

2017 Idaho Wheat Commission Report to Legislature

Approved 2017 Budget

Activities carried out by the Idaho Wheat Commission on behalf of Idaho wheat growers are funded by a \$.035 per bushel wheat tax. This tax is remitted quarterly. Revenue from the wheat tax during FY'17 is budgeted at \$2,950,000. Spending in FY'17 is budgeted at \$3,376,844. The budget was set before harvest and the difference was planned to be made up from reserves. However, 2016 yields were higher than anticipated so reserves will be minimally impacted. As of Jan 31, 2017, the IWC reserves are \$3,698,000.

Dollars remitted by Idaho wheat growers are invested on their behalf in foreign and domestic market development, variety development and other research, and information and education. The amount of the budget committed to administrative payroll and office operations is running at 2.5%, and Idaho continues to be among the most efficient of the wheat commission office operations among states. The wheat assessment in neighboring states range from \$.03/bushel to \$.06/bushel.

Projected FY '17 Revenue and Spending

Production in 2016 was higher than budgeted due to higher yields. In fact, Idaho led all states in 2016 in yield, at 91 bushels per acre. Acreage in the current production year is expected to remain similar to 2016. Spring plantings decisions are being made now, based on wheat prices compared to other competing spring crops. For planning purposes it is assumed that revenue from wheat tax will be around \$3,000,000.

The Idaho Wheat Commission is providing substantial support to the University of Idaho wheat and other agricultural programs in order to keep the wheat industry in Idaho robust. Agriculture is a basic industry benefiting all Idaho residents and reinvestment in agriculture by industry and by the Idaho taxpayer will help rebuild Idaho's economy and employment faster than almost any other sector of the economy.

The Idaho Wheat Commission established two \$1 million endowments in 2012 to provide support to two Aberdeen positions. The two endowments benefit and help stabilize the Aberdeen wheat breeder and Aberdeen cereal agronomist. These two endowments were fully funded in 2016 and have been named "The Potlatch Joe Anderson Cereal Agronomy Professorship" and "The D. Blaine Jacobson Wheat Breeding Professorship." The Idaho Wheat Commission is also funding a new wheat geneticist position at the Moscow wheat breeding station and this new position may be considered for an endowment at some point in the future.

Update on Wheat Production in Idaho

In the 2016 crop year approximately 1.1 million acres of wheat were harvested. The yield was approximately 91 bushels per acre and total harvest was over one million bushels. Sales were over \$645 million, and wheat continues to rank as Idaho's second largest crop, behind potatoes and ahead of hay.

Approximately sixty percent of Idaho's production is grown on irrigated farmland and forty percent is grown on dry land. Approximately two-thirds of the crop is winter wheat and the remaining one-third is spring wheat.

Soft White wheat makes up the largest amount of Idaho wheat grown. It is roughly 55% of the annual crop. Hard Red is the second most popular class, at 39%. Idaho's production of hard white wheat has slipped, but its six million bushels of hard white in 2016 still makes it the largest hard white growing state. Idaho has released new varieties of hard white wheat which will help recover lost hard white wheat acreage.

Half of Idaho's crop goes to domestic mills and customers. This includes the GrainCraft (Pendleton) mill in Blackfoot, mills in Ogden, and customers in California. California is the largest wheat-milling state in the country and they dramatically increased purchases of wheat from Idaho. Roughly half of the crop is exported. Top foreign destinations include Japan, Mexico, Korea, the Philippines, China, and Taiwan.

Organic wheat has been strong and will continue to strong and is not expected to be a fad.

Further detail on Idaho wheat production is found in the Winter 2016 issue of Idaho Grain magazine.

Key Success Factors from Idaho Wheat Commission Strategic Plan

- Invest Idaho's grower assessment dollars for maximum return.
- Uphold the consistent, dependable quality of Idaho wheat and preserve and protect the robust, healthy status of Idaho's wheat industry. Maintain what has already been built.
- Maintain and expand sales of Idaho wheat to domestic and export customers.
- Identify the best new wheat technologies and implement for the benefit of Idaho wheat growers and industry.
- Boost public research through the University of Idaho, and forge strong ties between public programs and new exciting breeding efforts.
- Maintain balance between profitability, sustainable production practices and stewardship of Idaho's natural resources.

IWC Website

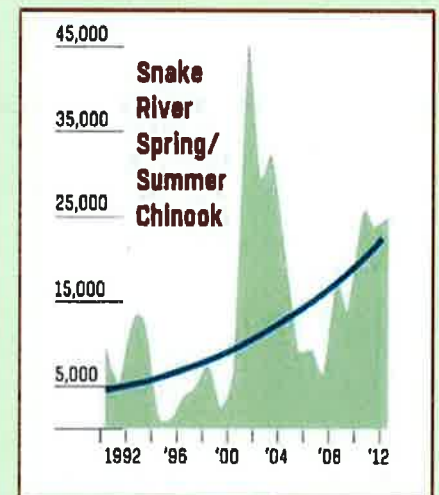
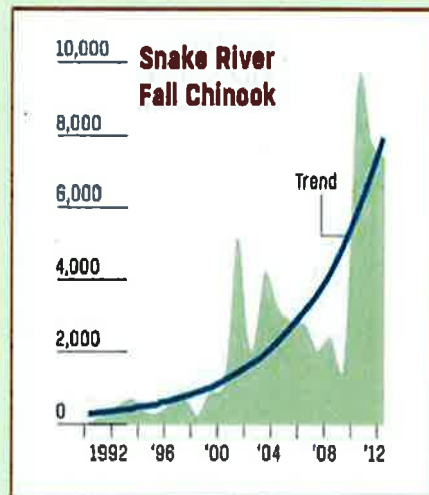
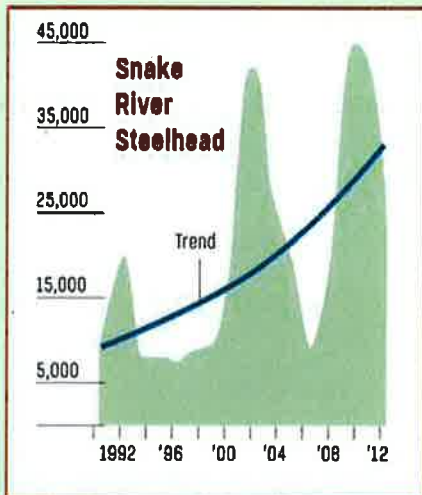
Updated information on the Idaho Wheat Commission can be found on an ongoing basis at www.idahowheat.org.

Snake River Dams

The four Snake River Dams provide enough clean energy to power 1.87 million homes



BPA reports the cost of removing the Snake River Dams would range from \$264 million to \$350 million annually



Dam investments have resulted in record fish returns and a 20 year sustained increase in salmon populations. 2015 adult returns past McNary dam are the highest returns recorded since the dam was completed in 1957.

Juvenile fish survival rates past each of the eight federal dams are between 95% and 98%

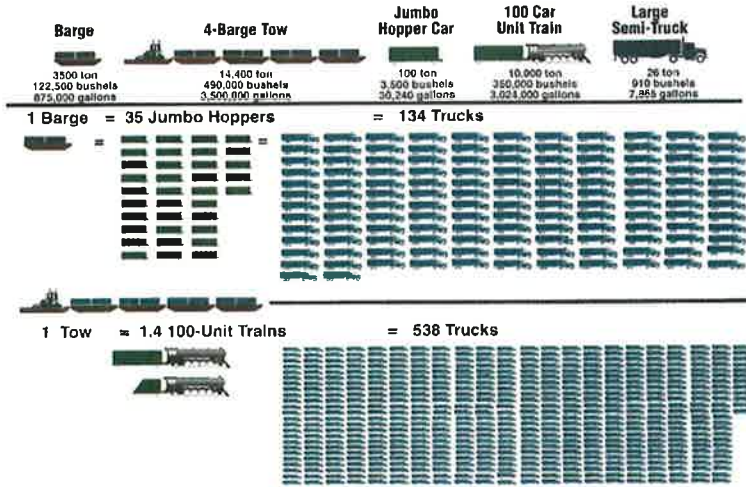


Between 2002 and 2011, average wild Chinook salmon populations have more than tripled, and average wild steelhead populations have doubled

Energy information courtesy of BPA
Fish information courtesy of BPA and the US Army Corps of Engineers

Snake River Dams

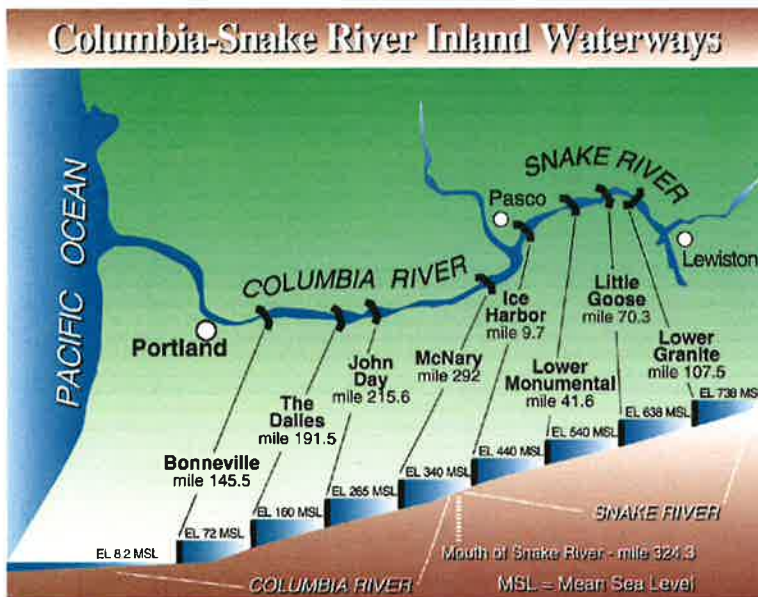
Freight Comparison of Barges, Trains and Trucks



Barging is the lowest cost, most environmentally friendly mode of transportation

A typical four-barge tow on the river system moves the same amount of cargo as 140 rail cars or 538 trucks

The Columbia Snake River System is a 465-mile commercial waterway that provides farmers as far as the Midwest access to international markets



The Columbia Snake River System is the top wheat export gateway in the United States and the third largest grain export gateway in the world

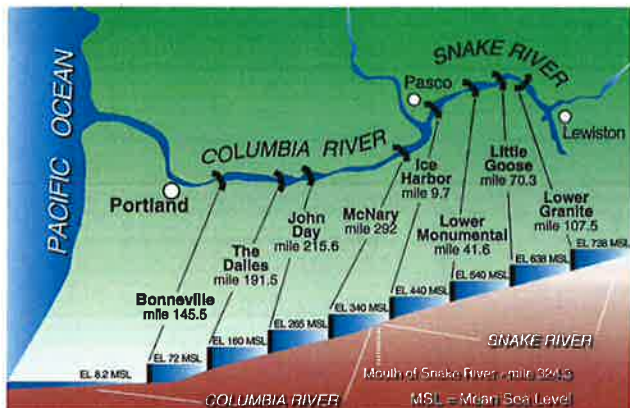
In 2014, nearly 10% of all U.S. wheat exports moved through the Snake River dams



Barging information courtesy of Texas Transportation Institute
Wheat information courtesy of US Department of Agriculture and U.S. Army Corps of Engineers



COLUMBIA SNAKE RIVER SYSTEM FACTS



Deep Draft Channel Facts:

- 105 miles, 43 feet deep
- Over 49 million tons of international trade in 2014
- At least \$24 billion in cargo value
- 40,000 local jobs are dependent on this trade

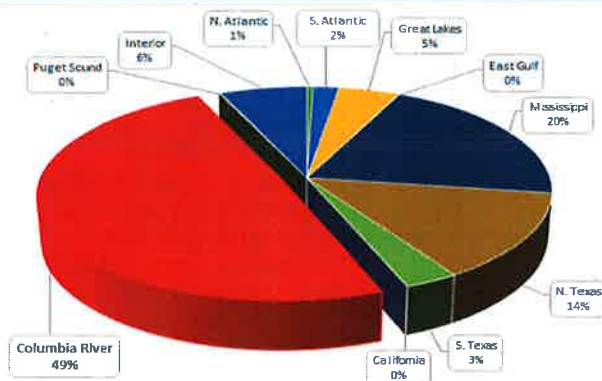
Inland Navigation Facts:

