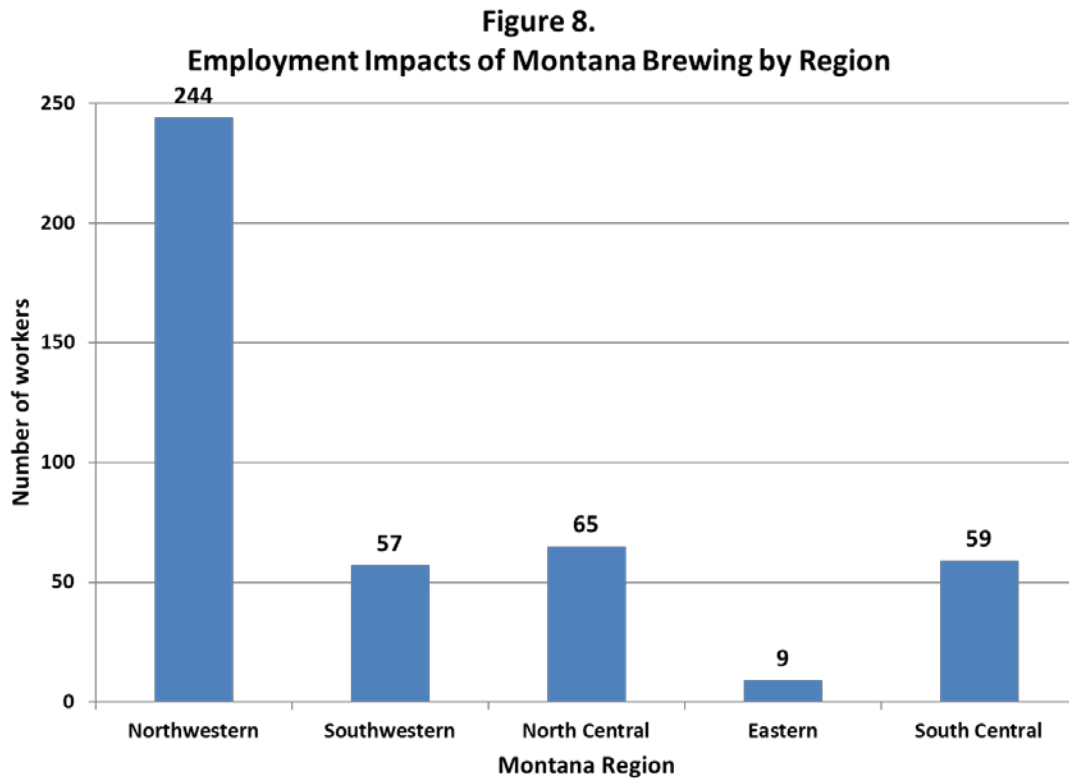


Figure 7.
Output (Gross Sales) Impacts of Montana Brewing by Region





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Based on the data collected from Montana breweries, the industry grew rapidly from 2010 to 2011.

Production rose 18 percent, sales were up 20 percent, employment (both full- and part-time) was up 39 percent, compensation increased 23 percent, and expenditures were up 21 percent. Operations of craft brewers produce a significant impact on the state economy. More than 430 jobs, nearly \$50 million in private sector sales, \$9.8 million in private non-farm compensation, \$1.8 million in government compensation, and \$1.5 million in state government revenues exist in the economy due to craft brewing operations in Montana. Jobs are spread across a wide spectrum of the economy, and impacts recur every year the brewing industry operates.

This work has developed a baseline economic impact of the brewing industry on Montana's economy. In the future, additional research could be conducted to monitor changes in the economic impact of the industry over time. Furthermore, the effects of legislative changes could be modeled to inform policy-makers on the impact of changing legislation on the Montana economy.

Appendix – Montana Brewing Survey

Montana Brewing – Economic Impact Study

The Montana Brewers Association has commissioned a study on the economic contribution of brewing in the state of Montana. The study is being conducted by the Bureau of Business and Economic Research (BBER) of the School of Business Administration at The University of Montana.

To be able to estimate the commercial craft brewing industry's economic impact in Montana, the BBER needs to ask a few questions regarding your business' income and expenditures. **Our goal is 100% participation by Montana brewers.** Your participation is appreciated and very important because it will allow us to accurately present the economic impact of the brewing industry in Montana. Individual firm responses will be kept confidential by the BBER and only aggregated results will be presented.

Please return survey by Aug 6, 2012 via email, fax, telephone, or the post.

Note: if you have more than one brewing location, please provide the total for all locations.

If you have questions, please contact Colin Sorenson or Todd Morgan at 406-243-5113.

1) Brewery name: _____

2) Contact person: _____ **Title:** _____

3) What was your company's total beer production (barrels)?

2010 _____

2011 _____

4) What was the sales value from your beer sales?

2010 _____

2011 _____

5) What was the average number of employees who worked for your company? Count as the average number of individuals both full and part-time—not FTEs.

2010 _____

2011 _____

6) What were your total compensation costs (payroll + benefits)?

2010 _____

2011 _____

7) What were your company's total expenditures, excluding labor but including vendor purchases and capital costs?

2010 _____

2011 _____

8) Please estimate the percentage of your total expenditures, excluding labor, that occurred in Montana. This includes direct purchases from an office or warehouse in Montana, despite where goods were ultimately sourced.

2010 _____%

2011 _____%

9) Does your business offer employees these benefits? Please indicate YES or NO for each.

YES NO

Health Insurance		
Dental Insurance		
Life Insurance		
Retirement		
Short-Term Disability		
Long-Term Disability		
Paid Vacation		
Other		

Please describe "other" benefits:

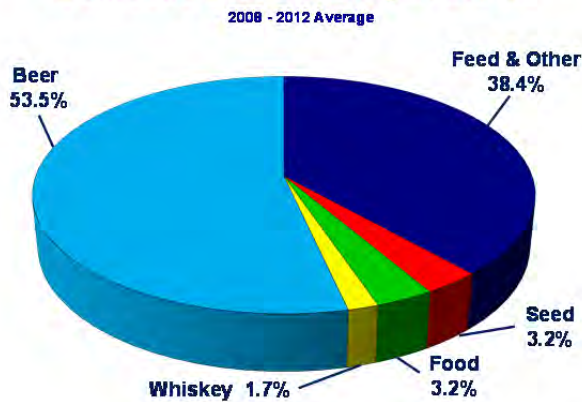
Thank you for your participation in this important study. All participating Montana brewers will receive a copy of the final report, and we will be presenting the results at the October 7-8, 2012 Montana Brewers Conference in Missoula.

Table of Contents

ECONOMIC SIGNIFICANCE OF BARLEY

One of the strengths of the U.S. economy is its crop production and agricultural based industries. Crop and value-added product exports reduce the unfavorable trade balance and generate new employment, grower income, and federal revenue. Maintenance of U.S. strength in agriculture requires continuing efforts to improve crop productivity and quality. U.S. agricultural production that can supply both domestic demands and can compete in world markets will only be accomplished by strong investments in agricultural research programs. Innovative and competitive research will keep the U.S. at the forefront of the development and implementation of new agricultural technologies.

Domestic Use of Barley in the US



Barley is a significant U.S. crop. Barley production has averaged 218 million bushels per year with an estimated annual value of \$785 million as a raw agricultural commodity (2003-2012).

Barley producers stimulate the rural economy through the purchase of fertilizer, seed, chemicals, fuel, labor, other supplies and farm equipment. These variable cash expenses averaged \$524 million annually (2007-2012).

The impact of barley on the U.S. economy is even more significant if the value-added products resulting from its utilization as an animal feed, in malt beverages, and in food products are considered. The economy also benefits from exports which annually average \$76 million for barley and its milled products, \$229 million for malt and malt extracts, \$344 million for beer, and \$1.43 billion for whiskey (2008-2012).

BARLEY BALANCE SHEET

ANNUAL FEDERAL RESEARCH INVESTMENT	ANNUAL RETURN ON INVESTMENT
\$ 12.7 USDA-Agricultural Research Service (ARS)* 2.2 USDA-NIFA Triticeae CAP 0.0 Other USDA-NIFA Barley Funding 0.0 Special Research Grants NA Formula Funds \$14.9 Million	\$ 0.8 Raw agricultural commodity 246.6 Brewing industry business activity 3.7 Federal excise tax revenue 19.1 Federal income tax 2.4 Value-added use as feed NA Value-added use as food \$272.6 Billion

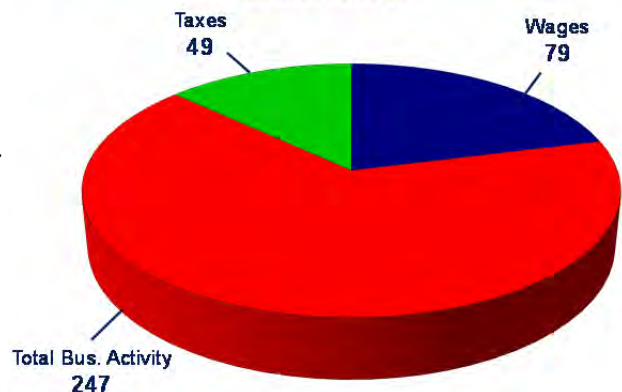
*FY2014 CR Funding Level
 NA: Not Available

ECONOMIC CONTRIBUTION OF THE BREWING INDUSTRY

Barley is a critical and primary raw material for beer. **Without malting barley, there would be no beer.** The economic value of the U.S. brewing industry is substantial.

Economic Contribution of Brewing

Billions of Dollars



BARLEY: ECONOMIC SIGNIFICANCE BY STATE

State	Annual ¹ Production	Crop ¹ Value	Economic Contribution of the Brewing Industry ²				Malt Plants	Other Uses
			Employment	Total Bus. Activity	Taxes ³	Brewers		
	(million bu)	(million \$)		(million \$)	(million \$)			
Alabama			21,660	1,924	465	17		
Alaska	0.2	0.6	4,460	476	97	21		
Arizona	4.5	17.0	36,210	3,511	749	46		Livestock feed.
Arkansas			11,880	1,082	198	14		
California	3.7	14.2	241,640	34,240	6,307	458		Livestock feed.
Colorado	8.0	31.6	58,360	14,787	2,703	164	2	Livestock feed.
Connecticut			21,130	2,285	481	30		
Delaware	1.9	4.5	4,700	465	83	13		
Florida			139,190	14,151	3,155	72		
Georgia			64,610	8,677	1,847	42		
Hawaii			8,990	813	193	13		
Idaho	48.7	198.0	10,610	978	198	30	3	Livestock feed.
Illinois			86,400	10,110	1,927	75	1	Distillers.
Indiana			38,690	3,318	648	51		
Iowa			21,990	1,974	340	33		
Kansas	0.4	1.2	17,550	1,552	293	22		Livestock feed.
Kentucky	0.7	1.5	16,520	1,620	332	15		Distillers.
Louisiana			32,450	2,992	582	17		
Maine	1.1	2.4	10,370	874	192	43		
Maryland	2.9	7.0	34,670	3,138	785	34		
Massachusetts			46,420	5,767	1,143	72	1	
Michigan	0.6	1.3	64,530	6,078	1,205	120	1	Livestock feed.
Minnesota	6.1	20.5	34,760	3,969	665	52	3	Livestock feed.
Mississippi			12,300	991	230	3		
Missouri			64,320	13,188	2,660	58		
Montana	37.5	146.1	8,530	656	120	38	1	Livestock feed.
Nebraska	0.2	0.3	13,470	1,214	203	23		Livestock feed.
Nevada	0.2	0.6	17,540	1,580	410	27	1	Livestock feed.
New Hampshire			10,320	1,350	302	21		
New Jersey	0.1	0.3	52,600	6,800	1,464	44		
New Mexico			10,740	838	201	35		Livestock feed.
New York	0.5	1.6	108,190	14,036	2,942	110	1	Livestock feed.
North Carolina	1.1	2.8	65,800	7,130	1,454	71	2	Livestock feed.
North Dakota	68.1	228.3	6,130	512	95	4	1	Livestock feed.
Ohio	0.3	0.7	82,730	10,016	1,951	63		
Oklahoma			17,800	1,560	293	13		Livestock feed.
Oregon	2.9	9.0	29,330	2,831	485	141	1	Livestock feed.
Pennsylvania	3.6	10.5	70,650	8,694	1,641	115		Livestock feed.
Rhode Island			5,780	508	108	9		
South Carolina			26,260	2,015	539	19		
South Dakota	1.5	4.5	6,260	492	88	9		Livestock feed.
Tennessee			29,010	2,944	712	29		Distillers.
Texas			160,390	21,007	4,051	126	1	Livestock feed.
Utah	2.3	7.5	10,630	1,029	180	23		Livestock feed.
Vermont			6,130	552	117	26		
Virginia	3.4	9.1	51,830	7,375	1,562	53		Livestock feed.
Washington	11.4	36.4	42,160	4,287	946	179	1	Livestock feed.
West Virginia			9,090	675	157	9		
Wisconsin	1.4	3.7	60,630	8,653	1,438	122	4	Livestock feed.
Wyoming	6.0	25.1	3,590	297	53	15		Livestock feed.
Total U.S.	218.4	784.6	2,015,120	246,566	49,124	2,851	24	

¹ Average annual production and crop values (2003-2012). (Source: USDA\NASS). Data not available for all years for some minor states.

² Source: Economic Impact, 2013 Prepared for the Beer Institute by John Dunham and Associates.

³ Taxes paid and generated -business, consumption & personal.

MAJOR & REGIONAL BREWERS IN THE UNITED STATES¹

STATE	COMPANY	CITY
Alaska	Alaskan Brewing & Bottling Co.	Juneau
Arizona	Four Peaks Brewing Co.	Tempe
California	Anchor Brewing Co.	San Francisco
	Anderson Valley Brewing Co.	Boonville
	Anheuser-Busch, Inc.	Fairfield
	Anheuser-Busch, Inc.	Los Angeles
	Ballast Point Brewing Co.	San Diego
	Bear Republic Brewing Co.	Healdsburg
	BJ's Chicago Pizza & Brewery	Huntington Beach
	Firestone Walker Brewing Co.	Paso Robles
	Gordon Biersch Brewing Co.	San Jose
	Green Flash Brewing Co.	San Diego
	Hangar 24 Craft Brewery	Redlands
	Karl Strauss Breweries	San Diego
	Lagunitas Brewing Co.	Petaluma
	Lost Coast Brewery and Café	Eureka
	Mendocino Brewing Co.	Ukiah
	MillerCoors, LLC	Irwindale
	North Coast Brewing Co.	Fort Bragg
	Pyramid Breweries	Berkeley
	Sierra Nevada Brewing Co.	Chico
	Speakeasy Ales and Lagers	San Francisco
	Stone Brewing Co.	San Marcos
	Trumer Brauerei	Berkeley
	21 ST Amendment Brewery	San Francisco
Colorado	Anheuser-Busch, Inc.	Fort Collins
	Avery Brewing Co.	Boulder
	Boulder Beer Co.	Boulder
	Breckenridge Brewery	Denver
	Great Divide Brewing Co.	Denver
	Left Hand Brewing Co.	Longmont
	MillerCoors, LLC	Golden
	New Belgium Brewing Co.	Fort Collins
	Odell Brewing Co.	Fort Collins
	Oskar Blues Brewery	Longmont
	SKA Brewing	Durango
Connecticut	Thomas Hooker Brewing Co.	Bloomfield
Delaware	Dogfish Head Craft Brewery	Milton
	Fordham & Dominion Brewing Co.	Dover
Florida	Anheuser-Busch, Inc.	Jacksonville
	Cigar City Brewing Co.	Tampa
	D.G. Yuengling & Son	Tampa
Georgia	Anheuser-Busch, Inc.	Cartersville
	MillerCoors, LLC	Albany
	Sweetwater Brewing Co.	Atlanta
	Terrapin Beer Co.	Athens
Hawaii	Kona Brewing Co.	Kailua-Kona
	Maui Brewing Co.	Lahaina
Illinois	Goose Island Beer Co.	Chicago
	Two Brothers Brewing Co.	Warrenville

¹ Breweries with production of 15,000 barrels or more in 2012. Source: Brewers Association

Indiana	Sun King Brewing Three Floyds Brewing Co.	Indianapolis Munster
Kentucky	Lexington Brewing & Distilling Co.	Lexington
Louisiana	Abita Brewing Co.	Abita Springs
Maine	Allagash Brewing Co. D.L. Geary Brewing Co. Shipyard Brewing Co.	Portland Portland Portland
Maryland	Clipper City Brewing Co. Flying Dog Brewing Co.	Halethorpe Frederick
Massachusetts	Berkshire Brewing Co. Boston Beer Co. Harpoon Brewery Ipswich Ale Brewery Wachusett Brewing Co.	South Deerfield Boston Boston Ipswich Westminster
Michigan	Atwater Brewing Co. Bell's Brewery, Inc. Founders Brewing Co. New Holland Brewing Co. Shorts Brewing Co.	Detroit Galesburg Grand Rapids Holland Bellaire
Minnesota	August Schell Brewing Co. Cold Spring Brewery Summit Brewing Co. Surly Brewing Co.	New Ulm Cold Spring St. Paul Minneapolis
Missouri	Anheuser-Busch, Inc. Boulevard Brewing Co. St. Louis Brewery	St. Louis Kansas City Maplewood
Montana	Big Sky Brewing Co.	Missoula
New Hampshire	Anheuser-Busch, Inc. Redhook Ale Brewery, Inc. Smuttnose Brewing Co.	Merrimack Portsmouth Portsmouth
New Jersey	Anheuser-Busch, Inc.	Newark
New York	Anheuser-Busch, Inc. Blue Point Brewing Co. Brewery Ommegang Brooklyn Brewery Genesee Brewing Co. Greenpoint Beer Works Inc. Ithaca Beer Co. The Matt Brewing Co. Sixpoint Brewery Southern Tier Brewing Company Olde Saratoga Brewing Co.	Baldwinsville Patchogue Cooperstown Brooklyn Rochester Brooklyn Ithaca Utica Brooklyn Lakewood Saratoga Springs
North Carolina	Highland Brewing Co. MillerCoors, LLC New Belgium Brewing Co. Oskar Blues Brewery Sierra Nevada Brewing Co.	Ashville Eden Asheville Brevard Mills River
Ohio	Anheuser-Busch, Inc. Boston Beer Co. Great Lakes Brewing Co. MillerCoors, LLC	Columbus Cincinnati Cleveland Trenton

¹ Breweries with production of 15,000 barrels or more in 2012. Source: Brewers Association,

Oregon	Bridgeport Brewing Co. Deschutes Brewing Co. Full Sail Brewing Co. Ninkasi Brewing Co. Pyramid Breweries Rogue Ales Widmer Brothers Brewing Co.	Portland Bend Hood River Eugene Portland Newport Portland
Pennsylvania	Boston Beer Co. D.G. Yuengling Son, Inc. The Lion Brewery, Inc. Straub Brewery, Inc. Tröegs Brewing Co. Victory Brewing Co. Western Pennsylvania Brewing Yards Brewing Co.	Breinigsville Pottsville Wilkes-Barre St. Mary's Harrisburg Downingtown Latrobe Philadelphia
Rhode Island	Narragansett Brewing Co.	Providence
Tennessee	Blues City Brewing Co. Yazoo Brewing Co.	Memphis Nashville
Texas	Anheuser-Busch, Inc. MillerCoors, LLC Rahr and Sons Brewing Co. Real Ale Brewing Co. Saint Arnold Brewing Co. Spoetzl Brewery, Inc.	Houston Fort Worth Fort Worth Blanco Houston Shiner
Utah	Uinta Brewing Co. Utah Brewers Cooperative	Salt Lake City Park City
Vermont	Harpoon Brewery Long Trail Brewing Co. Magic Hat Brewing Co. Otter Creek Brewing Co.	Windsor Bridgewater Corners South Burlington Middlebury
Virginia	Anheuser-Busch, Inc. MillerCoors, LLC Starr Hill Brewing Co.	Williamsburg Elkton Crozet
Washington	Elysian Brewing Co. Fish Brewing Co. Georgetown Brewing Co. Mac and Jack's Brewery Pyramid Breweries Redhook Ale Brewery	Seattle Olympia Seattle Redmond Seattle Woodinville
Wisconsin	Capitol Brewing Co. City Brewing Co. Jacob Leinenkugel Brewing Co. Lakefront Brewery Inc. Minhas Craft Brewery MillerCoors, LLC New Glarus Brewing Co. Sprecher Brewing Co. Stevens Point Brewery	Middleton La Crosse Chippewa Falls Milwaukee Monroe Milwaukee New Glarus Glendale Stevens Point

¹ Breweries with production of 15,000 barrels or more in 2012. Source: Brewers Association

MALTING PLANTS IN THE UNITED STATES

STATE	COMPANY	CITY
Colorado	Colorado Malting Company	Alamosa
	MillerCoors, LLC	Golden
Idaho	Anheuser-Busch, Inc.	Idaho Falls
	Great Western Malting Company	Pocatello
	InteGrow Malt	Idaho Falls
Illinois	Mammoth Malt	Thawville
Massachusetts	Valley Malt	Hadley
Michigan	Michigan Malt	Shepherd
Minnesota	Anheuser-Busch, Inc.	Moorhead
	Malteurop North America	Winona
	Rahr Malting Company	Shakopee
Montana	Malteurop North America	Great Falls
Nevada	Rebel Malt	Reno
New York	Farmhouse Malt	Newark Valley
North Carolina	Farm Boy Farms	Pittsboro
	Riverbend Malt	Ashville
North Dakota	Cargill Malt	Spiritwood
Oregon	Christensen Farms Malting Company	McMinnville
Texas	Blacklands Malt	Leander
Washington	Great Western Malting Company	Vancouver
Wisconsin	Malteurop North America	Milwaukee
	Briess Malt & Ingredients Company	Chilton
	Briess Malt & Ingredients Company	Waterloo
	Cargill Malt	Sheboygan

Future of Malting Barley In North America



**Keeping Barley Competitive
With Other Crops**

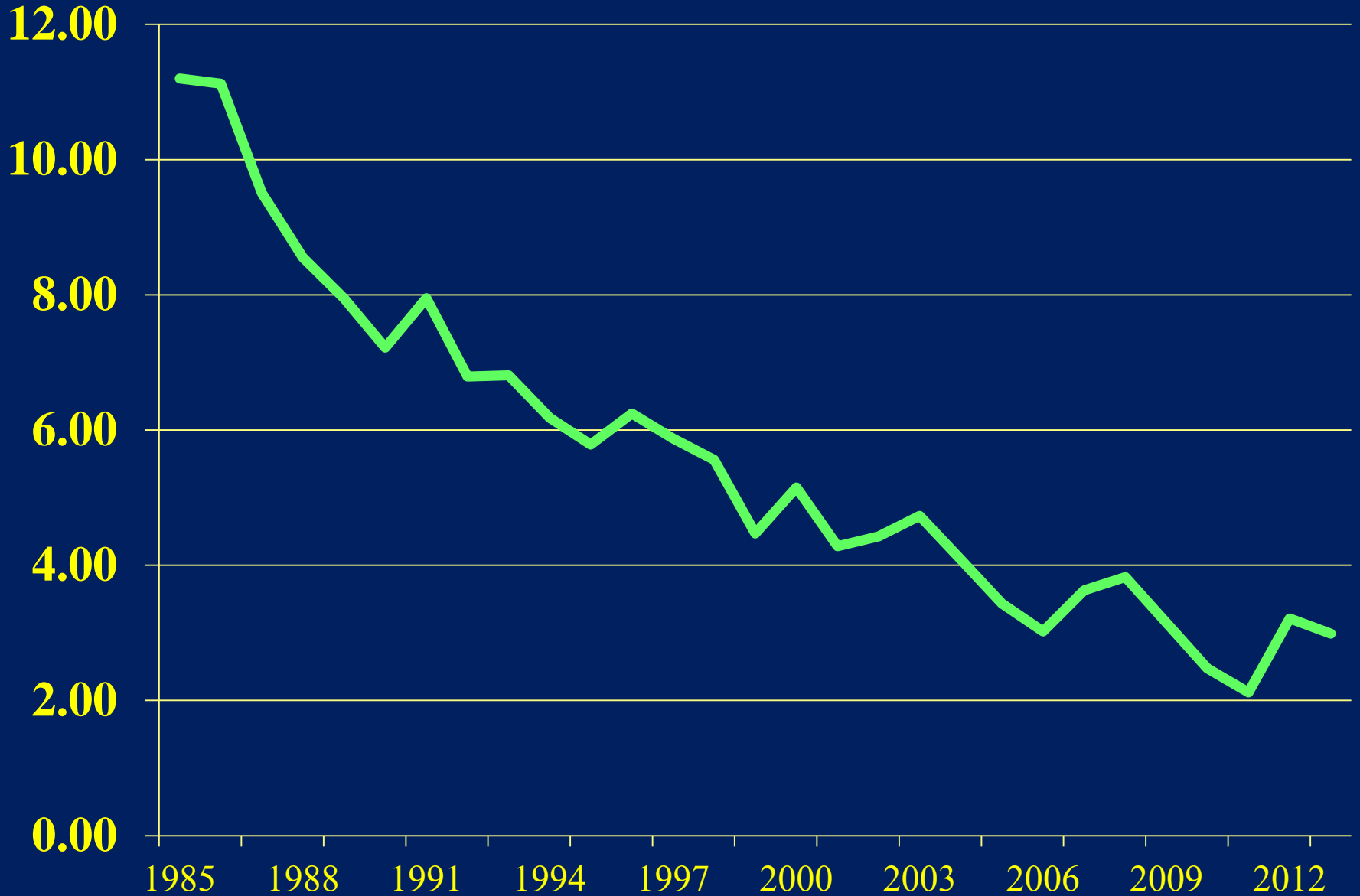
NO BARLEY

NO BEER!

