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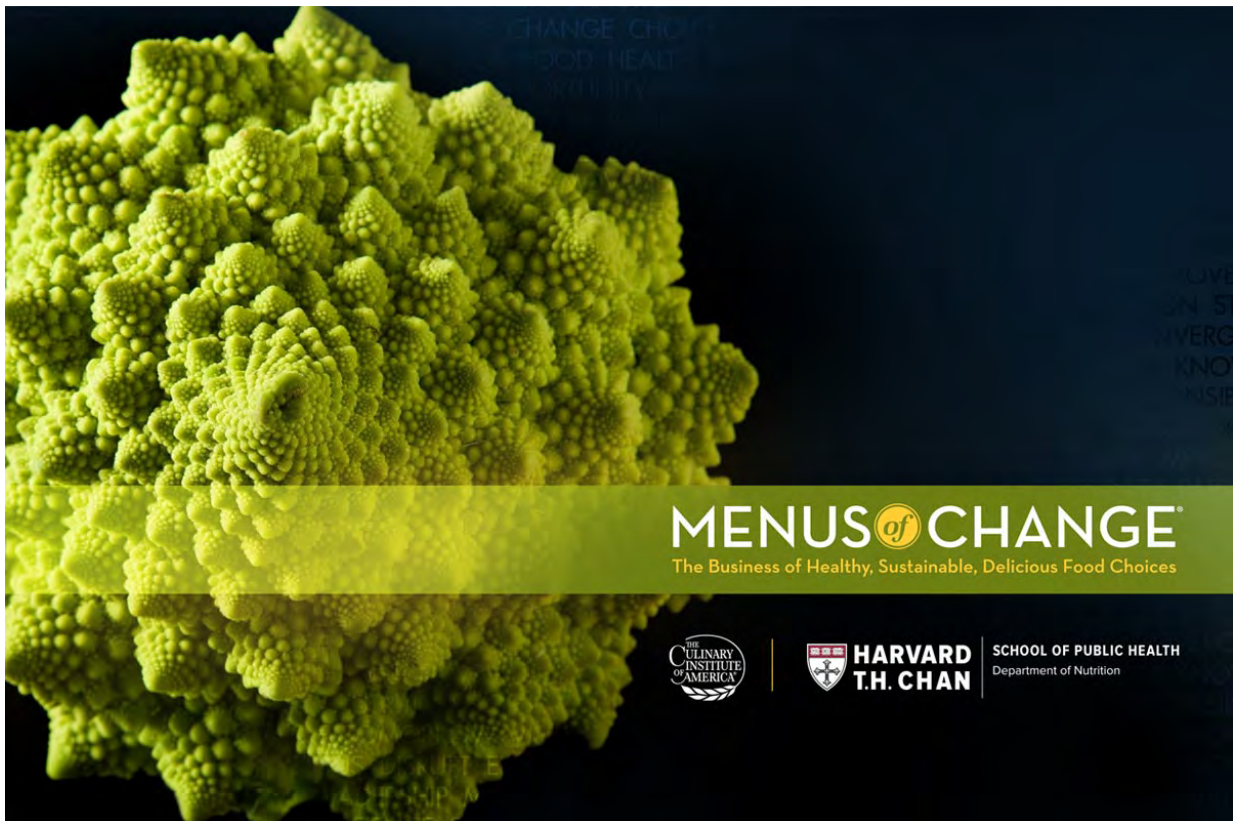
Whole Grains: Carbohydrates
and the Business of Healthy, Sustainable Menus

The Return of Wheat

-a tale of catastrophic shortsightedness and renewal

Presentation by:

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Community Grains grew out of a project within our restaurant, Oliveto, in Oakland, California. Ours was an environment where finding the best sources was essential to good cooking, and curiosity became part of our nature. Over time, we grew more and more deeply involved in our community of local food producers. We sourced humanely grown, naturally fed animals and learned traditional butchering and curing; we built relationships with local, sustainable farmers; and, of course, being intent on mastering traditional pasta making (and bread and pastry making) wheat and milling became our focus beginning in 2007.