- 360 miles, 14 feet deep, from Portland/Vancouver to Lewiston, Idaho
- Over 9 million tons of commercial cargo in 2012
- Important gateway for Northwest wheat and forest products

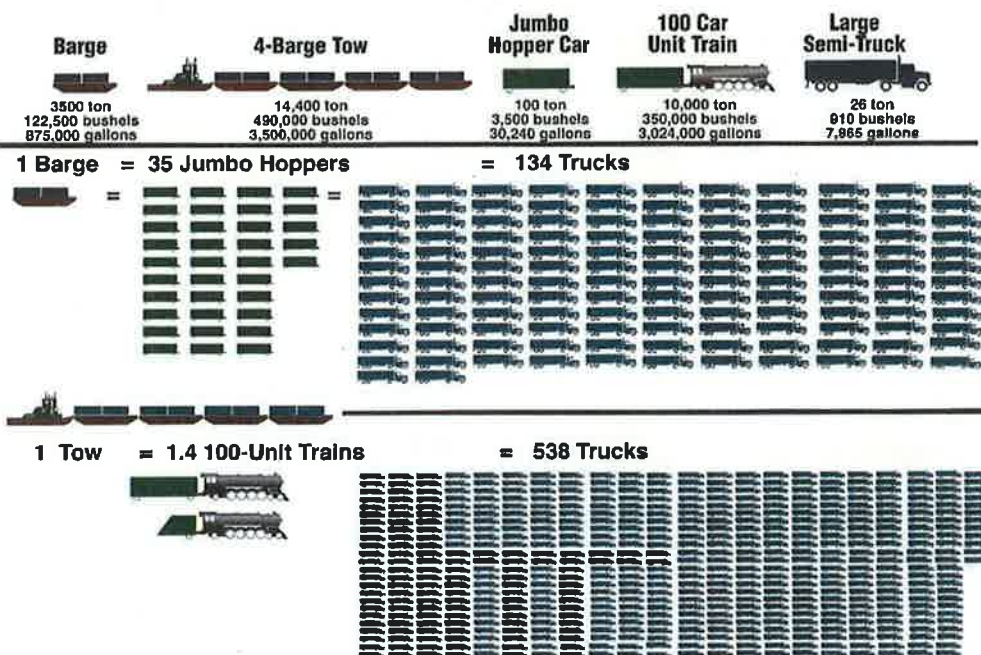
CSRS Highlights

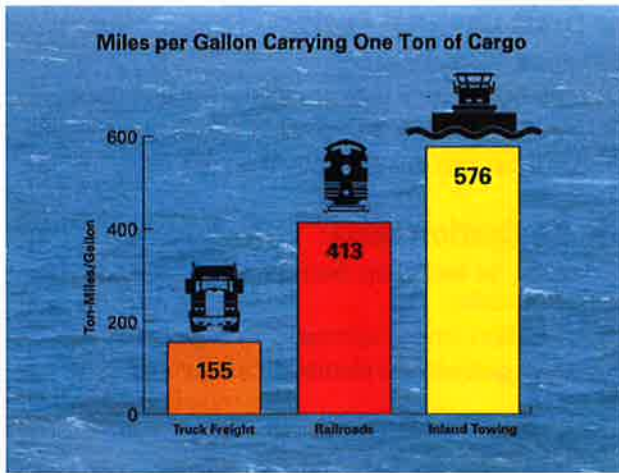
- #1 U.S. wheat export gateway
- #2 U.S. soy export gateway
- #1 West Coast wood exports
- #1 West Coast bulk exports

2015 U.S. Wheat Exports



Freight Comparison of Barges, Trains and Trucks on the CSRS





Barges can carry more freight, and are the most fuel efficient mode of transportation

Source: U.S. Maritime Administration

Idaho

The Idaho Department of Agriculture states that in 2014, Idaho exported \$1.06 billion in agricultural products. Wheat makes up a significant portion of exports with over \$500 million in wheat exported out of the state, mostly through the Columbia Snake River System. In addition, 30-40% of the barley and 25-35% of the peas/lentils grown in Idaho are exported via the Columbia River.

In 2014, the Port of Lewiston exported 22 million bushels of wheat and barley. The Port oversees properties that employ 1800 people and which provide \$390M in direct regional spending.

Montana

The Lower Columbia River is the most direct and economical gateway for Montana wheat exports. Of the 134.6 million bushels of wheat produced in Montana in 2004, 72.9 million were exported through the lower Columbia River System to Asia. At least 99% of wheat exported from Montana through the Pacific Northwest is transported through the river system.

According to the "2009 State of Montana Export Summary," over \$400 million in wheat exports were reported for the state last year. Bulk wheat and other agricultural commodities are shipped to Pacific Northwest grain facilities destined for export to Japan, Taiwan, Korea and the Philippines.

Oregon

The Oregon wheat industry depends largely on the Columbia Snake River System to carry its product to market. Approximately 85% of Oregon wheat is exported, largely to Pacific Rim countries. River transport of bulk commodities like wheat, is the most efficient way to move product to the ports. In 2009, of all product exported through the Portland Harbor, 48% was wheat. 10 million tons of wheat were exported through Columbia River ports.

More than 4 million tons of petroleum products are received at terminals in Portland each year. Approximately half of that volume is barged upriver to inland ports.

Washington

According to the 2009 State of Washington Marine Cargo Forecast, the total volume of waterborne trade is expected to expand at an average annual rate of 1.7% per year through 2030.

Lower Columbia River grain exports are expected to nearly double from 8.5 million tons today to 15.1 million tons. This increase is due in large part to the deepening of the navigation channel on the Lower Columbia River.

The Importance of the Columbia Snake River System

The Columbia Snake River system is a vital transportation link for the states of Idaho, Montana, Oregon and Washington. The economies of these four states rely on the trade and commerce that flows up and down the most important commercial waterway of the Northwest.

Idaho Wheat Commission Report

In the 2015 crop year approximately 1.1 million acres of wheat were harvested. The yield was about 77 bushels per acre and the total crop was 87.1 million bushels. Sales were over \$506 million, and wheat continues to rank as Idaho's second largest crop, behind potatoes and ahead of hay.

Almost sixty percent of Idaho's production is grown on irrigated farmland and forty percent is grown on dry land. Approximately two-thirds of the crop is winter wheat and the remaining one-third is spring wheat.

Soft white wheat makes up the largest amount of Idaho wheat grown. It is roughly 55% of the annual crop. Hard Red is the second most popular class, at 39%. Idaho's production of hard white wheat has slipped,

but its six million bushels of hard white in 2015 still makes it the largest hard white growing state, Idaho expects to release a new hard white winter variety of wheat this year.

Half of Idaho's crop goes to domestic mills and customers. This includes the GrainCraft (Pendleton) mill in Blackfoot, mills in Ogden, and customers in California. California is the largest wheat-milling state in the country and they dramatically increased purchases of wheat from Idaho during their dry years. Roughly half of the crop is exported. Top foreign destinations include Japan, Mexico, Korea, the Philippines, China, and Taiwan.

Approved 2016 Budget

Activities carried out by the Idaho Wheat Commission on behalf of Idaho wheat growers are funded by a \$.035 per bushel wheat tax. This tax is remitted quarterly. Revenue from the wheat tax during FY'16 is budgeted at \$3,025,000. Spending in FY'16 is budgeted at \$3,379,443. The difference will be made up from reserves invested with the State Investment Pool.

Every company has test acreage.
We have proving ground.

Syngenta varieties from North America's largest wheat breeding program deliver agronomic traits you need for superior performance. Prove it on your own acres with these new winter wheat varieties.

New SY Assure — Soft white variety

• Early maturity with short height, heavy test weight and high yield

New SY Touchstone — Hard red variety

• Heavy test weight with good protein and quality and high yield

Contact your AgriPro wheat seed associate, Syngenta retailer or visit www.AgriProWheat.com for more information.

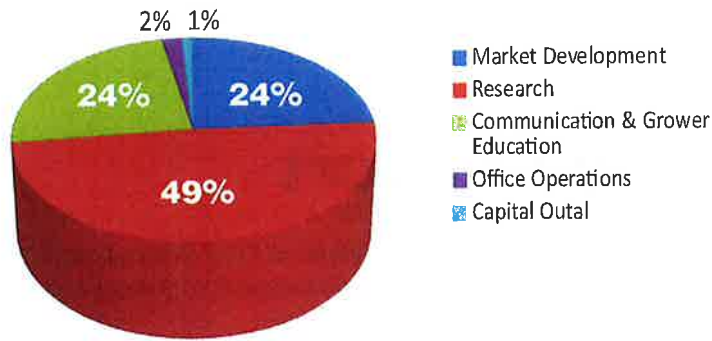
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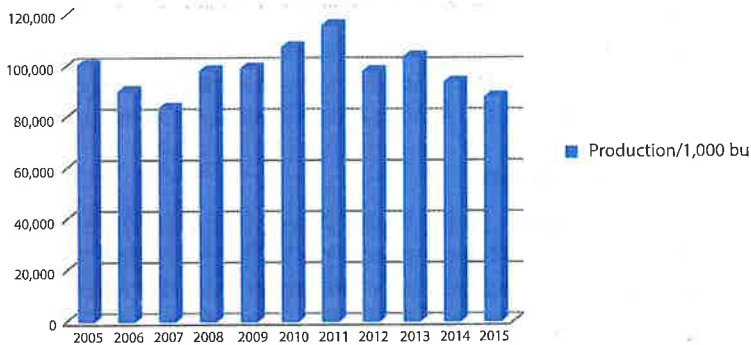
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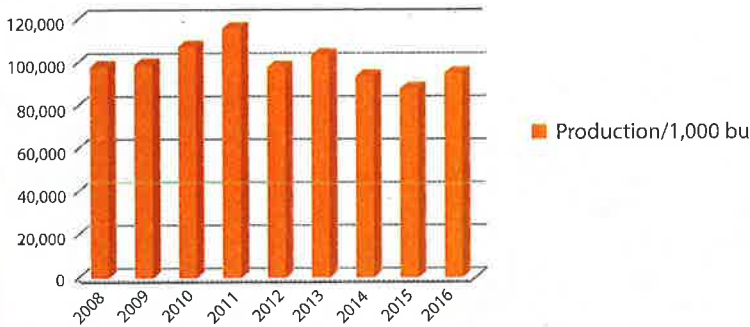
Idaho Wheat Commission 2016/17 Budget \$3,414,707



Idaho Wheat Production



Idaho Wheat Production History



Projected FY'17 Revenue and Spending

Production is slowly recovering from the sprout-damaged crop of 2014. Production in FY'17 is expected to be slightly over FY'16. The Idaho Wheat Commission is providing substantially more support to the University of Idaho and other agricultural programs than it did ten years ago. The IWC focuses its support on protecting core wheat programs. Agriculture is a basic industry benefiting all Idaho residents and reinvestment in agriculture will help rebuild Idaho's economy and employment faster than almost any other sector of the economy.

The Idaho Wheat Commission established two \$1 million endowments in 2012 to provide support to two Aberdeen positions. The two endowments benefit and help stabilize the Aberdeen wheat breeder and Aberdeen cereal agronomist. The Idaho Wheat Commission is also funding a new wheat geneticist position at the Moscow wheat breeding station and this new position may be considered for an endowment at some point in the future.

Where Wheat Commission Time and Resources are Currently Being Put

- Invest Idaho's grower assessment dollars for maximum return.
- Uphold the consistent, dependable quality of Idaho wheat and preserve and protect the robust, healthy status of Idaho's wheat industry. Maintain what has already been built.
- Maintain and expand sales of Idaho wheat to domestic and export customers.
- Identify the best new wheat technologies and implement for the benefit of Idaho wheat growers and industry.
- Boost public research through the University of Idaho, and forge strong ties between public programs and new exciting breeding efforts.
- Maintain balance between profitability, sustainable production practices and stewardship of Idaho's natural resources.