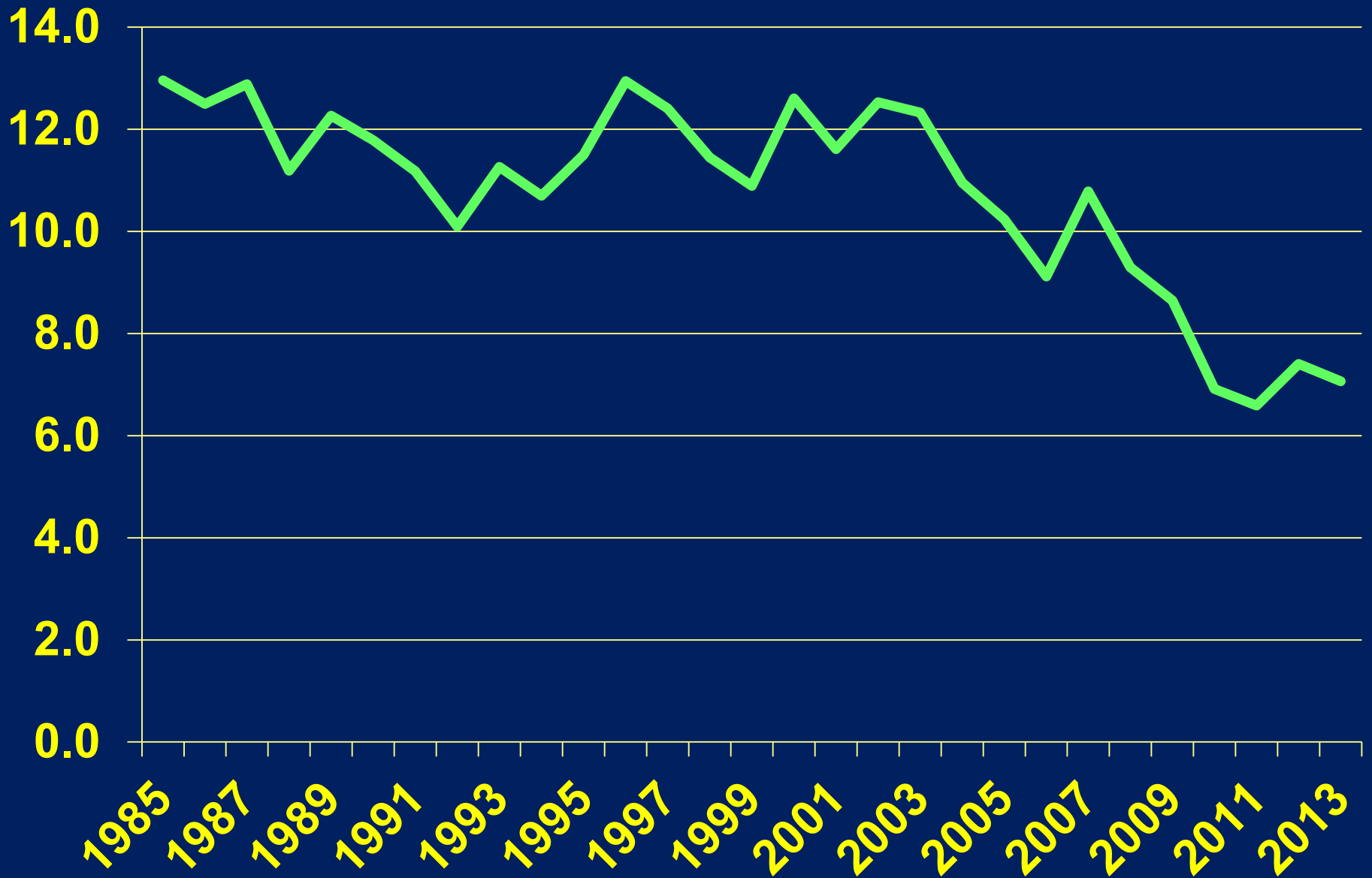


US Barley Acreage

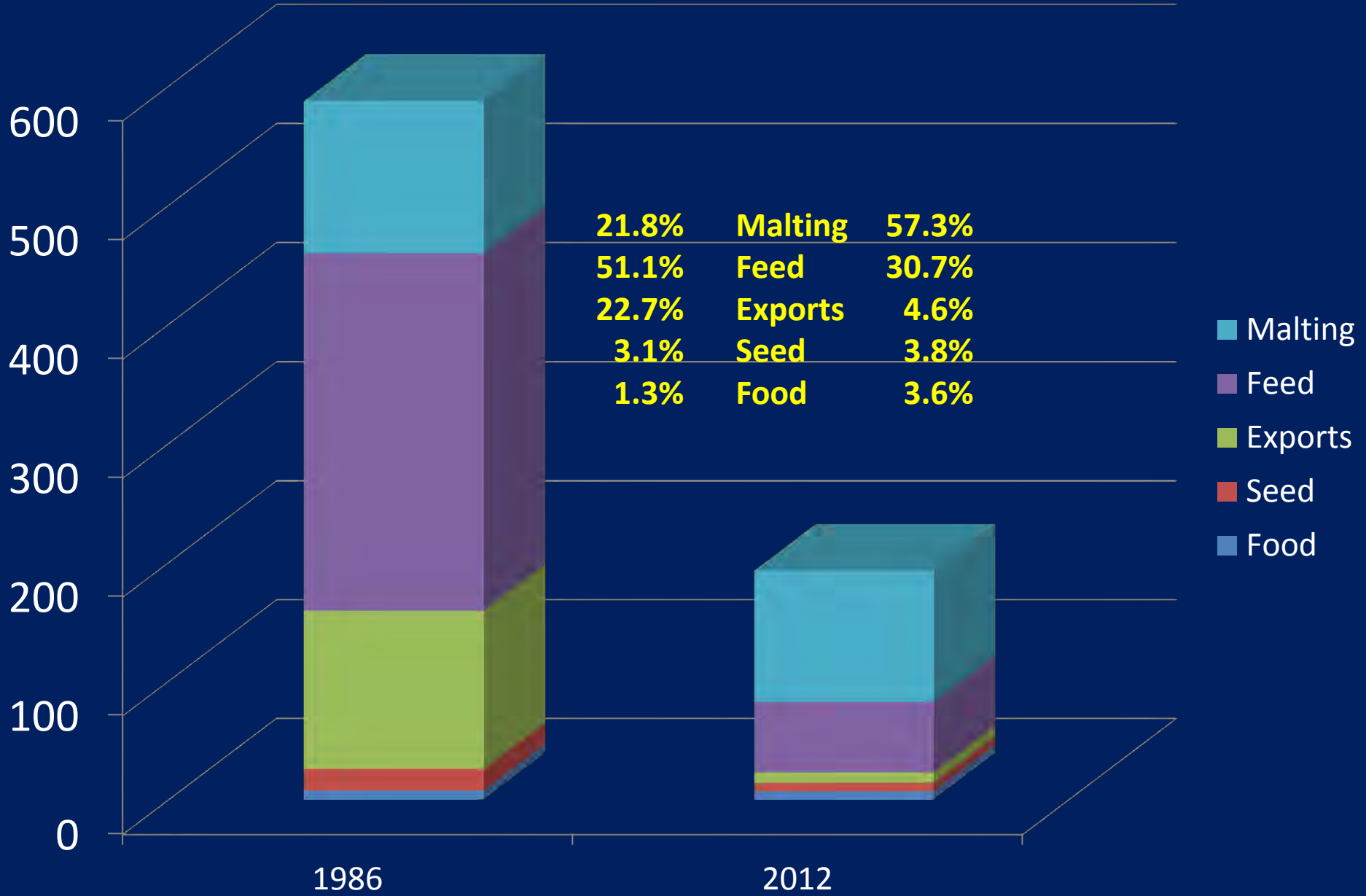
Million Acres



Canadian Barley Acreage

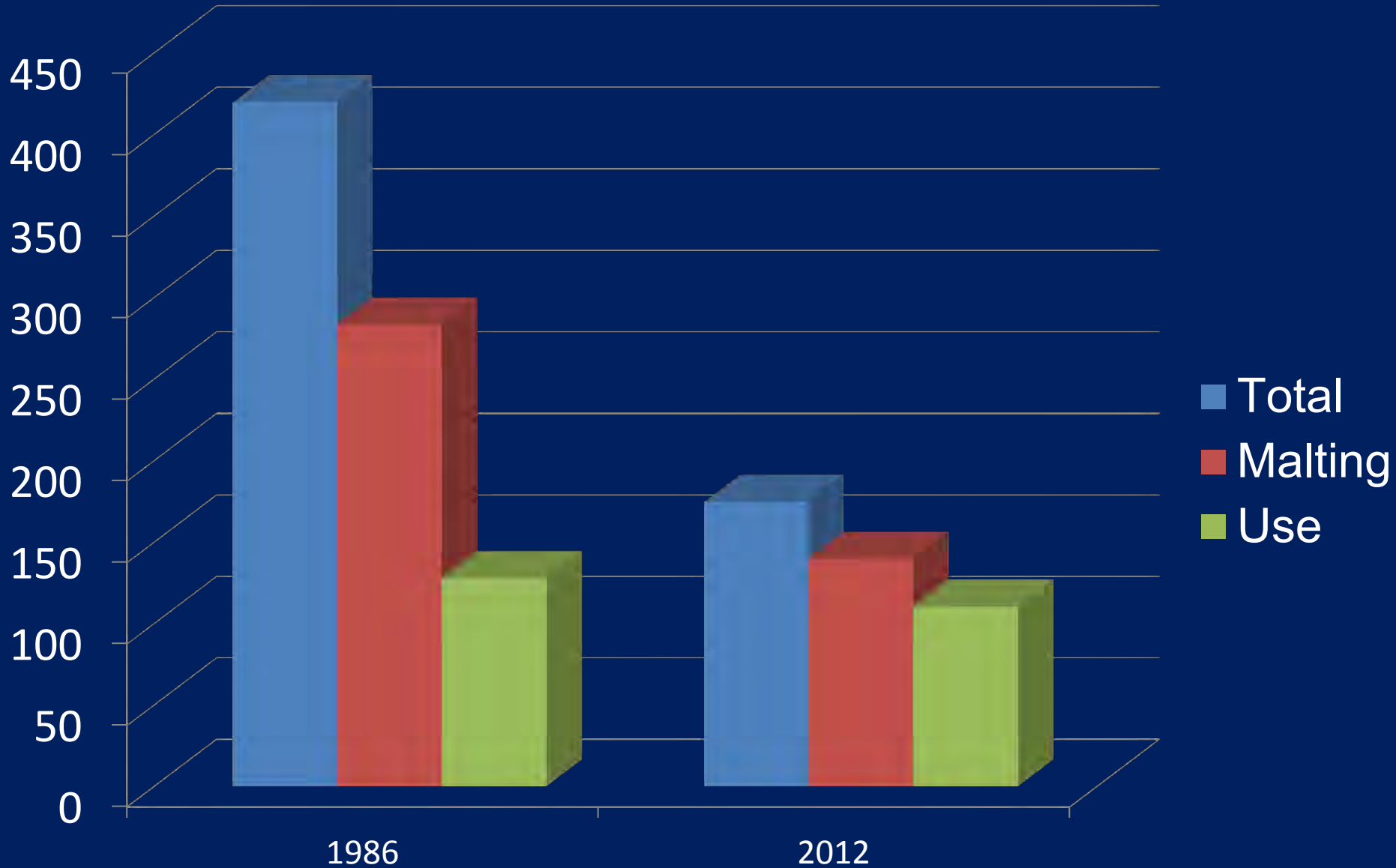


US Barley Use



US Barley Production & Malt Use

CO, ID, MN, MT, ND, WY



Why Has Barley Acreage Declined?

Static domestic malt use, limited barley & malt exports

Decline in use for feed = primary secondary use

Competition from abundant supplies of corn and dried distillers grain (DDGs)

Static & limited food use – although has FDA Healthy Heart Claim

USDA Barley Health Benefits Project – AMBA/NBIC lobbying

High risk crop – many chances for failure in making malting grade

Good return as malting, low or no return as feed

Risks: - Fusarium head blight (scab), other diseases, drought & heat stress, quality requirements

Competition with other crops – GROWERS HAVE OTHER OPTIONS

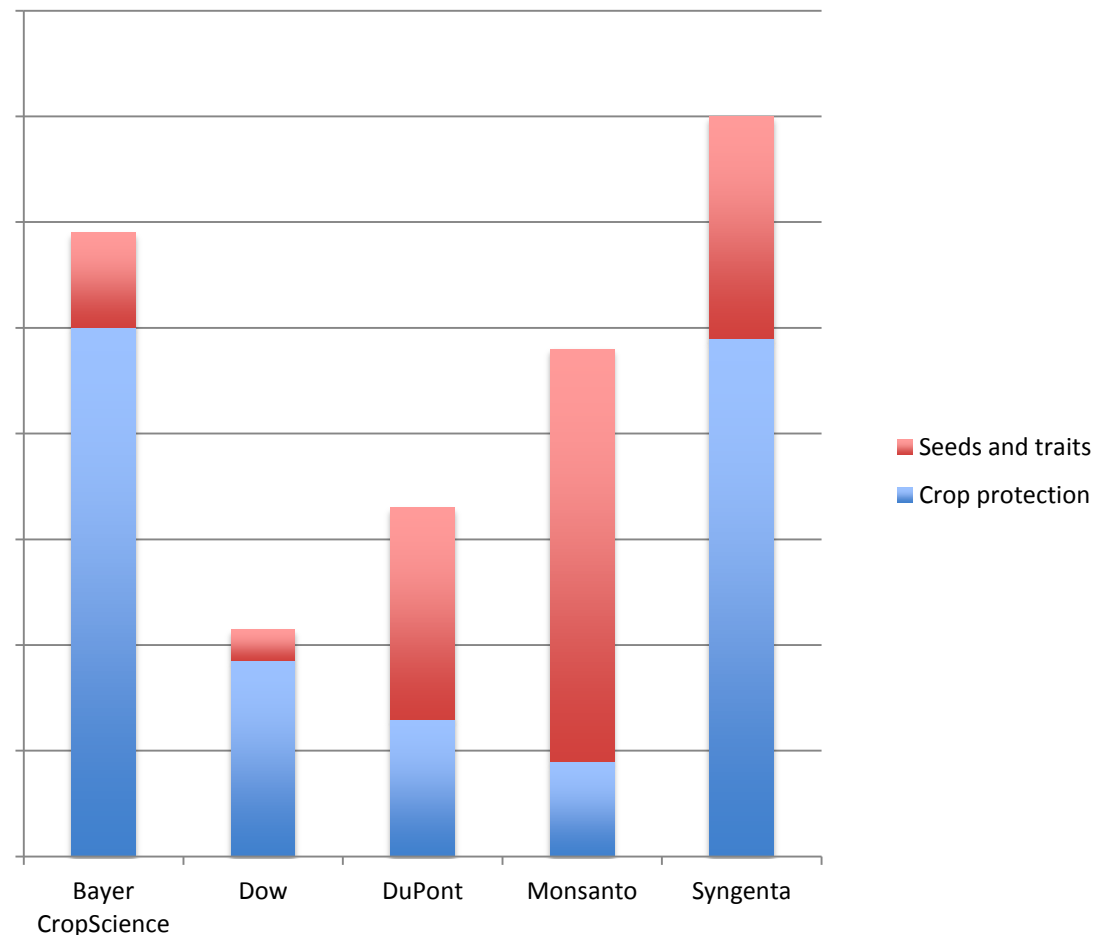
Corn, soybeans, canola = large and growing markets

Substantial investment by biotech seed companies, including GM variety development, in these crops and now wheat

Expenditures: Crop Protection and Seeds and Traits 1990-2008

- Bayer, Syngenta, BASF, DOW and DuPont were the firms that spent the most on Crop Protection R&D.
- Monsanto dominates the “seeds and traits” sector
- Comparative R&D Expenditures
 - Wheat—about 70c/acre/year
 - GM Row crops: \$10/acre/year

Expenditures in billions



Slide courtesy Dr. Bill Wilson, NDSU

Why Has Barley Acreage Declined?

Biotech Crops with improved traits, including GM, have pushed barley out of higher rainfall areas into more marginal, dry ones

What happens to barley when it faces competition from GM drought tolerant corn, wheat and other crops that are being developed ?

Barley research & variety development primarily in public sector

State and provincial universities; USDA-ARS and Agriculture & Agri-Food Canada

Limited and declining public sector investment

Limited variety development by companies

US = **Two brewers, one maltster**, one private sector company – all traditional breeding

- minor part of their business, driven to meet needs, not profit

- *depend on public sector for other research needs*

Little or no interest by biotech seed companies in barley

Low acreage compared to other major crops

Substantial cost to commercialize a GM variety

Discovery, Development and Deregulation Costs of a GM Trait

Category		Cost (\$ million)	Number of responses
Discovery	Early discovery	17.6	5
	Late discovery	13.4	5
	Total cost	31.0	5
Construct optimization		28.3	5
Commercial event production & selection		13.6	6
Introgression breeding and wide-area testing		28.0	6
Regulatory science		17.9	6
Deregulation and regulatory affairs		17.2	6
Total		\$136.0	\$105 w/o Discovery

GM Barley?

Current Status & Considerations

Experimental GM barley lines have been developed

Lines with various genes for resistance to Fusarium head blight (scab)

USDA-ARS US Wheat & Barley Scab Initiative funded researchers

High beta-glucanase lines to improve chicken feed

Washington State University

None commercialized

GM lines grown in hydroponic cultivation in geothermal greenhouses in Iceland for commercial production of pure proteins for research (*Cell Sciences*)

No commercial field production of GM barley

Strong support for development of GM barley by barley grower

organizations - Growers are experienced in growing GM crops and feel GM barley is needed to keep barley competitive with other crops

GM Barley?

Current Status & Considerations

Growing consumer resistance and concerns about GM

Mixed views of malting, brewing, distilling, and food end-users

Strongly opposed - to neutral - to supportive

Thus no clear signal to biotech seed companies to pursue

Developmental costs of GM barley too high to recover investment

Low acreage compared to major crops and thus limited seed sale potential

A unique trait, with exclusive IP rights, and substantial economic benefits (e.g. drought tolerance, major disease resistance) that could be used worldwide, may provide viable market

American Malting Barley Association, Inc. Biotechnology Policy Statement

June, 2008

The American Malting Barley Association, Inc. (AMBA) provides funding for basic barley research in plant physiology, biochemistry and fundamental genomics as well as for more applied research in barley variety development. In addition, AMBA is involved in various federal programs funding barley biotechnology research to ensure access to current science and to keep barley competitive with other crops. At this time, there are no commercially available GM barley varieties in North America. AMBA is opposed to the commercial release of GM barley varieties.

JUNE, 2009

The American Malting Barley Association, Inc. (AMBA) provides funding for basic barley research in plant physiology, biochemistry and fundamental genomics as well as for more applied research in barley variety development. In addition, AMBA is supportive of various federal and state programs funding barley biotechnology research to ensure scientific advancement and to keep barley competitive with other crops.

GM Barley Conclusions

No commercial GM barley expected in foreseeable future

Cost of commercialization precludes public sector university or federal research agency commercialization

Would require Biotech seed company to commercialize – none appear interested at this time

If work was initiated now, and gene discovery & construction, gene transfer, and utility already demonstrated, it would still take an estimated 10 years+ to complete the process to a commercially approved GM barley

GM WHEAT

Strong grower support combined with change of view of many end-users (e.g. millers, bakers, food companies) from opposition to support due to concerns about declining wheat acreage and competition with GM crops

Accordingly, biotech seed companies are now working on wheat, often in collaboration with the public sector universities that have the varieties needed for gene trait introgression

Current estimate for first commercial GM wheat = 6 Years

Considerations for malting, brewing, and distilling industries

Production of wheat products if you want to be non-GM

Comingling of GM wheat with non-GM barley

Most barley farmers also grown wheat

Wheat & barley grown in same area move through same elevator & transportation systems

Barley Biotechnology Tool Box

X - No GM variety development

Targeted genetic improvements without being transgenic (GM)

Induce base pair gene changes by the plant not through gene transformation technology

Rapid Trait Development system (RTDS) - *Cibus*
(*considered mutagenesis technology by USDA*)

Doubled Haploid (DH) Barley Line Development

Rapid development of genetically homozygous varieties

Barley Biotechnology Toolbox

Gene tracking Technology (genotyping)

Initial methodology = one gene

Current technology = tens of thousands of genes at one time

Current major genotyping technology

Based on Single Nucleotide Polymorphisms (SNPs)

Illumina BeadXpress system (old) – Illumina iSelect system (new)

Exome capture sequencing

Next generation technology for genotyping

Genotyping by Sequencing (GBS)

Gene tracking applications

Marker Assisted Selection (MAS)

Track introgression of one or a few genes

Genomic Selection (GS)

Track thousands of genes to develop lines with desired agronomic & quality traits

Barley Biotechnology Challenge

\$\$\$ - Most all funding from limited public sector sources

vs billions being invested by biotech seed companies in other crops

State universities & USDA-ARS research locations

USDA-ARS Small Grains Genotyping Laboratories (4)

Fargo, ND; Manhattan, KS; Raleigh, NC; Pullman, WA

Created through earmarks – AMBA/NBIC & wheat stakeholder lobbying

USDA-ARS US Wheat & Barley Scab Initiative grant program

USDA-NIFA Agriculture & Food Research Initiative (AFRI) Competitive Grant Program

Grants to individual scientists

Large grants to multi-researcher, discipline, and institution coordinated projects

Triticeae (barley & wheat) Agricultural Coordinated Project (TCAP)

\$25 million (\$5M/year): 2011-2015

Keeping Barley Competitive With Other Crops

Barley biotechnology research in of itself is not enough to keep barley competitive with biotech seed crops

Coordinated research in many disciplines is needed

Breeding, genetics, molecular biology, biochemistry, physiology, pathology, management

Adequate & effective national public sector barley research infrastructure

Stakeholder funding, direction, and collaboration

American Malting Barley Association (AMBA)

Brewing & Malting Barley Research Institute (BMBRI, Canada)

Brewers Association (BA)

Individual malting & brewing companies

State barley grower organizations

AMBA

National Coordinator of US Malting Barley Research

Facilities



**Adequate & Effective National
Public Sector
Barley Research Infrastructure**

Funding

AMBA, BA
Federal, State,
Growers, Brewers,
Maltsters



Direction



Personnel



AMBA lobbies Congress, Federal Agencies, and State Universities to positively impact all these research infrastructure components

AMBA also lobbies with barley growers for favorable federal farm program provisions (e.g. crop insurance)



American Malting Barley Association, Inc.

(Founded in 1938 as the Malt Research Institute)

MISSION: The primary purpose of AMBA is to encourage and support an adequate supply of high quality malting barley for the malting, brewing, distilling and food industries and increase our understanding of malting barley.

VISION: To be the leader in improvement, development, and understanding of malting barley in the US.

PRIMARY OBJECTIVE: Develop six-row and two-row malting barley varieties broadly adapted for the barley production areas of North America with suitable agronomic, malting, and brewing performance.

US Malting Barley Variety Development Programs

(breeding, genetics, supporting and other research)

Montana State University
North Dakota State University
Oregon State University
University of California – Davis
University of Minnesota
University of Nebraska
USDA-ARS, Aberdeen, ID
USDA-ARS, Raleigh, NC
Utah State University
Virginia Polytech & State University
Washington State University

AB-InBev
Malteurop
MillerCoors
Limagrain

AMBA member
Funded by AMBA

Other US Malting Barley Research

Biochemistry, Genomics, Molecular Biology, Physiology
Diseases, Insects, Quality, Management, Variety Trials

Programs listed for malting barley variety development plus:

Colorado State University

Cornell University (NY)

Michigan State University

North Carolina State University

Ohio State University

Pennsylvania State University

Texas A&M University

University of Idaho

University of Maryland

University of Vermont

University of Wisconsin

University of Wyoming

USDA-ARS, Fargo, ND

USDA-ARS, Madison, WI

USDA-ARS, Manhattan, KS

USDA-ARS, Pullman, WA

USDA-ARS, Stillwater, OK

USDA-ARS, St. Paul, MN

AMBA funding

Canadian Malting Barley Variety Development Programs

Primary

AAFC, Brandon, MB

University of Saskatchewan

Alberta Agriculture and Rural Development

Secondary

Sapporo Breweries Ltd.

Syngenta

US Varieties are entered into Canadian testing system for potential registration and production

Brewing & Malting Barley Research Institute (BMBRI) – AMBA's Canadian Counterpart

AMBA Quality Evaluation Program

Step 1 - Micro malting evaluations @ USDA-ARS Cereal Crops Research Unit, Madison, WI – 5,000 to 6,000 lines/year – AMBA provides supporting funds

Step 2 - AMBA pilot scale malting evaluations by collaborating members - Average of 35+ lines/year

Step 3 – AMBA Plant Scale Evaluation Program

<u>VARIETY/LINE</u>	<u>PROGRAM</u>	<u>BREWER TESTING</u>
<u>Western Winter Two-Row</u>		
Endeavor	USDA-ARS, ID	AB-InBev, MillerCoors
02Ab669	USDA-ARS, ID	AB-InBev, New Glarus
<u>Western Spring Two-Row</u>		
2Ab04-X01084-27	USDA-ARS, ID	New Belgium, Sierra Nevada
2Ab17271	USDA-ARS, ID	Briess, New Glarus
<u>Midwest Spring Two-Row</u>		
2ND25276	ND State University	AB-InBev, Bell's, MillerCoors
<u>Midwest Spring Six-Row</u>		
ND22421	ND State University	MillerCoors
ND26891	ND State University	AB-InBev, MillerCoors

AMBA 2014 Recommended Varieties

Two-Row

<i>ABI Voyager (2014)</i>	<i>AB-InBev</i>
<i>AC Metcalfe (2005)</i>	<i>Agriculture & Agrifood Canada</i>
<i>CDC Copeland (2007)</i>	<i>University of Saskatchewan</i>
<i>CDC Meredith (2013)</i>	<i>University of Saskatchewan</i>
<i>Charles*</i> (2009)	<i>USDA ARS, Aberdeen, ID</i>
<i>Conlon (2000)</i>	<i>North Dakota State University</i>
<i>Conrad (2007)</i>	<i>AB-InBev</i>
<i>Expedition (2013)</i>	<i>Malteurop</i>
<i>Harrington (1989)</i>	<i>University of Saskatchewan</i>
<i>Hockett (2010)</i>	<i>Montana State University</i>
<i>Merit (2000)</i>	<i>AB-InBev</i>
<i>Merit 57 (2010)</i>	<i>AB-InBev</i>
<i>Moravian 37 (2010)</i>	<i>MillerCoors</i>
<i>Moravian 69 (2010)</i>	<i>MillerCoors</i>
<i>Pinnacle (2011)</i>	<i>North Dakota State University</i>
<i>Scarlett (2008)</i>	<i>Saatzzucht Joseph Breun GdbH, Germany</i>
<i>Wintmalt*</i> (2013)	<i>KWS Lochow, Germany</i>

* *Winter barley* (year added)

AMBA 2014 Recommended Varieties

Six-Row

Celebration (2011)

AB-InBev

Innovation (2014)

AB-InBev

Lacey (2000)

University of Minnesota

Legacy (2001)

AB-InBev

Quest (2011)

University of Minnesota

Robust (1984)

University of Minnesota

Stellar-ND (2006)

North Dakota State University

Tradition (2004)

AB-InBev

American Malting Barley Association, Inc.

Malting Variety Development Funding Allocation Goals*

April, 2014

AMBA 2014 Funding

1994 %	2004 %	2012 %	2014* %		2014 Regional %	Variety & Supporting Research
				MIDWEST		\$194,418
7.1	10.2	14.0	32.7	Spring 2-Row	59.8%	
59.5	49.6	34.3	14.3	Spring 6-Row	26.1%	
		6.9	7.1	Winter 2-Row	13.0%	
		1.4	0.6	Winter 6-Row	1.1%	
66.6	59.8	56.6	54.7	Subtotal	100.0%	54.9%
				WEST		\$152,000
13.1	26.7	26.3	26.9	Spring 2-Row	63.7%	
14.3	7.8	2.1	0.1	Spring 6-Row	0.2%	
		11.2	15.1	Winter 2-Row	35.8%	
		3.8	0.1	Winter 6-Row	0.2%	
6.0	5.7			Winter (2&6)		
33.4	40.2	43.4	42.2	Subtotal	100.0%	42.9%
				East		\$7,500
			2.3	Winter 2-Row	74.2%	
			0.8	Winter 6-Row	25.8%	
0.0	0.0	0.0	3.1	Subtotal	100.0%	2.1%
100.0	100.0	100.0	100.0	TOTAL		\$353,918 Variety

* 96.8% Weighted dues reported

\$139,932 National/Other

\$493,850 Total Funding

National Barley Research Program

AMBA Strategic Goals

- **Technology to accelerate variety development**
 - e.g. latest DNA tracking technology
 - NOT GM
- **Management practices**
- Increased Yields
- **Winter Varieties**
- **Resistance to Abiotic Stress**
 - drought, heat, cold
- Lodging resistance
- **High Test Weight**
- Improved Quality
 - **Quality evaluation for breeding programs**
 - Preharvest sprouting
 - **Fermentability prediction**
 - Glucanase assays
 - **Flavor screening of barley**

National Barley Research Program

AMBA Strategic Goals

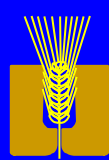
- **Food Safety**
- Increased secondary uses
 - Food, Feed, Straw for biofuels
- **Insects (RWA, Bird cherry oat aphid)**
- Disease Resistance
 - **Ug99 Stem Rust**
 - Fusarium head blight (scab)
 - **Barley yellow dwarf virus**
 - Cereal yellow dwarf virus
 - **Bacterial leaf streak**
 - Stripe rust
 - **Root diseases**
 - Net blotch
 - **Septoria speckled leaf blotch**
 - Spot blotch
 - **Powdery mildew (winter barley)**



Fusarium Head Blight
aka Scab = DON (vomitoxin)



Ug99 (African) Stem Rust



American Malting Barley Association, Inc.

