



RESEARCH

# 2019 ANNUAL REPORT





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WHETHER FACILITATING VARIETY DEVELOPMENT, HELPING SECURE RESEARCH FUNDS THAT AID GROWERS IN AGRONOMIC DECISIONS, OR SUPPORTING NUTRITIONAL STUDIES, THE RESEARCH TEAM HAS BROUGHT MUCH-NEEDED CONTINUITY TO A ONCE FRAGMENTED PORTION OF OUR INDUSTRY.

~ Chris Hansen  
General Manager  
CSS Farms

If only growing potatoes were as effortless as this bucolic photo suggests...

## POTATOES USA RESEARCH

### [ WHO WE ARE ]

With more than 2,500 potato growers, a host of field specialists and scientists scattered coast-to-coast, countless processing facilities, and myriad extension offices, **the potato industry is a powerful yet sprawling system.** While there is no shortage of academic and agronomic knowledge, nor private sector innovation, to fuel research on potato production, there is, however, a real risk that all these moving parts operate independently of one another, leading to siloed rather than synergistic efforts in potato research and development (R&D).

This is where Potatoes USA Research steps in to fill a vital role as **catalyst and connector** – creating **key partnerships**, consolidating **common resources**, and **concentrating attention** on pressing, industry-wide concerns that can be resolved through research-based methods. What emerges, in the end, is a more cohesive network – a network capable of accelerating progress that positions potatoes, among specialty crops and commodities, as a leader in measures as diverse as consumer health and new cultivar research.

Our team's **multi-pronged model** consists of **strategic advising**, **team coordination**, and **experimental studies** that address every major market segment and growing region.

Like the rest of Potatoes USA, the Research team relies on a steady stream of input and involvement from growers, processors, scientists, and consultants, all of whom spend significant time and money to ensure potato research stays on the cutting edge.



# 2019

## [ IN SHORT ]

**Further headway in fighting priority issues & enhancing industry competitiveness**

### **The Potato Research Advisory Committee**

The Potato Research Advisory Committee, better known as PRAC, entered the picture in 2016 with the goal of amplifying the industry's voice in agricultural R&D funding.

This year, once again, underscored the committee's value as new research studies garnered funding and endorsement.

### **The National Chip Program**

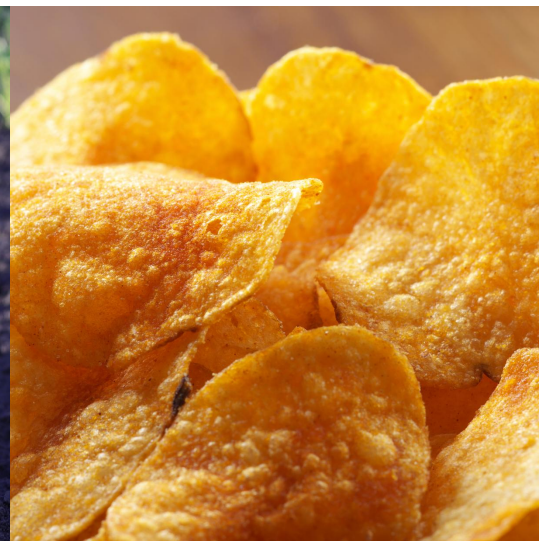
The National Chip Program (NCP) continues to generate high-performing clones with regularity. Graduates of the program, such as Lamoka, remain perennially popular varieties for their reliability and versatility.

Along with stress testing new potato cultivars in 2019, the NCP continued to lead the charge in tackling tough issues like stem-end defect, heat necrosis, and glycoalkaloids.

### **The National Fry Processor Trials**

Serving in a similar capacity as the National Chip Program, the National Fry Processors Trials (NFPT) kept up its track record of conducting mission-critical variety development analysis with participation from companies, growers, and state associations.

Despite harsh weather at trial sites at the close of 2019, the NFPT pushed several promising clones closer to commercialization.