Educating and Communicating with Idaho Wheat Growers

1. **Grower names and addresses are needed to fulfill the statutory duties of Idaho Wheat Commission.**
 - A. To improve grower education on wheat matters. 22-3309 (2)(a)
 - B. To research problems wheat growers are having in growing their wheat. 22-3309 (2)(e)
 - C. To conduct periodic referendums of Idaho wheat growers. 22-3309 (2)(i)

2. **Original rules provided for Idaho Wheat Commission to receive grower names and addresses from point of first purchase. Removed in early-70's due to petty politics.**
 - A. Administrative Rules fix for 2018 reinstates original provisions and enables wheat commission to comply with statute.
 - B. Wording consistent with other Idaho commodity commissions.
 - C. Idaho Code, IDAPA 42-301-02, provides for Idaho Wheat Commission to have access to grower records from first purchaser, but mechanism to collect records is not clear.

3. **Idaho wheat industry is at a disadvantage to other wheat-growing states.**
 - A. Idaho is the only state where grower lists are not provided to commission.
 - B. Wheat-growing states with most robust activity are where growers, grain handlers, and commission all work together to promote wheat sales in multiple channels.
 - C. More users of wheat are asking commissions to assist in traceability.

4. **Grower's names and addresses are kept confidential.**
 - A. The confidentiality of grower names and addresses are protected under Idaho statute, IDAPA 74-107, Subsection (7). It states that ***"shipping and marketing records of commodity commissions and the names and addresses of growers and shippers maintained by commodity commissions are exempt from disclosure."*** This means that grower names and addresses are not released when requests are received under Idaho Public Records Law.
 - B. As a further safeguard, the Idaho Wheat Commission has adopted a policy stating that all grower records are shredded after three years.
 - C. More than half of the elevators in Idaho already submit grower names and addresses and they are kept secure in the IWC system. Electronic records are in the office manager's computer in a password protected file. Hard copies are kept under lock and key in the same secure drawer as personnel records.

5. **Growers would like to receive more communication and education from Idaho Wheat Commission, as shown during the 2016 Negotiated Rule-Making Meetings and the 2016 IGPA Strategic Planning Sessions.**
 - A. Grower lists received from point of first purchase will be master list.
 - B. Growers can “opt in” to their choice of digital communications.
6. **Reinstatement of Administrative Rules delayed for one year at the request of Idaho elevators.**
7. **A list of wheat growers will enable the Idaho Wheat Commission to be more accountable.**
 - A. To conduct periodic polls and referendum to insure grower needs are met and to assess whether growers feel check-off funds are well-spent.
8. **A list of wheat growers will enable fast communications when time is of the essence.**
 - A. To respond to fast-moving diseases such as stripe rust.
 - B. To provide information necessary for adjustments to farm insurance policy.
 - C. To give growers an opportunity for price premiums or other market niches.
 - D. To rally support for policies supporting their wheat livelihood (e.g. Columbia Snake System).

Rules reinstatement proposed for 2018 are stated in two different pieces:

400.03 Delivery of Documents to Commission. The first purchaser of wheat shall complete and return the Report of Tax on Wheat, or equivalent, to the commission office at the end of each production year (July 1 – June 30). The report shall be due on the same date as the final quarter wheat tax as specified in IDAPA 22-3315, Subsection (1) and shall include the following legible information:

- a. The name or names and address or addresses of the grower and seller.
(proposed rule including sub-point A above is on separate proposal from sub-points B&C below)
- b. The number of bushels of wheat purchased.
- c. The total wheat tax withheld from each purchase.

IDAHO WHEAT COMMISSION

POLICY ON EDUCATING AND COMMUNICATING WITH GROWERS USING MAILING LISTS

The Idaho Wheat Commission receives names of wheat growers and their mailing addresses from grain handlers who are the point of first purchase.

The IWC master list of wheat growers in the State of Idaho will be used for periodic polls or referendum as determined by the Idaho Wheat Commissioners, and for quarterly mailing of the Idaho Grain Magazine.

Recognizing that much communication is now digital, the Idaho Wheat Commission will provide an opportunity for growers to “opt-in” to digital channels of communication. The Idaho Wheat Commission will maintain lists of growers who want to receive the weekly electronic Idaho Wheat Newsletter by email, or weekly text updates on their personal device, or Twitter messages or other social media platforms which the Wheat Commission maintains. Wheat growers may opt-in or opt-out at will to the electronic media vehicles.

Growers will have the opportunity to opt-in to digital media means through announcements in the Idaho Grain magazine, flyers at Cereal Schools and other grower meetings, and by so responding in periodic polls or referendums. Polls or referendums to gain feedback from Idaho growers on how their check-off dollars are spent are anticipated every three or four years.

All grower information is kept confidential, in a locked file drawer or password-protected computer file.

APPROVED: February 22, 2017

UPDATED:



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Idaho Statutes

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TITLE 74 TRANSPARENT AND ETHICAL GOVERNMENT

CHAPTER 1 PUBLIC RECORDS ACT

74-107. RECORDS EXEMPT FROM DISCLOSURE -- TRADE SECRETS, PRODUCTION RECORDS, APPRAISALS, BIDS, PROPRIETARY INFORMATION. The following records are exempt from disclosure:

(1) Trade secrets including those contained in response to public agency or independent public body corporate and politic requests for proposal, requests for clarification, requests for information and similar requests. "Trade secrets" as used in this section means information, including a formula, pattern, compilation, program, computer program, device, method, technique, process, or unpublished or in-progress research that:

(a) Derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use; and

(b) Is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

(2) Production records, housing production, rental and financing records, sale or purchase records, catch records, mortgage portfolio loan documents, or similar business records of a private concern or enterprise required by law to be submitted to or inspected by a public agency or submitted to or otherwise obtained by an independent public body corporate and politic. Nothing in this subsection shall limit the use which can be made of such information for regulatory purposes or its admissibility in any enforcement proceeding.

(3) Records relating to the appraisal of real property, timber or mineral rights prior to its acquisition, sale or lease by a public agency or independent public body corporate and politic.

(4) Any estimate prepared by a public agency or independent public body corporate and politic that details the cost of a public project until such time as disclosed or bids are opened, or upon award of the contract for construction of the public project.

(5) Examination, operating or condition reports and all documents relating thereto, prepared by or supplied to any public agency or independent public body corporate and politic responsible for the regulation or supervision of financial institutions including, but not limited to, banks, savings and loan associations, regulated lenders, business and industrial development corporations, credit unions, and insurance companies, or for the regulation or supervision of the issuance of securities.

(6) Records gathered by a local agency or the Idaho department of commerce, as described in chapter 47, title 67, Idaho Code, for the specific purpose of assisting a person to locate, maintain, invest in, or expand business operations in the state of Idaho.

(7) Shipping and marketing records of commodity commissions used to evaluate marketing and advertising strategies and the names and addresses of growers and shippers maintained by commodity commissions.

(8) Financial statements and business information and reports submitted by a legal entity to a port district organized under title 70, Idaho Code, in connection with a business agreement, or with a development proposal or with a financing application for any industrial, manufacturing, or other business activity within a port district.

(9) Names and addresses of seed companies, seed crop growers, seed crop consignees, locations of seed crop fields, variety name and acreage by variety. Upon the request of the owner of the proprietary variety, this information shall be released to the owner. Provided however, that if a seed crop has been identified as diseased or has been otherwise identified by the Idaho department of agriculture, other state departments of agriculture, or the United States department of agriculture to represent a

IDAHO WHEAT COMMISSION

ASSESSMENT RECORDS

POLICY

When grower names and addresses are provided to the commission by the assessment remitter or by the ISDA auditor, it is the IWC policy to keep those records for 3 years, after which they will be destroyed.

APPROVED: October 28, 2009

UPDATED: February 16, 2016

Wheat Grower Names are Kept Confidential

THE confidentiality of grower names and addresses are protected under Idaho statute, IDAPA 74-107, Subsection (7). It states that *“shipping and marketing records of commodity commissions and the names and addresses of growers and shippers maintained by commodity commissions are exempt from disclosure.”* This means that grower names and addresses are not released when requests are received under Idaho Public Records Law. As a further safeguard, the Idaho Wheat Commission has adopted a policy stating that all grower records are shredded after three years.

Idaho Administrative Code, IDAPA 42-01-01, provides for the Idaho Wheat Commission to have access to grower names, addresses, and wheat tax paid by the grower to the first purchaser of wheat. About half of the elevators in Idaho currently submit this information with their quarterly wheat tax remittance. Additional information on grower names and addresses are collected and submitted to the wheat commission by their audit representative, the Idaho State Department of Agriculture.

The primary reason for keeping a list is to be accountable to our growers and to have the means to conduct polls periodically and



make sure grower needs are met and to assess whether growers feel check-off funds are well spent. It is embarrassing, but to the cumbersome nature of assembling a grower list from diverse sources and inconsistent time periods, the Wheat Commission does not have a good listing of grower names and addresses.

Secondary reasons for a grower list are numerous. For example, time is of the essence when stripe rust and other fast-moving diseases hit, and information quickly disseminated directly to the grower via an accurate mailing list will help them react. Another example is the \$1.00 price premium for lower-protein soft white wheat

the past year. If a grower has not been made aware of this, someone else in the supply chain pockets the premium. A further example is the need we have currently to provide RMA with copies of settlement sheets showing discounts for sprouted wheat.

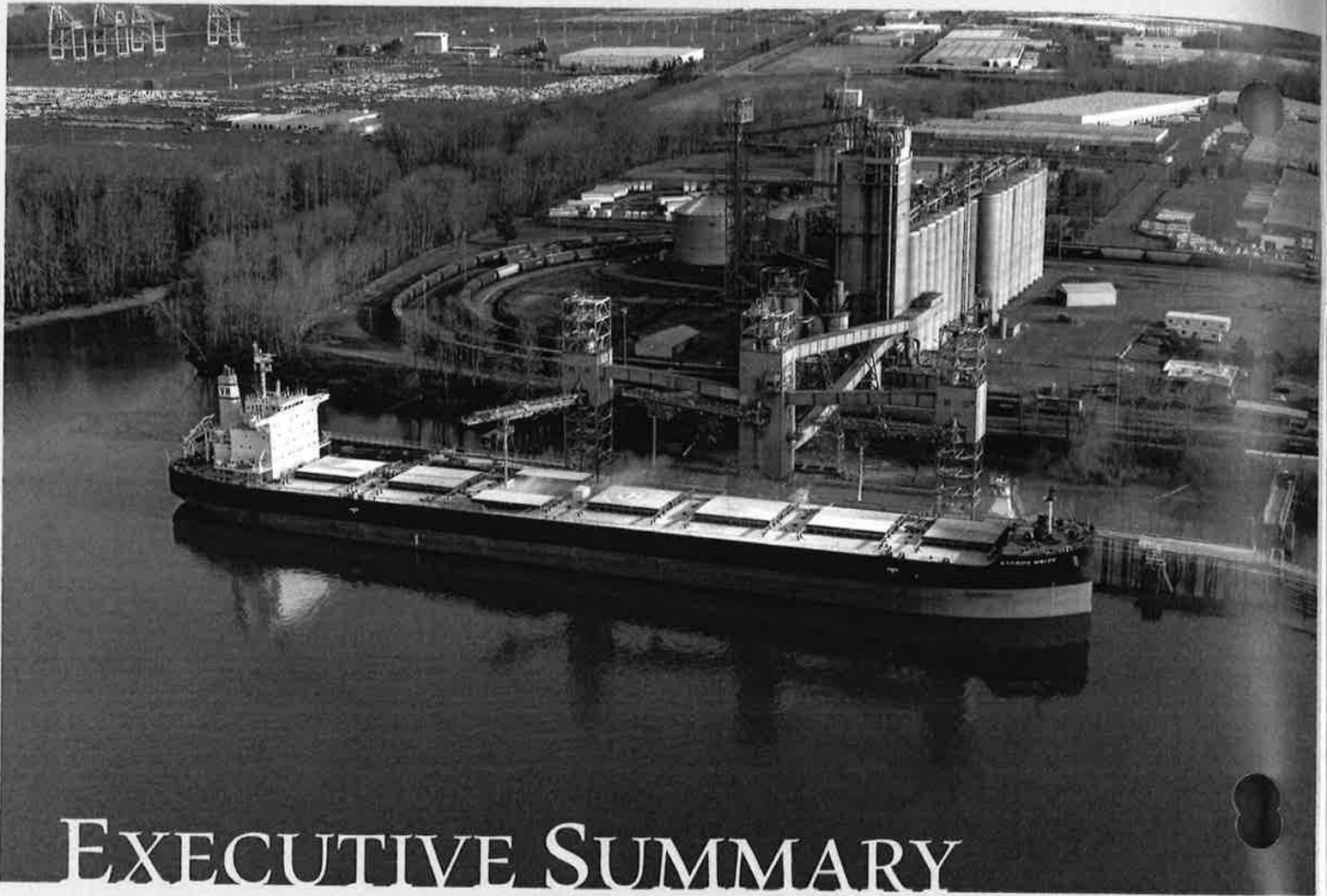
In order to meet the needs outlined above and to better communicate marketing opportunities to wheat growers and provide education, the Idaho Wheat Commission will submit an administrative rules change to the 2017 legislature to require the first purchaser of wheat to provide the wheat commission with a listing of grower names and addresses in a uniform format at the end of each harvest year.