REGULAR MEMBERS (21)

AB-InBev

Bell's Brewery

Boston Beer

Briess Malt & Ingredients

Brooklyn Brewery

Brown-Forman

Cargill Malt

Craft Brew Alliance

Deschutes Brewery

Dogfish Head Craft Brewery

Gambrinus Company

Great Western Malting

InteGrow Malt

Malteurop

MillerCoors

New Belgium Brewing

New Glarus Brewing

Rahr Malting

Schell's Brewing

Sierra Nevada Brewing

Summit Brewing



American Malting Barley Association, Inc.

ASSOCIATE MEMBERS (45)

Abita Brewing

Alaskan Brewing

Allagash Brewing

Anchor Brewing

Avery Brewing

Bear Republic Brewing

Blacklands Malt

Blue Ox Malthouse

Boulevard Brewing

Cold Spring Brewing

Colorado Malting

Corsair Artisan Distillery

Deer Creek Malthouse

Farm Boy Farms

Firestone Walker Brewing

Flying Dog Brewery

Founders Brewing

Full Sail Brewing

Gold Rush Malt

Harpoon Brewery

Langunitas Brewing

Lakefront Brewery

Left Hand Brewing

Leopold Bros Distillery



American Malting Barley Association, Inc.

ASSOCIATE MEMBERS (45)

Long Trail Brewing
Lost Coast Brewery
Malterie Frontenac
Matt Brewing
Odell Brewing
Oskar Blues Brewery
Rahr & Sons Brewing
Real Ale Brewing
Riverbend Malt House
Rogue Ales
Russian River Brewing

Saint Arnold Brewing
Schlafly Beer
Smuttynose Brewing
Storz Brewing
Stone Brewing
Troegs Brewing
Urban Chestnut Brewing
Valley Malt
Victory Brewing
Wachusett Brewing

Crafty brew: Rising demand from craft breweries will maintain industry growth

IBISWorld Industry Report OD5947 Malt Production in the US

November 2012

Olivia Tang

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About this Industry

Industry Definition

Operators in this industry manufacture malt, a grain that has been steeped, germinated and dried for use in beer

brewing and vinegar production. Malt is produced from a variety of grains, including barley and rye.

Main Activities

The primary activities of this industry are

Germinating and drying grains

Manufacturing barley malt

Manufacturing wheat malt

Manufacturing rice malt

Manufacturing rye malt

Manufacturing malt flour

Manufacturing distiller's malt

The major products and services in this industry are

Malts sold to brewers

Malts sold to distillers

Similar Industries

11117 Wheat, Barley & Sorghum Farming in the US

Wheat, barley and sorghum farmers produce coarse grains to be used in making food, animal feed, malt and other similar food products.

31121 Flour Milling in the US

Flour millers process wheat into flour.

31212 Breweries in the US

Breweries use malt, hops, yeast and other ingredients to produce alcoholic beverages.

Additional Resources

For additional information on this industry

ambainc.org

American Malting Barley Association Inc.

www.ag.ndsu.edu/ibms

Institute of Barley and Malt Sciences

www.bevinfo.org

The Beverage Information Group

www.usda.gov

US Department of Agriculture

Industry at a Glance

Malt Production in 2012

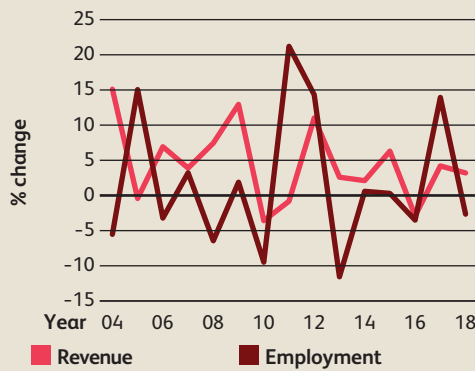
Key Statistics Snapshot

Revenue	Annual Growth 07-12	Annual Growth 12-17
\$1.1bn	5.2%	2.4%
Profit	Exports	Businesses
\$45.6m	\$262.2m	12

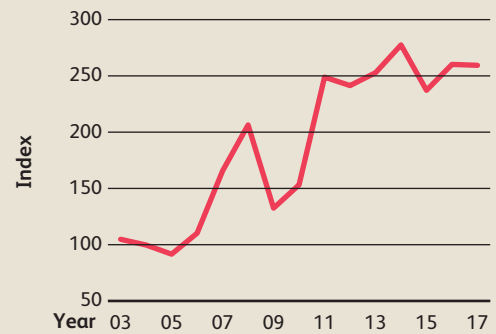
Market Share
 Malteurop Group
25.1%
 Cargill Inc. **19.3%**

p. 25

Revenue vs. employment growth



Price of coarse grains

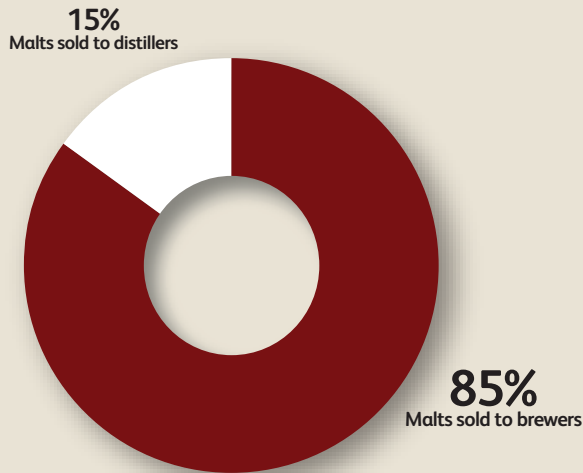


SOURCE: WWW.IBISWORLD.COM

Key External Drivers
 Price of coarse grains
 Demand from beverage manufacturing
 Trade-weighted index
 Per capita alcohol consumption

p. 4

Products and services segmentation (2012)



SOURCE: WWW.IBISWORLD.COM

Industry Structure

Life Cycle Stage	Mature	Regulation Level	Medium
Revenue Volatility	Medium	Technology Change	Low
Capital Intensity	Medium	Barriers to Entry	Medium
Industry Assistance	Low	Industry Globalization	High
Concentration Level	Medium	Competition Level	Medium

FOR ADDITIONAL STATISTICS AND TIME SERIES SEE THE APPENDIX ON PAGE 32

Industry Performance

Executive Summary | Key External Drivers | Current Performance
Industry Outlook | Life Cycle Stage

Executive Summary

The Malt Production industry, which dries and germinates barley and other coarse grains for use in beer production, experienced volatile, but positive growth over the past five years. Although barley costs were volatile and high, operators raised prices enough to partially counteract cost increases without significantly hurting demand, boosting revenue. Consumers had less disposable income during the recession and purchased less beer, which caused beer production volumes to decline slightly. However, the rise of craft beer maintained downstream brewers'

Nonetheless, beer is a widely accepted alcoholic beverage. Because consumption levels fluctuate only slightly, breweries are still demanding malt. Therefore, malt producers' revenue is estimated to rise an annualized 5.2% to \$1.1 billion in the five years to 2012, including an 11.0% jump in 2012.

Although firms passed on barley cost increases to downstream buyers in the form of higher prices, the price hikes covered only part of the cost increase. For example, malt producers raised prices in 2008, when the price of malting barley grew 29.9%, according to the US Department of Agriculture (USDA). But profit still fell from 4.4% of revenue in 2007 to 4.0% in 2008. Profit is estimated to account for about 4.3% of revenue in 2012 after much fluctuation over the five-year period.

In the next five years, the industry is forecast to continue growing. A larger supply of barley from farmers will temper input price increases and allow industry operators to better anticipate cost increases. Also, the rising popularity of craft beer and a trend for domestic brewers to "buy local" for malt inputs will further drive demand for industry products. Imports will continue to threaten the industry, but rising exports will mitigate the effect. As a result, revenue is projected to rise at an annualized rate of 2.4% to \$1.2 billion in the five years to 2017.

The rising popularity of craft beer and the "buy local" trend will keep the industry growing

demand for malt; craft brewers make up a small proportion of beer production, but account for about 18.0% of malt demand. Furthermore, increasing global beer production is driving foreign breweries to source malt from the industry, lifting exports an annualized 10.4% to \$262.2 million over the five years to 2012 and mitigating import competition. The industry also faced threats from growing wine popularity. Shifting consumer preferences from beer to wine due to widely accepted studies showing wine's health benefits is lowering per capita beer consumption.

Key External Drivers

Price of coarse grains

Malt is manufactured from coarse grains, including barley, so a rise in the price of coarse grains negatively affects profit. Industry operators may elect to pass on these cost increases in the form of higher prices, but they risk hurting demand and revenue. This driver is expected to increase in 2013, representing a potential threat to the industry.

Demand from beverage manufacturing

Breweries are a major downstream markets for malt products. As consumers demand more beer, the rise in demand makes it way up the supply chain, raising demand and revenue for malt producers. This driver is expected to increase slowly in 2013, representing a potential opportunity for the industry.

Industry Performance

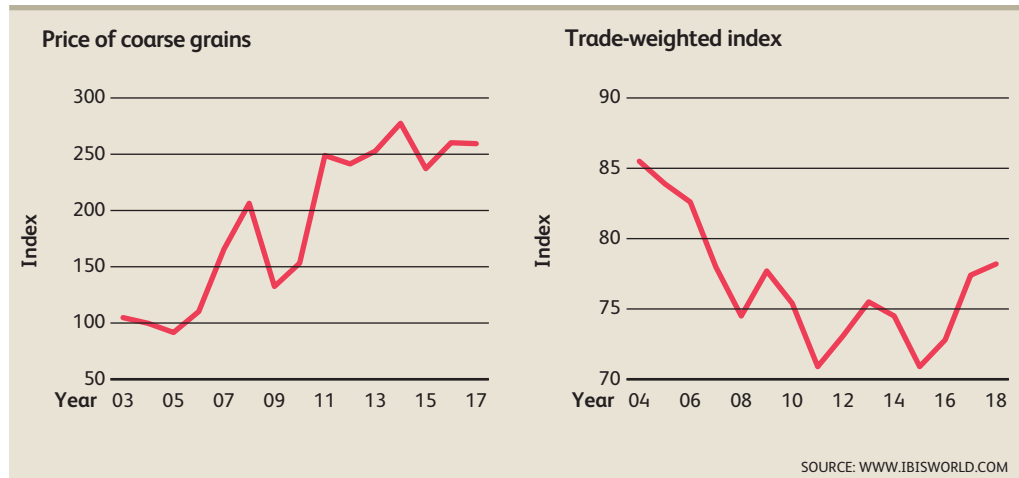
Key External Drivers continued

Trade-weighted index

The industry is dependent on exports to generate almost one-quarter of its revenue. Therefore, the value of the dollar relative to the currencies of United States' major trading partners is crucial in determining revenue. When the value of the dollar appreciates, domestic goods become relatively more expensive on the global market and less attractive to purchase. This driver is expected to increase slowly in 2013.

Per capita alcohol consumption

Despite increasing overall alcohol consumption, rising consumer health consciousness is working against beer consumption. Health conscious consumers are shying away from high-calorie and carbohydrate-heavy beverages, both of which are characteristics of beer. In addition, studies showing the health benefits of consuming wine are shifting consumers from beer to wine. This driver is expected to increase slowly in 2013.



Current Performance

The Malt Production industry has grown over the past five years despite challenges from volatile input prices, changing consumer trends and import competition. Malting uses a method of drying and germinating barley and other coarse grains for beer production. Although the price of barley and other coarse grain inputs has risen significantly over the past five years, producers were able to raise prices enough to cover part

of the cost, which boosted revenue. Additionally, an increase in global beer production caused many breweries around the world to demand more malt from US producers, lifting exports and mitigating import competition. Therefore, revenue is expected to rise at an annualized rate of 5.2% to \$1.1 billion in the five years to 2012, including an 11.0% jump in 2012 as a result of rapid export growth.

Industry Performance

Barley prices affect revenue and profit

Because coarse grains, specifically barley, are the main ingredient for malt production, revenue performance follows the price of these inputs closely. Barley is also a substitute to corn, wheat and soybeans in animal feed production. Therefore, as corn, wheat and soybeans were increasingly allocated toward biofuel production, their prices increased dramatically, causing buyers to shift demand toward barley and other substitutes. This shift drove up the price of coarse grains 7.8% per year on average in the five years to 2012. Luckily, producers were able to raise prices to cover part of the cost increase, boosting revenue growth. For example, when the price of malting barley skyrocketed 47.5% in 2009, according to the US Department of Agriculture (USDA), revenue also jumped 12.9% in the same year. Conversely, when the price of malting barley fell slightly in 2010, industry operators lowered their product prices; coupled with lower selling volumes, revenue fell 3.6%.

Although malt producers were able to raise prices in accordance with higher

Although input costs rose, producers were able to raise prices to cover part of the increase

barley costs, the price hikes were only able to cover a fraction of the cost, squeezing profit despite revenue gains. For example, when the price of barley rose 29.9% in 2008, profit fell from 4.4% of revenue in 2007 to 4.0% in 2008; revenue grew 7.4% in the same year. Because profit margins are highly dependent on fluctuating input prices, profit has also been volatile over the past five years; in 2012, profit is estimated to account for 4.3% of revenue. Unpredictable profitability has caused some firms to exit the industry and larger firms to merge with or acquire smaller firms. In the five years to 2012, the number of enterprises is estimated to fall from 16 to 12 companies, representing a 5.6% annualized decline.

Downstream demand

Beer producers remain the Malt Production industry's main downstream market. Unfortunately, high unemployment during the recession caused many consumers to cut back on beer purchases, leading breweries to produce a smaller volume of beer over the past five years. According to the Beverage Information Group, an industry information source, beer production volumes remained flat in 2008, fell 2.1% in 2009 and fell 1.9% in 2010. However, economic recovery and successful sales strategies for certain brands allowed this major downstream market to continue demanding malt through 2012. One niche segment in particular, craft breweries, performed especially well due to

expanding consumer palates despite overall beer volume declines. In fact, craft brewers grew to demand about 18.0% of malt despite accounting for a small proportion of the volume produced, according to the American Malting Barley Association (AMBA).

Another factor challenging the downstream breweries market is the shift in consumer preferences. Americans are becoming more health conscious and are wary of high-calorie, high-carbohydrate beverages, which are both common characteristics to beer. Furthermore, studies showing the health benefits of consuming wine is shifting consumers to demand more wine and spirits instead of beer. Per

Industry Performance

Downstream demand continued

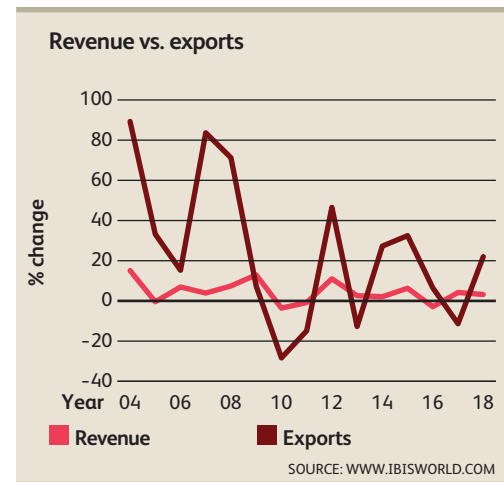
capita consumption of alcohol has been flat over the past five years due to an increase in wine consumption and an estimated 1.6% decline in per capita consumption of beer, according to the

Beer Institute. Nonetheless, beer is a commonly accepted alcoholic beverage, and consumption changes are generally minimal, creating stable demand for malt from breweries.

International trade

A rise in global beer production has also contributed to high demand for the US Malt Production industry. According to the American Malting Barley Association, global beer production has risen 33.5% in the past 10 years, driving industry exports. In particular, exports to Mexico, a major beer producing country that accounts for just over half of exports, has risen at an average annual rate of 12.1% over the five years to 2012. The devaluation of the dollar during the period also drove up export demand because domestic goods were relatively less expensive to the global market. As a result of these factors, exports are estimated to rise 10.4% per year on average to \$262.2 million in the five years to 2012, representing about 24.7% of revenue.

Despite strong export growth, the industry faces intense competition from imports, which increased from 16.8% of domestic demand in 2007 to an estimated 24.3% in 2012. This expansion is especially astonishing in light of the dollar's devaluation. However, changing consumer tastes are



driving domestic breweries to demand high-quality malt from abroad. Furthermore, the majority of imports come from Canada, which is an attractive source of imports due to its proximity to the United States and participation in the North American Free Trade Agreement (NAFTA). Consequently, imports are anticipated to rise 13.7% to \$255.3 million in the five years to 2012, posing as a threat to the industry.

Industry Outlook

In the next five years, the Malt Production industry's revenue is forecast to continue growing, although at a slower pace than the previous five years. Rising disposable income from economic recovery will allow consumers to increase their demand for beer, causing breweries to demand more malt; craft beers in particular are

forecast to perform well and further boost demand for malt. A growing supply of barley will also temper input price volatility for malt producers, allowing producers to better anticipate costs and adjust production accordingly. Furthermore, exports will continue to grow and contribute a larger proportion of revenue to the

Industry Performance

Industry Outlook continued

industry, although import competition will intensify. As a result of these factors, revenue is projected to rise at

an annualized rate of 2.4% to \$1.2 billion in the five years to 2017, starting off with a 2.6% increase in 2013.

Growing supply of inputs and expanding profit

The supply of barley is forecast to expand as a result of increasing farming acreage and shifting growing strategies. The acreage of malting barley is anticipated to increase in the next five years in order to continue maintaining the crop's competitiveness against substitutes, such as wheat and corn. Furthermore, barley farms may develop and grow genetically modified (GM) crops to make malting barley less sensitive to temperature in the malting process, which will be especially beneficial if the barley crops do not have enough of the natural enzymes that make it the prime ingredient for malting.

Additionally, more barley farmers are shifting the growing season to the winter, producing what is known as winter malting barley varieties. In the winter, barley crops are under less stress, which leads to an increase of up to 25.0% in crop production, according to the Institute of Barley and Malt Sciences. Furthermore, less water is necessary for irrigation because the plants mature earlier and the crops hold on to moisture, especially when it snows. Therefore, a

Farms will increase barley production, which will stabilize input costs for malt producers

growing supply of malting barley will slow the growth of coarse grain prices to 1.4% per year on average in the five years to 2017.

Slower growth of input prices will allow industry producers to anticipate cost fluctuations and adjust production and product prices as necessary, which will pad profit. Profit is also forecast to expand due to developing technology that will improve operating efficiencies, allowing firms to reduce their employee head count. The number of employees is estimated to decline 0.4% per year on average to 1,128 workers in the five years to 2017, while the average wage rises to \$59,840, reflecting the need for higher-skilled workers to operate the machinery. Profit is forecast to expand from 4.3% of revenue in 2012 to 5.3% in 2017.

Downstream demand

As the economy continues to recover in the next five years, unemployment will fall and consumers will regain disposable income, leading those who cut back on beer purchases during the recession to return to their typical level of purchases. Increasing demand for beer will prompt breweries to raise production volumes and, therefore, increase their demand for malt. Although health trends will continue to threaten demand for beer, many of

which are high in calories and carbohydrates, per capita alcohol consumption is estimated to rise at an annualized rate of 0.4% in the five years to 2017. In addition to wine and spirits, premium beer will be more popular as it becomes more affordable due to rising disposable incomes, which will lift demand for malt.

The growing popularity of craft beer in particular will contribute to rising beer consumption and demand for malt.

Industry Performance

Downstream demand continued

Craft beer producers already use about one-fifth of the industry's malt. Therefore, as breweries expand their

production in the next five years, this segment will grow to demand even more, benefiting industry revenue.

International trade

The trend for domestic breweries to “buy local” for inputs will be more widespread in the next five years. This trend will contribute to the slowdown in imports. However, similar to the previous five years, expanding taste preferences will continue to drive breweries to import malt from abroad. Furthermore, the dollar is forecast to appreciate, making foreign goods relatively cheaper to the US market and more attractive to purchase, lifting imports 10.3% per year on average to \$417.0 million in the five years to 2017. As a result, imports will grow to represent 33.5% of domestic demand.

Although exports are estimated to account for 30.5% of revenue in 2017, the appreciating dollar will hamper export

The growing “buy local” trend and appreciating dollar are expected to slow import growth

growth through the next five years. However, Mexico will continue to be a major export destination due to its significant beer production industry. Mexico and Canada's geographic proximity to the United States and participation in NAFTA will further sustain exports. Consequently, exports are estimated to grow 6.8% per year on average to \$364.1 million in the five years to 2017.

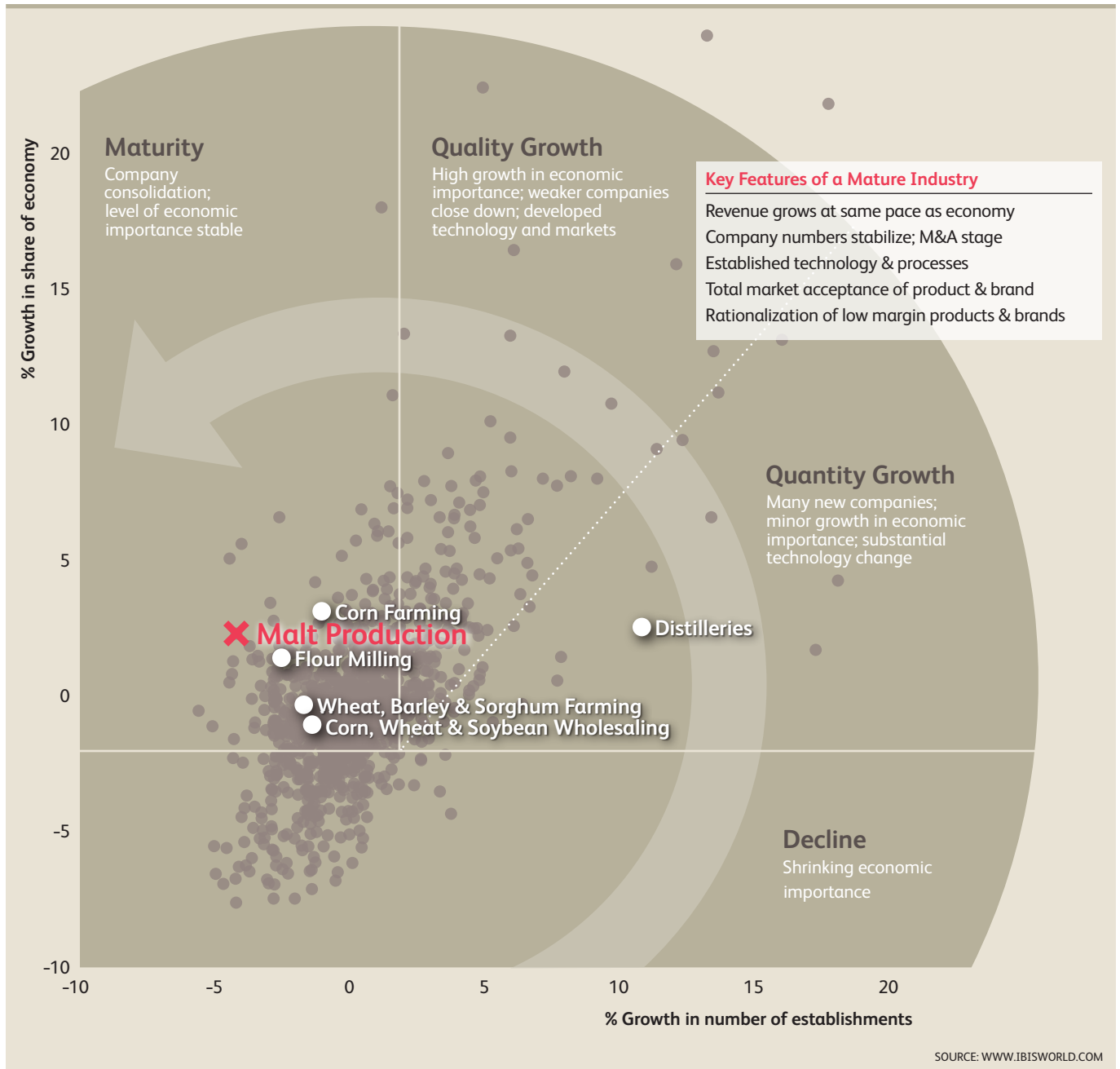
Industry Performance

Life Cycle Stage

IVA is expected to grow faster than GDP during the 10 years to 2017

The industry is experiencing consolidation through mergers and acquisitions

Beer, which uses malt as an ingredient, is a commonly accepted alcoholic beverage that is part of the American lifestyle



Industry Performance

Industry Life Cycle

This industry
is **Mature**

The Malt Production industry is expected to grow at a faster rate than the overall economy over the 10 years to 2017. IBISWorld estimates the industry's contribution to the economy, as measured by industry value added (IVA), will grow at an average annual rate of 3.9% over the 10-year period. During the same period, GDP is forecast to increase at an annualized rate of 1.8%. Although the industry is growing faster than the overall economy, it is in the mature stage of its life cycle.

Similar to other mature industries, the industry has experienced consolidation. Volatile input prices have made profitability unpredictable and created harsh operating conditions for some producers. In addition, larger companies

have merged with or acquired smaller firms in this industry to take advantage of economies of scale and expand their market share. Therefore, the number of producers fell from 16 in 2007 to 12 enterprises in 2012, representing an average annual decline of 5.6%.

Because beer is an accepted part of adult life in the United States, the malt used to produce beer has also had a long period of existence and acceptance, which is another hallmark trait of mature industries. It is unlikely that Americans will significantly reduce beer consumption in the next five years; in fact, beer and alcohol consumption is forecast to rise moderately, maintaining malt's prevalence in the American lifestyle.

