

MTP2

Roots kitchen & cannery



Employer / Co founder :

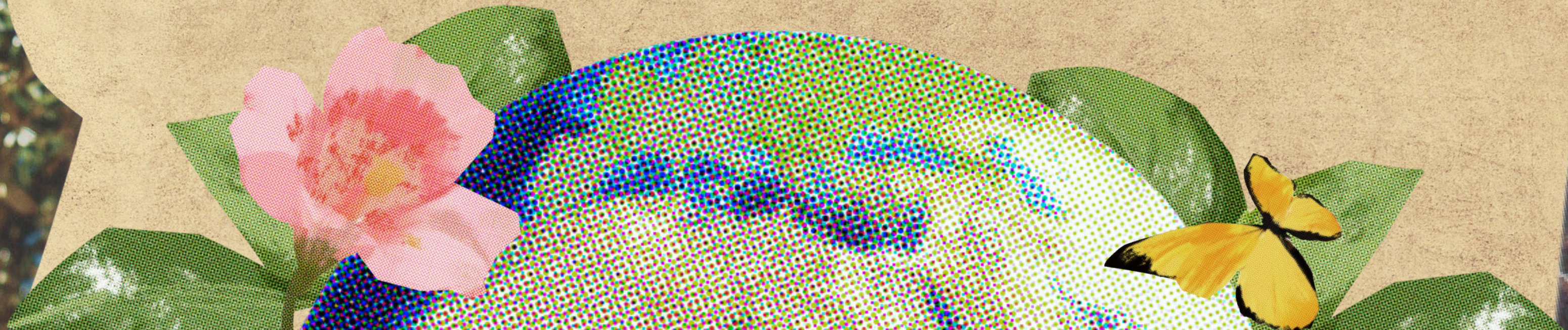
- Patrick Burr

Intern :

- Karen Nunez Michel
Industrial Management Systems Engineering

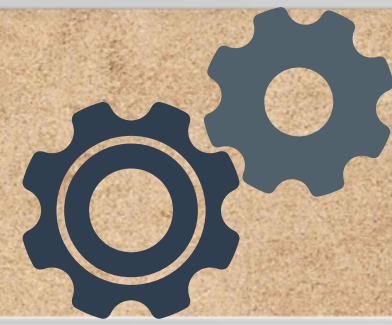
Advisors :

- Jennifer Grossenbacher
Director, Montana Pollution Prevention Program (MTP2)
- Alistair Stewart
Senior Business Advisor, Montana Manufacturing Extension Center