2016 HARVEST

U.S. PACIFIC NORTHWEST *Soft White Wheat Quality Report*

*This project is funded by the Idaho Wheat Commission,
Oregon Wheat Commission, Washington Grain
Commission, U.S. Wheat Associates, and
Wheat Marketing Center, Inc.*



EXECUTIVE SUMMARY

Photo courtesy of Port of Portland

Cover photo courtesy of Washington Grain Commission

Pacific Northwest (PNW) soft white wheat and white club wheat production returned to more normal conditions after two years of very dry weather. Isolated rain in early summer in some production areas resulted in falling number values that were lower than last year and the three-year averages. Total production of both soft white and club wheat exceeded the three-year averages. Protein levels were lower than last year; soft white and white club kernels were larger and heavier with higher test weights than last year, indicating excellent milling quality. Milled flour had low ash content, sound falling number values, and acceptable amylograph peak viscosity. Dough testing indicated typically weak gluten strength for soft white and white club wheat flour. All production zone averages for sponge cake volumes were lower than last year; however, their total scores were equivalent to or greater than last year and the three-year averages. Chinese southern type steamed bread total scores of all production zones were similar to or higher than the three-year averages.

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PACIFIC NORTHWEST WHEAT PRODUCTION

U.S. soft white wheat is grown in the Pacific Northwest, which includes the states of Idaho, Oregon, and Washington.



Pacific Northwest soft white wheat is known for its white bran, low moisture content, and weak dough strength characteristics. Consequently, soft white wheat is well suited for products such as cakes, pastries, cookies, crackers, pancakes, snack foods, flat breads, and Chinese southern-type steamed breads.

The soft white wheat class includes the subclasses of white club wheat and western white wheat. White club wheat has very weak gluten characteristics. Western white wheat is a blend of the white club wheat subclass and soft white wheat. The amount of white club wheat in western white wheat ranges from 10 to 90 percent. The minimum percentage of white club wheat in western white wheat is 10 percent and any higher amounts are contract specifications that are negotiated between buyer and seller (typically 10-30%).

SOFT WHITE AND WHITE CLUB WHEAT SUMMARY

	Soft White		White Club	
	2016	3 yr av	2016	3 yr av
Test Weight (lb/bu)	61.1	60.4	60.8	60.4
Hectoliter Weight (kg/hl)	80.3	79.5	80.0	79.5
Grade	1SWH	1SWH	1WHCB	1WHCB
Dockage (%)	0.5	0.5	0.8	0.5
Wheat Moisture (%)	9.7	9.2	9.6	8.6
Wheat Protein (% , 12% mb)	10.1	10.6	9.9	11.2
Wheat Ash (% , 14% mb)	1.25	1.36	1.18	1.30
1000 Kernel Weight (g , 14% mb)	36.4	33.6	33.7	30.5
Wheat Falling Number (seconds , 14% mb)	320	351	301	348
Flour Extraction (%)	75.3	74.9	77.2	74.5
Flour Ash (% , 14% mb)	0.40	0.49	0.35	0.50
Flour Wet Gluten (% , 14% mb)	24.7	25.8	15.8	27.6
Farinograph: Absorption (% , 14% mb)	53.9	53.9	52.8	53.3
Peak Time (minutes)	2.6	2.6	1.6	1.8
Stability Time (minutes)	3.0	3.2	1.5	1.3
Alveograph: L (mm)	94	107	80	79
W (10 ⁻⁴ joules)	96	105	45	52
Production (mmt)	5.73	5.13	0.46	0.25



Photo courtesy of Washington Grain Commission

Wheat Samples

At harvest, wheat samples were collected from a number of sources, including state and private grain inspection agencies and commercial wheat handling operation throughout Pacific Northwest. Sample collection was based on wheat production in each location. For the 2016 harvest, Wheat Marketing Center received and tested 402 soft white wheat and 66 white club wheat samples from Idaho, Oregon, and Washington. Federal Grain Inspection Service (FGIS) graded each sample. Wheat Marketing Center conducted wheat, flour, Solvent Retention Capacity (SRC), dough, and finished product tests on composites based on production zones and protein levels.



Photos courtesy of
Wheat Marketing Center (top) and
Oregon Wheat Commission (r)

The major soft white wheat varieties were SY Ovation, Otto, ORCF-102, Curiosity CL+, and Xerpha. The major club wheat variety was Bruehl.



Weather

The Pacific Northwest had limited to adequate soil moisture at planting. Most of the wheat producing areas received short to adequate rainfall during the late winter and early spring. Generally, dry and warm weather conditions were reported in the later spring. Isolated rains and cold temperatures occurred in early summer in some areas, causing lower falling number values in those locations. Sustained high temperatures over 90 degrees Fahrenheit (°F) were reported in most wheat growing regions.

Production Zones



2016 SOFT WHITE AND WHITE CLUB WHEAT

PRODUCTION by production zone

Production Zone	Million Metric Tons (mmt)	Million Bushels
North Central	1.79	65.8
Northeast	1.88	69.1
Central	1.33	49.0
Southeast	0.72	26.3
Southwest	0.47	17.2
Northwest	0.04	1.3
Total	6.23	228.7

Wheat production estimates courtesy of
Washington Grain Commission.

WHEAT QUALITY

Production Zone	Wheat Protein Range 12% mb %	Grade	Test Weight lb/bu	Dockage %	Whole Kernel Moisture %	Wheat Falling Number 14% mb seconds	Wheat Ash 14% mb %	Thousand Kernel Weight 14% mb g	SKCS Kernel Hardness Index	Whole Meal Wet Gluten 14% mb %
NORTH CENTRAL	<8.5	1SWH	61.3	0.3	9.5	280	1.15	36.6	33	14.0
Soft White	8.5-9.4	1SWH	61.9	0.4	9.7	310	1.15	37.1	31	19.9
Wheat Estimated	9.5-10.4	1SWH	61.2	0.5	9.8	328	1.18	35.8	33	22.0
Production	10.5-12.0	1SWH	61.3	0.6	9.7	325	1.24	34.7	33	25.5
1.50 MMT	>12.0	1SWH	61.9	0.4	9.2	326	1.32	35.3	29	30.1
	2016 Average	1SWH	61.4	0.5	9.7	317	1.20	35.8	32	22.1
	2015 Average	2SWH	59.2	0.5	8.3	364	1.39	29.0	35	25.5
	3 Year Average	1SWH	60.4	0.4	8.8	361	1.30	32.4	30	25.6
NORTHEAST	8.5-9.4	1SWH	62.2	0.5	9.6	274	1.28	37.6	27	19.1
Soft White	9.5-10.4	1SWH	62.3	0.5	9.5	299	1.25	38.3	33	22.1
Wheat Estimated	10.5-12.0	2SWH	62.0	0.5	9.5	338	1.20	36.9	34	25.6
Production	>12.0	2SWH	58.5	0.8	9.6	372	1.41	32.4	28	29.7
1.77 MMT	2016 Average	1SWH	61.9	0.5	9.5	314	1.25	37.4	32	23.4
	2015 Average	2SWH	58.8	0.7	8.7	351	1.41	30.3	28	25.2
	3 Year Average	1SWH	60.3	0.5	9.1	345	1.35	33.5	28	24.3
CENTRAL	<8.5	2SWH	59.4	1.4	10.7	306	1.03	36.1	29	17.1
Soft White	8.5-9.4	1SWH	60.6	0.5	10.2	310	1.16	34.9	31	20.4
Wheat Estimated	9.5-10.4	1SWH	61.0	0.6	9.7	316	1.17	35.2	30	23.0
Production	10.5-12.0	2SWH	59.4	0.6	9.6	333	1.18	32.7	32	26.6
1.27 MMT	>12.0	3SWH	57.7	0.7	9.8	365	1.21	31.4	33	31.4
	2016 Average	2SWH	59.7	0.6	9.8	330	1.17	33.7	31	25.1
	2015 Average	2SWH	59.5	0.6	8.5	348	1.35	29.5	35	24.0
	3 Year Average	1SWH	60.2	0.5	8.7	354	1.31	32.0	33	24.7
SOUTHEAST	<8.5	1SWH	60.5	0.6	9.5	317	1.38	40.6	27	15.0
Soft White	8.5-9.4	1SWH	61.9	0.4	9.5	318	1.41	40.6	33	18.2
Wheat Estimated	9.5-10.4	1SWH	61.5	0.5	9.2	327	1.41	38.9	37	19.6
Production	10.5-12.0	1SWH	61.8	0.7	9.4	327	1.45	36.4	39	19.7
0.72 MMT	2016 Average	1SWH	61.6	0.5	9.4	322	1.41	39.5	34	18.3
	2015 Average	1SWH	60.6	0.6	10.9	338	1.58	35.8	32	20.6
	3 Year Average	1SWH	60.9	0.5	9.9	340	1.55	36.1	32	19.5
SOUTHWEST	<8.5	2SWH	58.9	0.7	11.4	294	1.40	38.7	17	14.5
Soft White	8.5-9.4	2SWH	59.7	0.7	11.1	328	1.35	37.3	26	17.4
Wheat Estimated	9.5-10.4	1SWH	60.5	0.7	11.3	338	1.26	36.3	26	20.6
Production	2016 Average	2SWH	59.7	0.7	11.2	322	1.34	37.4	23	17.6
0.47 MMT	2015 Average	2SWH	59.8	0.7	10.7	342	1.47	36.7	28	21.6
	3 Year Average	1SWH	60.7	0.6	10.8	344	1.44	38.1	31	20.9
WHITE CLUB WHEAT	2016 Average	1WHCB	60.8	0.8	9.6	301	1.18	33.7	35	19.4
	2015 Average	1WHCB	58.3	0.8	8.0	363	1.39	25.7	37	19.7
Estimated Production 0.46 MMT	3 Year Average	1WHCB	60.2	0.5	8.6	343	1.31	30.6	34	17.1

