

# Leaving It Better Than I Found It<sup>1</sup>

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## ABSTRACT

For Idaho wheat producers, sustainable agriculture includes conservation of natural habitat, rehabilitation of soils, protection of streams and waterways, and increasing wildlife populations. It means adopting management practices that prevent flooding, air pollution, erosion of topsoils, and the loss of soil fertility. At the same time, these practices must be achieved in ways that sustain the profitability of farm operations. Three Idaho wheat producers share their stories of how they have tackled these challenges on their farms and in their communities as they address field burning, profitable cover cropping, and aquifer recharge.

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The meaning of “sustainability” depends on where you are standing. Overlooking an Idaho grain field at harvest time, the word “sustainability” covers as much ground as a combine harvesting a 150 bu/acre crop of wheat. It includes conservation of natural habitat, rehabilitation of soils, protection of streams and waterways, and increasing wildlife populations. It means adopting management practices that prevent flooding, air pollution, erosion of topsoils, and the loss of soil fertility. These are all part of sustainable farming, and they must be achieved in ways that also sustain the profitability of farm operations. When farming becomes unprofitable, farm families seek other occupations. Over the last century, 4.8 million family farms have ceased to exist because farming could no longer sustain a family (13). Today, farmers make up less than 2% of the U.S. population. Yet that 2% produces enough food, fiber, and fuel to export 50% of their output to meet the needs of families across the globe. Remaining profitable and adopting sustainable, innovative production practices preserves the opportunity to farm for the next generation. In this article, three Idaho grain farmers tell us what they are doing to leave their land and the environment in better condition for the next generation than the condition in which they received it.

## Cover Crops, Cattle, and Soil

“There’s a stream called [Silver Creek](#) where we shoot ducks from canoe.... Saw more big trout rising than have ever seen....” Ernest Hemmingway wrote to his son Jack about fly fishing in Silver Creek on Bud Purdy’s Idaho ranch (3). Nick Purdy, Bud’s son, describes it this way (8), “It’s such a special piece of property. There’s hardly any land like it because of Silver Creek. I feel we’re just holding it for the generations and passing it on....” Today, Pat Purdy, Nick’s son, echoes the sentiment (Pat Purdy, *personal interview*, July 2020), “Just look around. You can’t not care about preserving it.” The Purdy family’s passion for conser-

vation runs as deep and clear as the spring-fed Silver Creek meandering through the fields and rangelands they manage. Four generations have made their livelihood on the land purchased in the 1880s by the Kilpatrick brothers, Pat’s great-grandfather and great-uncle (12). Presently, the Purdy family runs a diversified farming, ranching, and outfitting operation in Blaine County, Idaho. “We run 750 cow/calf pairs now and farm 4,300 acres. We have added yellow mustard seed to our rotation, and we lease some acres each year to a seed potato grower,” Pat explains. “A lot has changed.”

That change began when Pat borrowed a “no-till” drill and drilled his first direct seed crop about six years ago (2). He had heard about this farming practice from members of the Pacific Northwest Direct Seed Association. After a lot of discussion and penciling it out, Pat experimented with “no-tilling” (aka direct seeding) because he thought it could improve his land and reduce his cost of production. Conventional farming practices plough crop residue (roots, stems, and leaves remaining after harvest) back into the soil to decompose. In the spring, the field is cultivated again to remove weeds, further breakdown crop residue, and create a smooth planting surface. Instead of cultivating before planting, direct seeding utilizes a specialized seed planter, called a drill, to plant the seed of the next crop directly into the stubble (i.e., crop residue) of the previous crop. Not cultivating the field saves tractor time, labor, and fuel. The roots of the previous crop anchor the topsoil, reducing wind erosion, and



Near the headwaters of Silver Creek on the Purdy Ranch, a world-class, fly-fishing stream near Picabo, ID.

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increase water infiltration during the off-season. The stubble holds snow during the winter, adding to the soil moisture as it melts during the spring thaw. All of these factors contribute to good soil moisture, healthy soil structure, and an active, living soil microbiome. Pat points to these benefits, commenting, “We now run a JD 1890 air-drill and are no-till planting 80+% of our crops each year.” Taking the risk and trying something new has paid off.