Products & Markets

Supply Chain | Products & Services | Demand Determinants
Major Markets | International Trade | Business Locations

Supply Chain

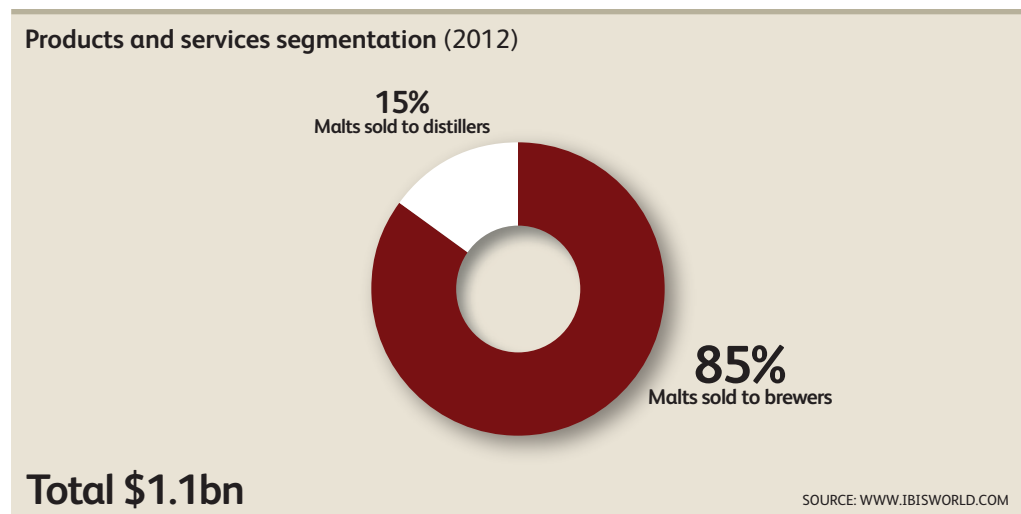
KEY BUYING INDUSTRIES

- 31212 Breweries in the US**
Breweries purchase malt from industry firms for use as an input in beer production.
- 31214 Distilleries in the US**
Distilleries purchase malt from industry firms for use as an input in certain kinds of liquor production.

KEY SELLING INDUSTRIES

- 11115 Corn Farming in the US**
Malt producers buy corn from farmers to make corn-based malts.
- 11117 Wheat, Barley & Sorghum Farming in the US**
This industry supplies malt producers with grains, such as wheat and barley, which are used in the malt production process.
- 42451 Corn, Wheat & Soybean Wholesaling in the US**
Industry firms may buy wheat or corn from wholesalers instead of farmers to make malt products.

Products & Services



The Malt Production industry primarily sells malts to brewing and distilling companies domestically and abroad. This industry primarily sells one product – malted grain – which is used to make beer and whiskey. Malts are distinguished primarily by their end use in the production of beer or liquor, but also by the types of grain inputs used. The quality and type of grain used, which include barley, wheat, rye and corn, have a great

influence on the end beer or liquor product sold.

Malts sold to brewers

Malts sold to brewers are estimated to account for about 85.0% of industry revenue, based on the number of brewing establishments, beer volumes and sales. Within this category, brewers loosely divide malts into base malts and specialty malts. Base malts are used during the fermentation process, while specialty

Products & Markets

Products & Services continued

malts are used to impart color, aromas and unique flavors to beer. Popular malt varieties include pale malts, such as English pale, American pale and pilsner pale, along with various types of kilned malts used in darker beers. Over the five years to 2012, this category has increased slightly due to higher demand from craft breweries, despite the overall decline in US beer sales. Although craft beers account for a small percentage of beer volumes and sales, they use a disproportionately high 17.9% of industry malts. Consequently, the annualized double-digit growth in craft beers over the past five years has been a key driver of growth for industry firms. Additionally, the diverse range of craft beers has contributed to innovations in malt varieties, particularly for specialty malts used to give craft beers unique flavors.

Malts sold to distillers

Fluctuations in world grain markets first made it economically unprofitable for

distillers to continue to malt grains in the 1960's. Since then, distillers have opted for customized malts produced by industry firms. Malt producers will typically set up special supply contracts with individual distillers that spell out malt requirements and set fixed quantities. Whiskey is the primary distilled alcoholic product that uses industry malts. Malt whiskies, such as Scotch, are the most popular type and are primarily made out of malted barley. Other types include grain whiskies, such as American whiskies, which are produced using a number of different grains like wheat, corn and rye. Different grains and malts are combined in numerous ways to produce whiskey around the world. IBISWorld estimates that malts sold to distillers account for about 15.0% of industry revenue based on alcohol volumes and sales. Over the five years to 2012, this category has grown slowly despite drops in revenue during the recession.

Demand Determinants

Demand for malts is derived primarily from downstream brewing and distilling industries that use malt in the production of malted beverages. Malt is one of the four major ingredients used in beer production and is also used extensively in malt liquor production. Consequently, changes in demand for malted beverages from end consumers will affect demand for malt from brewers and distillers. Likewise, an increase in demand for malted beverages will generally result in higher demand for malt from brewers and distillers, who would then increase production of malted beverages to meet consumer demand. Malted beverages are mature products with fairly stable demand; consequently, malt is also considered a mature product.

Demand for malted beverages also

depends upon its quality and price relative to substitutes, which include liquors and some nonalcoholic beverages. Changes in consumer preferences can influence the demand for these substitutes. Consumers often substitute among alcoholic beverage categories, and wine and spirit consumption has increased moderately in recent years. As consumers educate themselves about various beverages and explore the variety of beers available to them, the malt production industry is forecast to continue to develop new malt varieties with higher nutritional contents and flavors.

Consumer tastes are also an important driver of malt demand. Demand for beer and malt liquors vary geographically and depend upon the cultural and economic characteristics of a region. Over the past

Products & Markets

Demand Determinants continued

five years, consumer trends, such as buying locally and concerns over the nutritional contents of malted beverages, have supported strong growth in the craft brews market segment.

Consequently, malt producers continue to invest in research and development to develop new malt varieties that have different tastes, colors and nutritional contents. Breweries' interest in sourcing local malts has also provided a boost to the industry and have helped it compete with high-quality imported malts.

Demand for malt domestically is also influenced by global grain supply and demand, and international trade in the Global Malt Production industry. The economics of grain supplies vary among grain varieties, depending upon protein content, plumpness and moisture content, which affect their use by downstream brewers and distillers. Changes in the price of inputs affect malt producers' production levels and pricing, which affects downstream demand from brewers and distillers domestically and abroad. Fluctuations in currency

exchange rates also have an effect on imports prices, which affect the demand for industry malts against competing imports.

Demand for malt domestically is also influenced by global grain supply and demand and international trade in the Global Malt Production industry. The economics of grain supplies vary between grain varieties, depending upon protein content, plumpness and moisture content which affect their use by downstream brewers and distillers. Barley, which is primarily used in malt production, tends to be oversupplied which is why food-grade barley prices tend to be significantly lower than livestock-grade barley prices. Changes in the price of inputs affect malt producers' level of production and pricing, which in turn affects downstream demand from brewers and distillers domestically and abroad. Fluctuations in currency exchange rates also have an effect on the pricing of imports, which affect the demand for industry malts against competing imports.

Major Markets

Industry firms primarily sell malts to breweries and distilleries domestically and abroad. They also sell to food processing companies such as Kraft, Malt-O-Meal and Kellogg, but revenue from these sales are not included in this report. Malt is also increasingly recycled from the brewing and distilling processes and sold as livestock feed; however, this is also excluded from this report.

Large breweries

Large domestic breweries, such as those owned by Anheuser-Busch (InBev), SAB Miller, Molson, Labatts and Kirin, are the largest market segment for malt producers. While large brewing companies may be vertically integrated

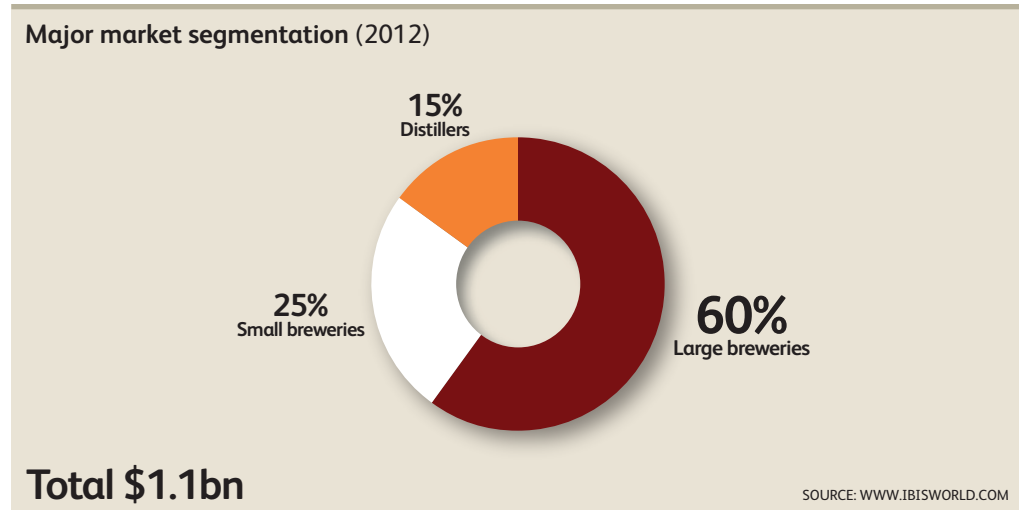
with farmers and malt production operations to a degree, they all still purchase malt from independent malt producers to meet their supply needs for high-volume beer production. Over the five years to 2012, this segment initially declined as beer volume sales continued to slide, but has since increased slowly because large breweries have started producing craft beers to meet changing consumer tastes.

Craft breweries

Craft brewers are defined as small, independent brewing operations that produce niche beers on a smaller scale than large breweries. The segment can be further divided into microbreweries,

Products & Markets

Major Markets continued



brewpubs, contract brewing companies, regional breweries and regional craft breweries. These account for the majority of brewing establishments in the United States. Changing consumer tastes and preferences toward higher-quality beer have made this a fast-growing segment for malt producers over the five years to 2012. According to data from the US Brewers Association, craft brews represent just about 5.7% of US beer volume and 9.1% of its sales; however, they consume a disproportionately high 17.9% of the malt used by the brewing industry. Consumer trends such as “buy local” and concerns over the health benefits of mass-produced beer have helped this segment outpace growth of the overall US brewing industry. IBISWorld estimates that craft brewers account for about 25.0% of industry revenue in 2012.

Distilleries

Distilling companies, such as Jack Daniels, Jim Beam and Seagrams, are major purchasers of malts for use in malt liquors. IBISWorld estimates that distillers account for about 15.0% of industry revenue in 2012. Over the past five years, this market segment has managed muted growth. Distillers were hard hit by the recession due to liquor’s high price relative to other alcohol beverages, such as beer and wine. However, this segment is expected to increase in 2012 as consumer incomes improve.

Exports

Exports are expected to account for about 24.8% of industry revenue in 2012. Major export markets include Mexico, Canada and Japan. For further discussion of industry exports, see the International Trade section of this report.

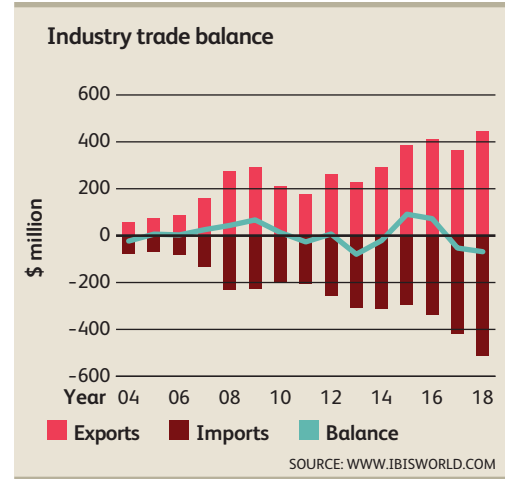
Products & Markets

International Trade

Level & Trend
 Exports in the industry are **High and Increasing**
 Imports in the industry are **Medium and Increasing**

The Malt Production industry has a high level of exports and a moderate level of import penetration. Industry firms primarily export malt to breweries in Mexico, Canada, Japan and the Dominican Republic. At the same time, they face competition in the domestic market from malts imported from Canada, the United Kingdom, Germany and Belgium. There is a 0.3 cent / kg tax on unroasted malts and 0.42 cent / kg tax on roasted malts imported in the United States. Consequently, about 97.2% of imported malts are non-roasted largely due to their lower tax rate.

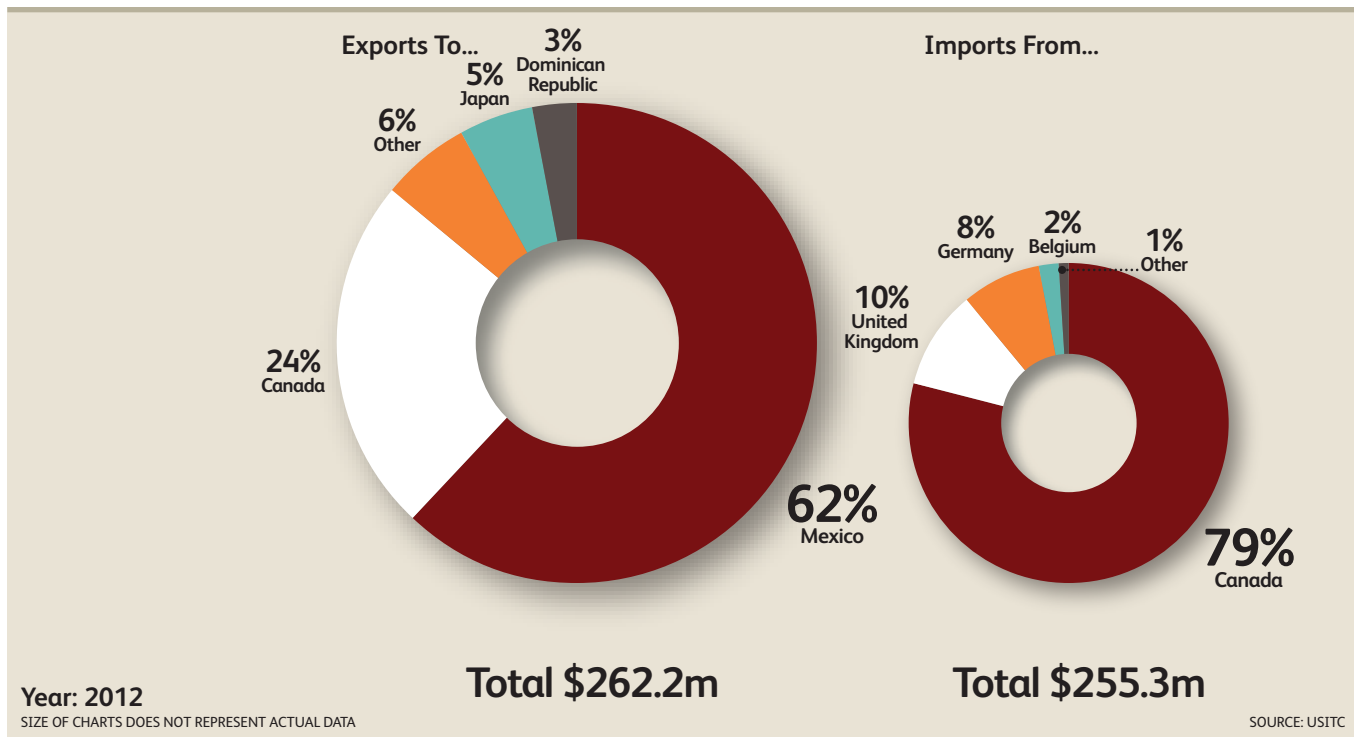
Trade agreements between the United States and Canada over the past decade have encouraged the integration of the US and Canadian malting industries. Price protections were eliminated, which has resulted into significant trade in malts between the two countries. However, the malting industry in both the United States and Canada continue to compete with the European Union's



favorable export support programs for malt barley and malt.

Exports

Over the five years to 2012, exports have grown at a 10.4% annualized rate to about \$262.2 million due to the falling value of the US dollar and growth in beer production abroad. As a share of revenue,



Products & Markets

International Trade continued

exports rose from about 19.4% in 2007 to 24.8% in 2012. Exports to Mexico and Canada were the key drivers of growth, with exports to these countries increasing at 12.2% and 7.3% annualized rates, respectively.

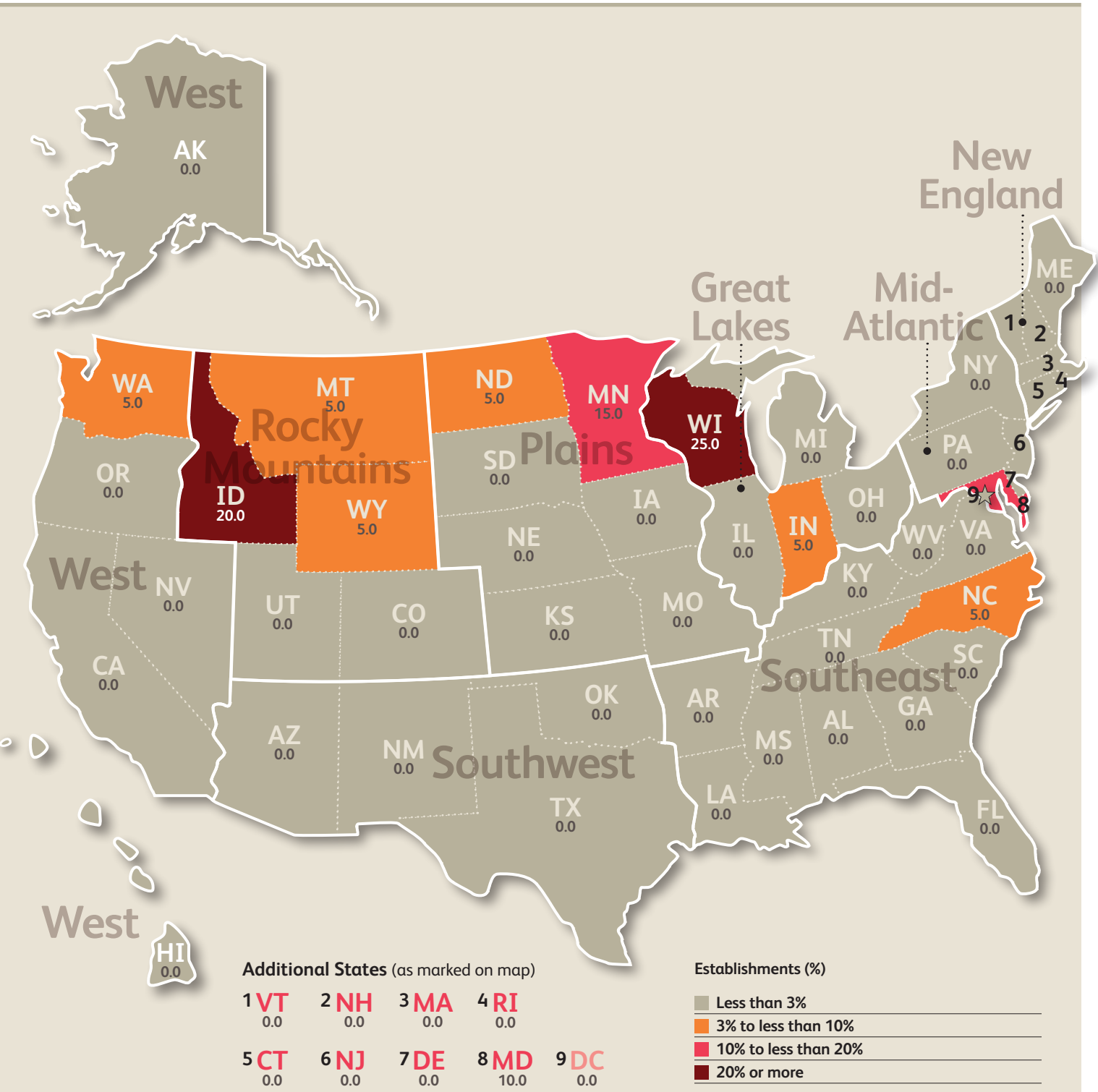
Imports

Imports have risen at a 13.7% annualized rate over the past five years to about \$255.3 million in 2012. Changing consumer tastes for beer at the retail

level drove up domestic demand for high-quality foreign malts. Malts imported from Canada, which account for 79.3% of total imports, increased at a 13.4% annualized rate from 2007 to 2012. Imports of high-quality malts from the United Kingdom and Germany also grew at 22.2% and 33.7% annualized rates, respectively. Consequently, IBISWorld estimates that imports rose from about 16.9% of domestic demand in 2007 to 24.3% in 2012.

Products & Markets

Business Locations 2012



Products & Markets

Business Locations

The distribution of malt manufacturing establishments in the United States closely follows the distribution of its suppliers and downstream brewing and distilling industries. Additionally, many companies are vertically integrated, growing input grains and processing them into malt. As a result, they locate their production facilities close to supplies to cut down on supply chain costs. Location is a key success factor for industry firms in order to profitably access raw materials and export markets. The spread of industry establishments does not change much year to year, although revenue from each region can fluctuate with changes in regional crop yields, input prices, regional downstream demand and per capita beer consumption.

The Great Lakes region has about 30.0% of industry establishments. Notable industry operators Cargill, Briess Industries and Rahr Malting Co. are headquartered in the region. Wisconsin has the largest concentration of establishments in the region and the United States, accounting for about 25.0% of the industry total. Minnesota is another prominent state in the region and accounts for about 15.0% of total industry establishments. This region has historically been and continues to be the largest brewing and distilling area in the country, which is why industry firms locate here near the region's downstream buyers.

The Rocky Mountains region also accounts for about 30.0% of industry establishments due to the region's favorable growing climate and concentration of barley producers. About 46.9% of domestic barley is produced in this region. States in the region get plenty of direct sunshine throughout the year,



which makes it an ideal grain-growing climate. Idaho, the second-largest malt producing state, is located in the region and has 20.0% of industry establishments alone.

The Plains region has about 20.0% of industry establishments due to its concentration of wheat producers. Although barley is the industry's largest production input, wheat is also used in malt production to varying degrees. Overall, the Plains region accounts for about 46.1% of US wheat production. Indiana has the largest concentration of establishments in the region, accounting for about 5.0% of total industry establishments.

The Mid-Atlantic, Southeast and West regions account for 10.0%, 5.0% and 5.0% of industry establishments, respectively. There are no establishments in the Southwest and New England regions because of their unfavorable climates for barley and wheat production.

Competitive Landscape

Market Share Concentration | Key Success Factors | Cost Structure Benchmarks
Basis of Competition | Barriers to Entry | Industry Globalization

Market Share Concentration

Level
Concentration in this industry is **Medium**

The Malt Production industry has a medium level of concentration, defined as the top four players accounting for between 40.0% and 70.0% of industry revenue. **Malteurop and Cargill, the two largest malt producers, are estimated to account for a combined 44.4% of industry revenue and significant shares of the total tonnage produced and consumed in the United States.** Other notable firms in the industry are Rahr Malting Co. and Briess Industries along with the malting operations of global brewer InBev (Busch Agricultural Resources).

According to latest available US economic census data, the top four industry firms made up about 64.4% of 2007 industry revenue, while the top

eight firms accounted for about 95.8% of 2007 industry revenue. Over the five years to 2012, IBISWorld estimates that industry market share concentration has largely remained stable. There has been a degree of consolidation and firm exits, but concentration levels have changed little. Domestic demand for malts continues to grow strongly, which has kept market shares stable despite increased import penetration. While penetration from high-quality imports sourced from Canada and Europe continues to rise due to changing US consumer tastes for beer, this has been counterbalanced by the “locally grown” movement, which has kept demand for domestically produced malts high among brewers.

Key Success Factors

IBISWorld identifies 250 Key Success Factors for a business. The most important for this industry are:

Economies of scale

Larger industry firms have higher bargaining power, which enables them to negotiate cheaper inputs and generate higher profit. Additionally, they are able to spread out fixed production costs over a larger volume of goods, further improving profitability.

Ability to alter goods produced in favor of market conditions

Industry firms that are able to develop new malt varieties are able to diversify their revenue streams and target new markets, which reduces their revenue volatility.

Access to high quality inputs

Major industry players are able to locate production facilities close to top barley growing regions in the United States and

source high-quality inputs from Canada and Europe to better realize supply chain efficiency and higher profit.

Automation reduces costs, particularly those associated with labor

Successful firms depend on equipment to modify their production output in response to changing demand conditions. Firms also rely on supply chain software to improve operational efficiency. This lowers wage and distribution costs and improves profit.

Supply contracts in place for key inputs

Successful industry firms have supply contracts, are vertically integrated with suppliers or trade commodity futures to ensure a steady supply of input grains. Guaranteed supplies at established prices assist in minimizing costs.

Competitive Landscape

Cost Structure Benchmarks

Because there are only 12 enterprises in the Malt Production industry, the cost structure is relevant to most industry players. Still, the largest players enjoy lower per-unit costs compared with the smallest ones in this industry. These larger companies can spread the cost of production over a larger volume of products.

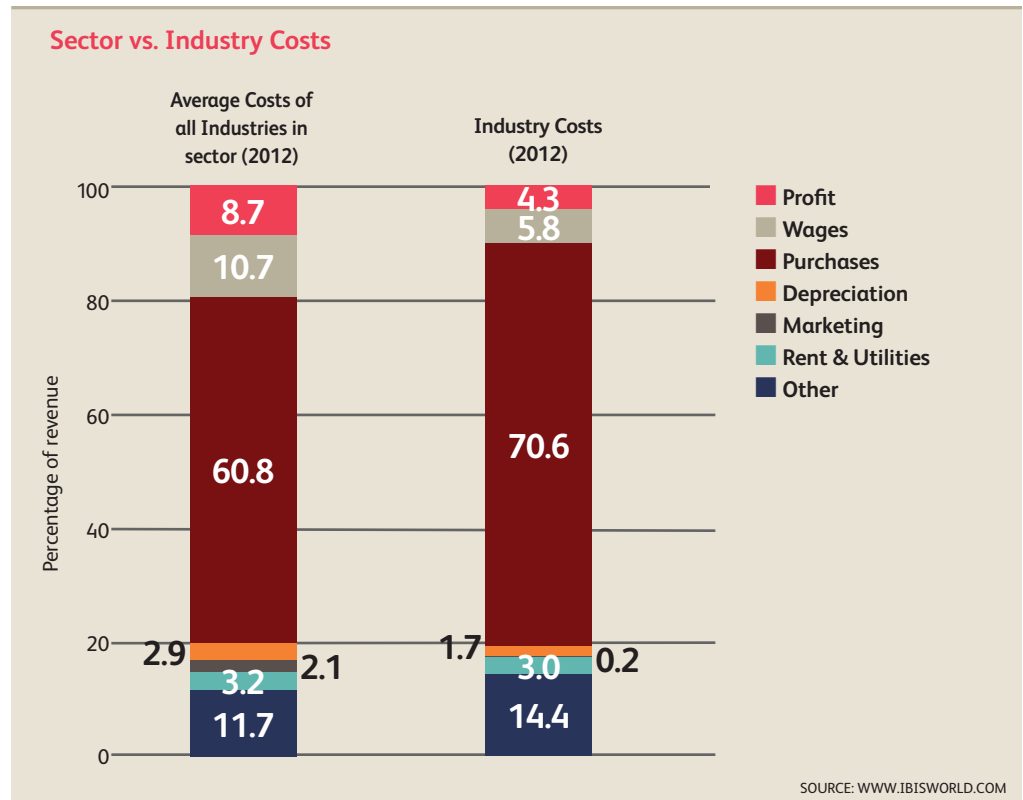
Profit

Profit, or earnings before interest and taxes (EBIT), accounts for about 4.3% of revenue in 2012. Profit has been highly volatile over the past five years because it depends on the prices of inputs, such as barley and other coarse grains. Although firms were able to raise product prices when the barley costs jumped, they were only able to raise product prices enough to cover a fraction of the cost. For example, when the price of barley rose 29.9% in 2008 (according to the US

Department of Agriculture), profit fell from 4.4% of revenue in 2007 to 4.0% in 2008, despite revenue growth. In the past five years, profit margins have ranged from 3.2% to 5.4% of revenue. However, increased reliance on equipment and machinery has improved operational efficiencies, lowering per-unit costs.