FLOUR QUALITY

Production Zone	Wheat Protein Range 12% mb %	Flour Yield %	Flour Ash 14% mb %	Flour Protein 14% mb %	Flour Color			Flour Wet Gluten 14% mb %	Flour Falling Number 14% mb seconds	Amylograph Peak Viscosity
					L*	a*	b*			BU
NORTH CENTRAL	<8.5	75.1	0.44	7.3	94.0	-2.3	7.8	15.3	297	188
Soft White	8.5-9.4	75.8	0.39	8.2	93.9	-2.1	7.1	15.5	328	318
Wheat Estimated	9.5-10.4	77.2	0.42	9.0	93.5	-1.9	6.9	23.4	370	348
Production	10.5-12.0	75.0	0.40	10.0	93.5	-1.9	7.0	25.8	355	501
1.50 MMT	>12.0	74.1	0.39	11.4	93.2	-1.8	6.4	32.8	367	520
	2016 Average	75.8	0.41	9.1	93.6	-2.0	7.1	22.1	347	379
	2015 Average	72.7	0.43	9.9	92.4	-2.3	7.6	26.6	391	599
	3 Year Average	73.9	0.47	9.7	92.1	-2.3	7.7	26.3	411	527
NORTHEAST	8.5-9.4	76.7	0.40	8.3	93.2	-2.0	6.8	21.3	309	257
Soft White	9.5-10.4	76.5	0.37	8.8	93.0	-1.9	6.7	21.6	330	292
Wheat Estimated	10.5-12.0	76.5	0.38	9.8	92.3	-1.8	6.7	26.2	343	344
Production	>12.0	73.3	0.41	11.4	92.3	-1.7	6.7	30.1	386	522
1.77 MMT	2016 Average	76.3	0.38	9.2	92.8	-1.9	6.7	23.7	336	320
	2015 Average	73.9	0.50	9.5	92.2	-2.3	7.7	24.7	390	610
	3 Year Average	75.5	0.49	9.6	92.1	-2.2	7.6	25.6	381	559
CENTRAL	<8.5	74.2	0.37	6.9	92.9	-2.2	7.4	15.2	308	515
Soft White	8.5-9.4	76.4	0.36	8.2	92.3	-2.1	7.4	20.6	336	458
Wheat Estimated	9.5-10.4	75.5	0.36	8.8	92.6	-2.1	6.6	23.6	308	445
Production	10.5-12.0	74.0	0.35	9.9	94.3	-1.9	6.9	24.4	358	498
1.27 MMT	>12.0	72.2	0.40	11.8	93.9	-1.9	6.9	34.3	359	489
	2016 Average	74.5	0.37	9.6	93.3	-2.0	6.9	25.3	337	474
	2015 Average	73.7	0.49	9.4	92.3	-2.4	7.7	25.9	407	596
	3 Year Average	74.4	0.49	9.6	92.0	-2.4	8.1	27.1	393	560
SOUTHEAST	<8.5	76.0	0.40	7.4	94.4	-2.0	6.6	13.9	353	426
Soft White	8.5-9.4	76.7	0.39	8.0	94.2	-2.0	7.0	18.4	350	442
Wheat Estimated	9.5-10.4	76.3	0.40	8.7	95.5	-1.9	6.8	21.8	347	398
Production	10.5-12.0	76.0	0.46	9.8	93.7	-2.0	7.2	27.4	369	443
0.72 MMT	2016 Average	76.4	0.41	8.4	94.5	-2.0	6.9	20.0	352	427
	2015 Average	76.9	0.55	9.1	92.2	-2.4	7.7	29.8	372	454
	3 Year Average	76.2	0.54	9.1	92.1	-2.4	7.9	26.5	379	459
SOUTHWEST	<8.5	75.9	0.41	7.0	94.0	-2.0	6.5	14.4	321	490
Soft White	8.5-9.4	77.2	0.39	7.7	93.8	-1.9	6.7	18.2	321	426
Wheat Estimated	9.5-10.4	76.6	0.31	8.8	94.0	-1.8	6.4	21.4	347	528
Production	2016 Average	76.7	0.37	7.8	93.9	-1.9	6.6	18.2	328	473
0.47 MMT	2015 Average	74.9	0.52	8.3	92.3	-2.4	7.5	21.6	356	612
	3 Year Average	75.8	0.52	8.1	92.1	-2.3	7.7	20.9	355	511
WHITE CLUB	2016 Average	77.2	0.35	8.8	91.6	-1.9	6.9	15.8	325	298
WHEAT	2015 Average	70.8	0.49	10.1	92.2	-2.2	7.3	28.1	417	647
Estimated	3 Year Average	74.5	0.50	9.9	91.9	-2.3	7.5	27.5	380	485
Production										
0.46 MMT										

SOLVENT RETENTION CAPACITY (SRC)

Production Zone	Wheat Protein Range 12% mb %	Water 14% mb %	50% Sucrose 14% mb %	5% Lactic Acid 14% mb %	5% Sodium Carbonate 14% mb %	Gluten Performance Index
NORTH CENTRAL	<8.5	64	90	113	108	0.57
Soft White	8.5-9.4	60	84	115	109	0.60
Wheat Estimated	9.5-10.4	61	84	112	108	0.58
Production	10.5-12.0	61	80	116	97	0.66
1.50 MMT	>12.0	58	85	117	106	0.62
	2016 Average	61	83	114	104	0.61
	2015 Average	60	116	130	85	0.65
NORTHEAST	8.5-9.4	57	82	107	107	0.57
Soft White	9.5-10.4	55	77	108	110	0.58
Wheat Estimated	10.5-12.0	59	79	118	113	0.62
Production	>12.0	56	86	95	111	0.48
1.77 MMT	2016 Average	57	79	111	111	0.58
	2015 Average	56	102	116	81	0.63
CENTRAL	<8.5	57	89	98	101	0.51
Soft White	8.5-9.4	57	85	101	103	0.54
Wheat Estimated	9.5-10.4	56	85	115	105	0.61
Production	10.5-12.0	58	114	101	83	0.51
1.27 MMT	>12.0	59	113	82	81	0.42
	2016 Average	57	99	101	93	0.52
	2015 Average	57	103	116	82	0.63
SOUTHEAST	<8.5	55	99	85	82	0.47
Soft White	8.5-9.4	59	105	83	81	0.45
Wheat Estimated	9.5-10.4	58	100	82	99	0.41
Production	10.5-12.0	57	83	96	99	0.53
0.72 MMT	2016 Average	58	99	85	89	0.45
	2015 Average	57	98	91	80	0.52
SOUTHWEST	<8.5	55	78	103	102	0.57
Soft White	8.5-9.4	56	82	100	106	0.53
Wheat Estimated	9.5-10.4	60	84	122	101	0.66
Production	2016 Average	57	81	107	103	0.58
0.47 MMT	2015 Average	58	103	117	80	0.63
WHITE CLUB WHEAT	2016 Average	50	96	82	73	0.49
Estimated Production 0.46 MMT	2015 Average	53	100	85	75	0.49

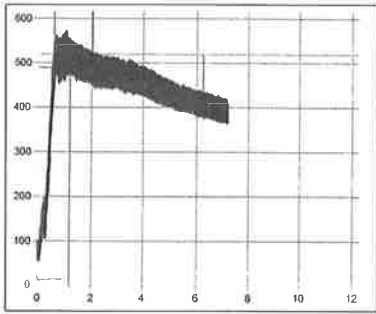
PHYSICAL DOUGH PROPERTIES

Production Zone	Wheat Protein Range 12% mb %	Farinograph			P	Alveograph		W
		Absorption 14% mb %	Peak Time minutes	Stability minutes		L mm	P/L	
NORTH CENTRAL	<8.5	54.6	1.5	2.8	70	73	0.96	152
Soft White	8.5-9.4	54.1	2.0	4.2	55	100	0.55	143
Wheat Estimated	9.5-10.4	54.9	2.8	3.8	46	81	0.57	109
Production	10.5-12.0	54.3	3.7	3.7	41	140	0.29	138
1.50 MMT	>12.0	55.9	3.7	2.8	38	148	0.26	142
	2016 Average	54.6	2.8	3.6	49	106	0.51	132
	2015 Average	54.5	4.1	5.0	50	128	0.45	169
	3 Year Average	54.5	3.2	4.0	48	121	0.46	142
NORTHEAST	8.5-9.4	53.7	2.4	2.6	36	82	0.44	81
Soft White	9.5-10.4	54.0	2.8	3.1	32	88	0.36	89
Wheat Estimated	10.5-12.0	54.7	3.2	3.4	39	85	0.46	95
Production	>12.0	54.5	3.5	3.1	37	139	0.27	130
1.77 MMT	2016 Average	54.2	2.9	3.1	35	89	0.40	93
	2015 Average	53.2	2.9	3.9	37	116	0.33	109
	3 Year Average	53.7	2.6	3.3	39	116	0.35	104
CENTRAL	<8.5	51.9	1.5	3.1	39	72	0.54	77
Soft White	8.5-9.4	52.4	2.2	2.2	33	68	0.49	66
Wheat Estimated	9.5-10.4	52.3	2.7	2.9	35	89	0.39	85
Production	10.5-12.0	53.2	2.7	2.4	35	115	0.30	98
1.27 MMT	>12.0	54.9	2.8	2.6	35	124	0.28	100
	2016 Average	53.1	2.6	2.6	35	100	0.37	88
	2015 Average	53.5	2.5	2.9	39	91	0.51	94
	3 Year Average	53.8	2.3	2.5	38	102	0.42	89
SOUTHEAST	<8.5	52.6	1.7	2.1	26	56	0.46	44
Soft White	8.5-9.4	53.3	1.2	2.1	33	58	0.57	54
Wheat Estimated	9.5-10.4	54.2	2.0	1.5	38	78	0.49	58
Production	10.5-12.0	54.2	2.0	1.7	31	114	0.27	62
0.72 MMT	2016 Average	53.6	1.6	1.9	33	72	0.48	55
	2015 Average	54.6	2.2	2.9	37	70	0.55	63
	3 Year Average	54.0	1.8	2.3	36	79	0.48	64
SOUTHWEST	<8.5	51.1	1.2	1.4	30	91	0.33	62
Soft White	8.5-9.4	52.7	1.4	2.2	42	74	0.57	78
Wheat Estimated	9.5-10.4	51.7	3.4	5.8	35	102	0.34	103
Production	2016 Average	52.0	1.9	3.1	37	87	0.44	81
0.47 MMT	2015 Average	53.0	2.3	3.8	44	89	0.49	109
	3 Year Average	53.4	1.9	3.0	43	83	0.57	92
WHITE CLUB	2016 Average	52.8	1.6	1.5	26	80	0.33	45
WHEAT	2015 Average	53.6	2.0	1.3	31	65	0.48	53
Estimated	3 Year Average	53.3	1.8	1.3	30	79	0.39	52
Production								
0.46 MMT								

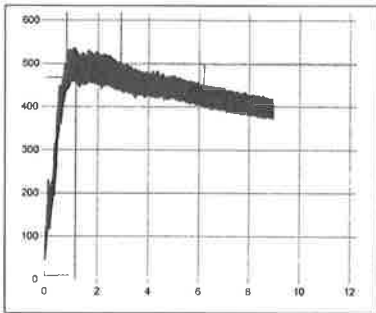
FINISHED PRODUCTS

Production Zone	Wheat Protein Range 12% mb %	Sugar Snap Cookie			Sponge Cake		Chinese Southern Type Steamed Bread	
		Spread cm	Spread Factor width/height	Top Grain Score	Volume cc	Total Score	Specific Volume cc/g	Total Score Control is 70
NORTH CENTRAL	<8.5	8.2	8.0	1.0	1224	54	1.48	61
Soft White	8.5-9.4	8.2	7.7	1.0	1207	54	1.62	68
Wheat Estimated	9.5-10.4	8.2	7.8	0.5	1165	40	1.91	68
Production	10.5-12.0	8.4	8.9	0.5	1152	43	1.99	70
1.50 MMT	>12.0	8.2	7.8	0.0	1164	38	2.04	70
	2016 Average	8.3	8.1	0.6	1176	45	1.83	68
	2015 Average	8.7	10.0	2.0	1233	39	2.34	70
	3 Year Average	8.6	9.5	2.4	1210	42	2.28	68
NORTHEAST	8.5-9.4	8.5	8.1	1.5	1195	49	1.80	66
Soft White	9.5-10.4	8.2	7.8	0.5	1177	49	1.89	68
Wheat Estimated	10.5-12.0	8.3	7.7	0.0	1157	43	2.10	69
Production	>12.0	8.2	8.0	0.0	1215	44	2.21	68
1.77 MMT	2016 Average	8.3	7.8	0.4	1175	47	1.97	68
	2015 Average	8.6	10.0	3.3	1268	41	2.34	67
	3 Year Average	8.6	9.7	3.0	1235	45	2.25	68
CENTRAL	<8.5	8.6	9.1	1.5	1244	54	1.78	67
Soft White	8.5-9.4	8.3	8.8	0.5	1204	49	2.01	68
Wheat Estimated	9.5-10.4	8.4	8.2	0.5	1178	49	1.99	68
Production	10.5-12.0	8.3	8.1	0.0	1216	49	2.19	70
1.27 MMT	>12.0	8.2	7.8	0.0	1177	40	2.14	68
	2016 Average	8.3	8.2	0.3	1195	47	2.07	68
	2015 Average	8.6	10.0	3.7	1286	45	2.34	67
	3 Year Average	8.5	9.6	3.2	1216	42	2.22	66
SOUTHEAST	<8.5	8.8	9.8	2.0	1227	56	1.74	67
Soft White	8.5-9.4	8.7	9.1	1.5	1201	47	1.88	69
Wheat Estimated	9.5-10.4	8.5	8.5	1.0	1217	56	1.98	67
Production	10.5-12.0	8.4	8.4	0.5	1180	46	2.04	66
0.72 MMT	2016 Average	8.6	8.9	1.3	1206	51	1.91	68
	2015 Average	8.7	9.4	3.8	1283	51	2.26	65
	3 Year Average	8.7	9.6	3.9	1241	49	2.17	64
SOUTHWEST	<8.5	8.9	9.9	4.5	1231	54	1.90	68
Soft White	8.5-9.4	8.3	7.5	1.0	1183	46	1.76	68
Wheat Estimated	9.5-10.4	8.4	7.8	0.5	1230	53	2.08	70
Production	2016 Average	8.5	8.2	1.8	1209	50	1.89	69
0.47 MMT	2015 Average	8.7	9.5	5.5	1264	47	2.39	67
	3 Year Average	8.6	9.2	4.3	1235	50	2.10	66
WHITE CLUB								
WHEAT	2016 Average	8.5	9.1	2.5	1233	49	2.12	65
Estimated	2015 Average	8.8	11.0	3.5	1267	39	2.39	66
Production	3 Year Average	8.8	10.8	3.8	1225	44	2.41	65
0.46 MMT								