But to gain an understanding of wheat—a commodity crop that is part of an enormous industrial system—we had to understand the entire process of flour production, from seed to mill. Like almost all such systems, the details of wheat farming and flour production are not available to the consumer, even if that consumer is in the restaurant business. The answers to the most basic questions we had about the flour we purchased for the restaurant—what were the characteristics of the varieties of wheat in our flour, where and how was this wheat grown, what kind of soil was it grown in and how did that affect its qualities, where and under what conditions was it stored, how was it milled and how did the milling affect the flour—were not available. We soon learned that most information on labels is misleading and, of course, incomplete. And so, as we learned more from seed breeders, farmers, millers, and scientists, as we scrutinized USDA and FDA regulations to be certain we got the wheat we wanted for the restaurant, we saw the need for, and began to create, an alternative system, which was to become Community Grains.

We live in a good neighborhood. We're close to UC Berkeley with its biochemists and plant biologists, we know great cooks and bakers as well as innovative millers, our northern California community supports any project that results in better tasting, more healthful, more earth-friendly foods, and, most important, we are close to, and friends with, regenerative farmers for whom soil comes first.

The learning process we've begun is a complicated and fascinating one, ever reminding us how wonderful wheat is and how limitless the opportunities for advance.

TIME TESTED

It's hard to overstate the importance of wheat to Civilization — *as with no other food*, for many thousands of years, around the world, mankind has thrived on wheat.



We looked at historical references. It took us a while to learn just how fundamental wheat has been to the success of our species. We learned that half the calories of Europe, for thousands of years, came from wheat. Wheat's dominance in our history came about because of certain of wheat's unique qualities:

- It is highly adaptive to different climates.
- There are thousands of diverse wheat varieties, with different growing characteristics—drought tolerance, specific disease and pest resistance, etc.
- It is easy to grow.
- It stores well.
- Wheat has a remarkable range of health-giving components: vitamins, minerals, protein, fiber, and micronutrients. There are few foods that come close to carrying such a range and quantity of nutrients.

When one looks at the basic technological advances humans have made before and after the beginning of agriculture to make food bioavailable—fire, breeding, cultivation, milling, fermentation—wheat has been central to all of these. However, Western “civilized” societies have lost their knowledge of, and respect for, wheat's historical importance.

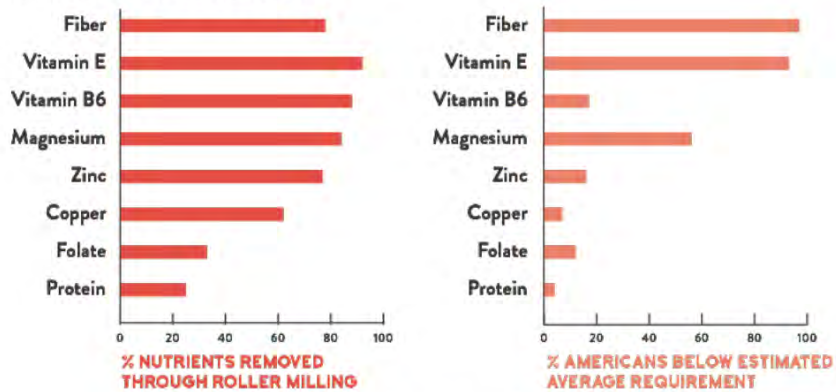
**BUT LATELY,
WE'VE MADE
SOME MISTAKES.**

We've lost the flavor,
nutrition and culture
of wheat.



Michael Pollan says that we went off track in the late 1800s with the introduction of the roller mill, which separates wheat's major component parts (germ, bran, and endosperm). With the change from stone milling to the roller mill, consumers developed a preference for, or were able to better afford and avail themselves of, the white, bland bread made from endosperm alone, and flour companies and bakers didn't have to worry about poor shelf life caused by the fats in the germ. The change to large roller mills went along with mechanization in the fields and railroads. Societies lost connection with their grain farmers, millers, and the foods their ancestors ate. We stopped supporting local farm economies. And whole populations lost their main source of nutrition. (Pollan cited a 2003 study by epidemiologists at the University of Minnesota showing that "the health benefits of whole grains cannot be completely explained in terms of nutrients we know the grains contain.... Either there are synergies at work among these nutrients, or there is some X-factor in whole grains that scientists have yet to identify." Fortunately, more and more, blandness is no longer in vogue.