Purchases

Purchases make up the largest cost component, accounting for about 70.6% of revenue in 2012. Barley is the most common coarse grain used in malt production, but some firms also purchase rye or wheat to produce malt. Coarse grains, including barley, are substitutes to corn, wheat and soybeans, which have experienced skyrocketing prices as a result of increased demand from the biofuel sector. As more downstream markets turned to coarse



Competitive Landscape

Cost Structure Benchmarks continued

grains, demand rose and the price of coarse grains grew an estimated 7.8% per year on average in the five years to 2012. Therefore, this segment has grown as a share of revenue over the past five years. Other products in this segment include packaging for transport.

Wages

Wages make up about 5.8% of revenue in 2012. The malting process depends more on capital and other equipment rather than labor; employees generally supervise the machines and manage production processes. While wages have risen 2.1% per year on average to \$61.7 million in the five years to 2012, revenue has grown at a faster rate, lowering wages from 6.8% of revenue in 2007.

Other costs

Other costs make up about 14.4% of revenue in 2012. This segment includes overhead, compliance with government regulations, administrative costs,

distribution, and research and development (R&D). Some companies are also vertically integrated, so they are able to source, process and distribute at a lower cost than firms that are not vertically integrated. Marketing is a minor part of firms' costs; firms generally have supply contracts with downstream buyers, so advertising is not significant. However, many firms have websites that are able to provide stockholders and potential investors information about company performance.

Rent and utilities make up about 3.0% of revenue in 2012. To produce malt, the barley and other grains must have a large amount of room for the drying process and storage. In addition, firms are using more equipment, including heating devices and fans, to make production more efficient. Using more equipment creates more wear and tear on the machines. As a result, firms spend about 1.7% of revenue on depreciation.

Basis of Competition

Level & Trend
Competition in this industry is **Medium** and the trend is **Steady**

Competition is high in the Malt Production industry because there is a moderate level of market share concentration. The industry is in the mature phase of its life cycle, which is characterized by intense competition, pressured profit margins and a degree of consolidation. Domestic malt producers face increasing competition from imports; however, underlying domestic demand for malts continues to grow, which has kept competition levels and market shares flat. Consequently, IBISWorld estimates that the level of industry competition has remained steady over the five years to 2012.

Internal competition

The main basis of competition for malt producers is price. Operators also

compete over product quality, range of product offerings, and relationships with upstream suppliers and downstream distributors. Other factors include marketing and branding.

The ability for malt producers to secure supply and sale contracts with upstream grain producers and downstream brewers is critical for their competitive position. Companies that are able to do so can buy inputs at fixed prices to reduce cost volatility. Similarly, manufacturers invest heavily in establishing strong distribution relationships with downstream malt beverage makers.

Some malt producers engage in competition through advertising campaigns to sustain established malt varieties or to encourage downstream breweries and distilleries to purchase

Competitive Landscape

Basis of Competition continued

new malt varieties. The rise of the craft brew movement in the United States has caused the industry to invest in R&D to develop new malt varieties, which are aggressively marketed to niche brewers and distillers.

External competition

The US Malt Production industry competes internationally with many large, multinational agro-industrial groups. Malt is a global commodity that is traded in international markets to

supply brewing and distilling industries worldwide. The key factors affecting world demand for malt are the same variables driving domestic demand. However, changes in global currency exchange rates also have a significant effect on the US market. These fluctuations can influence the price of imports and the threat they pose. In general, the economics of the global malting industry will change depending upon selected barley varieties, their protein and moisture content.

Barriers to Entry

Level & Trend
Barriers to Entry in this industry are **Medium and Steady**

The Malt Production industry has medium and steady barriers to entry that have not changed significantly over the past five years. The primary barrier to entry for market entrants is the level of initial capital investment. Malting requires large up-front investment in a processing plant, equipment, a malting house and initial purchases. As a result, many new market entrants will finance initial operations through lending institutions, such as banks and financing companies. However, credit has been tight and lending institutions have not lent capital in the same amounts or with favorable terms as they had prior to the recession.

In addition to capital, new market entrants have to secure supply contracts of cereals grains to ensure consistent production. Without prior operating history, suppliers may be hesitant to enter into supply contracts with market entrants, which can act as a barrier.

Another factor that affects new market entrants is the scale of production. Many existing industry firms are characterized by large production volumes, which minimize per-unit costs. Additionally, new market entrants have to achieve enough scale to turn an initial profit at current low grain prices. Although scale is not a barrier to entry, it may hamper

Barriers to Entry checklist

	Level
Competition	Medium
Concentration	Medium
Life Cycle Stage	Mature
Capital Intensity	Medium
Technology Change	Low
Regulation & Policy	Medium
Industry Assistance	Low

SOURCE: WWW.IBISWORLD.COM

the success of new firm operations. At the same time, this factor is less critical for firms focusing on developing higher-valued products, such as limited specialty malts, to target niche brewing markets.

New market entrants would typically focus on malting certain types of grains and would have a limited product portfolio. However, they compete against multinational vertically integrated businesses. Malt producers often integrate the growing of cereal grains, processing of grains into malt and brewing malt beverages into a single company supply chain to better control production and adapt it to changes in market conditions. Vertical integration provides existing firms with greater control over margins and operations across the supply chain and can out

Competitive Landscape

Barriers to Entry continued

potential new entrants from contracts. Therefore, established malt producers enjoy competitive advantages over firms

looking to enter the market. Although this is also not a barrier to entry, it may hinder new entrants' success.

Industry Globalization

Level & Trend
Globalization in this industry is **High** and the trend is **Increasing**

Like many other food and beverage industries, the Malt Production industry is affected by trends in global agricultural markets and beer and distilling industries. The industry has a high level of industry globalization, characterized by a high level of international trade and a moderate degree of foreign ownership. Imports of malts from countries such as Canada, the United Kingdom, Germany and Belgium account for 24.3% of domestic demand, while exports to countries such as Mexico, Canada and Japan make up about 24.8% of total industry revenue. Changing consumer tastes for higher-quality beers has supported strong growth in the downstream domestic craft brewing industry, which has increasingly demanded new domestic malt varieties and high-quality malts from abroad. Consequently, the level of

globalization has increased over the past five years.

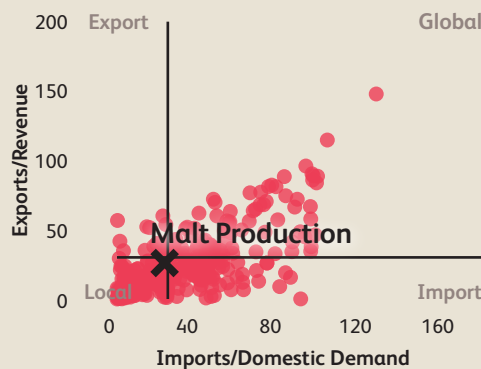
The industry is also already characterized by multinational agro-industrial companies such as Cargill and Malteurop. For example, Cargill has about 139,000 employees in 65 countries, and 10 malt production facilities spread across North America and Europe. Malteurop, which is based in France and entered the industry in 2008 with the acquisition of ADM's malting operations, has 24 malt production facilities spread across North America, Europe and Oceania to gain easier access to grains grown extensively in North America and Europe. Over the five years to 2017, IBISWorld expects industry globalization to increase due to rising international trade levels and continued cross-border consolidation in the global malting industry.

International trade is a major determinant of an industry's level of globalization.

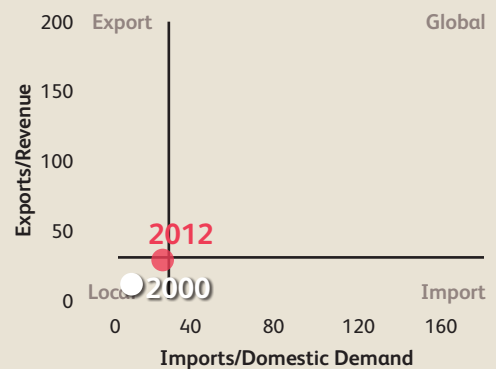
Exports offer growth opportunities for firms. However there are legal, economic and political risks associated with dealing in foreign countries.

Import competition can bring a greater risk for companies as foreign producers satisfy domestic demand that local firms would otherwise supply.

Trade Globalization



Going Global: Malt Production 2000-2012



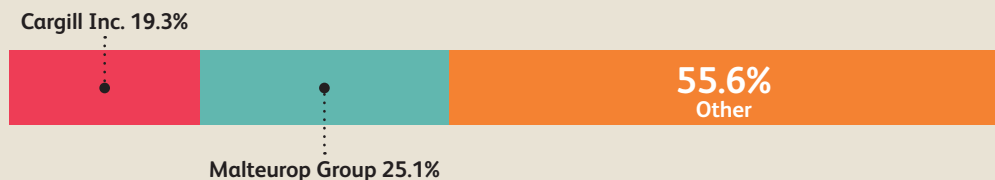
SOURCE: WWW.IBISWORLD.COM

Major Companies

Malteurop Group | Cargill Inc. | Other Companies

Major players

(Market share)



SOURCE: WWW.IBISWORLD.COM

Player Performance

Malteurop Group

Market share: 25.1 %

Industry Brand Names

Malteurop North America Inc.

The Malteurop Group is the world's leading malt producer, with annual production capacity of more than 2.2 million tons. Founded in 1984 and based in France, the group is owned by a number of agro-industrial cooperative groups in France that together form the Siclae group, the company's majority shareholder. The Malteurop Group has operations in 13 countries in Europe, North America, Oceania and Asia, with 24 production sites and about 830 employees worldwide.

In 2008, the group entered the North American market by purchasing Archer Daniels Midland's (ADM) malting division, which was then the leading malt producer in the United States. ADM had average annual production of about 742,000 tons of malt and production operations in the United States, Canada, Australia and New Zealand. It has since been renamed Malteurop North America Inc. The acquisition quickly made the Malteurop Group the world's largest

malt producer and gave it a presence in all major malt markets and sectors. IBISWorld estimates that the group's three production facilities in barley-intensive regions in Minnesota and Montana generated about 535,000 tons of malt in 2011.

Financial performance

IBISWorld estimates that Malteurop's industry-specific revenue grew at a 0.9% average annual rate to about \$265.9 million from 2009 to 2012. Company operations in the United States have benefited greatly from the company's scale, financial resources and the parent company's complementary product portfolio since the acquisition. Malteurop North America has strong bargaining power with grain growers, which has lowered purchase costs and improved profitability. Additionally, it has access to high-quality raw materials from leading agricultural regions in both the United States and Europe. This

The Malteurop Group (Malteurop North America) – financial performance*

Year	Revenue (\$ million)	(% change)	EBIT (\$ million)	(% change)
2009**	253.8	N/C	7.3	N/C
2010	249.8	-1.6	10.0	37.0
2011	248.5	-0.5	9.3	-7.0
2012	265.9	7.0	12.1	30.1

*Estimates **Acquisition of ADM Malt division in 2008, consolidated results first reported in 2009

SOURCE: IBISWORLD

Major Companies

Player Performance continued

access has allowed it to develop new malt varieties and growing itineraries to quickly adapt production volume to meet changes in consumer demand, particularly growing US consumer preferences for locally sourced craft

beers. Malteurop has recently invested in a brand-new, state-of-the-art malting plant in Great Falls, MT, giving the company strategic access to one of the most intensive barley growing regions in the United States.

Player Performance

Cargill Inc.
Market share: 19.3 %
Industry Brand Names
Cargill Malt

Cargill Inc., based in Minneapolis, is one of the largest private corporations operating in the United States. Founded in 1865, Cargill is now an international producer and marketer of agricultural, food, financial and industrial products and services, with about 139,000 employees in 65 countries. The company operates four divisions: agriculture services, food ingredients and applications, industrial, and risk management and financial. The company operates in the Malt Production industry through its malt division, which is classified under the food ingredients business segment.

Cargill originates and transforms malting barley into quality malts that it sells to the global brewing, distilling and food manufacturing industries. Worldwide, Cargill operates 10 malting plants in Belgium, France, Spain, Holland, Germany, the United States and Canada. IBISWorld estimates Cargill's global malt production is about 1.5

million tons, making it one of the top five malt producers worldwide. Within the United States, Cargill operates two production centers, one of which is a key research and development center for the company. This facility is also equipped with equipment to produce specialty malts and a pilot brewery.

Financial performance

IBISWorld estimates that Cargill's industry-specific revenue increased at a 3.6% average annual rate to about \$204.0 million over the five years to 2012. Revenue did experience small declines during the recession due to falling consumer demand for malt products at the retail level, but Cargill's diverse malt product offerings and wide complementary product portfolio kept revenue volatility low.

Cargill's malt production benefits greatly from the company's scale and vertical integration across the malt supply chain. Company production plants

Cargill Inc. (Cargill Malt) – financial performance*

Year	Revenue (\$ million)	(% change)	EBIT (\$ million)	(% change)
2007	171.1	N/C	7.9	N/C
2008	164.0	-4.1	6.2	-21.5
2009	158.0	-3.7	5.1	-17.7
2010	186.4	18.0	8.4	64.7
2011	208.8	12.0	8.8	4.8
2012	204.0	-2.3	10.8	22.7

*Estimates

SOURCE: ANNUAL REPORT AND IBISWORLD

Major Companies

Player Performance continued

are strategically located near major barley growing regions in the United States, which enables the firm to source malt production inputs from company grain operations and improve profitability. Additionally, the firm is an active trader in global commodity futures markets, allowing it to more effectively manage its production input supply and

malt inventories to keep costs down. The company also has cut costs and pursued an international expansion and vertical integration strategy by acquiring downstream food processing industries that use malt. This has further contributed to reduced revenue volatility and improved profitability over the past five years.

Other Companies

Industry financial information and production data is limited because most firms are privately held and family owned. IBISWorld estimates that the Malt Production industry is a moderately concentrated industry with a number of large and global vertically integrated agro-industrial conglomerates operating in this industry. The market is dominated by Malteurop and Cargill,

which combined are estimated to account for about 44.4% of industry revenue and a significant share of the total malt tonnage produced and consumed in the United States. Other notable firms that operate in the industry include Rahr Malting and Briess Industries along with the malt production operations of brewers such as InBev (Busch Agricultural Resources).

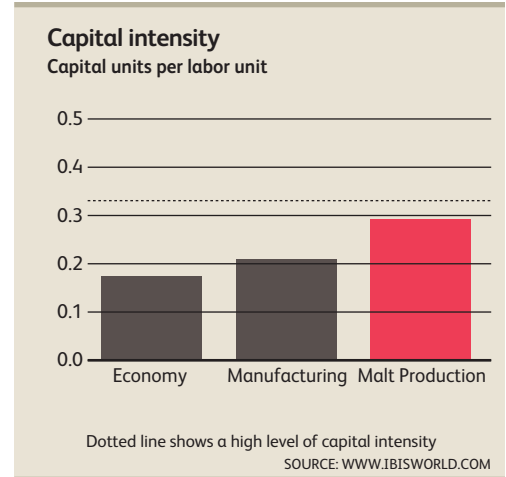
Operating Conditions

Capital Intensity | Technology & Systems | Revenue Volatility
 Regulation & Policy | Industry Assistance

Capital Intensity

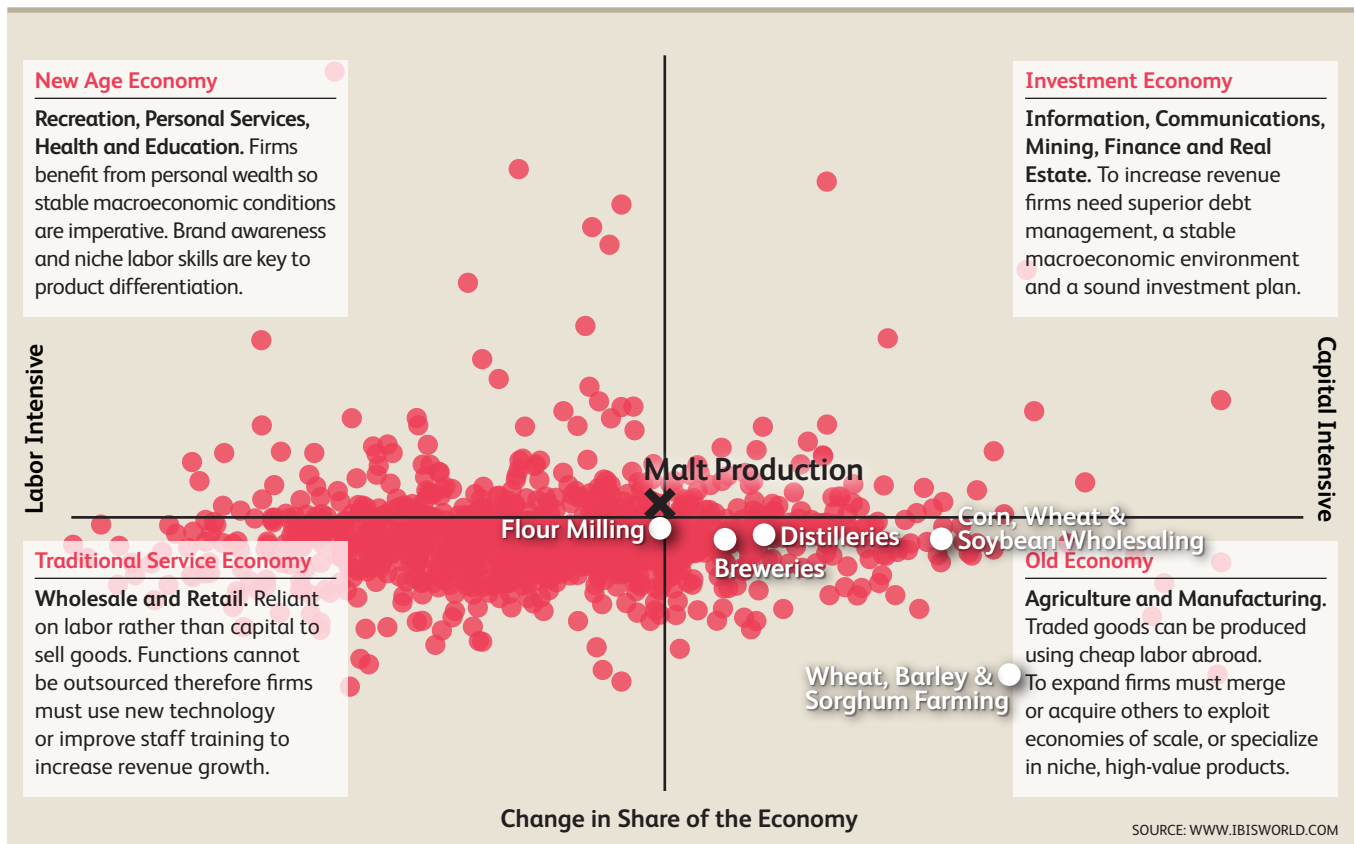
Level
 The level of capital intensity is **Medium**

The Malt Production industry has a moderate level of capital intensity. On average, for every dollar industry operators spend on wages, they spend about 29.3 cents on capital, which is consistent with other intermediary agricultural production industries, such as flour milling. Depreciation expenses, an indicator of spending on capital expenses such as equipment and software, accounts for about 1.7% of total industry revenue. Cereal grain malting processes require specialized equipment because the malting process consists of two unique steps: germinating grains and drying them. These processes require investment in large, specialized facilities such as malthouses, which are designed to dry germinated seeds in perforated



wooden floors. Consequently, many industry firms are vertically integrated to lower fixed expenses and per-unit costs.

Tools of the Trade: Growth Strategies for Success



New Age Economy
 Recreation, Personal Services, Health and Education. Firms benefit from personal wealth so stable macroeconomic conditions are imperative. Brand awareness and niche labor skills are key to product differentiation.

Investment Economy
 Information, Communications, Mining, Finance and Real Estate. To increase revenue firms need superior debt management, a stable macroeconomic environment and a sound investment plan.

Traditional Service Economy
 Wholesale and Retail. Reliant on labor rather than capital to sell goods. Functions cannot be outsourced therefore firms must use new technology or improve staff training to increase revenue growth.

Old Economy
 Agriculture and Manufacturing. Traded goods can be produced using cheap labor abroad. To expand firms must merge or acquire others to exploit economies of scale, or specialize in niche, high-value products.

Malt Production

Flour Milling × Breweries Distilleries Corn, Wheat & Soybean Wholesaling

Wheat, Barley & Sorghum Farming

Operating Conditions

Capital Intensity continued

Over the past five years, automation in the industry and capital intensity levels have increased because industry firms have invested in new equipment and software that allow them to more easily adapt and manage production. As a result, malt producers have been able to reduce wages costs. Wages account for

just about 5.8% of industry revenue and have steadily declined over the past five years as automation has increased. IBISWorld estimates that industry capital intensity will continue to rise over the next five years due to the continued automation of industry production processes and supply chains.

Technology & Systems

Level

The level of Technology Change is **Low**

The underlying malting process has changed in the past hundred years. Technology change has mainly come through automating this process to both ensure the consistency of the finished malt and reduce labor expenses. Over the five years to 2012, technology change has been low due to the industry's prior investments in automation technologies. However, this investment is increasing as firms purchase equipment to develop new malt varieties catering to craft brewers.

The malting process consists of three basic stages: steeping, germination and kilning. In the first stage, grains are immersed in water to encourage growth, followed by period where the water is drained away. Moisture content typically ranges from about 12% to 45%. During germination, the wetted grain is allowed to grow under controlled conditions. Internally, the internal structure of the grain is altered, sugars are produced from the grain's starches and natural enzymes develop within the grain kernel. Once the desired growth has

occurred, kilning takes place. Warm air is passed through the grain to halt growth and dry the grain to a stable state. Color and flavor compounds are formed, transforming the grain into malt. The entire process takes about seven days.

Today, product innovation is a key strategy for malt producers to gain market advantage. To do so, firms focus on research and development. This increases the ability of industry firms to identify the quality of raw inputs and develop new malt varieties by experimenting with new grains outside of barley such as corn, rye and wheat.

The industry's adoption of new technology includes updated computer systems. In particular, e-commerce is providing industry firms with improved customer and supplier arrangements, leading to cost savings through better inventory and production planning. In some cases, e-commerce is also used to track exports. Most of the computer system adoption is confined to major players.

Revenue Volatility

Level

The level of Volatility is **Medium**

The Malt Production industry is characterized by a moderate level of revenue volatility, which is a function of input prices, demand from downstream buyers and exchange rates. Because malt is generally made from barley, the rising price of coarse grains forced producers to raise prices where possible, although the

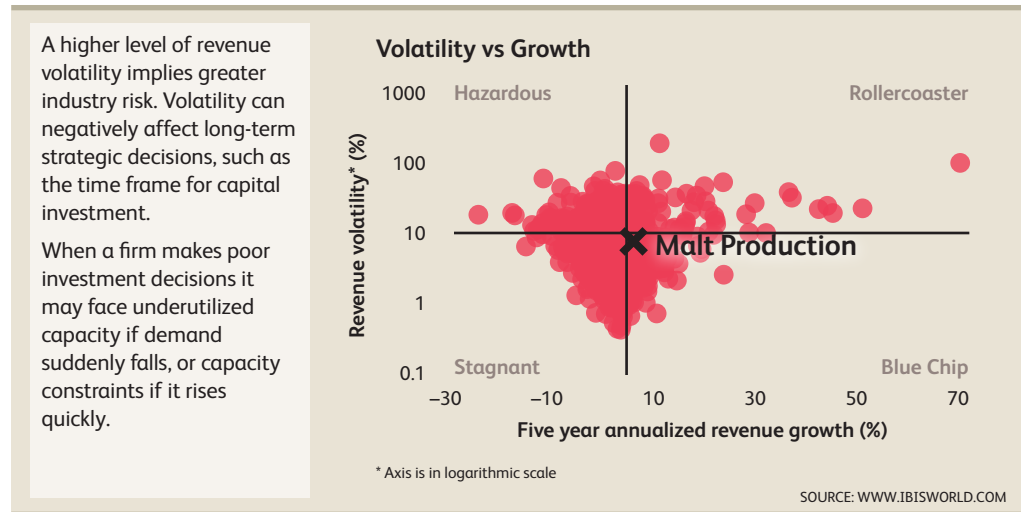
entire price hike was typically unable to be passed on. More specifically, the price of malting barley rose 6.3% per year on average in the five years to 2012, including a 47.5% jump in 2009, according to the US Department of Agriculture. Therefore, revenue spiked 12.9% during the same year. However,

Operating Conditions

Revenue Volatility continued

the price of malting barley fell slightly in 2011; coupled with lower demand from breweries as consumers bought less domestic beer, revenue fell 3.6% in 2010. Furthermore, exports, which make up about one-quarter of industry revenue,

grew strongly over the past five years as a result of a depreciated dollar that made domestic goods relatively cheaper to the global market. Therefore, the industry experienced an average revenue volatility of 8.0% in the past five years.



Regulation & Policy

Level & Trend
The level of Regulation is **Medium** and the trend is **Steady**

Malt production is not regulated at the industry level. Nevertheless, producers of malt must adhere to various environmental, food and health regulations. This varies between industry firms depending upon their level of vertical integration. These regulations are aimed at maintaining high levels of malt quality and safeguarding end-consumers of malt beverages.

Serious breaches or failure to comply with regulations, laws and other rules governing malt production can subject industry players to civil remedies and administrative penalties. It can also result in considerable negative publicity that can damage the reputation and public image of producers. Given this, non-compliance can potentially have a material effect on the earnings and competitive position of firms operating in this industry. Over the past decade, laws and regulations relating to beverage

production became more stringent, resulting in increasing compliance costs for industry firms.

Malt producers are primarily subject to regulations by federal agencies and state and local governments.

Food and Drug Administration

Malt manufacturing is chiefly regulated by the Food and Drugs Administration (FDA). This public health agency is part of the Public Health Services. The FDA's main functions can be divided into three main areas: the provision of scientific expertise to the food sector, the maintenance of food safety, and the enforcement of food laws through site inspections and legal sanctions.

One of its main responsibilities is to enforce the Federal Food, Drug and Cosmetic Act although it also implements several other public health laws. Under the Federal Food, Drug and Cosmetic

Operating Conditions

Regulation & Policy continued

Act, malt producers are required to comply with a wide range of labeling rules. These relate to matters such as the ingredients used, the presence of genetically modified raw materials, the country in which the malt was produced, and the product description on the packaging.

Environmental Protection Agency

The Environmental Protection Agency (EPA) is a federal agency responsible for addressing environmental issues and enforcing environmental protection laws. The EPA is responsible for enacting a number of environmental laws including the Clean Water Act (CWA), the Clean Air Act (CAA), the Pollution Prevention Act (PPA) and the Resource Conservation and Recovery Act (RCRA). Together,

these statutes and laws affect the methods malt manufacturers employ to handle raw material and dispose of waste. Therefore, firms must be conscious of their processing methods so as not to hurt the environment.

State and local governments

State and local governments also regulate malt producers. Generally, these governments are responsible for overseeing food safety within their specific jurisdictions. In carrying out this role, state and local governments work with federal agencies to implement beverage production safety standards within their state borders. They also carry out inspections of malting facilities to establish the level of food hygiene present in processing.

Industry Assistance

Level & Trend
The level of Industry Assistance is **Low** and the trend is **Steady**

The Malt Production industry has a low and steady level of industry assistance. Imports of malt into the United States have a 0.3 cent tax on unroasted malt and a 0.42 cent tax on roasted malt. IBISWorld estimates that, based on US International Trade Association data, unroasted malt accounts for about 97.2% of all imports due to its lower tax rate. In addition to

having an effect on the composition of imports, these tariffs do provide assistance to domestic malt producers, although minimal. Imports still account for about 24.8% of domestic malt demand and are projected to continue to increase over the next five years as the US dollar strengthens relative to its trading partners' currencies.