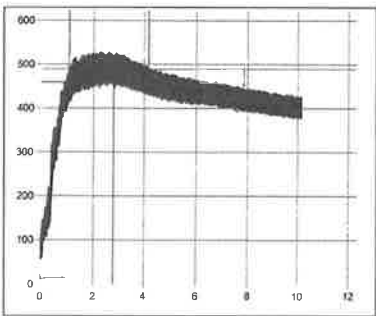
FARINOGRAPH



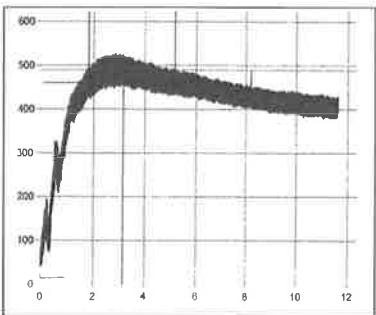
<8.5% Wheat Protein Range



8.5-9.4% Wheat Protein Range



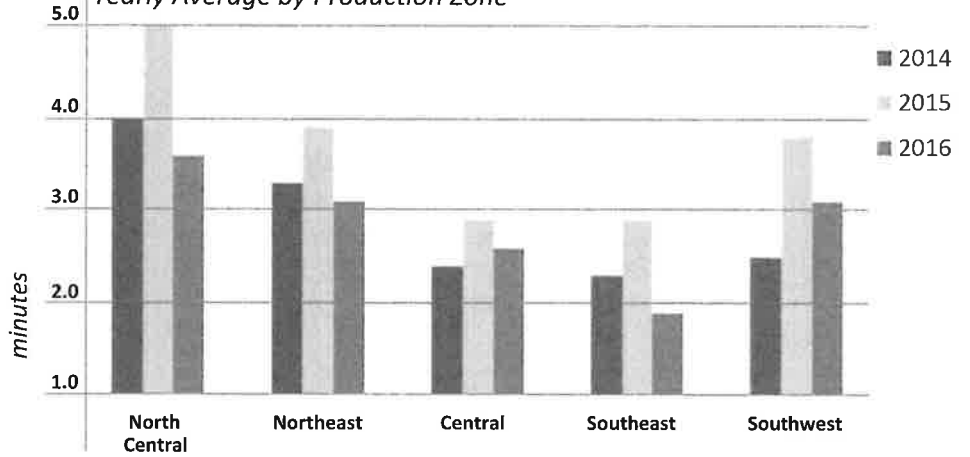
9.5-10.4% Wheat Protein Range



10.5-12.0% Wheat Protein Range

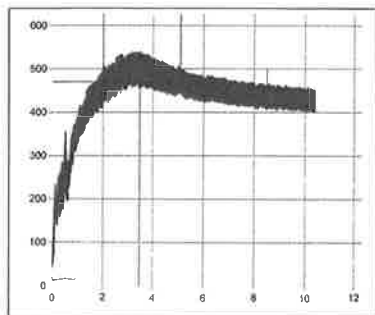
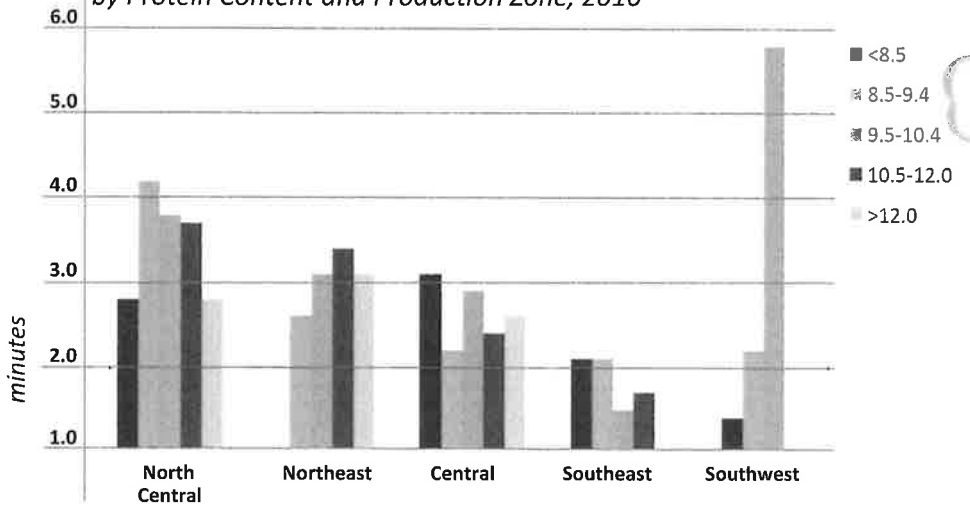
PNW Soft White Wheat Farinograph Stability

Yearly Average by Production Zone

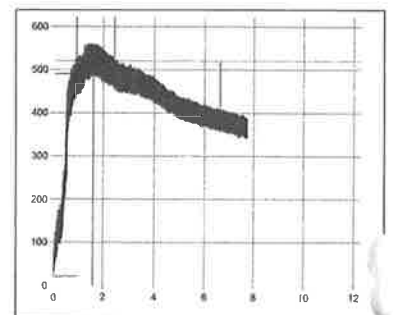


PNW Soft White Wheat Farinograph Stability

by Protein Content and Production Zone, 2016

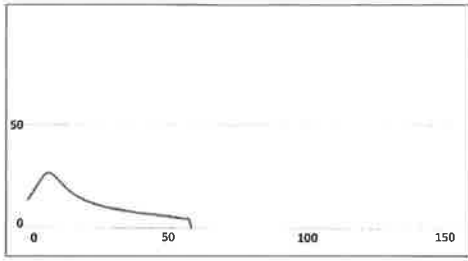


>12.0% Wheat Protein Range

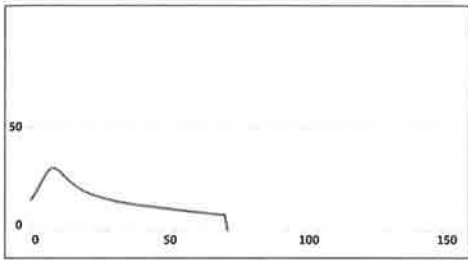


White Club Wheat

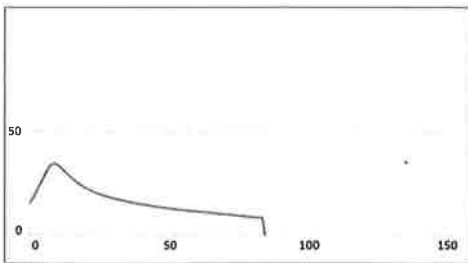
ALVEOGRAPH



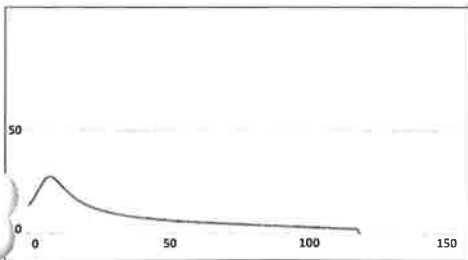
<8.5% Wheat Protein Range



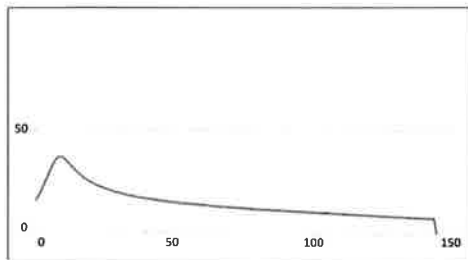
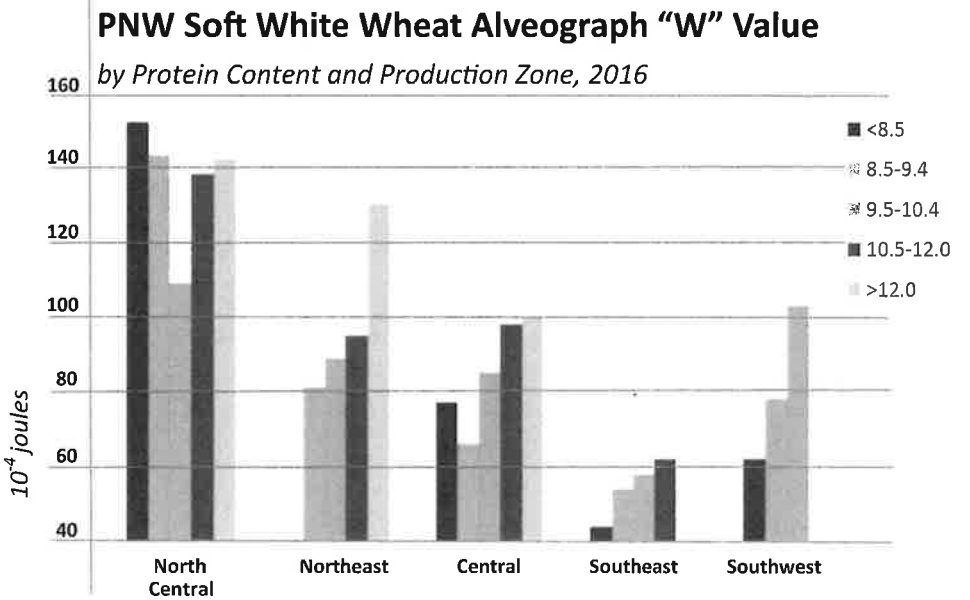
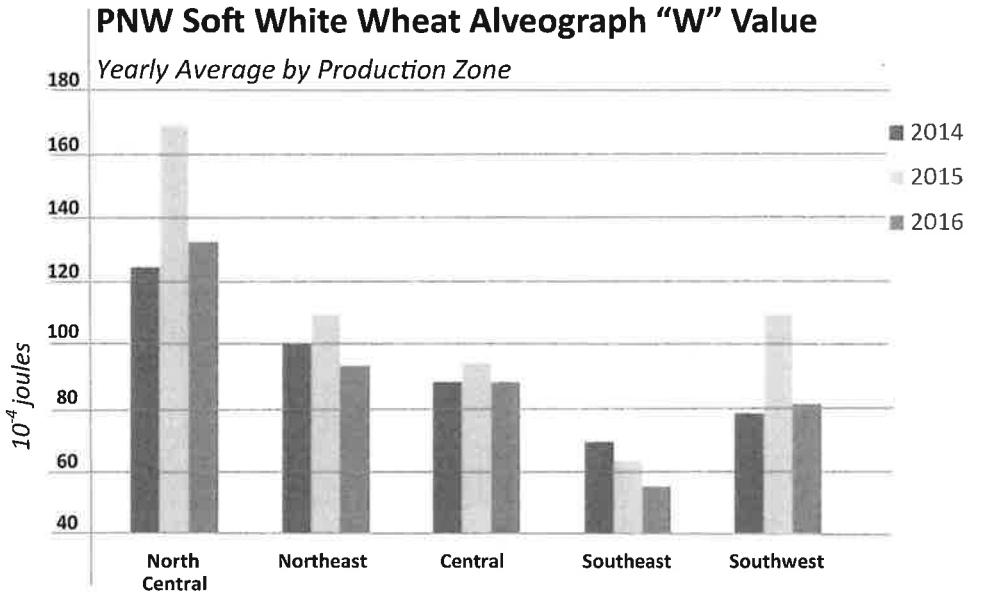
8.5-9.4% Wheat Protein Range