LOW NUTRIENTS IN MILLED WHEAT CORRELATE WITH NUTRIENT DEFICIENCIES



Adapted from USDA Nutrient Database and NHANES 2001–2002

It is commonly thought that wheat does contain nutrients, but that those nutrients can be found in many other foods, making their loss in milling immaterial. The reality is that even if that were true, most people eat little or none of those other foods.

The above graph on the left represents eight important nutrients removed when wheat is refined. The graph to its right shows the percentage of Americans whose diets are largely deficient in those nutrients. Wheat comprises 20 to 30% of Americans' caloric intake. Even a modest change from refined to whole grain wheat consumption would improve public health by improving nutrition.

I've seen a presentation by Dr. David Killilea, biochemist at the Nutrition and Metabolism Center at Children's Hospital Research Institute—CHORI—and associated with UC Berkeley, that details an extensive array of micronutrients in wheat that are directly associated with human development and health. The eight nutrients in the graph are just a fraction of the story.

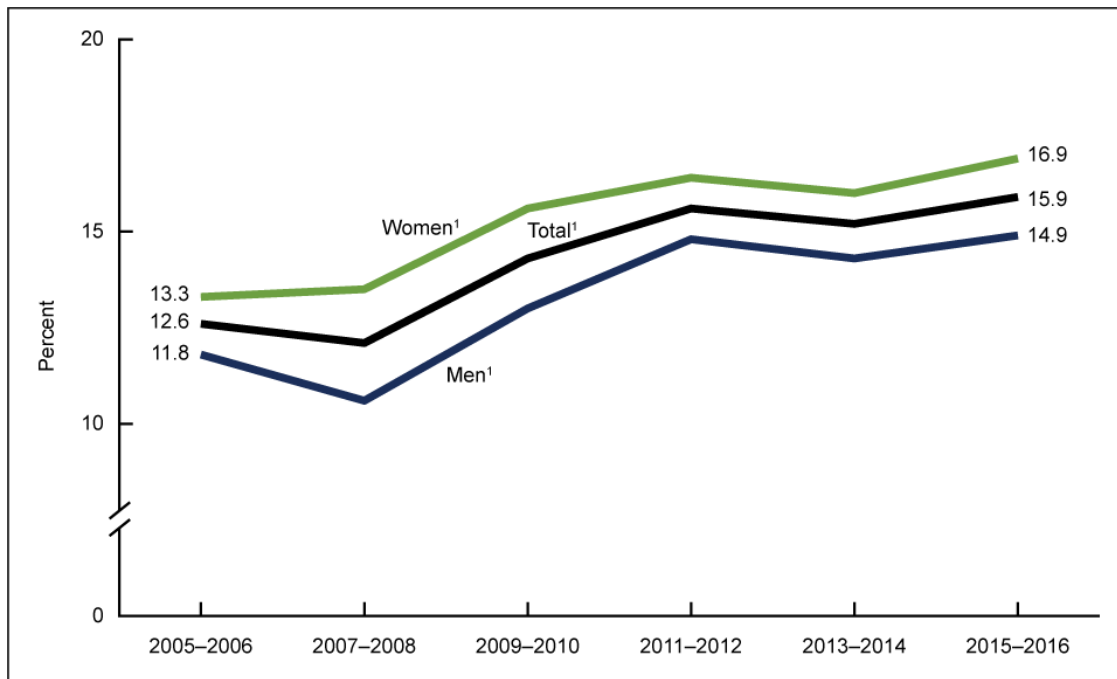
CURRENT WHOLE GRAIN USE IN U.S.

- Metrics are murky on whole grain consumption, but likely modestly up over the past decade.
- But certainly, the intent is there.
 - Growing interest in healthy eating
 - Confusion about healthy messaging
 - Growing distrust, greatest with younger populations



When I look at published data, I don't get a clear picture. Usually, the term "whole grain" is used without stating whether that refers to true whole wheat, or oats, or a processed grain. For example, a current CDC study finds the whole grain contribution to grain total consumption to be 15.9%, up 26% over the past 10 years. (However, such figures do clearly indicate a fast-growing interest in whole grain foods.)

Figure 4. Age-adjusted trends in the contribution of whole grains to total grains intake among adults aged 20 and over on a given day, by sex: United States, 2005–2006 through 2015–2016



¹Significant increasing linear trend from 2005–2006 through 2015–2016.

NOTES: Estimates were age adjusted by the direct method to the 2000 U.S. population using the age groups 20–39, 40–59, and 60 and over. Women were significantly different from men at all time points except 2015–2016. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db341_tables-508.pdf#4.