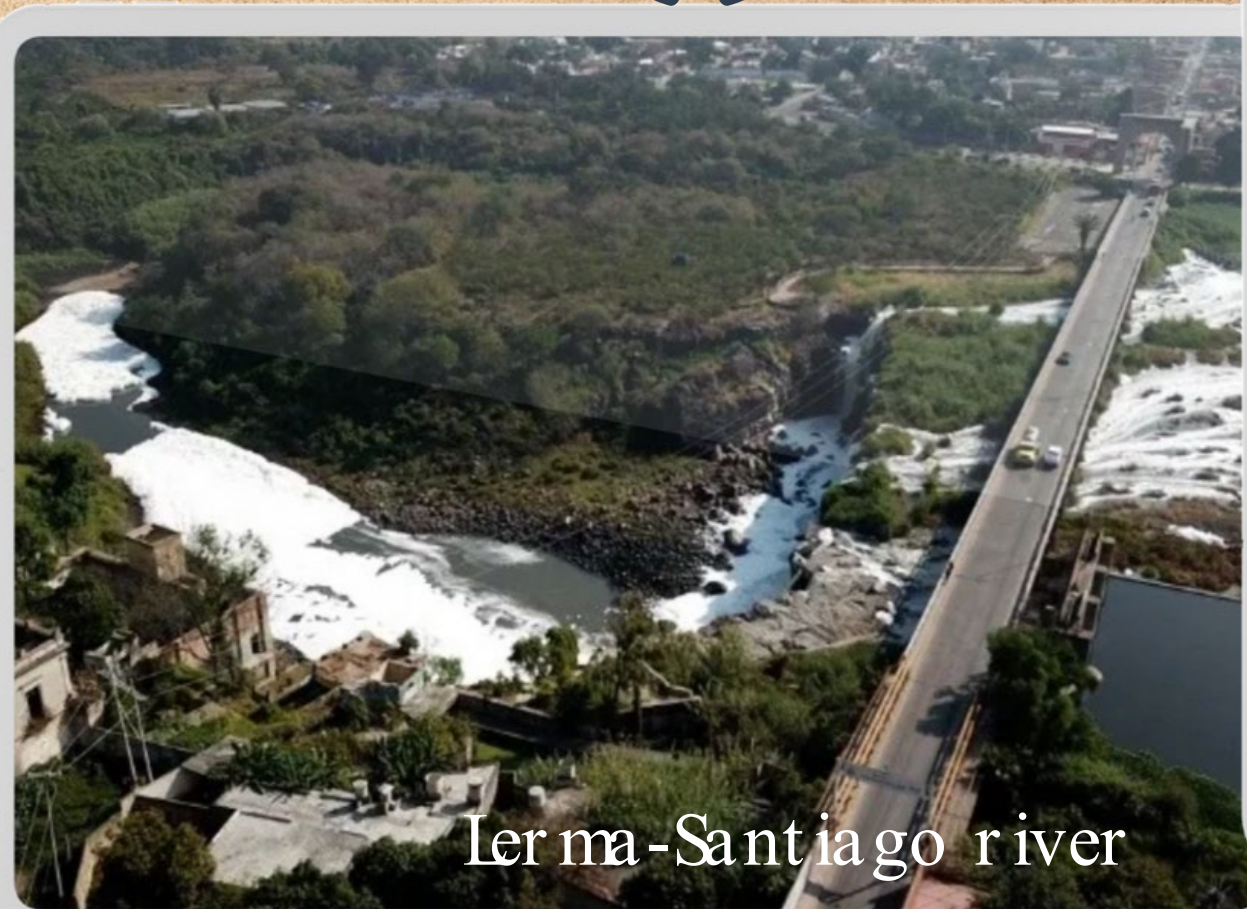




Guadalajara, Mexico



Industrial Management systems engineering



Lerma-Santiago river



PIERCE COLLEGE

April 2020 - June 2022

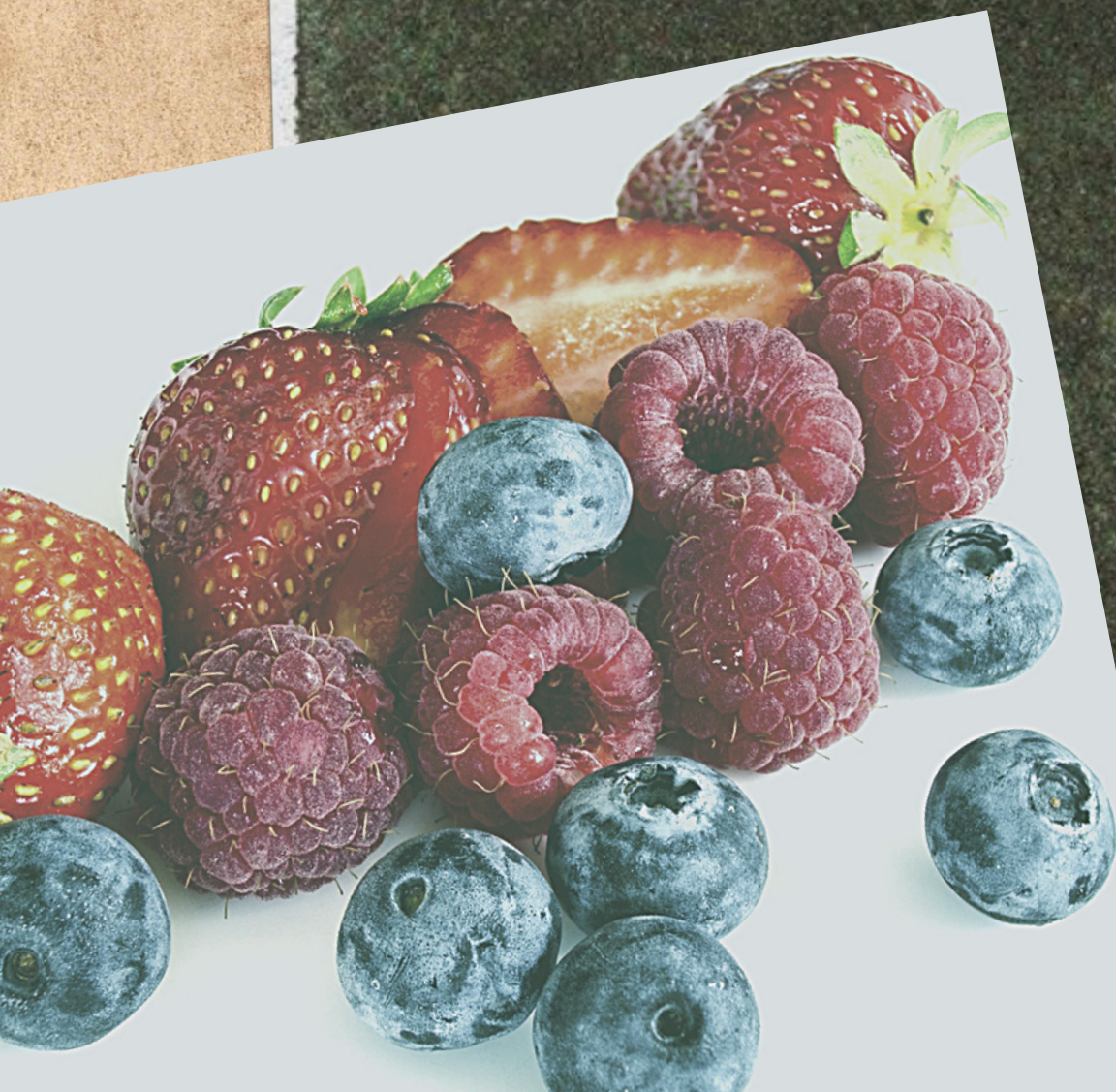
Significance



- This business is in the food industry, specifically in the market for pickles and preserves.
- They source their ingredients for pickle production seasonally from local farmers, which impacts the economic development for the region.
- Preserves require water and energy, generating CO2 emissions.

Berries:

- Require energy-intensive production methods to process them year-round
 - Use of refrigeration/freezer as preservation methods to store them for several months



"Over 98% of the food manufacturers in the US are small businesses (<500 employees). However, four firms or fewer controlled at least 50% of the market for 79% of the groceries. For small businesses that rely more on labor and have fewer automation resources, lean manufacturing is crucial to optimize their operation and enhance opportunities to scale up."