**THE GROUP OPERATES WITH AMAZING OPENNESS  
AND OBJECTIVITY TO JOINTLY ARRIVE AT  
CONCLUSIONS.**

**~ Donavon Johnson**

President, Northern Plains Potato Growers Association



# THE POTATO RESEARCH ADVISORY COMMITTEE

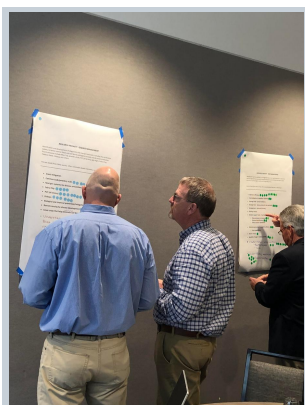
## [ PRAC ]

### Positioning potatoes at the leading edge of agriculture

The Potato Research Advisory Committee (PRAC) acts as the focal lens for the U.S. potato industry, aligning the diverse research goals of different stakeholders – from state and national grower organizations to academic institutions, food companies, and consumers. Since its founding in 2016, PRAC has been pivotal in earning additional grant dollars for projects aimed at addressing priority issues.

Run by 14 members, but bolstered by the voluntary contributions of many others, PRAC draws its strength from an open governance structure and a unique blend of science and business savvy. These qualities make PRAC an important, recognized ally for researchers seeking funding.

In 2019, PRAC ultimately elected to endorse three projects that look well-positioned to drive step-change in advanced breeding, pest control, and disease prevention.



*PRAC draws up new ideas at the 2020 D.C. Fly-In*

“  
BECAUSE OF PRAC,  
I CAN DIRECT MY  
RESEARCH TO BETTER  
SERVE GROWERS.

~ Amy Charkowski  
Plant Pathology &  
Department Head,  
Colorado State  
University