SOURCE: NCHS, National Health and Nutrition Examination Survey, 2005–2016.

Nevertheless, there is great confusion arising from a lack of accurate, widely available information about both product ingredients (which products offer what amount of true whole grains) and scientifically proven effects of true whole grain consumption on—and elimination of true whole grain consumption from—the body. And there's growing public distrust.

The International Food Information Council 2019 Survey contains some useful observations. These findings show a nexus of interest in environmental sustainability, healthfulness, transparency, and animal welfare that apply to various groups of people. From the report:

- Consumers struggle to know how to recognize sustainable sources.
- One in four consumers actively seeks health benefits from foods.
- “Food confidence” decreased 4% between 2018 and 2019.
- Fiber and whole grains are almost universally perceived as healthier foods.
- Millennials and Gen Z groups are the most distrustful.

For Community Grains, changing tastes to Whole Grain needs 3 things:

1. TRUST

- Metrics, good science
- Regulation
- Transparency:
23 Points of Identity
- Comprehensible new language, honest, not-misleading packaging
- Selling based on real values



Trust being the cornerstone of what we need to establish to move consumers toward eating healthier food, we need to make sure good science is behind information regarding true whole grains, and that scientific study results are made available and become widely disseminated to consumers. CHORI's Dr. Killilea has developed a test for whole-grain content in food products. By using a biomarker, wheat germ agglutinin (WGA), he has developed a means of precisely measuring how much germ is actually in any food sample. This may be the first such test for *actual* whole wheat content. He tested four national-brand flours labeled "whole-grain wheat" and seven national-brand pastas labeled "whole grain wheat." The results were consistently disappointing, and for most, shocking. The pastas measured in the range of just 10% wheat germ, 90% lower than what one would expect from products labeled 100% whole grain.

That means a consumer hoping to get their recommended three portions of whole grain a day would need 30 portions of that 10% pasta. It also means that consumers **have no way of knowing** the actual whole wheat content of a product, and that our labeling practices are

inaccurate and deceptive. The distrust our consumers have of us is well deserved.

When we talk to the press about the study, they want to talk about malfeasance—they want to know who the bad guy is. There certainly are bad guys, but it's not that simple. The media must accept their share of responsibility for this broken system. Unqualified doctors make irresponsible health claims based on observations they make in their practices. Books are published, and the media do no vetting. The theories make a splash, the media are happy, the doctors get rich, confusion and unhealthy trends follow. Later, more often than not, the claims are disproven. Confusion and distrust build.

It is essential to establish an accurate biochemical analysis of wheat food labeled “whole grain” or “whole wheat” at the point of completed processing...
...so consumers can make better-informed dietary choices,
...so research scientists can work from a universally accepted baseline definition of “whole grain” for population and epidemiological studies on the health effects of whole grain consumption, and they could strenuously criticize ALL unsubstantiated health theories,
...so manufacturers can offer whole grain foods with confidence, and
...so regulators will be motivated to develop accurate, enforceable labeling standards.

Transparency is vital for trust. At Community Grains, we've developed *23 Points of Identity* as our standard. We reveal every piece of the supply chain from the seeds and their source, to farm, land quality, soil development and tith, crop rotation, water use, milling and storage, dates of harvest and milling—everything. Standards for the policies are in place, but the overriding principle is transparency.

Such detailed information is beyond most consumers' interest, but the information is there for those who do want to know and for any journalist or influencer. And we stand behind it. Certifications are at times unreliable. But most people trust those who are resolute in being open and forthcoming.

Whole is an old word that goes back a thousand years. Its meaning is clear. It doesn't mean “fiber,” or 10% complete. *Whole* wheat is the kernel in its entirety. Ingested as such, the synergy of all of its component elements will continue to serve us as it has so well for millennia.

2. SCALE

- Zero-based mindset
- Smart Ag, bringing soil enrichment to scale
- Wheat grown as rotation crop



As Community Grains scales up, much of our plan for expanding production on the farm will take us to good organic farmers who see wheat as a promising cover crop and as a part of innovative crop rotation plans, as opposed to farmers who only grow wheat or grain. That will require some infrastructure, which we're underway in developing. There are 5 million acres of organic farmland in California, with far more that can be converted. And there are many good farmers out there practicing regenerative farming for the benefit of their land and our food, and providing carbon sequestration. The resulting collaboration represents a big home run.