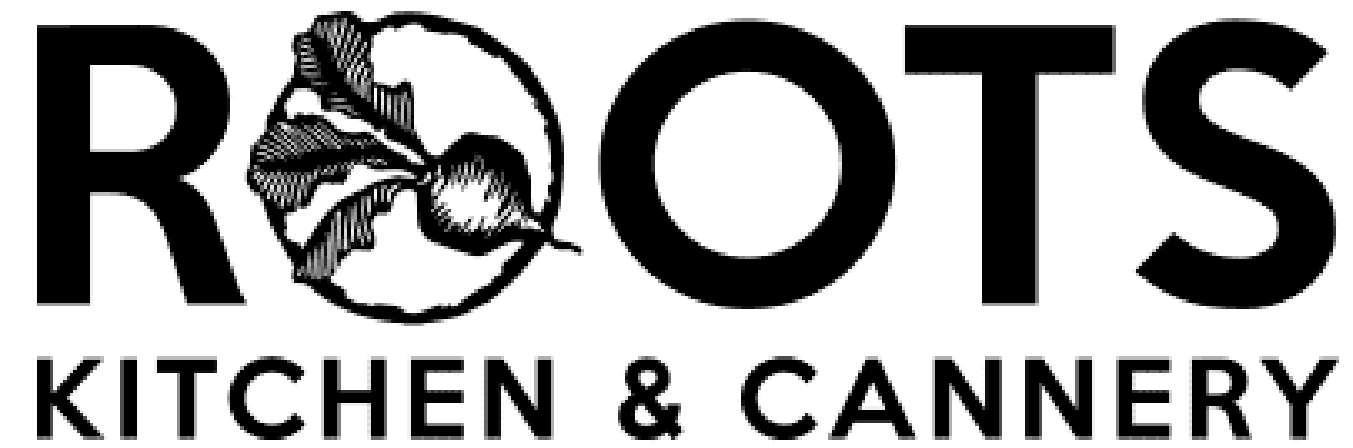


Company intro

Roots Kitchen & Cannery was founded in 2012. It originally evolved out of a simple booth at the farmer's market in Jackson Hole, Wyoming. Founder Orion Bellorado then teamed up with Patrick Burr, & eventually the third member, Willi Brooks, joined the company in 2014.

Expressed interest/challenges in P2:

- To examine ways to improve their in
- To transition to other recipes using the preserving processes.
- To switch to automation in the current operations.

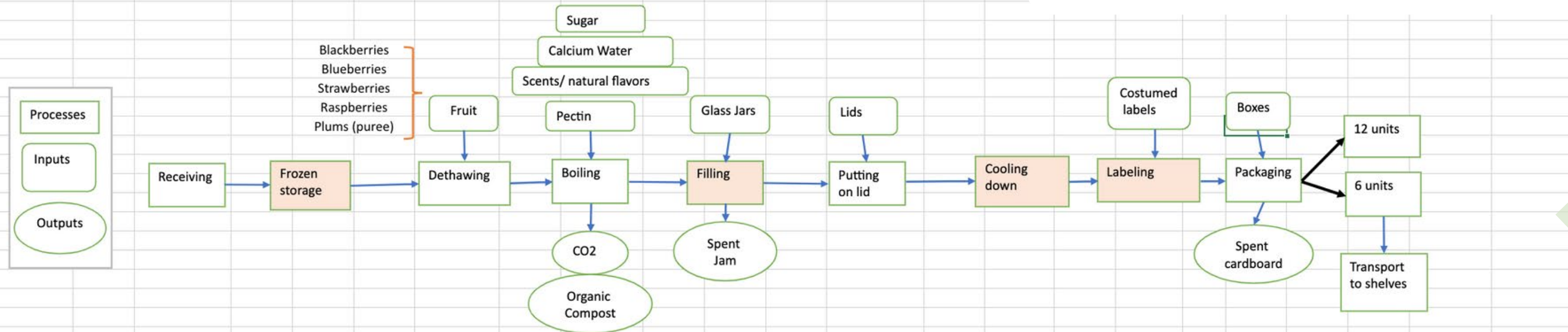


Current product manufactured at a facility in Belgrade, MT.
Market: wholesale & retail



value stream map

"Preserves Production" - Current State Value Stream Map



- CO2 per pound of jam
~1.86 lbs
- Total cycle time per batch
4hrs

Uptime				1 hr - 1.5 hr	1 hr	1/2 hr				
CIPs (Clean in Place)					3-5 sec					Bleach @ end of production
Unplanned downtime							30-40 min			
Yield				40 Gallons	(270 gr/jar) ~ 600 - 690 units					
Batch Size				40 Gallons						40 Gallons (16 batches/mo)
Cycle Time	3 mo	3 mo	12 hr	1 hr - 1.5 hr	1 hr	1/2 hr	1/2 hr	1/2 hr	5-10 min	
Energy Used		3475.91kW/mo 4.76kWh		29.3kWh	17kWh	0.075 kWh				10427.73 + 43.95 + 17 + 0.0375 ~ 10488.7 kW/batch
CO2		9945 lb/mo 4.54lb/hr		27.9 lb/hr	16.2lb/hr					29835 + 41.85 + 16.2 ~622.77lb / batch ~1.86lb of CO2 / lb of jam ~ 29893.05lb/3mo
Quality				Continuous temp. check	3 sec/item (leaks)				(sealed) 5 sec	



Identified P2 areas of focus



Lean practices

- Automatization in the cooling & labeling process.
- Improve the flow of product.