**Eric Schroeder (co-chair)**  
Schroeder Brothers Farms, WI

**Chris Hansen (co-chair)**  
CSS Farms, NY



**Mike Larsen**  
Mart Produce, ID

**Tom Enander**  
Enander Seed Farm, ND

**Bryan Jones**  
Riverdale Potato Farms, FL

**Peter Imle**  
Pine Lake Wild Rice, MN

**Chris Voigt**  
Washington State  
Potato Commission

**Tamas Houlihan**  
Wisconsin Potato Growers

**Pat Kole**  
Idaho Potato Commission

**Mike Wenkel**  
National Potato Council

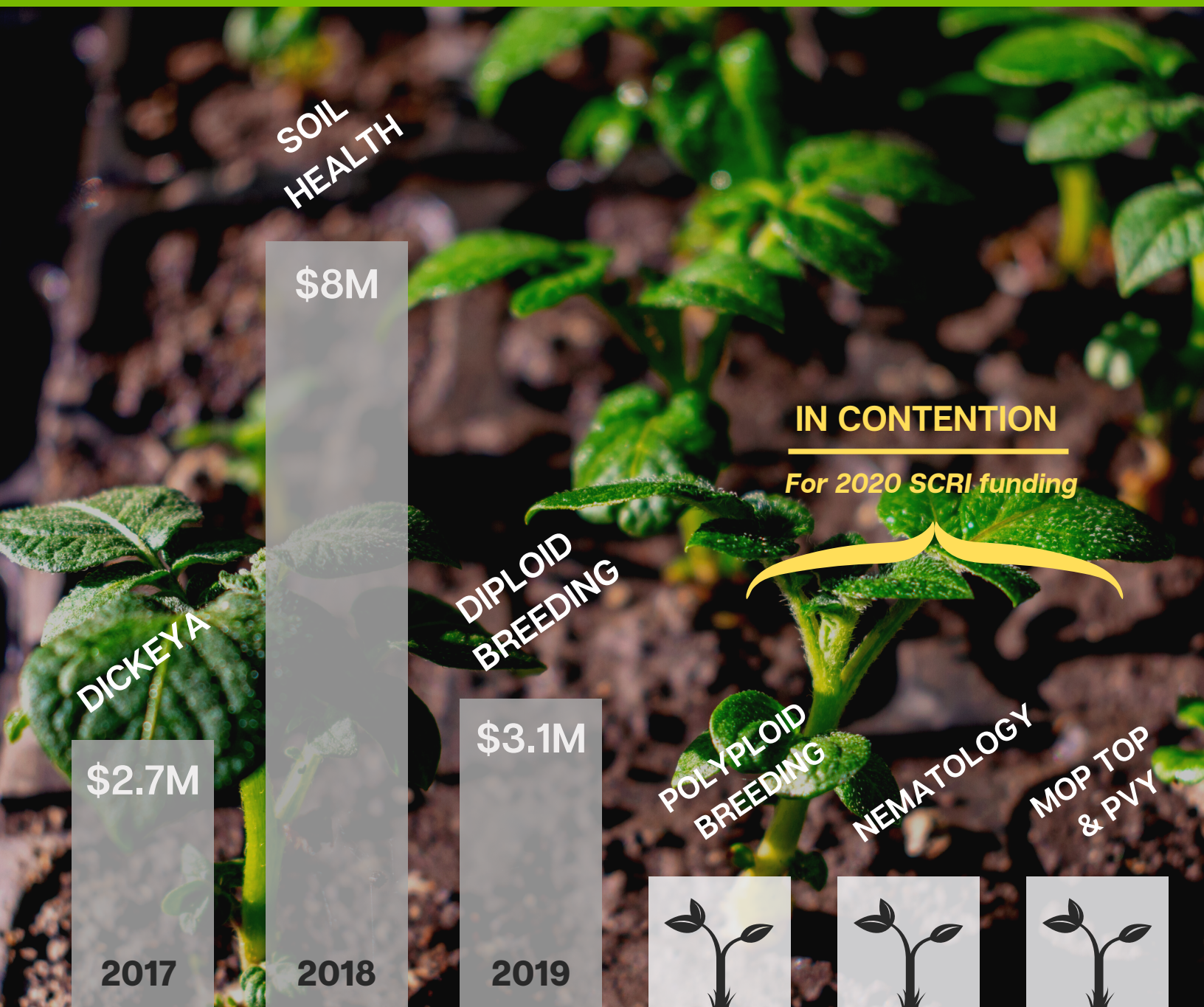
**Mark Otto**  
Agri-Business Consultants, MI

**Doug Messick**  
Spud Grower Farms, CO

**Heath Gimmestad**  
Friehe Farms, WA

**RJ Andrus**  
Idahoan Foods, ID





## PRAC [ SEEDS OF INNOVATION ]

### Building the case for sustained investment in potato R&D

Often, all that an industry needs to gain increased recognition is a seasoned and articulate spokesperson – a role that PRAC has capably held over the past four years. Marrying the technical depth of the research community with the ground-level knowledge of growers has given the potato industry a measurable edge, as evident in the more than \$17 million in Specialty Crop Research Initiative (SCRI) dollars that spuds have seen in the years following the committee's inception.

In 2019, PRAC published communication materials on a diploid breeding project led by Drs. Jeff Endelman, Shelley Jansky, and Paul Bethke, and complemented by a large supporting team. It also mustered support for new projects focused on tackling key questions around polyploidy, nematodes, and PMTV/PVY. All three proposals progressed through the first round of SCRI review in early 2020.

100 +



Support letters  
written

#### 2019 HIGHLIGHTS

3/3



New proposals  
advanced



# PRAC [ 2019 PROJECT HIGHLIGHTS ]

What kind of research does PRAC seek out and support? The kind that forges fearlessly into the unknown, blazing new frontiers in science and technology



**A cadre of veteran scientists is hard at work simplifying the potato genome to speed up breeding and ultimately bring better varieties to market.**

*Learn more: <https://potatov2.github.io/>*

## DIPLOID BREEDING

*2018 PRAC-endorsed*



Dr. Jeff Endelman (project director), along with Drs. David Douches and Shelley Jansky (co-directors), are leading the effort to develop and scale a breeding system for diploid hybrid potatoes, drawing on insights from existing potato varieties