From where I stand, looking through a novice's eyes at the huge industrial system that dominates worldwide wheat production, it is with humility that I state some observations and raise some questions. The current industry as a whole developed over a period of over 150 years, and became gigantic. Its size, and the economic interests of its constituents' shareholders, make change extremely problematic. But with expanding popular interest in soil quality and nutrient value, and the potential for developing a market for better food, if zero-based questions aren't being raised at the highest levels, now would seem a good time to start doing so.

When we began looking at wheat about ten years ago, I understood that good flour, among its other qualities, was consistent flour for the baker—the same from bag to bag. We assumed we'd have to blend wheat to meet that standard. Now, however, we're finding bakers—even production bakers—who are excited by variation, accepting the challenge and

tweaking formulations and baking methods, and creating deliciously successful breads. So we wonder what the cost of consistency is, and about its benefits. For the farm and the ecosystem, and the quality of our food, variation has substantial benefits.

A second observation: I hear organic farmers complain about the expense of the chicken manure needed to bring in wheat at a high enough protein level (13-15%) to meet bread makers' requirements. Currently, Community Grains farmers are sometimes bringing in wheat, grown on nutrient-rich soil and milled whole, with lower protein levels—sometimes below 10%. Many, if not most, of our bakers are accepting the flour, and finding their breads have better flavor and aroma, not to mention texture. We've worked with the California Wheat Commission, and they concur: **protein level doesn't measure the quality of the protein.** Protein measured in a standard wheat analysis designed for industry isn't helpful in predicting the quality of a whole-grain, long-fermented bread. Many winemakers like a low nitrogen, but nutrient rich soil because the nitrogen that promotes plant growth diminishes flavor components in the grapes. Presumably, high protein wheat, or added gluten, is needed to stand up to the high speed mixers of the industrial bread process. But you could ask, "What is the cost of fertilizer application, plus the diminished organic matter in the soil, and likely bread nutrition loss, compared with the cost of slowing down the mixers?"

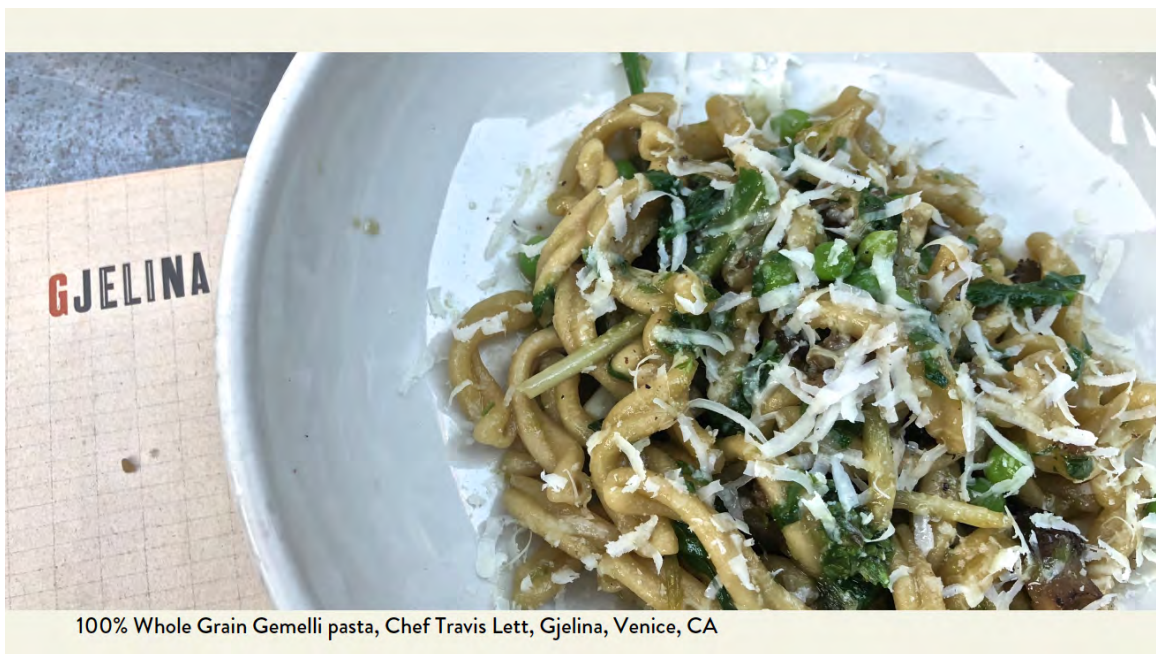
Whether my observations have validity in the complicated world of industrial baking I don't know, but questions such as these need to be asked, and surely the quality of our food needs to take a higher priority. We must ask ourselves if we want to be selling simply a bag of calories or a bag of nutrients.