Key Statistics

Industry Data

	Revenue (\$m)	Industry Value Added (\$m)	Establishments	Enterprises	Employment	Exports (\$m)	Imports (\$m)	Wages (\$m)	Domestic Demand (\$m)	Price of Coarse Grains (Index)
2003	645.8	83.7	27	17	886	29.9	77.6	48.2	693.5	104.8
2004	743.4	97.8	22	13	837	56.6	79.8	46.5	766.6	99.7
2005	740.2	108.4	24	15	963	75.4	69.0	55.1	733.8	91.6
2006	791.5	105.9	23	14	932	86.9	84.0	50.5	788.6	110.2
2007	822.3	104.3	26	16	962	159.6	134.3	55.8	797.0	165.6
2008	883.5	105.1	21	11	900	273.3	229.7	57.4	839.9	206.4
2009	997.9	134.8	20	11	917	293.5	226.4	66.9	930.8	132.5
2010	962.1	122.2	24	12	830	210.2	197.2	55.1	949.1	153.2
2011	954.2	105.0	20	11	1,006	178.9	205.6	58.3	980.9	248.9
2012	1,059.4	125.3	22	12	1,150	262.2	255.3	61.7	1,052.5	241.4
2013	1,086.9	112.3	19	10	1,017	228.8	308.3	61.2	1,166.4	252.8
2014	1,109.8	114.0	17	9	1,023	291.2	312.1	61.8	1,130.7	277.5
2015	1,179.7	144.8	17	9	1,026	385.8	294.6	68.1	1,088.5	237.2
2016	1,145.5	144.5	15	8	990	410.8	338.4	65.4	1,073.1	260.2
2017	1,193.6	153.4	17	9	1,128	364.1	417.0	67.5	1,246.5	259.4

Annual Change

	Revenue (%)	Industry Value Added (%)	Establishments (%)	Enterprises (%)	Employment (%)	Exports (%)	Imports (%)	Wages (%)	Domestic Demand (%)	Price of Coarse Grains (%)
2004	15.1	16.8	-18.5	-23.5	-5.5	89.3	2.8	-3.5	10.5	-4.9
2005	-0.4	10.8	9.1	15.4	15.1	33.2	-13.5	18.5	-4.3	-8.1
2006	6.9	-2.3	-4.2	-6.7	-3.2	15.3	21.7	-8.3	7.5	20.3
2007	3.9	-1.5	13.0	14.3	3.2	83.7	59.9	10.5	1.1	50.3
2008	7.4	0.8	-19.2	-31.3	-6.4	71.2	71.0	2.9	5.4	24.6
2009	12.9	28.3	-4.8	0.0	1.9	7.4	-1.4	16.6	10.8	-35.8
2010	-3.6	-9.3	20.0	9.1	-9.5	-28.4	-12.9	-17.6	2.0	15.6
2011	-0.8	-14.1	-16.7	-8.3	21.2	-14.9	4.3	5.8	3.4	62.5
2012	11.0	19.3	10.0	9.1	14.3	46.6	24.2	5.8	7.3	-3.0
2013	2.6	-10.4	-13.6	-16.7	-11.6	-12.7	20.8	-0.8	10.8	4.7
2014	2.1	1.5	-10.5	-10.0	0.6	27.3	1.2	1.0	-3.1	9.8
2015	6.3	27.0	0.0	0.0	0.3	32.5	-5.6	10.2	-3.7	-14.5
2016	-2.9	-0.2	-11.8	-11.1	-3.5	6.5	14.9	-4.0	-1.4	9.7
2017	4.2	6.2	13.3	12.5	13.9	-11.4	23.2	3.2	16.2	-0.3

Key Ratios

	IVA/Revenue (%)	Imports/Demand (%)	Exports/Revenue (%)	Revenue per Employee (\$'000)	Wages/Revenue (%)	Employees per Est.	Average Wage (\$)	Share of the Economy (%)
2003	12.96	11.19	4.63	728.89	7.46	32.81	54,401.81	0.00
2004	13.16	10.41	7.61	888.17	6.26	38.05	55,555.56	0.00
2005	14.64	9.40	10.19	768.64	7.44	40.13	57,217.03	0.00
2006	13.38	10.65	10.98	849.25	6.38	40.52	54,184.55	0.00
2007	12.68	16.85	19.41	854.78	6.79	37.00	58,004.16	0.00
2008	11.90	27.35	30.93	981.67	6.50	42.86	63,777.78	0.00
2009	13.51	24.32	29.41	1,088.22	6.70	45.85	72,955.29	0.00
2010	12.70	20.78	21.85	1,159.16	5.73	34.58	66,385.54	0.00
2011	11.00	20.96	18.75	948.51	6.11	50.30	57,952.29	0.00
2012	11.83	24.26	24.75	921.22	5.82	52.27	53,652.17	0.00
2013	10.33	26.43	21.05	1,068.73	5.63	53.53	60,176.99	0.00
2014	10.27	27.60	26.24	1,084.85	5.57	60.18	60,410.56	0.00
2015	12.27	27.06	32.70	1,149.81	5.77	60.35	66,374.27	0.00
2016	12.61	31.53	35.86	1,157.07	5.71	66.00	66,060.61	0.00
2017	12.85	33.45	30.50	1,058.16	5.66	66.35	59,840.43	N/A

Figures are inflation-adjusted 2012 dollars.

SOURCE: WWW.IBISWORLD.COM

Jargon & Glossary

Industry Jargon

GENETICALLY MODIFIED (GM) A technique in which changes are introduced into a plant or animal's DNA by genetic engineering techniques.

GERMINATION The second step in malting barley. It is the process of soaking previously dried barley in water to allow the plant to sprout.

HOPS The female flower of plant family Humulus lupulus. Hops are an ingredient to beer that adds a bitter flavor.

IBISWorld Glossary

BARRIERS TO ENTRY Barriers to entry can be High, Medium or Low. High means new companies struggle to enter an industry, while Low means it is easy for a firm to enter an industry.

CAPITAL/LABOR INTENSITY An indicator of how much capital is used in production as opposed to labor. Level is stated as High, Medium or Low. High is a ratio of less than \$3 of wage costs for every \$1 of depreciation; Medium is \$3 – \$8 of wage costs to \$1 of depreciation; Low is greater than \$8 of wage costs for every \$1 of depreciation.

CONSTANT PRICES The dollar figures in the Key Statistics table, including forecasts, are adjusted for inflation using 2012 as the base year. This removes the impact of changes in the purchasing power of the dollar, leaving only the 'real' growth or decline in industry metrics. The inflation adjustments in IBISWorld's reports are made using the US Bureau of Economic Analysis' implicit GDP price deflator.

DOMESTIC DEMAND The use of goods and services within the US; the sum of imports and domestic production minus exports.

EARNINGS BEFORE INTEREST AND TAX (EBIT) IBISWorld uses EBIT as an indicator of a company's profitability. It is calculated as revenue minus expenses, excluding tax and interest.

EMPLOYMENT The number of working proprietors, partners, permanent, part-time, temporary and casual employees, and managerial and executive employees.

ENTERPRISE A division that is separately managed and keeps management accounts. The most relevant measure of the number of firms in an industry.

ESTABLISHMENT The smallest type of accounting unit within an Enterprise; usually consists of one or more locations in a state or territory of the country in which it operates.

EXPORTS The total sales and transfers of goods produced by an industry that are exported.

IMPORTS The value of goods and services imported with the amount payable to non-residents.

INDUSTRY CONCENTRATION IBISWorld bases concentration on the top four firms. Concentration is identified as High, Medium or Low. High means the top four players account for over 70% of revenue; Medium is 40–70% of revenue; Low is less than 40%.

INDUSTRY REVENUE The total sales revenue of the industry, including sales (exclusive of excise and sales tax) of goods and services; plus transfers to other firms of the same business; plus subsidies on production; plus all other operating income from outside the firm (such as commission income, repair and service income, and rent, leasing and hiring income); plus capital work done by rental or lease. Receipts from interest royalties, dividends and the sale of fixed tangible assets are excluded.

INDUSTRY VALUE ADDED The market value of goods and services produced by an industry minus the cost of goods and services used in the production process, which leaves the gross product of the industry (also called its Value Added).

INTERNATIONAL TRADE The level is determined by: Exports/Revenue: Low is 0–5%; Medium is 5–20%; High is over 20%. Imports/Domestic Demand: Low is 0–5%; Medium is 5–35%; and High is over 35%.

LIFE CYCLE All industries go through periods of Growth, Maturity and Decline. An average life cycle lasts 70 years. Maturity is the longest stage at 40 years with Growth and Decline at 15 years each.

NON-EMPLOYING ESTABLISHMENT Businesses with no paid employment and payroll are known as non-employing establishments. These are mostly set-up by self employed individuals.

VOLATILITY The level of volatility is determined by the percentage change in revenue over the past five years. Volatility levels: Very High is greater than $\pm 20\%$; High Volatility is between $\pm 10\%$ and $\pm 20\%$; Moderate Volatility is between $\pm 3\%$ and $\pm 10\%$; and Low Volatility is less than $\pm 3\%$.

WAGES The gross total wages and salaries of all employees of the establishment.

At IBISWorld we know that industry intelligence is more than assembling facts

It is combining data with analysis to answer the questions that successful businesses ask

Identify high growth, emerging & shrinking markets

Arm yourself with the latest industry intelligence

Assess competitive threats from existing & new entrants

Benchmark your performance against the competition

Make speedy market-ready, profit-maximizing decisions



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We are strategists, analysts, researchers, and marketers. We provide answers to information-hungry, time-poor businesses. Our goal is to provide real world answers that matter to your business in our 700 US industry reports. When tough strategic, budget, sales and marketing decisions need to be made, our suite of Industry and Risk intelligence products give you deeply-researched answers quickly.

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Industrial/ Commercial Malting Companies

Canada Malting

<http://canadamalting.com/>

Rahr Malting Canada

<http://www.rahr.com/>

Prairie Malt Limited

<http://www.prairiemaltltd.com/about.html>

MillerCoors

<http://www.millercoors.com/AgeVerification.aspx>

Anheuser-Busch InBev

<http://www.ab-inbev.com/>

Great Western Malting

<http://countrymaltgroup.com/greatwestern.asp>

Cargill Malt

<http://www.cargillfoods.com/na/en/products/malt/malt-specialty-products-group/>

Malteurop

<http://www.malteurop.com/who-we-are>

Briess Malt and Ingredients Co.

<http://www.briess.com/>

Colorado Malting Company

<http://coloradomaltingcompany.com/>

Michigan Malt Co.

<http://michiganmalt.com/>

Rebel Malting Co.

<http://rebelmalting.com/>

Farmhouse Malt

http://www.farmhousemalt.com/_malthousehome.html

Farm Boys Malt

<http://www.farmboybrewery.com/>

Farm Boys Malt

<http://www.farmboybrewery.com/>

Riverbend Malt

<http://riverbendmalt.com>

Christensen Farms Malting

<http://www.christensenfamilyfarms.com/crops.php>

Balcklands Malt

<http://www.blacklandsmalt.com/>

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Know Your 2013

MALTING BARLEY VARIETIES



Two-Rows

AC Metcalfe	(2005)
CDC Copeland	(2007)
CDC Meredith	(2013)
Charles*	(2009)
Conlon	(2000)
Conrad	(2007)
Expedition	(2013)
Harrington	(1989)
Hockett	(2010)
Merit	(2000)
Merit 57	(2010)
Moravian 37	(2010)
Moravian 69	(2010)
Pinnacle	(2011)
Scarlett	(2008)
Wintmalt*	(2013)

Six-Rows

Celebration	(2011)
Lacey	(2000)
Legacy	(2001)
Quest	(2011)
Robust	(1984)
Stellar-ND	(2006)
Tradition	(2004)

Variety name & year first recommended

*Winter

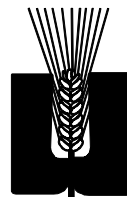
These malting varieties listed in alphabetical order are recommended by AMBA for planting in 2013. When delivered to market in pure carlots of sound, bright, plump, low moisture barley in an acceptable protein range, they may command premium prices over feed barley. Growers are encouraged to contact their local elevator, grain handler or processor to gauge market demand for any variety grown in their region prior to seeding. 2012 crop plantings by variety are included at the end of this publication.

prepared and distributed by

AMERICAN MALTING BARLEY ASSOCIATION, INC.

740 N. Plankinton Avenue, Suite 830, Milwaukee, WI 53203

<http://www.AMBAinc.org>



	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
	(% of AMBA Recommended Six-Row Malting Varieties)				
<u>Six-Rows</u>					
CELEBRATION	*	*	3.0%	*	5.7%
LACEY	23.4%	23.4%	34.4%	27.7%	27.3%
LEGACY	10.9%	6.6%	4.7%	7.3%	3.6%
QUEST	*	*	*	*	0.5%
ROBUST	8.1%	5.5%	6.5%	6.4%	8.1%
STELLAR-ND	11.7%	4.7%	2.3%	0.7%	1.7%
TRADITION	45.9%	59.8%	49.1%	57.9%	53.1%
	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
	(% of AMBA Recommended Two-Row Malting Varieties)				
<u>Two-Rows</u>					
AC METCALFE	27.9%	25.8%	33.7%	33.0%	27.6%
CDC COPELAND	1.1%	*	2.1%	1.9%	2.5%
CHARLES	0.1%	1.0%	1.2%	1.0%	0.7%
CONLON	17.0%	21.5%	10.3%	5.7%	8.3%
CONRAD	12.0%	14.6%	16.9%	16.8%	16.7%
HARRINGTON	23.7%	17.8%	9.8%	5.6%	3.6%
HOCKETT	*	*	4.7%	6.1%	10.6%
MERIT	8.7%	7.7%	7.0%	3.9%	3.6%
MERIT 57	*	0.1%	0.2%	6.7%	8.2%
MORAVIAN 37	2.5%	3.5%	0.7%	1.0%	0.5%
MORAVIAN 69	6.6%	8.0%	12.1%	16.3%	13.3%
PINNACLE	*	*	1.4%	2.1%	3.9%
SCARLETT	0.3%	*	*	*	0.4%
* Less than 0.1%					
Source: USDA/NASS Barley Variety Surveys					

VARIETY IDENTIFICATION

PROCEDURE

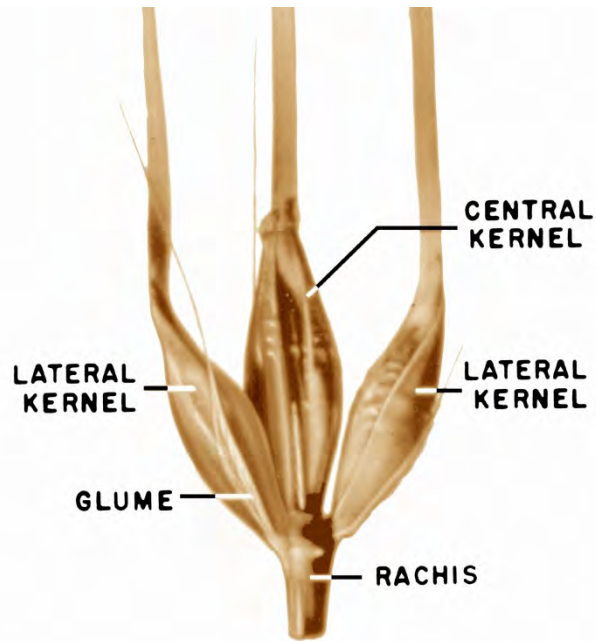
VARIETY IDENTIFICATION IS NOT DIFFICULT

Surveys show that in any one community there are usually not more than five or six varieties. With careful study of typical, pure kernel samples one can learn to recognize local varieties with a high degree of accuracy.

GUIDES IN IDENTIFYING KERNELS OF BARLEY VARIETIES

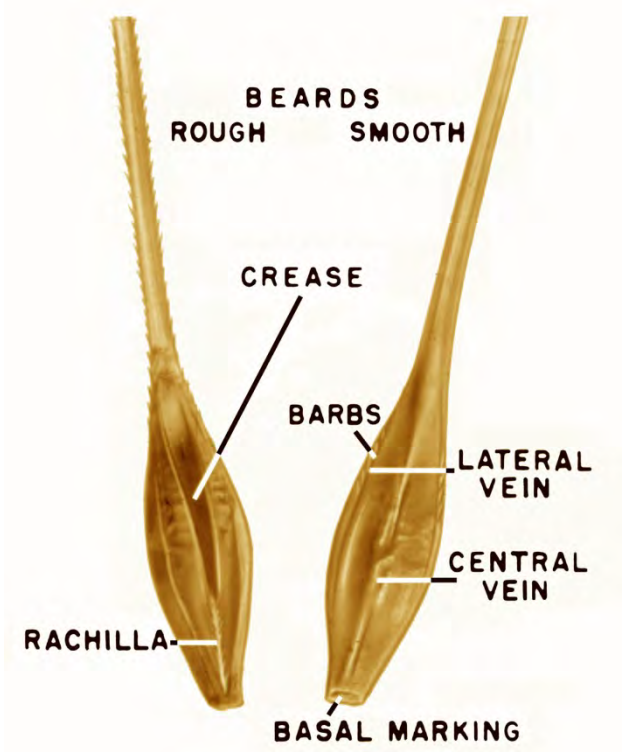
1. Study type samples - look at the sample as a whole, not at only a few individual kernels. Line up a row of 10-20 kernels pointing the base end toward the light source.
2. Use a magnifier with a good strong light - north daylight is best.
3. Know which varieties are being grown in your area - keep an eye open for any new introductions. Study varietal kernel characteristics for each new crop.

Do not be afraid to look and look, and look again.



TO IDENTIFY A SAMPLE

- A. Check general appearance of the sample. A pure sample will usually appear uniform. A sample containing a mixture of varieties generally has a non-uniform appearance.
- B. Determine the major kernel characters as follows:



1. Six-Row or Two-Row - The lateral or side kernels in six-row varieties are twisted. Therefore, in six-row varieties, two-thirds of the kernels are twisted. In two-row varieties, which have no lateral kernels, all kernels are straight and symmetrical and none are twisted.
2. White or Blue pearl (aleurone) – This is an easy character to determine with the use of a barley pearling machine. Sometimes blue varieties may have very weakly developed blue color and can be confused with white pearls.
3. Rough or Smooth Beards (awns) – There are usually enough broken pieces of beard or short pieces of beard attached to the kernel so that this character can easily be determined. Most smooth or semi-smooth bearded varieties have a few barbs at the tip but have no barbs on the rest of the beard.

4. Long or Short Hairs on Rachilla - This is an excellent character to use but a hand magnifying lens is needed to see the rachilla hairs. The difference between long and short hairs is very pronounced and does not vary from year to year or in different areas. Some varieties have aborted rachillas, these can be seen readily with the naked eye.

C. If the above characters are not sufficient to identify a variety, other characters will have to be used. The most useful are described below:

1. The basal mark can vary from a depression to a transverse crease. A depression is a smooth uniform hollow or “dimple”. A transverse crease is a sharp fold or line.

2. Crease shape may vary from wide, open and V-shaped from base of kernel to narrow and almost closed. In some varieties the crease is closed in the bottom half of the kernel and flaring at the tip end. This character will vary with growing conditions and plumpness of kernel.

3. Barbs on lateral veins can be seen with a magnifying glass or felt with the finger. Their number varies from none to many in different varieties. These barbs are not related to the barbs on the beards of rough bearded varieties.

4. Hairs on glumes require careful observation with a hand magnifying lens to determine the length of hairs and their location on the glume. This can be a very useful character in varieties such as Foster where the glumes are covered with long hairs.

5. Kernel shape varies with growing conditions but can be of value in a local area. The relationship between length and width and fullness in different parts of the kernel are useful characters. Kernel shape may be smooth and tapered or there may be prominent bulges or other distinctive features.

6. Wrinkling of the hull varies from very fine to coarse. Many two-row varieties have numerous, very fine wrinkles. Some varieties, such as Steptoe, have very little wrinkling and may have a smooth hull.

C. In any area one may find additional characters which will be of use in identifying local varieties. It is important to study locally grown samples each year as some kernel characters may vary depending on the season and location at which a variety is grown.

RACHILLA HAIRS



Rachilla hairs: left – long, center – short, right - aborted

KERNEL CHARACTERS



Hairiness of glumes: left to right – covered, in band, on midline, without hairs or smooth.

GLUME HAIRS



Variations in

width.

crease shape and

CREASE SHAPE

KERNEL CHARACTERS



Basal mark: left – depression, center – depression tending to crease, right – transverse crease.

BASAL MARK



Wrinkling of hulls: left – slightly wrinkled, center – semi-wrinkled, right – wrinkled.

HULL WRINKLING

SIX-ROW MALTING BARLEY VARIETIES

CELEBRATION

PEARL	White
RACHILLA	Short Hairs
BEARD	Semi-smooth

Crease is open with crease hairs.
Kernel is mid-long to long.



LACEY

PEARL	White
RACHILLA	Short Hairs
BEARD	Smooth

V-shaped, narrow at base. Kernels medium large, plump, and wide at center. Veins moderately prominent.



LEGACY

PEARL	White
RACHILLA	Long Hairs
BEARD	Smooth

Crease V-shaped with crease hairs.
Several barbs on lateral veins. Hull wrinkled with sharkskin in interveinal areas.



ROBUST

PEARL	White
RACHILLA	Short Hairs
BEARD	Smooth

Crease V-shaped, narrow at base. Hull slightly wrinkled. Barbs on lateral veins absent. Central vein moderately prominent, lateral veins less prominent. Kernel wide at center, full on crease side.

**STELLAR-ND**

PEARL	White
RACHILLA	Long Hairs
BEARD	Semi-Smooth

Crease V-shaped, narrow at base, flared toward beard end. Veins moderately prominent. Kernel plump with no prominent bulges.

**TRADITION**

PEARL	White
RACHILLA	Long Hairs
BEARD	Semi-smooth

Crease V-shaped with crease hairs and fence hairs. Kernel is midlong to long and narrow.



TWO-ROW MALTING BARLEY VARIETIES

AC METCALFE

PEARL White
 RACHILLA Long Hairs
 BEARD Rough

Crease narrow at base, flared toward beard end.



CDC COPELAND

PEARL White
 RACHILLA Long Hairs
 BEARD Rough

Crease narrow at the base, flared toward beard end.



CHARLES

PEARL White
 RACHILLA Short Hairs
 BEARD Rough

Crease V-shaped and open at base.



CONRAD

PEARL	White
RACHILLA	Long Hairs
BEARD	Rough

Ventral crease is open and lacking crease hairs. Kernel large and mid-long to long.

**HARRINGTON**

PEARL	White
RACHILLA	Long Hairs
BEARD	Rough

Crease narrow, shallow and flared toward beard end. Barbs on lateral veins absent. Kernel broad and diamond shaped. Hull smooth to slightly wrinkled and skins easily.

**MERIT**

PEARL	White
RACHILLA	Long Hairs
BEARD	Rough

Crease narrow at base, flared toward beard end. Prominent lateral veins. Mid-long kernel.



SCARLETT

PEARL White

RACHILLA Long Hairs

BEARD Rough

Hull extensively wrinkled in distal half of the kernel.



KEY TO KERNEL IDENTIFICATION

<u>Variety</u>	<u>Pearl</u>	<u>Beard</u>	<u>Rachilla Hairs</u>	<u>Basal Mark</u>	<u>Hull</u>	<u>Lateral Vein Barbs</u>	<u>Glume-Hair</u>	<u>Other Characters</u>
<u>SIX-ROW VARIETIES</u>								
* Drummond	W	SS	L	D	W	N	C/L	Crease narrow at base, flared toward beard end. Kernel, midlong to long, plump, with no prominent bulges.
* Excel	W	S	L	DC	W	N-F	B/L	Crease narrow at base, flared toward beard end. Long hairs on rachilla may be infrequent, fragile.
* Foster	W	SS	L	DC	W	N	C/L	Crease V-shaped, narrow at base.
** Lacey	W	SS	S	DC	W	F	C/S	Crease V-shaped, narrow at base. Kernels medium large, plump, and wide at center. Veins moderately prominent.
** Legacy	W	SS	L	DC	W	S	B/L	Crease V-shaped with crease hairs. Several barbs on moderately prominent lateral veins. Hull wrinkled with sharkskin in interveinal areas.
* Rasmusson	W	SS	S	C	W	F	C/S	Crease V-shaped, narrow at base. Kernel plump like Stander.
** Robust	W	S	S	DC	W	N	C/S	Crease V-shaped, narrow at base. Central vein moderately prominent, lateral veins less prominent. Kernel wide at center, full on crease side.
* Stander	W	S	S	DC	W	N-F	C/S	Crease V-shaped, narrow at base. Plump as Robust.
** Stellar-ND	W	SS	L	D	S	N	C/L	Crease narrow at base, flaring at beard end. Kernels plump with no prominent bulges.
** Tradition	W	SS	L	D	W	S	B/L	Crease V-shaped with crease hairs and fence hairs. Kernel long and narrow.
<u>TWO-ROW VARIETIES</u>								
** AC Metcalfe	W	R	L	D	W	F	C/L	Crease narrow at base, flared toward beard end.
* B1202	W	R	L	D	W	N	C/L	Crease narrow at base, flared toward beard end. Loose hull.
Baronesse	W	R	L	D	W	N	C/L	Mid-long to long kernel. Crease narrow lower half, flared at beard end. Lateral sterile florets are extremely reduced in size vs typical two-row barley.
Bob	W	R	L	D	W	N	C/S	Narrow crease, veins are prominent and hull is wrinkled in distal half of the kernel.
Bowman	W	SS	L	DC	W	N	B/L	Crease narrow and shallow at base, flared toward beard end. Plump kernel, broad in relation to length.
** CDC Copeland	W	R	L	D	W	N-F		Crease narrow at base, flaring toward beard end.
** Conlon	W	SS	L	DC	W	N	B/L	Crease narrow and shallow at base, flared toward beard end. Kernel plump, symmetrical, smooth with no prominent bulges.
** Conrad	W	R	L	D	W	N	B/L	Crease is open and lacking crease hairs . Kernel mid-Loang to Long.