**Researchers, industry members, and collaborators working across 10 states are spearheading a sweeping study into the science, management, and economics of soil health in potato production.**

*Learn more: <https://potatosoilhealth.cfans.umn.edu/>*

## SOIL HEALTH

*2017 PRAC-endorsed*



Established a national platform to identify microbial, chemical, and physical indicators for soil health



Standardized experimental protocol and soil sampling methodology deployed across 37 sites



Comprehensive grower/industry survey tool drafted



**A national research team directed by Dr. Amy Charkowski continues to delve into the detection and mitigation of a destructive potato disease.**

## DICKEYA

*2016 PRAC-endorsed*



Completion of multi-state field trials assessing crop losses



Publication of Dickeya PCR tests, development of additional primers for Pectobacterium, and identification of blackleg-resistant wild genes



# THE NATIONAL FRY PROCESSOR TRIALS

THE NFPT TRULY GIVES U.S. POTATO CLONES A COMPETITIVE ADVANTAGE AS A RESULT OF THE QUANTITY AND QUALITY OF DATA THAT ACCOMPANIES ITS RELEASE.

~ Tina Brandt  
Variety Development  
Manager, J.R. Simplot Co.



## [ NFPT ]

In pursuit of  
the perfect fry

Thanks to its multi-tiered trialing process, the National Fry Processor Trials has offered up increasingly refined and robust candidates year after year. In hindsight, 2019 was a continuation of this trend. The NFPT Steering Committee unanimously voted to accept every single Tier 1 candidate submitted by breeders in January. Buttressing this year's strong variety candidate pool were new, powerful upgrades to Medius Ag's Variety Database Management platform and substantial progress in Jeff Endelman's genetic marker analysis; over the year, he successfully fingerprinted more than 130 NFPT clones.

Arguably, the year's greatest milestone arrived in December with the formal stamp of approval on a procedure to import Pacific Northwest seed into Maine. To address the state's phytosanitary requirements, Potatoes USA assembled a task force and crafted a strategy for raising germplasm in a soil-less environment, greatly minimizing the risk of disease. The cost-effective methodology carefully devised by the Potatoes USA Maine Seed Access Working Group will strengthen the breadth and depth of NFPT trial data and accelerate the development of new varieties adapted to the Northeast climate.

Cavendish  
Lamb Weston

McCain  
Simplot

◀ PARTNERS ▶

Idaho  
Maine  
NPPGA

Oregon  
Washington  
Wisconsin

### THE ELEMENTS OF AN NFPT VARIETY



#### FIELD READINESS

Exceptional yield with optimum tuber shape, size, and biochemical attributes



#### STRESS TOLERANCE

Resistance to abiotic and biotic pressures



#### PROCESSING PERFORMANCE

Attributes like strong solids that are tailor-made for the processing plant



#### SENSORY QUALITIES

QSR acceptance and top-notch consumer hedonics



# THE NATIONAL CHIP PROGRAM

**[ NCP ]** Big goals edge closer to being in the bag



From strengthening the Variety Database Management (VDM) platform to streamlining budgets and contracts, success in the National Chip Program took many shapes and forms in 2019.

While multiple candidates demonstrated promise in trials over the past months, the example of NC470-3, a high-yielding, disease resistant clone out of North Carolina State's breeding program, is emblematic of the NCP's effective and participatory approach. All it took was a short phone call between growers, scientists, and Potatoes USA staff to shift this variety into Fast Track, where it will receive accelerated testing.

The Chip Program's agile and cost-effective architecture – increasingly essential in today's rapidly moving world – further proved its mettle at multiple points throughout the year. For instance, we made a swift yet strategic decision to downgrade a variety from Fast Track to Mini Fast-Track status (amounting to a cutback of approximately 10,000 mini tubers) to reduce extraneous costs.