Pat is taking another risk with part of his 2020 crop by integrating cover crops, cattle grazing, and winter wheat in hopes of further stimulating the soil biology in his fields and making it profitable to do so. Over time, these practices result in increased organic matter and soil fertility. “We lease some land that needs rehabilitation,” he explains. “The soil is very fine; it blows everywhere if the field is bare. Fertility is poor. We could put chemical fertilizers on it and get a crop, but that isn’t improving the soil.” The downside is that the field is not producing a cash crop while it is planted to a cover crop, and it costs money to plant, grow, and graze that field. Pat wondered if winter wheat could be added to the cover crop mix to provide a cash crop the following year. “The idea is to sow the cover crop in the spring, then bring cow-calf pairs in to graze it in sections so they graze all the species evenly,” Pat notes. “The cattle guy will take them off in late fall, the annuals will freeze out, and the wheat goes dormant in winter. Next spring, if the wheat doesn’t winter kill, it should take off, head out, and we hope to harvest a cash crop off the wheat in July 2021.”

The farming, ranching, and outfitting businesses all benefit from adding cover cropping and grazing practices, making each business unit more profitable. The cover crops and crop residue also improve the habitat for native wildlife. “We see a lot more wildlife now, including ducks and geese,” notes Pat. Keeping cattle confined to specific grazing areas and away from the stream banks protects the stream banks from caving in and prevents manure nutrients from reducing the water quality in Silver Creek. The outfitting business is thriving because of better land and water management on the agricultural side. Cattle grazed on nutrient-rich cover crops in smaller spaces gain weight faster, becoming another profit center. Manure from the cattle and the



Pat Purdy, farmer, Picabo, ID, and Joel Packham, University of Idaho extension educator, Cassia County, discuss changes to the size of the grazing area allotted to cattle at one time. “Small paddock size when grazing pairs on mixed species cover crops, results in uniform grazing of all crop species and increased weight gain. They don’t walk it off, like on the range,” explains Packham.

diversity of root systems from the cover crops build a healthy soil microbiome, increasing soil fertility and further reducing operational costs for the next cash crop. Pat sums it up this way, “It isn’t sustainable if I can’t make a profit at the end of the day.”

### Community, Air Quality, and Compromise

Further north, in Idaho’s panhandle, lies the Palouse, a scenic region of rolling hills covered in a patch work of amber wheat, yellow mustard, and green chickpea fields. Decades ago, the crisp autumn air of the Palouse was choked by dust as the wind picked up topsoil, blowing it everywhere while tractors ploughed and harrowed fields. “When I was 11, it was my job to work summer fallow [fields] every two weeks using a steel track crawler tractor,” recalls Joe “Potlatch” Anderson (Joe Anderson, *personal interview*, July 2020). Air quality improved in the 1970s and 1980s as growers on the Palouse perfected no-till planting to control soil erosion from wind and water on the hilly terrain.

Burning to remove crop residue and clean up ditch banks was also a valuable agricultural practice in Idaho. Bluegrass seed was a common perennial crop across the Palouse, but profitability depended on burning off residue to stimulate the crop to go to seed the next season. Field burning increased seed yield while killing pests and diseases harbored in the residue. Field burning, however, also polluted the air with smoke. As the Palouse sky turned black, communities as far away as Spokane, WA, experienced worse air quality than during the dust days of conventional tillage. It appeared the trade-off for controlling soil and water erosion was smoke-filled air over the region’s cities.

The dilemma was how to control erosion, keep the air clean, decompose residue, manage pests and diseases, and remain profitable. Idaho law allowed field burning across the state, but in 2007 that law was successfully challenged in 9th District Federal Court by a citizens group, Safe Air for Everyone, resulting in a total ban on field burning in the state (4). Bluegrass seed producers and southeastern Idaho grain producers, who also burned fields to clear excess field residue, lost a valuable tool. These grain producers and bluegrass growers were certain they would be put out of business. At the time, Governor Butch Otter determined that the issue should be resolved, once and for all, by negotiation with all interested parties—regional citizens, Native American tribes, farmers, water users, conservationists, and a myriad



“Potlatch” Joe Anderson farms near Potlatch, ID, in Idaho’s northern Panhandle. “I am 77 and proud to say I am still farming.” Photo courtesy of J. Anderson.

of lawyers representing them. Potlatch Joe served on the governor's taskforce, recalling, "The first meeting with the mediator established that field burning would not be eliminated. Instead, it would be regulated in such a way as to adequately address the real environmental and health concerns associated with it." The governor set a frame around the negotiations, acknowledging the legitimate concerns of all parties and providing a pathway—apart from litigation—to a sustainable solution.