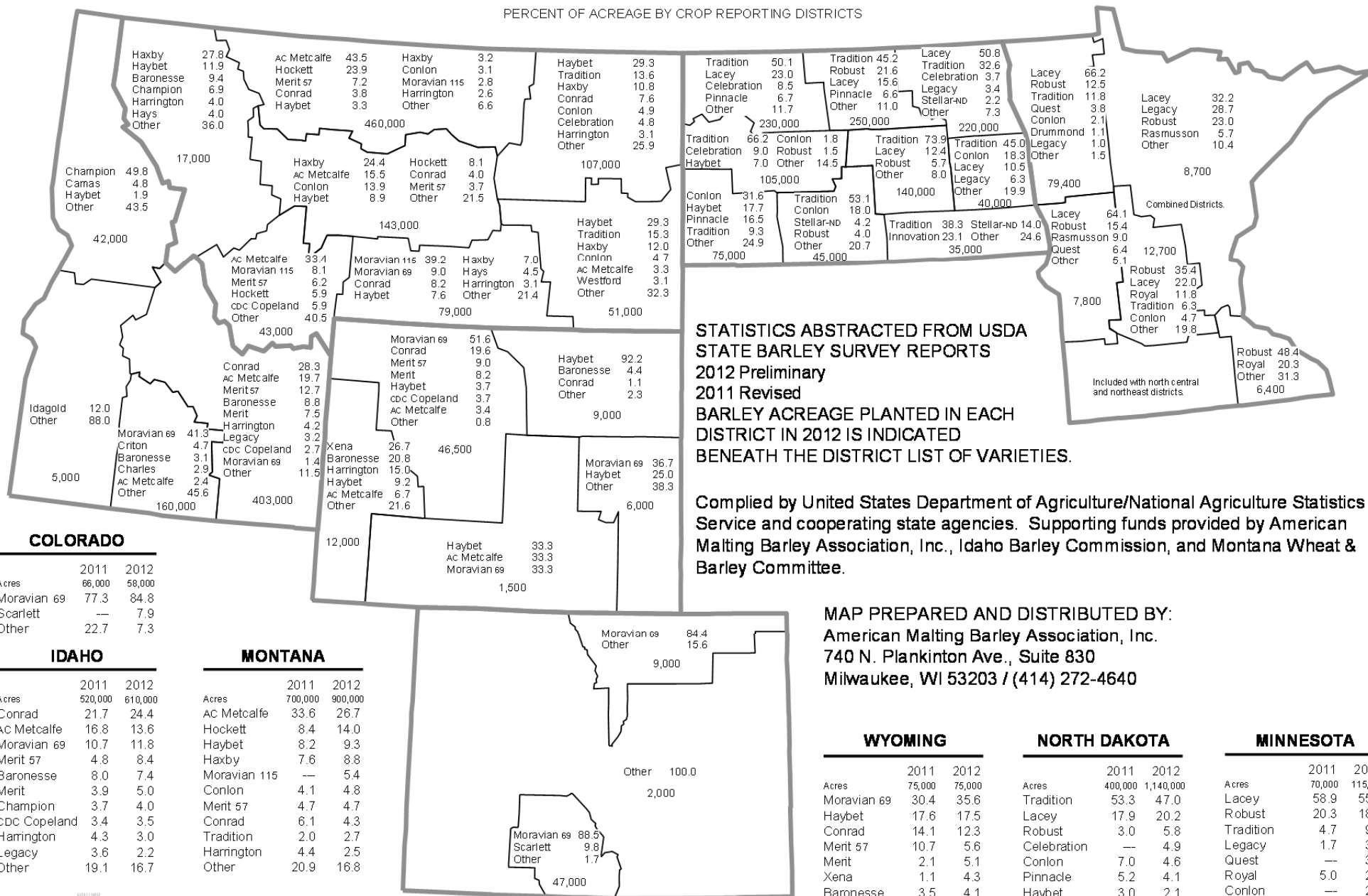
<u>Variety</u>	<u>Pearl</u>	<u>Beard</u>	<u>Rachilla Hairs</u>	<u>Basal Mark</u>	<u>Hull</u>	<u>Lateral Vein Barbs</u>	<u>Glume-Hair</u>	<u>Other Characters</u>
<u>TWO-ROW VARIETIES (continued)</u>								
*Craft	W	SS	L	DC	W	N	B/L	
Gallatin	W	R	S	D	W	N	C/S	Crease narrow at base, flared toward beard end.
*Garnet	W	R	L	DC	W	N	C/L	Lateral veins prominent. Kernels broad at midpoint, giving kernels a diamond shape.
**Harrington	W	R	L	D	S-W	N	C/L	Crease narrow, shallow. Loose Hull. Diamond shaped kernel.
Haxby	W	SS	L	D	W	N-F	B/L	Crease narrow and shallow at base and flared toward beard end.
**Hockett	W	R	L	D	W	N	C/L	Crease narrow, shallow. Kernels finely wrinkled.
Lewis	W	R	L	D	W	N	C/L	Crease narrow at base, flared toward beard end.
**Merit	W	R	L	D	W	F	B/L	Crease narrow at base, flared toward beard end. Prominent veins. Mid-long kernel.
**Moravian 37	W	R	L	D	W	N	C/L	Crease V-shaped. Narrow at base, flared toward beard end.
Radiant	W	R	L		W			Crease narrow and veins prominent without pigment. Kernels long and plump and lateral sterile florets are extremely reduced in size vs typical two-row barley.
**Scarlett	W	R	L		W			Hull extensively wrinkled in distal half of the kernel.
Valier	W	R	L	D	W	N-F	C/L	Crease narrow lower half, flared at beard end. Prominent veins.
Xena	W	R	L	D	W	N	C/S	Crease narrow in lower half, flared toward beard end. Lateral florets greatly reduced in size.

**Recommended by AMBA for planting in 2013. *Recommended in previous years.

ABBREVIATIONS Variety: w-winter; Pearl: W-white, B-blue; Beard: R-rough, S-smooth, SS-semi-smooth; Rachilla Hairs: S-short, L-Long; Basal Mark: D-depression, C-crease, DC-depression tending to crease; Hull: W-wrinkled, S-smooth; Lateral Vein Barbs: N-none, F-few, S-several, Nu-numerous; Glume-hair: C-Covered, B-band, M-midline, S-short, L-long.

Barley Variety Survey - 2012

PERCENT OF ACREAGE BY CROP REPORTING DISTRICTS



COLORADO

	2011	2012
Acres	66,000	58,000
Moravian 69	77.3	84.8
Scarlett	---	7.9
Other	22.7	7.3

IDAHO

	2011	2012
Acres	520,000	610,000
Conrad	21.7	24.4
AC Metcalfe	16.8	13.6
Moravian 69	10.7	11.8
Merit 57	4.8	8.4
Baronesse	8.0	7.4
Merit	3.9	5.0
Champion	3.7	4.0
CDC Copeland	3.4	3.5
Harrington	4.3	3.0
Legacy	3.6	2.2
Other	19.1	16.7

MONTANA

	2011	2012
Acres	700,000	900,000
AC Metcalfe	33.6	26.7
Hockett	8.4	14.0
Haybet	8.2	9.3
Haxby	7.6	8.8
Moravian 115	---	5.4
Conlon	4.1	4.8
Merit 57	4.7	4.7
Conrad	6.1	4.3
Tradition	2.0	2.7
Harrington	4.4	2.5
Other	20.9	16.8

WYOMING

	2011	2012
Acres	75,000	75,000
Moravian 69	30.4	35.6
Haybet	17.6	17.5
Conrad	14.1	12.3
Merit 57	10.7	5.6
Merit	2.1	5.1
Xena	1.1	4.3
Baronesse	3.5	4.1
AC Metcalfe	5.0	3.9
CDC Copeland	1.2	3.2
Harrington	2.6	2.4
Other	11.7	6.0

NORTH DAKOTA

	2011	2012
Acres	400,000	1,140,000
Tradition	53.3	47.0
Lacey	17.9	20.2
Robust	3.0	5.8
Celebration	---	4.9
Conlon	7.0	4.6
Pinnacle	5.2	4.1
Haybet	3.0	2.1
Legacy	2.4	1.9
Stellar-ND	0.7	1.6
Innovation	---	0.9
Other	7.5	6.9

MINNESOTA

	2011	2012
Acres	70,000	115,000
Lacey	58.9	55.2
Robust	20.3	18.0
Tradition	4.7	9.2
Legacy	1.7	3.2
Quest	---	3.0
Royal	5.0	2.8
Conlon	---	2.3
Rasmusson	3.4	1.7
Drummond	---	1.0
Other	6.0	3.6



BEAVER CREEK BREWERY	PO BOX 196	WIBAUX	MT	59353
FAT JACK'S TAP ROOM	3513 PRESTWICK RD	BILLINGS	MT	59101
HARVEST MOON BREWING	PO BOX 510	BELT	MT	59412
OUTLAW BREWING	3309 SUNDANCE DR	BOZEMAN	MT	59715
KETTLEHOUSE BREWING COMPANY	313 N 1ST ST W	MISSOULA	MT	59802
GLACIER BREWING COMPANY	6 10TH AVE E	POLSON	MT	59860
WILDWOOD BREWING INC	4018 US HIGHWAY 93 N	STEVENSVILLE	MT	59870
UBERBREW	1669 AUGSBURG DR	BILLINGS	MT	59105
ANGRY HANKS MICROBREWERY	2940 ROCKRIM LN	BILLINGS	MT	59102
CANYON CREEK BREWING	2460 FERN DR	BILLINGS	MT	59102
BILLINGS BREWING CO.	113 1/2 N BROADWAY	BILLINGS	MT	59101
DRAUGHT WORKS	915 TOOLE AVE	MISSOULA	MT	59802
THE FRONT BREWING COMPANY	PO BOX 2493	GREAT FALLS	MT	59403
BITTER ROOT BREWING	101 MARCUS ST	HAMILTON	MT	59840
BOZEMAN BREWING CO INC.	504 N BROADWAY AVE	BOZEMAN	MT	59715
HIMMELBERGER BREWING	PO BOX 22272	BILLINGS	MT	59104
THE GREAT NORTHERN BREWING COMP.	2 CENTRAL AVE	WHITEFISH	MT	59937
CARTERS BREWING	3011 COVE CREEK CIR	BILLINGS	MT	59106
BIG SKY BREWING COMPANY	PO BOX 17170	MISSOULA	MT	59808
YELLOWSTONE VALLEY BREWING CO	2123 B 1ST AVE N	BILLINGS	MT	59101
NEPTUNE'S BREWERY	119 N L ST	LIVINGSTON	MT	59047
BLACKSMITH BREWING COMPANY	114 MAIN ST	STEVENSVILLE	MT	59870
KETTLEHOUSE BREWING COMPANY LLC	313 N 1ST ST W	MISSOULA	MT	59802
LONE PEAK BREWING COMPANY	PO BOX 161773	BIG SKY	MT	59716
LEWIS AND CLARK BREWING COMPANY	1517 DODGE AVE	HELENA	MT	59601
YELLOWSTONE VALLEY BREWING COMF	2123B 1ST AVE N	BILLINGS	MT	59101
BLACKFOOT RIVER BREWING COMPANY	66 S PARK AVE	HELENA	MT	59601
PHILIPSBURG BREWING COMPANY	PO BOX 843	PHILIPSBURG	MT	59858
BAYERN BREWING	1507 MONTANA ST	MISSOULA	MT	59801
QUARRY BREWING	124 W BROADWAY ST	BUTTE	MT	59701
MADISON RIVER BREWING COMPANY	20900 FRONTAGE RD	BELGRADE	MT	59714
TAMARACK BREWING COMPANY	105 BLACKTAIL RD	LAKESIDE	MT	59922
FLATHEAD LAKE BREWING	26008 E SHORE DR	BIGFORK	MT	59911
BOWSER BREWING COMPANY	1509 12TH AVE S	GREAT FALLS	MT	59405
TAMARACK BREWING COMPANY	105 BLACKTAIL RD	LAKESIDE	MT	59922
RED LODGE ALES BREWING COMPANY	PO BOX 2278	RED LODGE	MT	59068
MISSOURI BREAKS BREWING	PO BOX 654	WOLF POINT	MT	59201
406 BREWING COMPANY	101 E OAK ST	BOZEMAN	MT	59715
ANGRY HANK'S MICROBREWERY	2940 ROCKRIM LN	BILLINGS	MT	59102
HIGHERGROUND BREWING CO	518 N 1ST ST	HAMILTON	MT	59840
DESERT MOUNTAIN BREWING AND DRAI	220 S MONTANA ST	BUTTE	MT	59701
BRIDGER BREWING COMPANY	1609 S 11TH AVE	BOZEMAN	MT	59715
KALISPELL BREWING LLC	PO BOX 1886	KALISPELL	MT	59903
BADLANDS BREWERY	13749 COUNTY ROAD 33	CULBERTSON	MT	59218
H.A. BREWING CO	2525 GRAVE CREEK RD	EUREKA	MT	59917
BONSAI BREWING PROJECT	6475 US HIGHWAY 93 S	WHITEFISH	MT	59937
MIGHTY MO BREWING CO	PO BOX 3311	GREAT FALLS	MT	59403

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Montana Barley for Malt 2012 Marketing Year

Cooperating with the Montana Department of Agriculture
10 W 15th Street, Suite 3100 · Helena, MT 59626
800-835-2612 · FAX 800-915-6277 · www.nass.usda.gov/mt

Released: September 17, 2013

27.9 Million Bushels of Montana Malt Barley Purchased During the 2012 Marketing Year

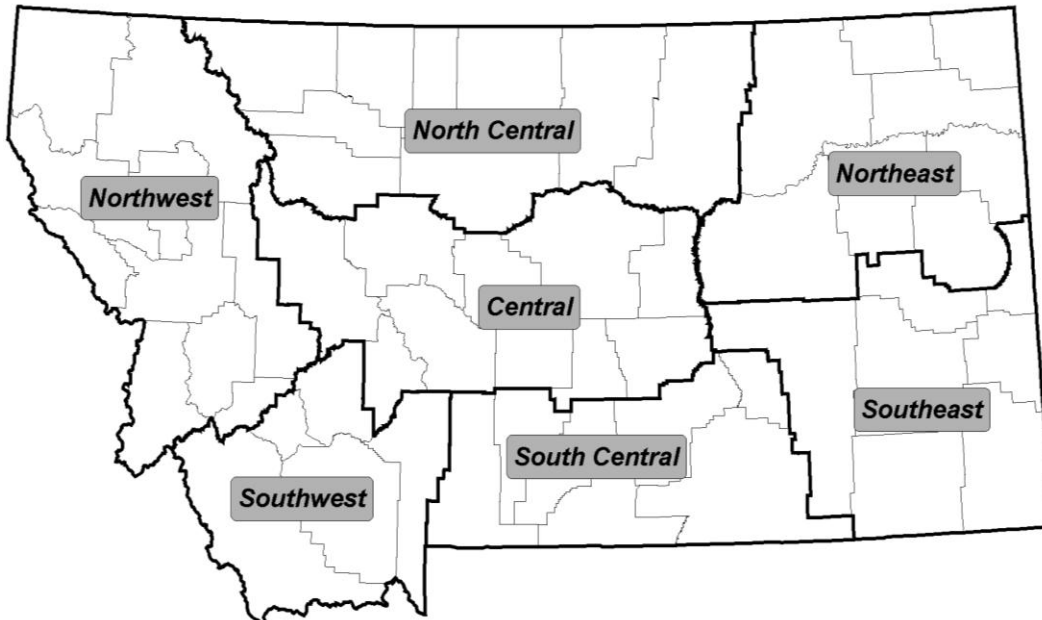
Maltsters and brewers purchased 27.6 million bushels of Montana's barley crop between July 1, 2012 and June 30, 2013 to make malt. This is up 15.8 percent from the same period a year ago, according to a recent survey conducted by the USDA, NASS, Montana Field Office. The survey was requested and funded by the Montana Wheat and Barley Committee. The average protein of the purchased barley was 11.9 percent, which is slightly higher than the 11.6 percent average from a year ago. Average plumpness decreased 1 percentage point from last year to 88 percent.

Montana growers planted 1,000,000 acres of barley in 2013, up 100,000 acres from 2012. Of the total, approximately 66 percent, or 660,000 acres, were planted to malting barley varieties.

AC Metcalfe was the most frequently purchased variety by maltsters and brewers this year. AC Metcalfe, an Anheuser Busch variety, accounted for 32 percent of the total purchases. Hockett, Moravian 115, and Merit 57 were also commonly purchased varieties at 18, 17, and 11 percent of the total, respectively.

Fifty-eight percent of all malt barley purchased was grown in North Central Montana compared with 54 percent last year and 64 percent two years ago. Fifteen percent was purchased from the South Central district, and 12 percent of the total was purchased from the Central district growers.

Montana's Agricultural Districts



This survey was requested and funded by the Montana Wheat and Barley Committee.

Special thanks to the maltsters, brewers, and grain elevators that cooperated in furnishing data.

USDA, NASS, Montana Field Office
Ron Schumacher, Statistician

Montana Department of Agriculture
Ron de Yong, Director

Montana Wheat & Barley Committee
Kimberly Falcon, Executive Vice President

Montana Barley Purchased to Produce Malt, 2010-2012 Crops

	Crop Year 1/	DISTRICTS																					STATE 2/				
		Northwest			North Central			Northeast			Central			Southwest			South Central			Southeast							
		Bushels	% Protein	% Plump	Bushels	% Protein	% Plump	Bushels	% Protein	% Plump	Bushels	% Protein	% Plump	Bushels	% Protein	% Plump	Bushels	% Protein	% Plump	Bushels	% Protein	% Plump	Bushels	% Protein	% Plump		
AC Metcalfe	2010	30,000	11.2	92	7,355,000	11.7	89				701,000	12.1	89	263,000	11.8	94	3,000	11.5	94				8,352,000	11.7	89		
	2011				5,972,000	11.4	89				1,624,000	11.9	88	1,267,000	11.9	90	250,000	12.4	90				9,113,000	11.6	89		
	2012	30,000	10.7	88	6,299,000	12.0	85				1,416,000	12.4	83	827,000	12.1	86	220,000	12.9	83				8,792,000	12.1	85		
Hockett	2010				2,170,000	11.1	92				63,000	12.1	94	12,000	12.8	92	55,000	10.7	91				2,300,000	11.2	92		
	2011				2,008,000	11.7	91				871,000	12.0	87	223,000	11.2	92	36,000	11.6	91				3,138,000	11.7	90		
	2012				4,527,000	11.7	88				377,000	12.4	87	68,000	12.4	80	51,000	11.1	73				5,023,000	11.8	88		
Moravian 115	2010																87,000	10.5	95				87,000	10.5	95		
	2011				334,000	11.4	93										416,000	11.9	88				750,000	11.6	90		
	2012										1,130,000	11.0	92	346,000	12.0	90	3,300,000	10.9	91				4,776,000	11.0	91		
Merit 57	2010				690,000	10.5	90	9,000	12.1	95	17,000	10.4	91										716,000	10.5	90		
	2011				1,288,000	10.9	90	30,000	12.6	91	124,000	10.9	91				27,000	11.9	85	55,000	12.1	85	1,524,000	11.0	90		
	2012				2,672,000	11.4	87				325,000	11.1	88				14,000	10.5	79				3,011,000	11.4	87		
Conrad	2010				2,184,000	11.8	94	9,000	12.0	98	250,000	11.5	96	77,000	12.8	94	566,000	11.2	92				3,086,000	11.7	93		
	2011				1,868,000	12.0	93	200,000	12.1	95	264,000	12.4	96	85,000	12.8	94	400,000	12.8	85	30,000	12.5	88	2,847,000	12.2	92		
	2012				1,540,000	12.3	93	450,000	13.1	92	155,000	12.5	94	27,000	12.7	97	349,000	12.3	90				2,521,000	12.5	92		
Tradition	2010							1,453,000	12.3	89												171,000	12.0	91	1,624,000	12.3	89
	2011							1,300,000	12.6	91												125,000	12.2	91	1,425,000	12.6	91
	2012							1,500,000	12.9	84												150,000	13.4	83	1,650,000	13.0	84
Harrington	2010				1,093,000	11.6	91	11,000	12.6	89	21,000	10.6	94	107,000	11.6	93								1,232,000	11.6	92	
	2011				500,000	11.9	87	11,000	11.7	90	4,000	12.4	95	326,000	11.4	91								841,000	11.7	88	
	2012				184,000	12.6	85				1,000	10.6	89	228,000	12.1	85	18,000	13.1	83				431,000	12.4	85		
Celebration	2010							263,000	12.9	86													263,000	12.9	86		
	2011							210,000	13.1	88										21,000	13.4	83	231,000	13.1	88		
	2012							355,000	13.2	81													355,000	13.2	81		
CDC Copeland	2010																										
	2011							38,000	12.7	70													38,000	12.7	70		
	2012												147,000	12.7	86	136,000	12.3	90					283,000	12.5	87		
Other	2010				994,000	10.4	93	102,000	12.2	87	242,000	10.6	94	277,000	11.1	87	3,532,000	10.4	91				5,147,000	10.5	91		
	2011				910,000	10.7	91				332,000	11.3	90				2,721,000	11.2	82				3,963,000	11.1	85		
	2012				799,000	11.4	91																799,000	11.4	91		
Total	2010	30,000	11.2	92	14,486,000	11.5	91	1,847,000	12.4	89	1,294,000	11.6	92	736,000	11.6	91	4,243,000	10.5	91	171,000	12.0	91	22,807,000	11.4	91		
	2011				12,880,000	11.4	90	1,789,000	12.6	91	3,219,000	11.9	88	1,901,000	11.8	90	3,850,000	11.6	84	231,000	12.3	89	23,870,000	11.6	89		
	2012	30,000	10.7	88	16,021,000	11.8	87	2,305,000	13.0	85	3,404,000	11.8	88	1,643,000	12.2	87	4,088,000	11.2	90	150,000	13.4	83	27,641,000	11.9	88		

1/ Crop year defined as July 1 to June 30. 2/ Totals may not add due to rounding.



Montana Barley Varieties 2013

Cooperating with the Montana Department of Agriculture
10 W 15th Street, Suite 3100 · Helena, MT 59626

Released: July 29, 2013

The total acres of barley seeded in Montana in 2013 are reported at 1,000,000 acres, up from 900,000 acres planted in 2012. Montana now ranks first in planted barley acreage in the United States for 2013, according to the USDA National Agricultural Statistics Service, Montana Field Office. The top variety seeded in Montana for the sixth year in a row was AC Metcalfe, followed by Haxby, Hockett and Moravian 115.

TOP MALTING VARIETIES

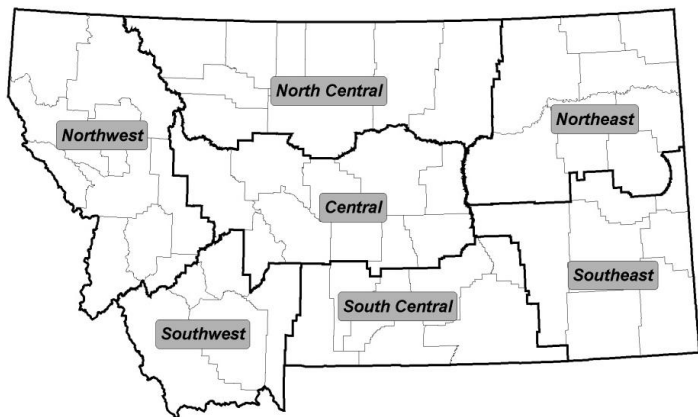
AC Metcalfe continues to be the leading malting barley variety for the sixth year in a row. Montana growers seeded 300,800 acres (30.1 percent of total acres of barley planted in Montana). AC Metcalfe is a two-row malting barley developed by Agriculture and Agri-Food Canada, located in Brandon, Manitoba. It has an 8 percent higher yield, but matures one day later than Harrington. It is resistant to loose smut, and is moderately resistant to the spot-form of net blotch, surface-borne smuts, and common root rot. It has plump kernels and high test weight, but it is susceptible to scald and septoria.

Hockett is the second leading malting barley variety planted in 2013. Montana producers planted 105,400 acres, accounting for 10.5 percent of the total barley acres planted this year. Hockett is a two rowed dry land variety that was developed by Montana State University (MSU) in 2008. When compared to Harrington, Hockett has a higher yield and better malt quality given dry land conditions. It is susceptible to lodging and stripe rust.

Moravian 115 ranked third among malting barley varieties seeded for the 2013 crop year. A total of 78,000 acres or 7.8 percent of all barley is planted to this variety. This is a two rowed variety bred by Coors Brewing Company. It is a small-stature, high yielding variety with high extract and moderate protein. It is a semi-dwarf barley and typically does not lodge under normal production conditions.

Conrad is the fourth most common malting barley variety seeded in 2013. A total of 48,900 acres were planted, accounting for 4.9 percent of the total acres seeded. Conrad is a two-row variety released by Busch Agricultural Resources in 2005. This variety is a medium-tall plant with fair straw strength and a medium late maturity. Conrad has malt protein levels similar to Merit and Harrington. Its resistance to both scald and net blotch is slightly better than Harrington and is resistant to rust stripe.

Montana's Agricultural Districts



TOP FORAGE VARIETIES

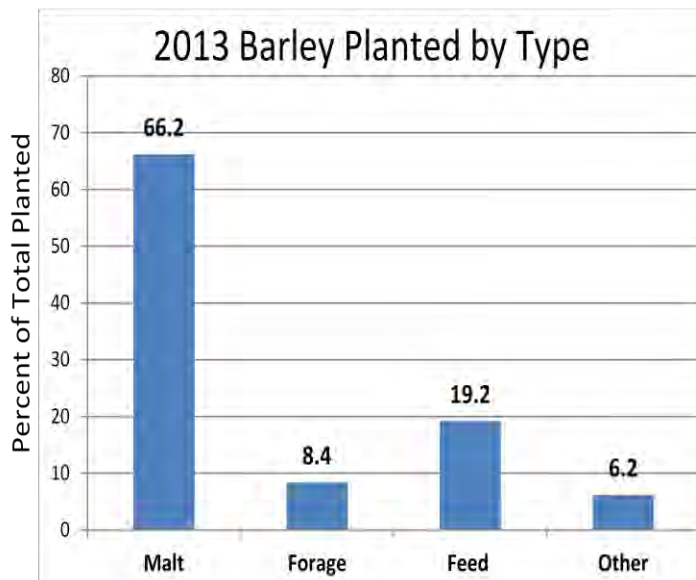
Haybet has been the top forage barley variety seeded for the past fourteen years. Montana farmers planted 60,700 acres, accounting for 6.1 percent of the total acres seeded in 2013. It was developed cooperatively by the Agricultural Research Service, USDA, and the Montana Agricultural Experiment Station in 1989. It is a two-rowed, hooded, white-kernel spring hay barley. Compared to Horsford hay barley, Haybet is 3 days later in heading and similar in plant height and percent lodging. Haybet is higher in hay yield than Horsford, but they are similar in yield.

Hays is the second most common forage barley variety planted in 2013 with 14,900 acres or 1.5 percent of the total barley planted. It is a two-rowed hooded hay barley developed by MSU, and is a cross between Haybet and Baronesse varieties. Forage yields are similar to Haybet and higher than Westford. Hays is about three inches shorter and heads two days later than Haybet, however, the two varieties have similar test weights.

TOP FEED VARIETIES

Haxby remained the top feed barley variety planted for feed in 2013 for the seventh year in a row. Producers planted 112,600 acres in 2013 up from 74,900 in 2012. This variety accounts for 11.3 percent of the total barley acres planted in Montana. Haxby is a two-rowed barley developed by MSU. Yields are equal to Baronesse and Eslick and are higher than Gallatin and Valier varieties. It is medium height and maturity, and has superior performance in low moisture conditions. Haxby has high test weights in both dry land and irrigated areas.

Champion is the second most common Montana feed barley variety in 2013. Montana growers planted 18,500 acres, accounting for 1.9 percent of the 2013 planted acres. Champion was developed by WestBred LLC, Bozeman, Montana in 1997. It is a cross between Baronesse and Camas. It is a two-row spring barley that has a semi-erect to intermediate growth habit. Champion has fair to good resistance to lodging and shattering. It also shows strengths to neck breaking and drought.