Better Made  
Campbell's  
Herr's

Middleswarth  
Shearer's  
SNAC

• Utz

◀ **PARTNERS** ▶

• USDA-ARS

• 17+  
Universities

THE COMPARISONS THAT COME OUT OF THE TRIALS PUT A SPOTLIGHT ON THE BEST NEW VARIETIES. I HAVE BEEN IMPRESSED WITH THE AMOUNT OF INFORMATION AND SYNCHRONIZATION THAT THE PROGRAM BRINGS FROM A NATIONAL LEVEL.



~Kelly Turner  
Executive Director,  
Michigan Potato Industry Commission





# NCP VARIETIES

## [SEED ACREAGE]

### Continuous improvement: the crucial ingredient

Real-world learning informs our iterative research and development process. We know that small plot trials and small batch cooking don't offer an accurate picture of how a variety will perform, so we put candidates through their paces *at scale*: in the fields of commercial farms and the fry lines of large chip plants.

### If a picture is worth a thousand words...

U.S. seed charts – showing the increasing appeal of varieties like Lamoka and Manistee – speak volumes about the caliber of clones that come out of the National Chip Program.

#### THE MAKINGS OF MARKET-LEADING CHIPS



#### AGRONOMICS

Yield, maturity,  
stress tolerance



#### DISEASE

Broad-spectrum resistance  
(Blight, scab, PVY, PCN, etc.)