3. DELICIOUSNESS

- The keys to the kingdom
- With expanded wheat palette, opening the door to new possibilities for talented chefs and bakers

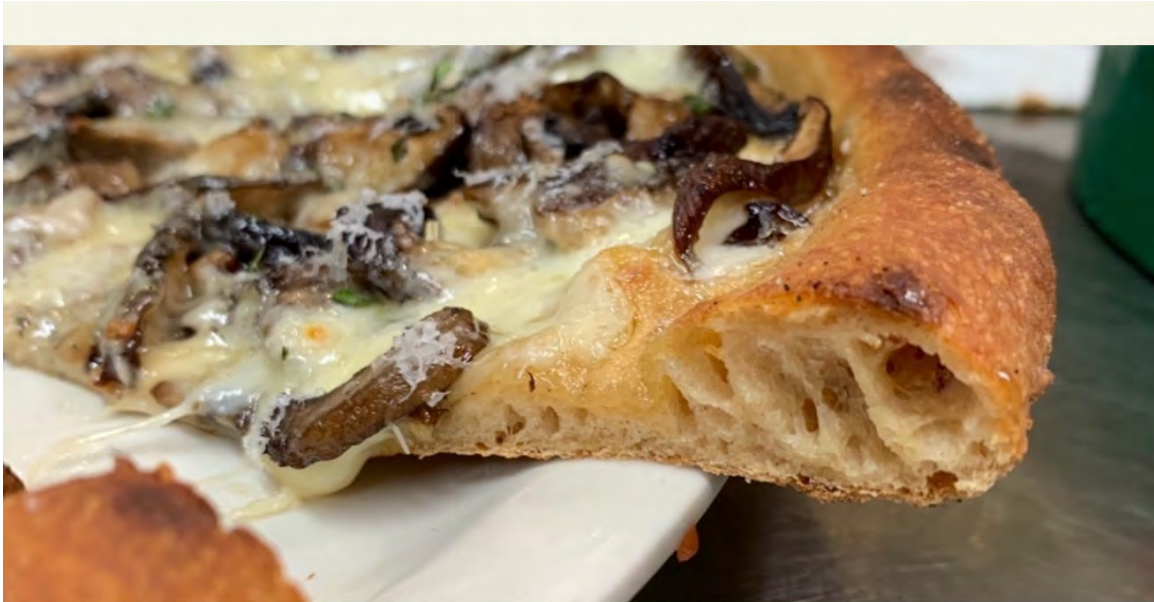


We Americans have a history, especially recently, of noted chefs creating foods that, over time, find their way to the grocery aisles and home kitchens. It is one way to expand palates and improve the nutrition of large audiences. We're working with some great chefs who are taking us in that direction.



100% Whole Grain Gemelli pasta, Chef Travis Lett, Gjelina, Venice, CA

—This is hard white wheat whole grain *gemelli* pasta from Gjelina in Venice Beach, California



100% Whole Grain pizza prototype, Chef Nancy Silverton, Moza, Los Angeles CA

—This is Nancy Silverton’s prototype whole grain pizza, from Moza, in LA. Justin Smillie at Upland in New York is also making a great whole grain pizza.



A

—And this is our bread.

The information on the bag is still a bit overwhelming, but generally we think it’s the right direction for labeling, with full information—23 Points of Identity. As the farmer, and the miller, and the baker, advance their methods, creating real value for consumers, it’s critical that we find ways to express those values so they can be compensated, and consumers have a chance to find the honest food they want. We’re very proud of this bread. Because of the

quality of wheat and milling, we can par-bake it 75%, freeze it, and ship it frozen to be baked off in stores as needed, cutting down on waste. It compares well with any fresh artisan bread, and it's a breakthrough for frozen bread.