Joe continues, "I don't recall how many meetings it took, but it was costly to the grain industry. Over \$250,000 for a consultant to guide the grain and bluegrass growers through the negotiation process! The group finally came to a set of field-burning regulations that no one totally liked, but that would allow field burning to continue in a way that protected air quality and addressed environmental and health concerns."

Idaho's burn regulations stand today, modified but unchallenged, testifying to the effectiveness of building consensus and compromise for the benefit of all stakeholders. "As a result of this effort, I believe Idaho has the most comprehensive and scientifically managed field-burning regulations in the nation," asserts Potlatch Joe. "And most of the bluegrass seed producers did go out of business, but with higher prices lately, some production has returned to Idaho."

In a scholarly article authored by Ley and Weber (9), they note that "The decision [repeal of Idaho's burn law] forced farmers and grass growers to the bargaining table." From Joe's perspective, it was statewide stakeholders, dependent on agriculture's economic engine, who sought to engage in an alternative to litigation to find a solution benefiting all Idaho citizens.

### **Aquifers, Irrigation, and Flood Control**

The Raft River Basin in southeastern Idaho was designated a Critical Groundwater Area in 1963 by the Idaho Department of Water Resources (IDWR) (5). About 76,000 acres of land are under irrigation in the basin, using a combination of surface (i.e., rain, rivers, streams, springs) and ground (i.e., aquifers) water rights. In 1987, the IDWR began a process to confirm water rights in the Snake River Basin through administrative and legal processes. Within two years of the final Snake River Basin Adjudication (SRBA), signed August 25, 2014, Raft River Water Rights expansion required groundwater withdrawals to be no more than the total aquifer recharge to balance pumping with recharge (6). The Raft River Groundwater District had two years to develop a management plan, approved by the IDWR, to avoid curtailment of groundwater usage on the expansion water rights (7).

The Albion, Goose Creek, Black Pine, and Sublet Mountain ranges encircle the basin, their snowmelt filling the Raft River as it flows north to the Snake. In the past, fur trappers described the river as a raging, muddy, impassable torrent (11). Pioneers and gold seekers traveling the Oregon Trail in the 1850s and 1860s often saw a modest trickle of water in a dry stream bed, leaving their cattle thirsty for more. In the late 1880s, good grass for grazing and fertile soils lured Mormon settlers to establish farms and communities in the basin. Crops relied on river water, springs, and, by the 1940s, well water. The natural alluvial subsoils were easy to drill through, allowing wells as deep as 1,500 feet to penetrate the aquifer below.

John Spratling, and now his sons Lucas and Johnny, farms about 1,500 acres in the Raft River Basin near the Utah border. Johnny, with some seasonal help from Lucas's wife Laurie, runs a nearby cow-calf operation as well. Spratling Farms is a family affair.

On an agricultural tour in Texas, Lucas experienced an epiphany. He overheard a farmer saying, "I'll spend my last dollar to drain the last drop of water out of the Ogallala," referring to the vast aquifer of fossil water underlying eight states on the Great Plains. Lucas saw that he and his neighbors were on the same path (Lucas Spratling, *personal interview*, July 2020). "I knew our aquifer was being pumped dry, too," he observes, "but I realized we were choosing a different response to get a more sustainable outcome." Lucas knew then that his work on the Raft River Flood Control Board and the Raft River Water Management Board was key to preserving the opportunity for the next generation to farm in the basin.

A reckoning came in September 2016 when the IDWR rejected the Raft River Groundwater District Management plan and imposed a reduction of 30% on the expansion water rights for the first year, with more to come in subsequent years (7). The Raft River Basin is the only area covered by the SRBA where the IDWR has imposed curtailment. The final order for curtailment affected 75 expansion water rights irrigating 5,600 acres—approximately 10% of groundwater irrigated acres in the basin.