#### STORAGE

Cold sweetening  
resistance



#### PROCESSING

Optimal tuber shape, size,  
color, specific gravity

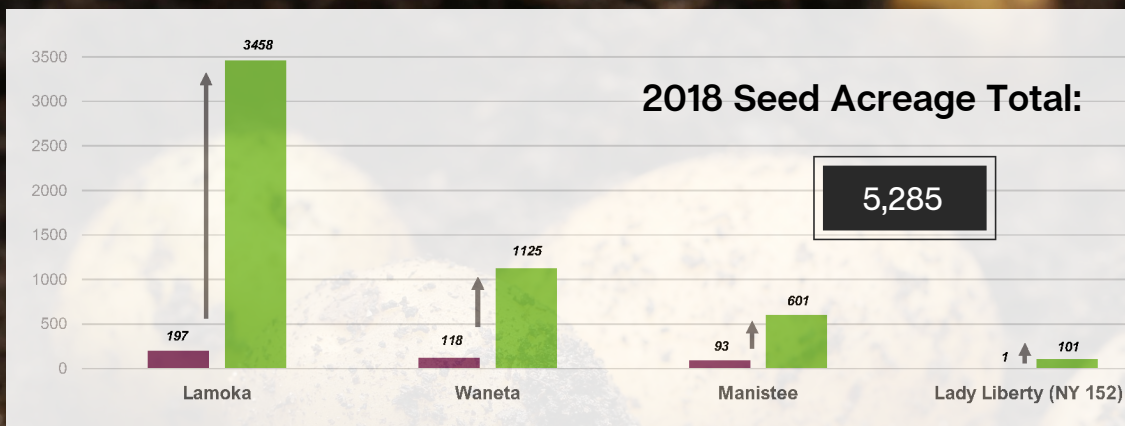


#### CONSUMER

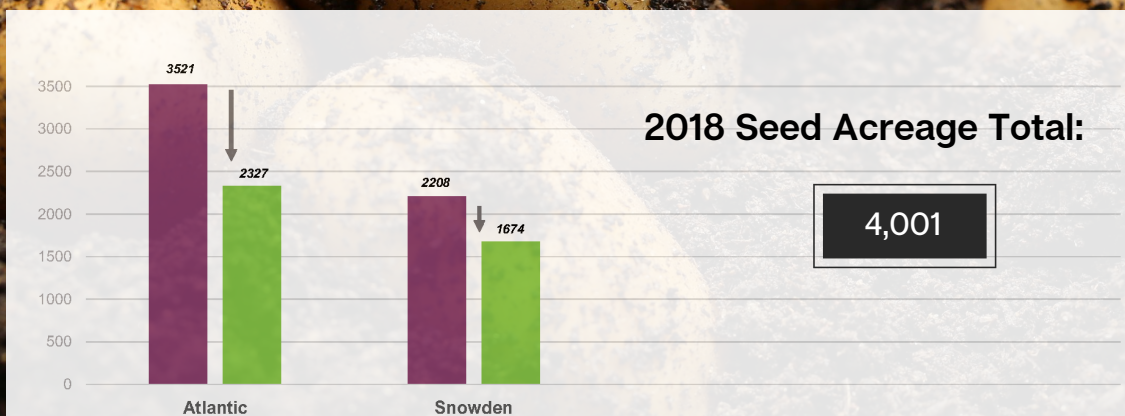
Taste, texture, appearance



### THE NEW STANDARDS



### THE OLD STANDARDS



Charts depict certified seed acreage data, reported by individual states and aggregated nationally. Time range represented: 2012-2014 (purple columns) to 2018 (green columns).



# COLLABORATORS

## [ COLLECTIVE IMPACT | COAST TO COAST ]

We are fortunate to have many of the nation's best plant breeders, agronomists, potato specialists, commercial growers, and food processors as our partners

### UNIVERSITIES

Colorado State University  
Cornell University  
University of Florida  
University of Idaho  
University of Maine  
Michigan State University  
University of Minnesota  
New Mexico State University  
North Carolina State University  
North Dakota State University  
Oregon State University  
Texas A&M University  
University of Wisconsin

### COMPANIES

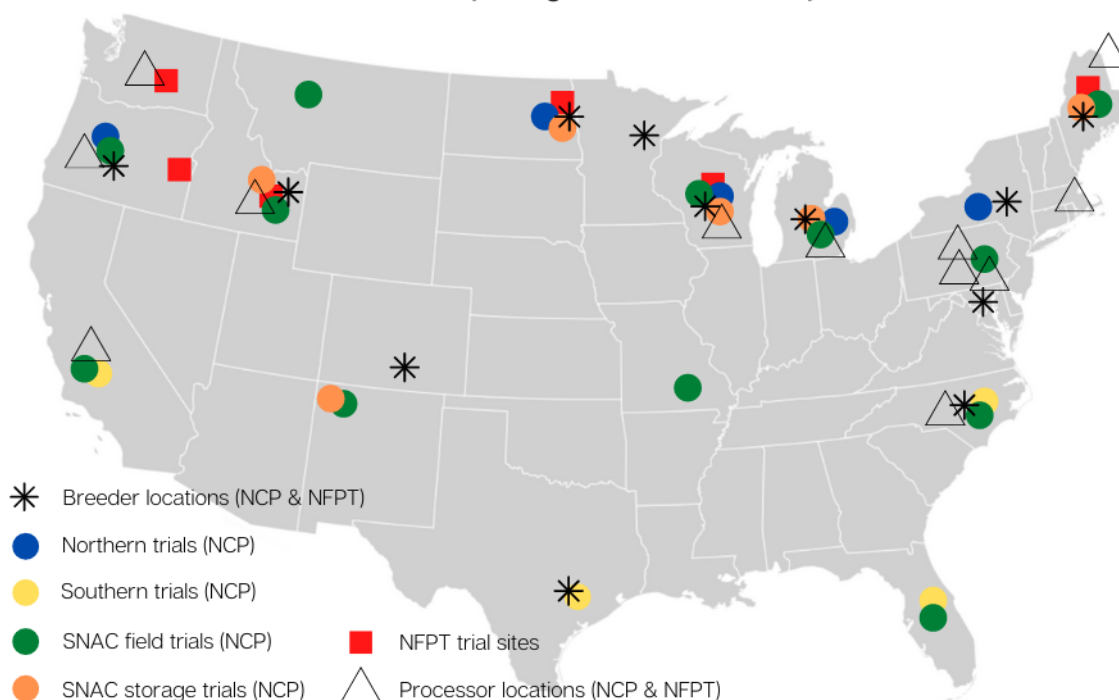
Better Made  
Campbell's Snacks  
Cavendish Farms  
Eurofins  
Herr's  
J.R. Simplot  
Lamb Weston  
McCain Foods  
Middleswarth  
Shearer's  
SNAC International  
Techmark  
Utz