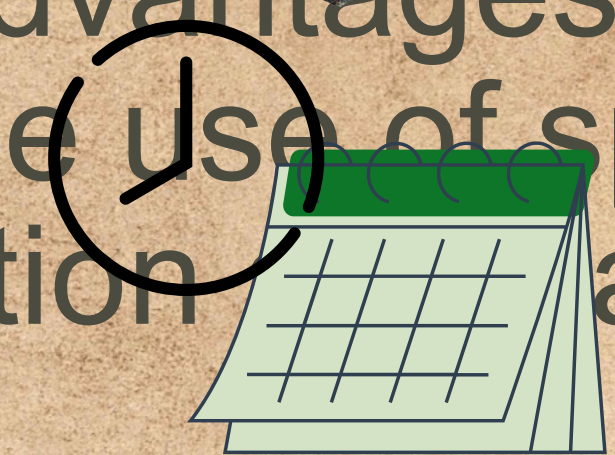
Management Inventory Systems

- Establish a stable system with the use of technology to control risks, cash and time.



Reducing costs and environmental impact

- Conduct a preliminary trial to evaluate the advantages production & warehouse layout improving the use of space
- Obtain data on cycle times with new production



5S Practices

Work instructions

proposed solutions

ROOTS KITCHEN & CANNERY

PACKAGING

MATERIALS

- Cases of product (A)
- Boxes (B)
- Recycled cardboard (C)
- Packing paper (D)
- Tape (E)

WHOLESALE FULFILLMENT

This task involves some motor control and self-checking quality control.

ROOTS KITCHEN & CANNERY

INVENTORY

SOURCING THROUGH INVENTORY

This task involves the use of a manual forklift and precise motor control.

PROCEDURE

- Bring into the storage room the utility cart with the batch load of product.
- Make sure that the pallet and the forks are aligned.
- Using the lift control, the foot pump, set the forks to the desired level aligning them to the pallet.
- Move forward the utility cart making sure that the forks are inserted into the pallet.



systematic layout planning



www.rootsk

P2 outcomes

Recommended Actions	Annual reductions	Annual savings	Barrier to implement	Plans to Implement within 5 years?
Automatization for the filling and labeling processes	50% reduction in CO2 by doubling the amount of batches during production throughout the week	TBD	Equipment consultation in process.	Y
5S and Lean practices implementation	Reduction of unplanned downtime.	TBD	Future workforce training	Y
TPM	Reduction of unplanned downtime caused by equipment failure.	TBD	Equipment consultation in process.	Y



Reflections/recommendations

- Personal learning: Lean practices and 5S are essential for manufacturing throughout all stages of the process. An organized workspace helps to fulfill the requirements in a labor intensive way, administrating times and increasing productivity.
- Recommendations for future P2 interns and take notes on every detail that goes on every step of the process. Ask all types of questions, that's where the learning happens while identifying P2 opportunity areas.
- Recommendations for P2 activities and instructions: Having a tour of the business/facility at the beginning of training will help the interns to start while learning about P2 practices.

Acknowledgments

- Land acknowledgment Montana State University located upon the homeland of indigenous peoples with proud heritage, a vibrant present, and a bright future. We acknowledge the Assiniboin, Blackfeet, Chippewa, Crow, Gros Ventre, Kootenai, Little Shell, Northern Cheyenne, Pend' Oreille, Plains Cree, Salish, Sioux, Hidatsa, Mandan, Arikara and the other indigenous nations of this region in the past, present, and future. We recognize that this rich human tapestry is central to our institutional mission of learning, discovery, and engagement.
- Funding: Environmental Protection Agency





thank you