Todd Gerratt, along with 10 other water users, formed the Raft River Recharge Group LLC in early 2015. IDWR action was not going to solve a problem 60 years in the making. Lucas's dad, John, was one of the nine founders (10). "They thought we could save runoff water from the Snake River and Raft River in heavy snow years by putting it in recharge ponds draining into the aquifer, while controlling flooding at the same time," Lucas explains. The group proposed an audacious plan to pump and pipe 70 ft<sup>3</sup> of water/sec from the Snake River, 13 miles up through the valley, and dump it into recharge basins adjacent to the Raft River for groundwater recharge (Hattie Zobott, *personal interview*, and documents made available to the author, July 2020). Lucas became more involved in the group after his "aha" moment in Texas. "Passion is expensive," Lucas chuckles. "I have spent a lot of time and money selling this idea to others."

The Raft River Recharge Group LLC hired Hattie Zobott, J-U-B ENGINEERS, Inc., to engineer and guide the project. She helped develop relationships to support the project, obtain permits, write a grant proposal, and coordinate all the moving parts. The first hurdle to overcome was getting access to the Minidoka Wildlife Refuge (inclusive of Lake Walcott) to complete an Environmental Assessment (EA). The EA would determine if the project would benefit the refuge. Next challenge was gathering letters of support from five other shareholder districts that would be impacted. Two other groups were solicited to become cosponsors of the project, providing matching funds to complete the necessary infrastructure (Hattie Zobott, *personal interview*, and documents made available to the author, July 2020). The complexities of the project might have overwhelmed others, but these farmers were willing to do anything to sustain their way of life. "Farmers want to be farming," Hattie notes. "It took two years of work to build all the relationships, get the support of agencies to proceed with the EA, and develop the grant application for funding through the National Resource Conservation Service [NRCS] Watershed Program. I was impressed by the patience, a refusal to give up on the vision, these growers had." That vision became a reality when the NRCS selected the project for funding under the Watershed Program. After selection for the program, NRCS became the lead government agency for the Flood Control and Aquifer Recharge Project.

The project proposed intentional flooding of parts of the basin to reduce erosion by controlling seasonal flooding and re-

store sensitive riparian habitat along the rivers and streams. The project has 215 acres of planned recharge basins that will accept flood waters, recharging the aquifer with as much as 20,000 acre/ft of water a year (Fig. 1) (Hattie Zobott, *personal interview*, and documents made available to the author, July 2020). The goal of balancing water withdrawals with annual aquifer recharge has not been met yet, but recharging is helping, and it is just the first phase of the plan. “We hope when people see it built and working, those further up the basin will want to participate in the next phase,” Lucas says as his gaze settles on the Albion Mountains to the south toward the headwaters of the Raft River.

Spratling Farms is taking actions to conserve water resources and reduce pumping out of the aquifer, as well. “Converting center pivots to low elevation sprinklers [LESA technology] can save 15–17% of water per irrigation just by reducing evaporation. We tried cutting out 1, 2, even 3 waterings, to see how far we could go without reducing yield to the point of losing profitability. You name it, we are trying it,” Lucas remarks enthusiastically.

Regardless of the IDWR curtailments, “as is” pumping of the aquifer is not sustainable. Lucas and Laurie Spratling know their 14-month-old son Orlin will not be farming this land unless something changes. “We are all in this together, and we have to