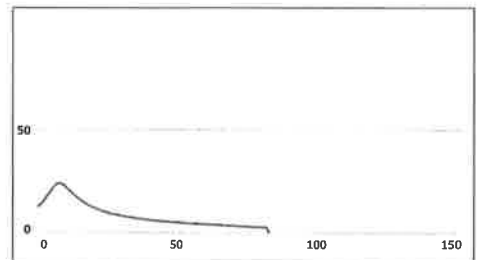
9.5-10.4% Wheat Protein Range



10.5-12.0% Wheat Protein Range

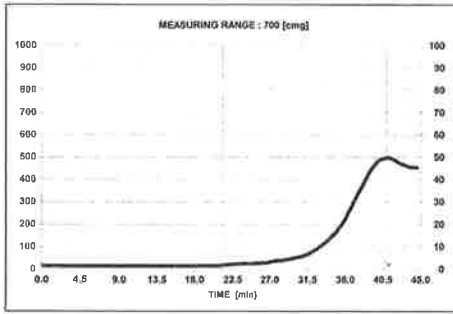


>12.0% Wheat Protein Range

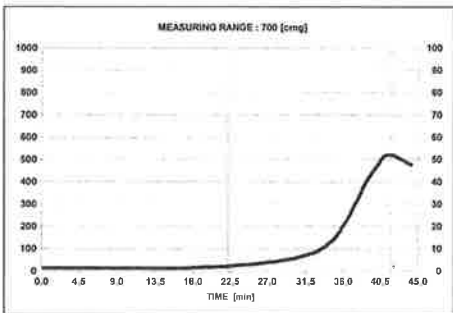


White Club Wheat

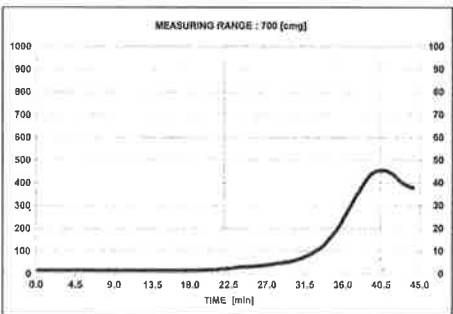
AMYLOGRAPH



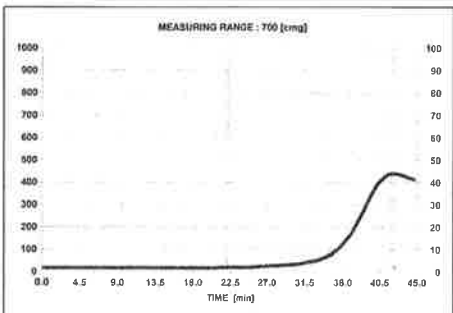
North Central Production Zone



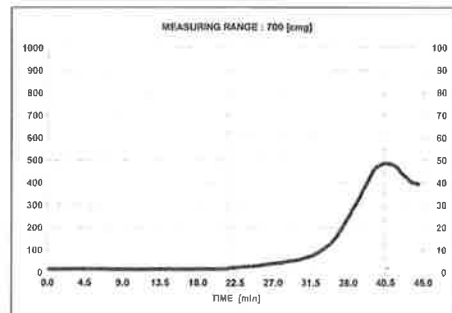
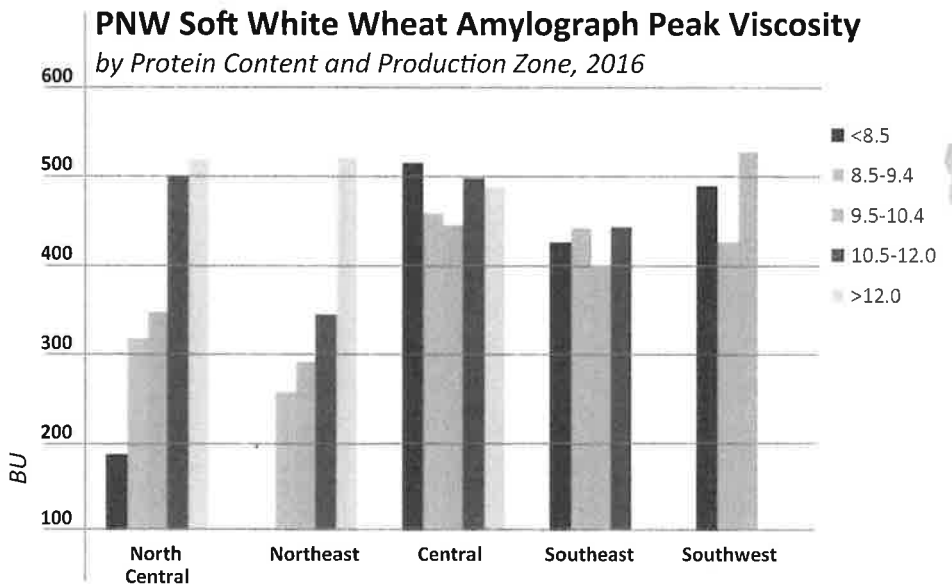
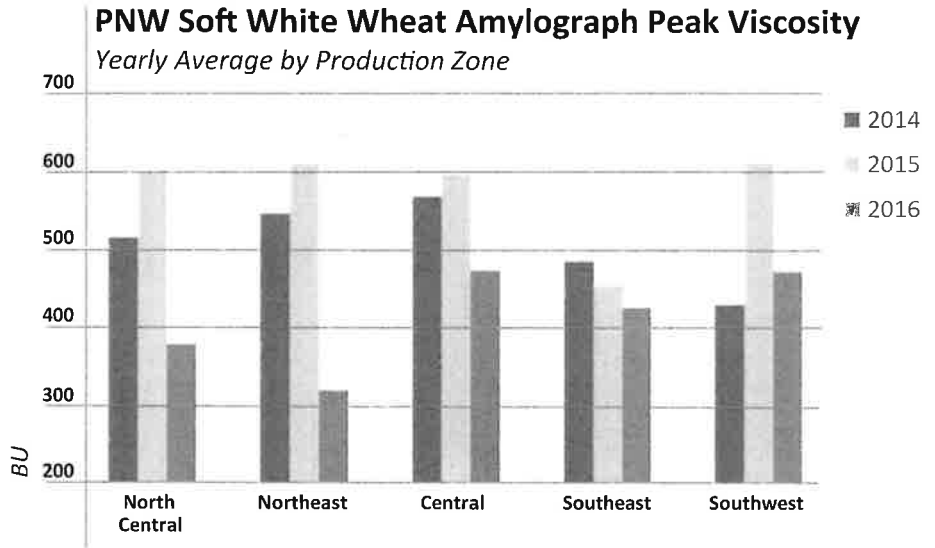
Northeast Production Zone



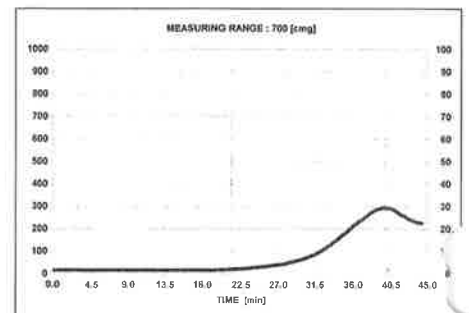
Central Production Zone



Southeast Production Zone

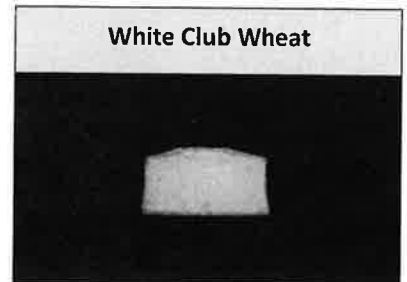
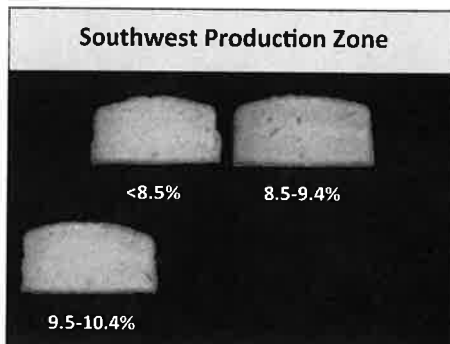
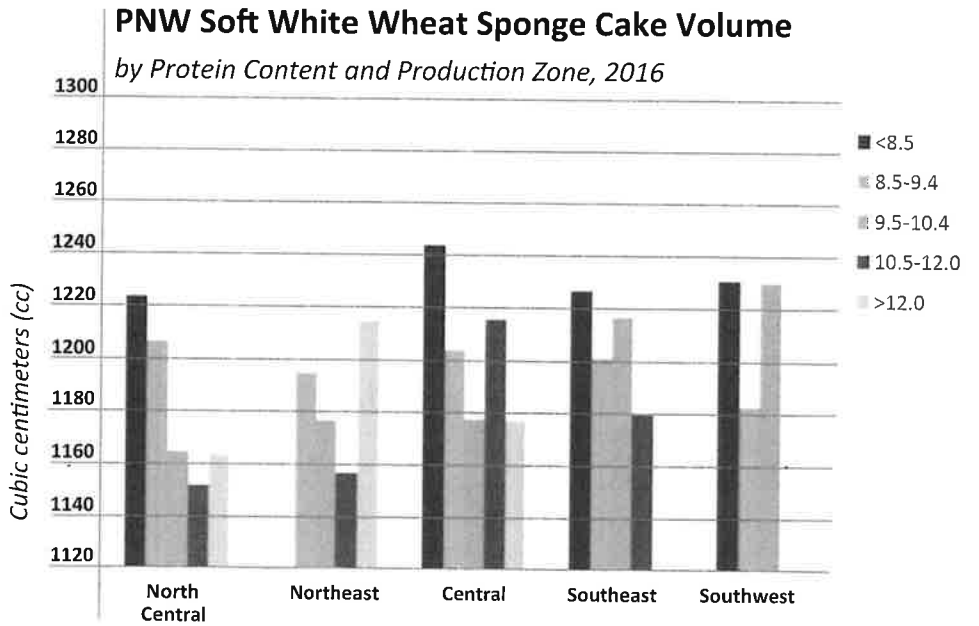
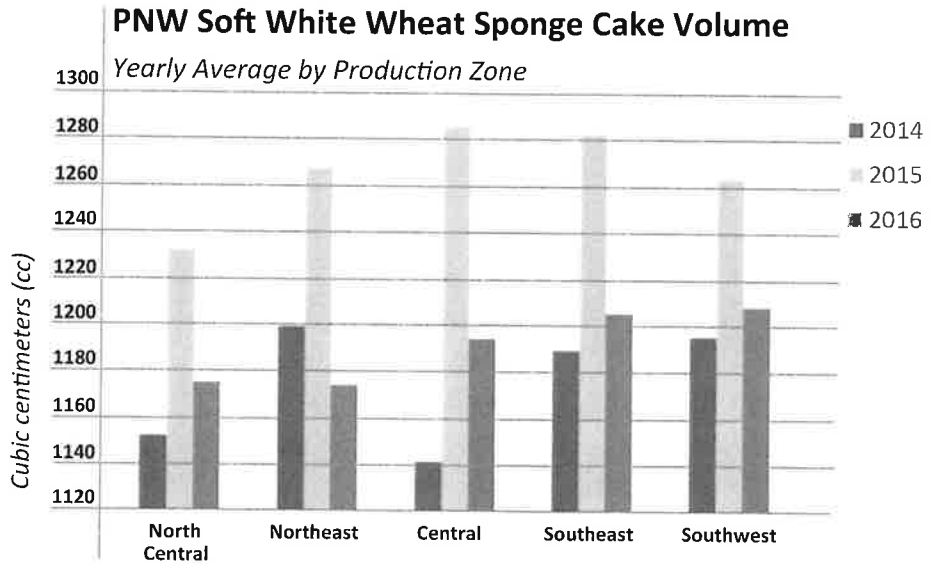
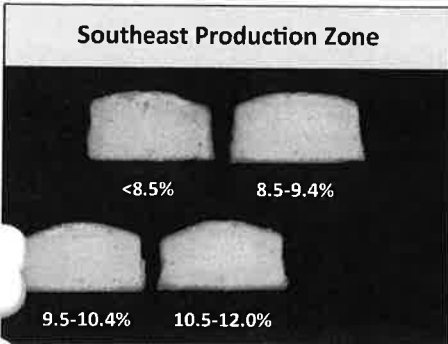
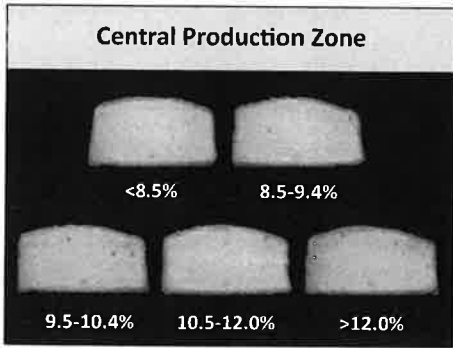
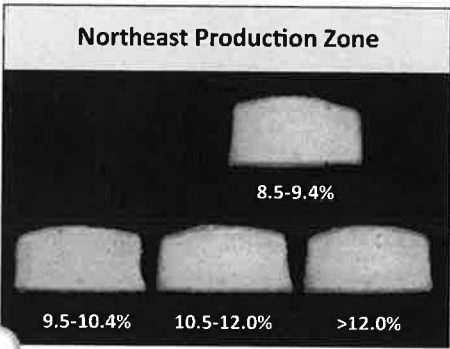
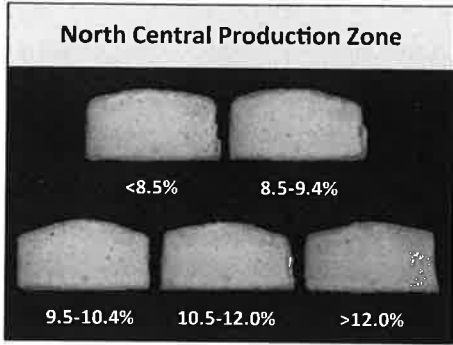