### ASSOCIATIONS

Idaho Potato Commission  
Maine Potato Board  
Michigan Potato Industry Commission  
Northern Plains Potato Growers (NPPGA)  
Oregon State Potato Commission  
PA Co-operative Potato Growers  
USDA-ARS  
Washington State Potato Commission  
Wisconsin Potato Growers

## [ POTATOES USA RESEARCH NETWORK ]

National Chip Program & National Fry Processor Trials





# THE TEAM

## RESEARCH COMMITTEE

**Eric Schroeder (Chair)**  
*Schroeder Brothers Farms*

**Mike Larsen**  
*Mart Produce*

**Tom Enander**  
*Enander Seed Farm*

**Chris Hansen (Chair)**  
*CSS Farms*

**Jared Smith**  
*Three S Ranch*



**Bryan Jones**  
*Riverdale Potato Farms*

**Jennifer Borowicz**  
*Hapka Farms*

## CHIP COMMITTEE

**Tyler Backemeyer (Chair)**  
*CSS Farms*

**Jake Lake**  
*Campbell's Snacks*

**Mike Behrendt**  
*Black Gold Farms*

**Alan Jones (Chair)**  
*Jones Potato Farm*

**Jim Allan**  
*Shearer's*

**Phil Gusmano**  
*Better Made*

**Brian Sackett**  
*Sackett Potatoes*

**Jim Fitzgerald**  
*Utz*

**Tom Prasalowicz**  
*Heartland Farms*

## FRY COMMITTEE

**Andrew Thompson**  
*Cavendish Farms*

**Jennifer Borowicz**  
*Hapka Farms*

**Tom Drader**  
*Lamb Weston*

**Chris Voigt**  
*Washington State  
Potato Commission*

**Jolyn Rasmussen**  
*Simplot*

**Tom Salaiz**  
*McCain Foods*

**Gary Hawkins**  
*McCain Foods*

**Tina Brandt**  
*Simplot*

**Travis Blacker**  
*Idaho Potato  
Commission*

**Gary Roth**  
*Oregon Potato Commission*

**Tom Drader**  
*Lamb Weston*

## POTATOES USA STAFF

**John Lundeen**  
*Director of Research*

**Ben Harris**  
*Research Associate Manager*

## CONSULTANTS

**Brad Halladay**  
*Medius Ag*

**Charlie Higgins**  
*Agronomist*

**Chris Long**  
*Potato Specialist*

**Ryan Krabill**  
*Ascent Agriculture*



# LOOKING AHEAD

## [ 2020 & BEYOND ]

What the future of farming looks like is far from set in stone (or soil). Will agricultural drones be a common sight in the skies? Can we expect the consumer to embrace gene editing? Many of these questions remain up for debate and unlikely to be settled anytime soon. One thing is for certain, though: potatoes should feature prominently in this future food system – we'll make sure of it.

As our organization continues to work to increase demand for U.S. potatoes all around the world, we're committed to helping growers raise up America's favorite vegetable in a manner that is profitable (first and foremost), as well as environmentally sustainable and ultimately supportive of the social fabric of farming communities. We will always welcome your ideas on how to ensure this vision becomes a reality.

IDENTIFYING RESEARCH ISSUES THAT WE HAVE IN  
COMMON AND GETTING SUPPORT COLLECTIVELY IS  
IMPORTANT. IF WE WANT TO BE BETTER TOMORROW,  
WE NEED TO IMPROVE CONTINUOUSLY.

~ Mike Larsen  
General Manager, Mart Potato

”

Potatoes<sup>®</sup>  
USA

We'd like to recognize and thank those whose terms of service with Potatoes USA Research completed in 2019:

Alan Jones, Bryan Jones, Doug Messick, Eric Schroeder, RJ Andrus, Ryan Krabill, and Tom Enander