Data compiled and summarized by the Montana Field Office of the National Agricultural Statistics Service, an agency of USDA, as a service provided for the Montana Wheat and Barley Committee

Barley: 2013 Seeded Acreage and Percent of Total Seeded by District																
Variety	Northwest		North Central		Northeast		Central		Southwest		South Central		Southeast		State Total	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
AC Metcalfe	0.5	2.9	254.8	48.1	1.5	1.4	28.2	16.8	14.9	29.2	0.9	1.2	--	--	300.8	30.1
Haxby	10.4	57.8	31.7	6.0	7.2	6.8	48.7	29.0	2.6	5.2	8.2	10.1	3.8	8.2	112.6	11.3
Hockett	--	--	73.5	13.9	--	--	24.7	14.7	2.0	3.9	5.0	6.2	0.2	0.4	105.4	10.5
Moravian 115	--	--	37.1	7.0	1.0	0.9	--	--	5.7	11.2	34.1	42.1	0.1	0.3	78.0	7.8
Haybet	1.2	6.8	10.6	2.0	20.1	19.0	10.2	6.1	0.9	1.7	2.2	2.7	15.5	33.8	60.7	6.1
Conrad	--	--	21.7	4.1	8.2	7.7	5.0	3.0	3.4	6.7	8.0	9.9	2.6	5.6	48.9	4.9
Merit 57	--	--	29.2	5.5	--	--	4.7	2.8	1.4	2.7	0.4	0.5	--	--	35.7	3.6
Tradition	--	--	--	--	24.7	23.3	--	--	--	--	--	--	2.0	4.3	26.7	2.7
Conlon	--	--	11.1	2.1	1.0	0.9	9.7	5.8	--	--	--	--	3.3	7.2	25.1	2.5
Harrington	--	--	8.6	1.6	2.7	2.5	3.2	1.9	6.4	12.5	--	--	--	--	20.9	2.1
Champion	0.8	4.3	1.5	0.3	5.0	4.7	8.9	5.3	0.3	0.6	2.0	2.5	--	--	18.5	1.9
Hector	--	--	6.5	1.2	2.0	1.9	7.1	4.2	--	--	0.2	0.3	1.1	2.4	16.9	1.7
Hays	0.7	3.8	2.5	0.5	3.0	2.8	1.3	0.8	2.9	5.6	2.6	3.2	1.9	4.2	14.9	1.5
Lavina	1.6	8.8	1.0	0.2	2.7	2.5	0.7	0.4	0.1	0.3	0.6	0.8	3.6	7.8	10.3	1.0
Voyager	--	--	6.5	1.2	--	--	0.3	0.2	--	--	--	--	--	--	6.8	0.7
Moravian 69	--	--	2.5	0.5	--	--	--	--	0.6	1.3	3.4	4.2	--	--	6.5	0.7
CDC Copeland	--	--	3.0	0.6	0.6	0.6	--	--	1.8	3.5	1.1	1.3	--	--	6.5	0.7
Baronesse	0.3	1.5	2.0	0.4	--	--	1.3	0.8	2.5	4.8	0.1	0.2	--	--	6.2	0.6
Moravian 37	--	--	3.0	0.6	--	--	1.0	0.6	--	--	2.0	2.5	0.1	1.4	6.1	0.6
Stockford	--	--	0.5	0.1	0.5	0.5	0.3	0.2	0.9	1.7	1.4	1.8	1.4	3.0	5.0	0.5
Stark	--	--	--	--	3.5	3.3	--	--	--	--	0.7	0.9	0.8	1.7	5.0	0.5
Boulder	0.5	2.5	4.0	0.8	--	--	--	--	--	--	--	--	--	--	4.5	0.5
Horsford	--	--	1.0	0.2	2.3	2.2	0.8	0.5	0.1	0.3	0.2	0.2	0.1	0.2	4.5	0.5
Other & Unknown	2.0	11.6	17.7	3.3	20.0	19.0	11.9	6.9	4.5	8.8	7.9	9.5	9.5	19.5	73.5	7.0
All Varieties	18.0	100.0	530.0	100.0	106.0	100.0	168.0	100.0	51.0	100.0	81.0	100.0	46.0	100.0	1,000.0	100.0

Barley: 2012 Seeded Acreage and Percent of Total Seeded by District																
Variety	Northwest		North Central		Northeast		Central		Southwest		South Central		Southeast		State Total	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
AC Metcalfe	--	--	226.2	43.5	0.1	0.1	22.9	15.5	16.4	33.4	1.6	2.4	1.1	3.3	268.3	29.8
Hockett	--	--	124.3	23.9	--	--	12.0	8.1	2.9	5.9	1.5	2.3	--	--	140.7	15.6
Haxby	3.9	27.8	16.6	3.2	7.8	10.8	36.1	24.4	2.1	4.3	4.6	7.0	3.8	12.0	74.9	8.3
Haybet	1.7	11.9	17.2	3.3	21.1	29.3	13.2	8.9	1.5	3.0	4.9	7.6	9.4	29.3	69.0	7.7
Merit 57	--	--	37.4	7.2	--	--	5.5	3.7	3.0	6.2	0.5	.8	0.2	0.6	46.6	5.2
Moravian 115	--	--	14.6	2.8	--	--	0.9	0.6	4.0	8.1	25.5	39.2	0.2	0.6	45.2	5.0
Conlon	--	--	16.1	3.1	3.5	4.9	20.6	13.9	--	--	1.0	1.5	1.5	4.7	42.7	4.7
Conrad	--	--	19.8	3.8	5.5	7.6	5.9	4.0	0.8	1.6	5.3	8.2	0.3	0.9	37.6	4.2
Harrington	0.6	4.0	13.5	2.6	2.2	3.1	2.1	1.4	2.2	4.4	2.0	3.1	--	--	22.6	2.5
Tradition	--	--	2.1	0.4	9.8	13.6	--	--	0.4	0.9	--	--	4.9	15.3	17.2	1.9
Hays	0.6	4.0	2.6	0.5	2.0	2.8	1.2	0.8	1.7	3.4	2.9	4.5	0.4	1.1	11.4	1.3
Merit	--	--	6.2	1.2	--	--	1.6	1.1	1.3	2.6	0.3	0.5	--	--	9.4	1.0
Moravian 69	--	--	3.1	0.6	--	--	--	--	--	--	5.9	9.0	--	--	9.0	1.0
Champion	1.0	6.9	0.5	0.1	--	--	4.4	3.0	0.7	1.5	0.9	1.4	--	--	7.5	0.8
Moravian 37	--	--	5.2	1.0	--	--	1.0	0.7	--	--	0.3	0.5	--	--	6.5	0.7
Horsford	--	--	0.5	0.1	2.2	3.1	0.7	0.5	2.6	5.3	0.3	0.4	0.1	0.3	6.4	0.7
Stockford	0.5	3.8	0.5	0.1	--	--	1.0	0.7	1.8	3.7	2.0	3.1	0.1	0.1	5.9	0.7
CDC Copeland	--	--	0.5	0.1	1.1	1.5	--	--	2.9	5.9	1.2	1.9	--	--	5.7	0.6
Baronesse	1.3	9.4	1.6	0.3	--	--	0.9	0.6	1.5	3.0	--	--	0.2	0.6	5.5	0.6
Westford	0.2	1.2	0.5	0.1	0.6	0.8	3.0	2.0	--	--	--	--	1.0	3.1	5.3	0.6
Hector	--	--	0.5	0.1	1.2	1.7	1.0	0.7	--	--	1.0	1.6	--	--	3.7	0.4
Gallatin	--	--	1.0	0.2	--	--	1.3	0.9	0.5	1.0	0.8	1.2	--	--	3.6	0.4
Celebration	--	--	--	--	3.5	4.8	--	--	--	--	--	--	--	--	3.5	0.4
Other & Unknown	4.2	31.0	9.5	1.8	11.4	15.9	12.7	8.5	2.7	5.8	2.5	3.8	8.8	28.1	51.8	5.9
All Varieties	14.0	100.0	520.0	100.0	72.0	100.0	148.0	100.0	49.0	100.0	65.0	100.0	32.0	100.0	900.0	100.0

Barley: Percent of Total Seeded Acreage 2007-2013 & Seeded Acreage 2012-2013									
Variety	Percent of Total Seeded Acreage							Seeded Acres (000)	
	2007	2008	2009	2010	2011	2012	2013	2012	2013
AC Metcalfe	19.6	23.5	23.0	29.1	33.6	29.8	30.1	268.3	300.8
Haxby	3.8	5.1	6.2	6.9	7.6	8.3	11.3	74.9	112.6
Hockett	--	--	--	5.7	8.4	15.6	10.5	140.7	105.4
Moravian 115	--	--	--	--	--	5.0	7.8	45.2	78.0
Haybet	11.8	8.8	9.8	14.8	8.2	7.7	6.1	69.0	60.7
Conrad	2.2	5.4	5.9	5.3	6.1	4.2	4.9	37.6	48.9
Merit 57	--	--	--	--	4.7	5.2	3.6	46.6	35.7
Tradition	2.0	6.0	4.4	2.6	2.0	1.9	2.7	17.2	26.7
Conlon	2.5	3.1	4.1	4.8	4.1	4.7	2.5	42.7	25.1
Harrington	23.0	19.1	16.2	7.1	4.4	2.5	2.1	22.6	20.9
Champion	--	--	--	0.4	1.0	0.8	1.9	7.5	18.5
Hector	0.8	0.4	0.8	0.7	0.7	0.4	1.7	3.7	16.9
Hays	2.4	1.9	2.2	2.4	1.6	1.3	1.5	11.4	14.9
Lavina	--	--	--	--	--	--	1.0	--	10.3
Voyager	--	--	--	--	--	--	0.7	--	6.8
Moravian 69	--	--	--	4.6	4.6	1.0	0.7	9.0	6.5
CDC Copeland	1.1	0.8	--	--	--	0.6	0.7	5.7	6.5
Baronesse	2.7	3.5	1.3	0.9	0.7	0.6	0.6	5.5	6.2
Moravian 37	3.1	3.4	5.5	0.5	1.0	0.7	0.6	6.5	6.1
Stockford	--	--	0.6	0.5	0.4	0.7	0.5	5.9	5.0
Stark	--	0.9	0.9	0.5	--	--	0.5	--	5.0
Boulder	--	--	0.7	0.5	--	--	0.5	--	4.5
Horsford	1.1	0.9	1.0	1.2	0.6	0.7	0.5	6.4	4.5
Celebration	--	--	--	--	--	0.4	--	3.5	--
Gallatin	1.6	--	1.1	0.7	0.6	0.4	--	3.6	--
Merit	6.3	4.9	3.5	3.1	2.3	1.0	--	9.4	--
Westford	1.6	0.9	0.7	1.5	0.7	0.6	--	5.3	--
Other & Unknown	14.4	11.4	12.1	6.2	6.7	5.9	7.0	51.8	73.5
All Varieties	100.0	100.0	100.0	100.0	100.0	100.0	100.0	900.0	1,000.0

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LARGE + IMPORTS

TOTAL U.S. BEER INDUSTRY, MAJOR BREWERS & IMPORTERS

Major Suppliers	Shipments (000)		Change		Market Share	
	2012	2013	bbbl	%	2012	2013
AB	95,200	96,550	-2,650	-2.7	46.3	45.6
MillerCoors	58,950	57,200	-1,750	-3.0	27.5	27.0
Crown Imports	12,300	13,000	700	5.7	5.7	6.1
Heineken USA	8,400	8,300	-100	-1.5	4.0	3.9
Pabst	5,640	5,480	-160	-2.8	2.6	2.5
Boston (Leicester)	2,650	2,875	225	8.5	1.2	1.4
Yuengling	2,790	2,725	-65	-2.3	1.3	1.3
NAB	2,715	2,590	-125	-4.6	1.3	1.2
Diageo/Guinness	2,580	2,375	-205	-7.9	1.2	1.1
Mark Anthony	1,425	1,510	85	6.0	0.7	0.7
Others	17,341	19,113	1,772	10.2	8.1	9.0
Total	214,051	211,718	-2,333	-1.1	100.0	100.0

Shipments	bbls - 000		Change	
	2012	2013	bbls	%
Tikapa	180,303	177,782	-2,521	-1.4
No Alcohol	825	825	0	0.0
Import	27,843	27,561	-282	-0.7
US Shipments	208,971	206,268	-2,703	-1.3
Tax-free	5,080	5,450	370	7.3
Total Shipments	214,051	211,718	-2,333	-1.1

*Data provided by Beer Marketers Insights. Includes flavored malt beverages.

TOTAL U.S. BEER IMPORTS

Year	Volume	% change from previous year
2004	23,849,827	1%
2005	25,565,702	7%
2006	29,294,760	15%
2007	29,694,714	1%
2008	28,699,731	-3%
2009	25,881,474	-10%
2010	27,142,994	5%
2011	27,338,239	3%
2012	27,712,665	1%
2013	27,529,358	-1%

*Does not include non-alcoholic beers

one-third of the industry last year and 56 percent of MillerCoors' retail volume. There seems some hope that declines could be largely weather-related, as Long pointed out that "Coors Light in the West does quite well," while in worse-weather areas, "the delivery side of beer has been affected, particularly the Southeast."

MillerCoors' largest success in 2013 was the introduction of Redd's Apple Ale, which settled at a 0.35 share in IRI scans for the year. Redd's sourced over 9 percent of its volume from outside the MillerCoors portfolio. Strawberry Ale, launched in mid-August, added to A-B's Rita franchise. Flavored beers are clearly a trend that the big brewers have capitalized on.

This year will see Coors Light's first U.S. line extension, Coors Light Summer Brew, a lemon-flavored beer debuting on Memorial Day for a limited time in 12-pack, 10-ounce cans.

distribution are fetching these days. Joe Thompson of IBG says that when negotiating with A-B on the potential sale of a distributorship, they told him, "Why on earth would I invest \$50 million in this distributorship at a 6-percent return on investment when I can invest \$50 million in Asia and get 36 percent?"

3 percent in 2013 and 1.0 percent in the fourth quarter. Last year saw the first time Coors Light has declined in years, down low-single digits despite gaining premium light market share. Miller Lite was down high-single digits with improving fourth-quarter trends to mid-single, and better

ABE
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"If there is anything a man can do well, I say let him do it."

ABERHAN LINCOLN

AMERICAN BEER EQUIPMENT

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REGIONAL BREWING COMPANIES

All figures in U.S. dollars. Companies not reported from information not available. See the publication for more details. All figures are preliminary and subject to audit.

* Percentages are based on the total volume of sales reported by companies in the industry.

Company	State	Sales (\$ millions)					Annual Percent Change		
		2009	2010	2011	2012	2013	2010*	2011*	2012*
U.S. Brewing and Distilling Co.	WI	2,023,000	2,148,000	2,111,101	2,388,140	2,333,000	6	0	0
Wheat Beer Co.	MA	1,811,000	1,884,000	2,078,000	2,133,000	2,276,000	8	8	8
Three Stone Brewing Co.	CA	1,718,800	1,790,700	1,811,400	1,893,000	1,953,000	10	9	9
New England Brewing Co.	CO	1,663,100	1,651,700	1,712,211	1,791,111	1,821,242	10	6	10
Civil War Brewing Co.	OH	1,489,200	1,511,800	1,523,000	1,593,000	1,633,000	7	24	6
Specialty Brewing Co.	IA	1,479,000	1,511,000	1,511,171	1,543,000	1,571,100	5	23	6
City of Beer Brewing Co.	IA	1,115,000	1,080,000	1,113,278	1,147,479	1,177,427	6	30	43
San Juan Brewing Co.	UT	1,091,467	1,074,308	1,076,912	1,111,094	1,117,189	10	6	11
Iron Horse Brewing Co.	WI	973,100	1,143,619	1,082,000	1,163,814	1,166,234	19	17	19
Mohler Craft Brewery	MA	1,176,876	1,160,000	1,200,000	1,240,000	1,270,000	17	20	11
Blazing Brewing Co.	MO	807,500	1,068,000	1,142,000	1,153,000	1,163,000	33	20	14
Other Brewing Co.	PA	869,112	1,146,000	1,148,889	1,177,200	1,173,000	19	26	25
Iron Mountain Brewing Co.	WI	1,117,400	1,141,000	1,149,479	1,190,400	1,171,400	8	16	0
Ironspoon Brewing Co.	MA	1,063,516	1,058,430	1,118,842	1,160,800	1,191,330	19	14	11
Loganhead Craft Beer Brewing Co.	CO	96,391	128,450	143,512	132,291	120,000	34	16	20
Barnyard Brewing Co.	MO	124,864	148,200	172,231	171,100	164,882	7	6	9
Shipyard Brewing Co.	MI	82,516	98,142	123,294	138,445	151,008	19	32	13
Alta Brewing Co.	LA	83,960	108,100	125,400	131,200	138,000	21	15	10
Frontier State Brewing Co.	CA	138,412	162,800	180,000	181,200	191,200	19	20	18
Alaska Brewing Co.	AK	118,000	111,000	120,200	129,900	148,600	11	7	9
New Glarus Brewing Co.	WI	28,100	31,917	38,840	42,212	44,912	17	26	16
Stone Island Brewing Co.	CA	11,467	16,862	20,000	24,000	24,000	25	33	15
Olson Lake Brewing Co.	OH	17,131	203,428	129,442	139,623	143,672	14	8	19
Bigfoot Lake Brewing Co.	WA	81,144	116,700	129,400	131,900	138,900	14	11	9
Kaiser Brewing Co.	CA	81,153	90,421	101,616	111,000	111,110	8	15	13
Strong Beer Brewing Co.	VT	17,000	117,000	120,000	133,000	133,000	58	0	0
Turned Brewing Co.	MA	38,400	36,198	39,435	41,411	42,211	4	8	9
Other Brews Brewing Co.	CO	19,000	21,200	26,200	30,200	31,810	14	19	17
Pat's Beer Brewing Co.	OH	161,119	189,688	179,108	175,000	171,000	5	4	5
Flourish Brewing Co.	WI	17,130	24,201	40,501	42,000	41,800	17	43	16
Widge Ale Brewing Co.	OH	15,342	41,918	41,110	41,200	39,000	5	15	16
Country Brewing Co.	IA	49,841	68,408	81,241	81,180	80,640	19	26	15
Ballast Point Brewing Co.	CA	11,242	20,800	23,000	47,300	62,254	77	46	44
Mudfish Brewing Co.	WI	19,119	38,710	50,800	66,871	68,000	15	47	19
Goldfish Lake Brewing Co.	WI	1,400	20,000	20,000	21,000	21,000	15	10	10
Mendocino Brewing Co.	CA	18,420	14,800	22,000	24,000	24,200	8	11	2
Chasing Clouds Beer Co.	MA	114,000	46,200	36,000	31,000	30,000	10	11	11
Pumpkin Brewing Co.	MA	49,100	26,811	17,100	11,100	14,100	14	14	8
Dark Brewing Co.	CO	40,191	51,441	58,244	61,144	66,461	19	18	17
Motors Beer Brewing Co.	WI	25,000	54,000	52,000	61,000	57,000	46	11	18
New Market Brewing Co.	PA	14,100	17,100	18,100	19,100	21,100	12	10	18
Jim Cosentino Brewery and Lab	CA	38,400	41,200	43,800	38,100	48,000	8	11	14
Manitoulin Brewing Co.	MA	24,400	19,100	47,111	48,100	52,800	40	23	18
Left Field Brewing Co.	CO	18,024	24,001	36,800	49,124	53,876	20	30	20
Greenridge Brewery Co.	CO	17,000	31,541	41,000	52,200	61,800	17	30	19
San Joaquin Brewing Co.	CA	13,000	14,500	16,500	18,000	19,146	2	14	16
Star Point Brewing Co.	NY	5,000	11,000	14,000	18,000	20,000	34	31	16
Capital Brewery	NY	5,000	11,000	14,000	18,000	20,000	34	31	16
French Creek Brewing Co. PA	PA	20,312	26,376	32,614	37,223	39,182	12	20	17
Louis Brewing Co.	UT	17,179	21,101	25,108	44,914	54,719	5	27	28
Allyson Brewing Co.	IA	18,819	23,445	27,021	32,117	35,017	11	12	10
Turned Brewing Co.	IA	20,110	31,441	40,411	49,119	56,291	21	28	19
Golden State Brewing Co.	CA	48,800	41,200	47,200	51,200	58,000	10	18	11
21st Amendment Brewing Co.	CA	883	839	74,800	44,110	51,900	7	388	16
Grain State Brewing Co.	CA	11,100	13,120	23,300	43,389	53,440	22	10	21
Yards Brewing Co.	IA	18,000	21,000	23,000	24,000	25,000	11	10	11
Wood Lake Brewing Co.	IA	17,111	21,000	24,100	41,163	51,100	14	27	17
Sales Lake Brewery and Artisanal Wineries MO	MO	22,000	26,000	43,019	45,019	51,846	17	24	18

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Confirmation x Wiscards Brewing Comp... x New Glarus Brewing x Hotel S. Thompson Co... x Settings - Audit settings... x Brewers Association Store... x The New Brewer Online... x The New Brewer May/June...

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2013 INDUSTRY REVIEW

Company	State	Sales (\$ millions)					Annual Percent Change		
		2009	2010	2011	2012	2013	2010*	2011*	2012*
Avery Brewing Co.	CO	16,091	21,650	35,248	40,957	47,846	35	63	16
Big Sky Brewing Co.	MT	36,350	38,150	45,265	45,600	46,500	7	17	1
Georgetown Brewing Co.	WA	23,773	27,825	33,882	38,000	44,305	17	22	12
Strub Brewery	PA	42,080	41,198	41,759	43,420	44,000	-2	1	4
Brewery Onnagang	NY	15,042	24,588	35,311	31,111	42,955	63	23	3
Four Peaks Brewing Co.	AZ	18,220	23,300	26,600	29,785	33,300	28	55	11
Smuttynose Brewing Co.	NH	25,797	29,138	40,646	40,179	42,542	22	40	0
Maple and Ash's Brewery Inc.	VA	35,011	35,371	38,075	38,075	40,073	41	36	5
Loneflight Brewery Inc.	WI	12,970	16,662	23,546	23,369	40,897	28	41	42
Great Divide Brewing Co.	CO	12,020	19,491	26,067	32,225	37,100	51	34	24
Allyson Brewing Co.	IA	5,918	11,276	13,525	31,809	35,422	69	15	13
Elysian Brewing Co.	WA	5,918	11,276	13,525	31,809	35,422	69	15	13
Copper City Brewing Co.	MD	14,592	19,909	36,618	33,204	36,201	36	54	8
Hungar 24 Craft Brewery	CA	4,875	10,017	15,021	24,022	45,041	105	50	60
Three Heads Brewing Co.	IN	11,031	14,005	20,417	24,000	34,600	36	36	18
Casper City Brewing Co.	FL	1,050	3,501	9,600	17,000	34,580	250	174	77
Hopland Brewing Co.	NC	15,878	17,825	20,600	19,500	34,300	15	12	51
Tempan Beer Co.	CA	10,666	18,075	19,505	22,921	32,647	75	5	17
Yards Brewing Co.	IA	9,000	14,000	21,000	26,000	32,000	56	50	24
Two Brothers Brewing Co.	IL	10,020	13,041	17,241	23,598	30,094	30	36	33
Wachusett Brewing Co.	MA	20,567	20,970	23,330	26,351	29,492	2	11	13
Turner Breweries	CA	17,750	20,430	22,630	26,600	29,470	15	11	17
Capital Brewery Co. Inc.	WI	19,008	26,227	29,125	28,486	29,263	38	-8	18
New Holland Brewing Co.	MI	10,650	12,334	16,500	20,500	29,050	18	34	24
Speaking Ale and Lagers	CA	7,600	10,800	19,000	19,800	29,000	40	24	48
Sully Brewing Co.	MA	9,087	11,545	17,340	20,847	28,971	27	50	20
S&B Brewing Co.	CO	11,682	15,311	21,257	25,770	28,732	31	39	21
Loop Brewery Inc.	PA	15,000	15,000	18,000	20,000	26,000	0	37	0
Alto's Lexington Brewing & Distilling Co.	KY	4,300	12,200	14,850	22,600	26,000	179	25	47
Boulder Beer Co.	CO	24,790	26,680	28,552	29,752	26,848	8	7	-8

McDantim Home of the Trumix® Blender asks you...

Have Gas Leaks? Know the Cost? Save Gas / Save \$\$\$

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Navigation History: Data

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Program	Year	Period	Geo Level	State	State ANSI	Commodity	Data Item	Domain	Domain Category	Value
SURVEY	2013	MARKETING YEAR	NATIONAL	US TOTAL	...	BARLEY	BARLEY, MALTING - PRICE RECEIVED, MEASURED IN \$ / BU	TOTAL	NOT SPECIFIED	6.6

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[Abbreviations and Symbols](#)

Useful Links and Articles

IMC construction of the now Malteurop facility

<http://archive.greatfallstribune.com/news/stories/20040530/localnews/536592.html>

American Malting Barley Assc.

<http://ambainc.org/>

Economics of beer

<http://www.smartasset.com/blog/economics-of/the-economics-of-craft-beer/>

Malting tonnages and brewery needs

<http://www.craftbeer.com/craft-beer-muses/the-return-of-the-micro-maltsters-a-locavores-craft-beer-dream-come-true>

Most Beer Friendly State: Montana

<http://www.fool.com/investing/general/2014/03/16/the-best-us-states-for-beer-lovers-youll-never-gue.aspx>

Flathead brewery movements

http://www.dailyinterlake.com/members/article_d13fb094-bad2-11e3-b662-0019bb2963f4.html

Return of the Micro Maltsters

<https://www.craftbeer.com/craft-beer-muses/the-return-of-the-micro-maltsters-a-locavores-craft-beer-dream-come-true>

Valley Malt, a husband and wife business started by Andrea and Christian Stanley, has been making malt for about a year. The couple just expanded their malt house and will produce about 75 tons of malt next year, up from 50 tons in 2011. "The demand has been high from day one," Andrea Stanley says. "We're always working at capacity, and we're always a couple months behind."

Malteurop at Craft Brewers conference:

<http://www.craftbrewingbusiness.com/ingredients-supplies/malteurop-north-america-discusses-craft-beer-malt-trends/>

malt process

<http://www.briess.com/food/Processes/malttmp.php>

US Micro-Maltsters

[Riverbend Malt House in Ashville NC](#)

Riverbend Malt House pledges to provide the area's craft brewers locally farmed, artisan malts that bring depth and character to your passion, while greatly lessening our impact on the earth.

<http://www.youtube.com/watch?v=-IEs-fwWGJs>

[Rebel Malting Co., Reno, Nevada](#)

Rebel Malting Company is small, and produces malted products with local and niche grains

[Colorado Malting Co., Alamosa, CO](#)

CMC provides Colorado with the highest handcrafted brewing malt available. They also offer 100% Colorado sourced barley and gluten free malts.

[Valley Malt, Hadley, Ma](#)

Valley Malt now offers base malts for local brewers and is bringing an innovative twist to many traditional malts. Being a micro-malthouse has its advantages. We can offer unique malts that are made from heirloom or gluten-free grains, smoked with native woods, and roasted fresh to order.

<http://www.youtube.com/watch?v=l2lq0xZkqmE>

<http://www.youtube.com/watch?v=IDcQwLhTumo>

Abbotts Mill, Milford, DE

<http://www.delawaretoday.com/Delaware-Today/Delaware-Resources/Sports-and-Recreation/index.php/name/Abbotts-Mill/listing/28015/>

Malt Consumption/beer production Interactive Map – MICHAELA's numbers

<http://www.newyorker.com/sandbox/business/beer.html>

Brewer's Association (national craft brewers) Key stats

<http://www.brewersassociation.org/pages/business-tools/craft-brewing-statistics/beer-sales>

President's White House honey Brews – First wine beer or liquor to be made in the white house. The beer also uses honey from the first ever beehive on the white house property.

<http://www.whitehouse.gov/blog/2012/09/01/ale-chief-white-house-beer-recipe>

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