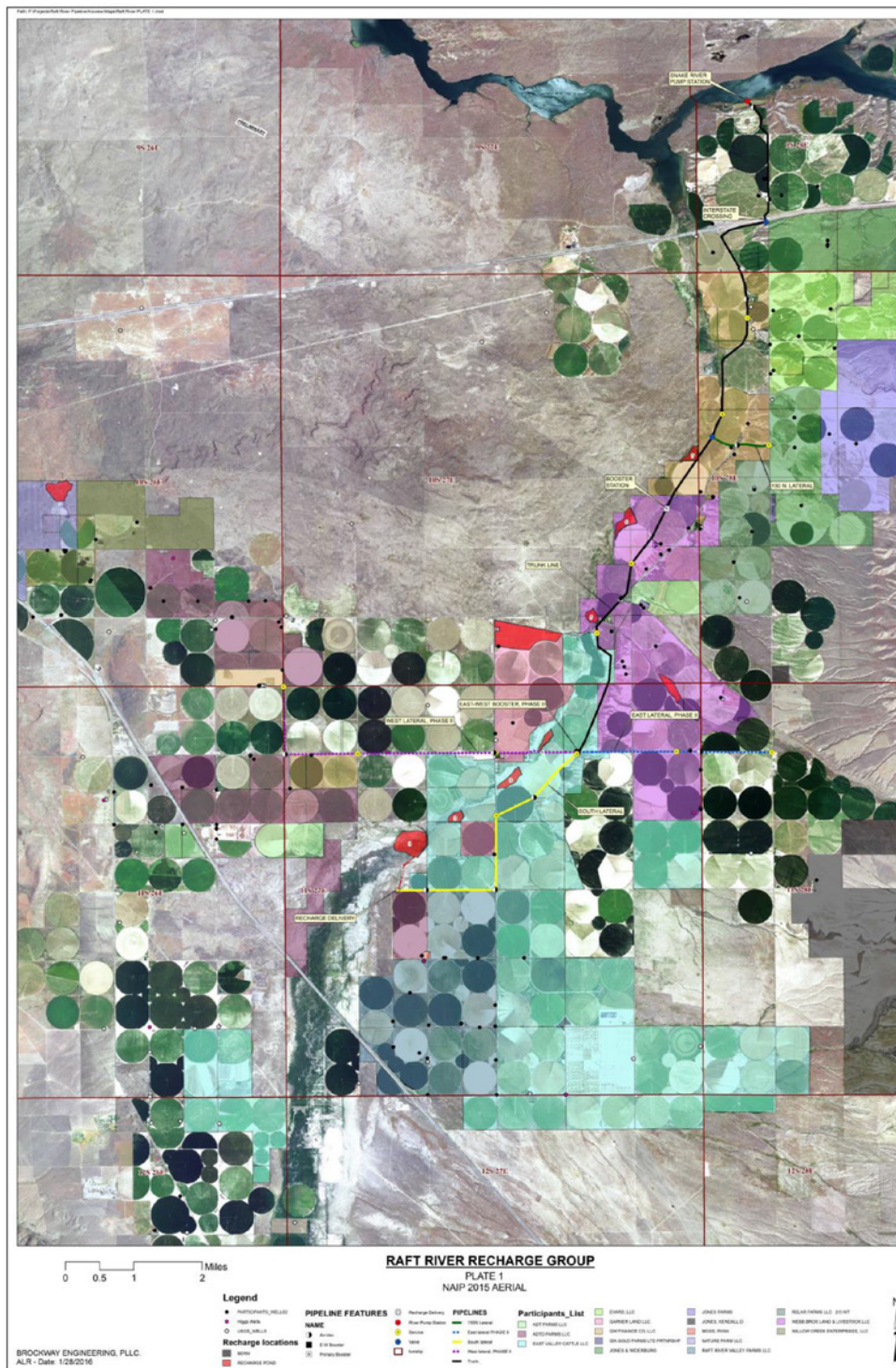


Fig. 1. Raft River Recharge Project Map Plate 1. Brockway Engineering, PLLC, ALR January 28, 2016.



Lucas and Laurie Spratling with 14-month-old son Orlin holding on to a LESA nozzle attached to a drop line from a sprinkler pivot in the Raft River Basin, ID.

find a way to recharge the aquifer to balance what is pumped out annually. None of us will be farming the basin with a dry aquifer.” The Raft River Recharge Group LLC and the coalition of partners participating in the Raft River Watershed Project are committed to providing enough recharge to support the irrigation withdrawals in the basin aquifer. “It’s our future, or we don’t farm,” Lucas bluntly concludes.

### Conclusions

Agricultural practices that balance profitability with restorative water and land management are key to passing farming on to the next generation. The 2017 census records 26,000 Idaho farms, farming 11 million acres of crop land. Of these acres, 58% are irrigated crop lands. About 9% of Idaho farms (513,984 acres) are using no-till or low-till practices. Irrigated cropping systems, including root and tuber crops (i.e., sugar beet and potatoes), do not lend themselves to no-till practices. Cover crops are used by 1,362 farms (28,965 acres), with an average of 94 acres/operation. Grazing cover crops is not an option for many farms, and without that profit center, it is hard to financially justify growing them (1). In Idaho, 97% of wheat is produced on family-owned farms, and most have succession plans in place. The Idaho farmers whose stories you have just read all share a passion to “leave it better than I found it” for the next generation.

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