Southwest Production Zone

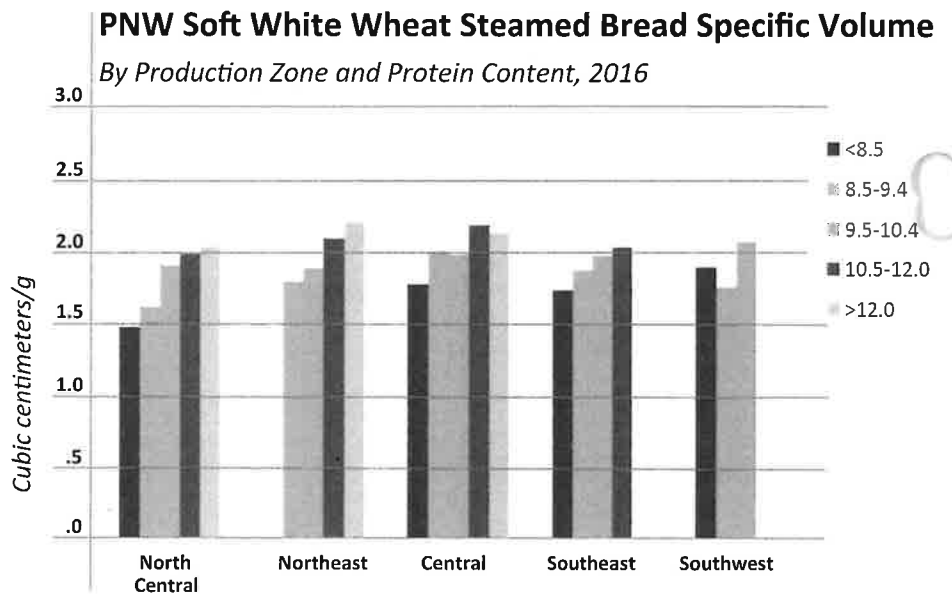
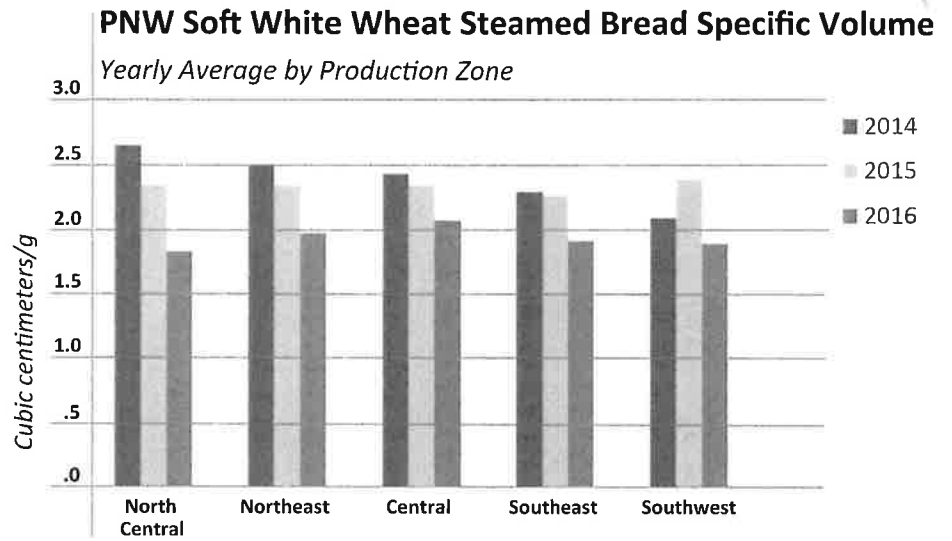
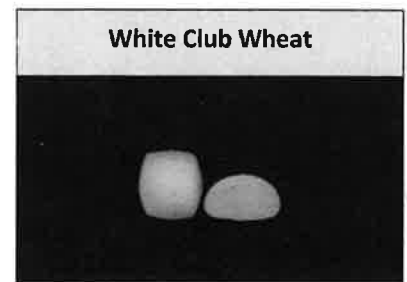
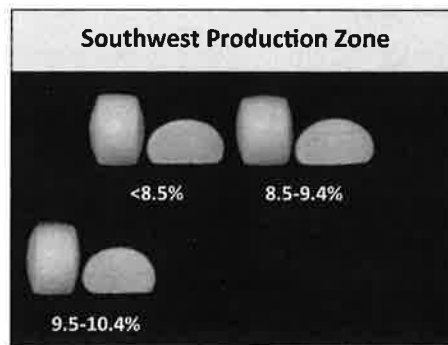
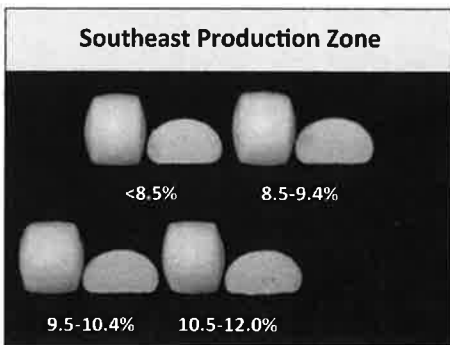
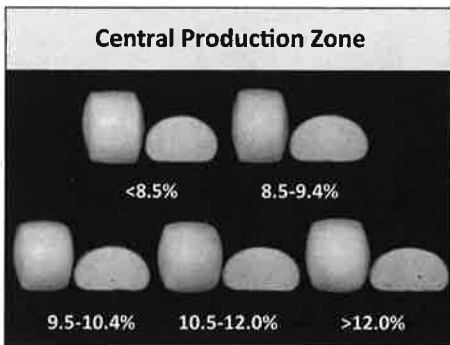
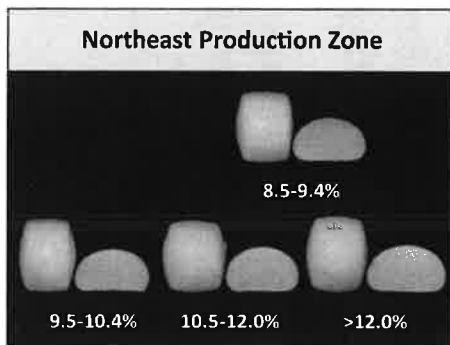
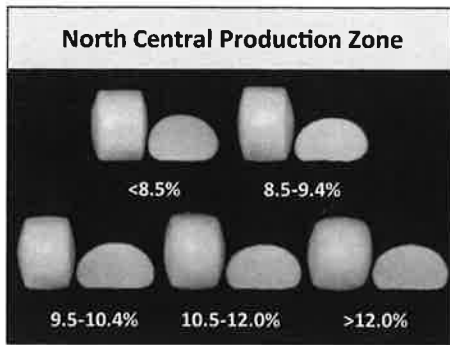


White Club Wheat

SPONGE CAKE



CHINESE SOUTHERN TYPE STEAMED BREAD



SUMMARY

These results were derived from composite samples of the Pacific Northwest soft white wheat and white club wheat harvest. Soft white wheat composites were prepared by production zone and protein levels, and all white club wheat samples were made into one composite. These composite samples were analyzed for wheat quality, flour quality, solvent retention capacity, physical dough properties, and finished product characteristics. Harvest information is summarized as follows:

Wheat Quality

Average test weights were over 60 pounds per bushel (lbs/bu) at most protein levels in most production zones. Dockage averages were similar to last year and the three-year averages in all production zones. Wheat moisture averages were less than 10 percent in the major wheat producing zones of North Central, Northeast, Central, and Southeast. Average falling number values for lower protein levels in North Central, Northeast, and Southwest were below 300 seconds. Average wheat ash content was lower than last year in all production zones. Thousand kernel weights were heavier than last year in all production zones. SKCS kernel hardness index values were similar to last year and the three-year averages in all production zones. Whole meal wet gluten averages were lower than last year and the three-year averages in production zones of North Central, Northeast, Southeast, and Southwest.

Flour Quality

Average flour yields were higher than last year and the three-year averages in all production zones. White club wheat had much higher flour yield than last year and the three-year averages, probably due to higher thousand kernel weight. Average flour ash contents were lower than last year and the three-year averages in all production zones. Flour color averages were slightly whiter than last year and the three-year averages in all production zones. Flour quality parameters indicated higher wet gluten contents in samples with higher protein contents. Flour falling number values were greater than 300 seconds in

all production zones for all protein levels, except for <8.5% in North Central. Amylograph peak viscosity averages were lower than last year and the three-year averages in all production zones.

Solvent Retention Capacity (SRC)

Water SRC average values were similar to last year. North Central, Northeast, Central, and Southwest Sucrose SRC average values were lower than last year. Lactic acid SRC averages were lower than last year due to lower protein contents in all production zones. Sodium carbonate SRC averages were higher than last year in all production zones, indicating higher damaged starch content. Gluten performance index values were lower than last year in all production zones.

Physical Dough Properties

Physical dough property tests indicated generally lower water absorption values and generally weaker gluten strength, as measured by the farinograph, in samples with lower protein content in each production zone. Longer dough extensibility, as shown by alveograph L value, was observed in samples with higher protein content. White club wheat had weaker gluten strength than soft white wheat samples, as indicated by much lower Alveograph W values.

Finished Products

In general, lower protein soft white wheat samples, within each production zone, made better sugar snap cookies as measured by spread factor and top grain scores. Average sponge cake volumes were smaller than last year and the three-year averages in all production zones. However, sponge cake total score averages were either similar to or greater than last year and the three-year averages. Steamed bread specific volumes generally increased with increasing protein content within each production zone. Steamed bread specific volume averages were lower than last year and the three-year averages in all production zones. White club wheat composite sample followed the same trend as soft white wheat.

