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Irrigation Leader

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STAFF:
Kris Polly, *Editor-in-Chief*
John Crotty, *Senior Writer*
Matthew Dermody, *Writer*
Julia Terbrock, *Graphic Designer*
Capital Copyediting LLC, *Copyeditor*

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COVER PHOTO:
Brad Armstrong, general manager of Okanogan Irrigation District.

PHOTO COURTESY OF BRAD ARMSTRONG.

Modernizing Irrigation Districts

By Kris Polly

Bringing century-old irrigation projects into the 21st century requires vision, strategy, and perseverance. In the October issue of *Irrigation Leader*, we talk to managers and innovators who help tell the story of irrigation district modernization as it works today.

In our cover interview, Erling Juel, general manager of Greenfields Irrigation District in central Montana, discusses his district's efforts to modernize its 100-year-old infrastructure. That infrastructure dictates Greenfields' current operations, which Mr. Juel describes as "essentially deliver[ing] water the same way it was done 100 years ago." So to transform Greenfield's delivery infrastructure and, in turn, its operations, Mr. Juel has developed a vision based on "how you would build your district if you were building it today," and, more critically, he has developed an implementation plan. Mr. Juel is the type of manager to see this vision through.

Modernization is not just for upgrading infrastructure projects; it can involve approaches to infrastructure. The Salt River Project, which delivers irrigation water to an urbanized central Arizona, has helped transform a small part of one of its canals in downtown Scottsdale into an urban amenity lined with restaurants and shops. Salt River Project's Jim Duncan explains that irrigation districts that are "willing to step outside their comfort zone and consider new, innovative ideas with local partners" can reap long-term benefits.

We also talk to now-retired general manager of the Lower Platte North Natural Resources District, John Miyoshi, whose 30 years of management and dedication involved staying on top of the latest innovations to keep his district's systems modern. "Keeping up with advancements in technology and hiring people who know how to use it have been long-standing priorities for me, and those practices have greatly benefitted the district over the years." Over the years, Mr. Miyoshi's strategy and vision were a testament to his leadership.

Upgrading aging infrastructure and modernizing operations are national issues. Managers like Erling Juel, Jim Duncan, and John Miyoshi are leading the way to solving them. IL

Kris Polly is editor-in-chief of Irrigation Leader *magazine and president of Water Strategies LLC, a government relations firm he began in February 2009 for the purpose of representing and guiding water, power, and agricultural entities in their dealings with Congress, the U.S. Bureau of Reclamation, and other federal government agencies. He may be contacted at Kris.Polly@waterstrategies.com.*

Historic photo of completed portion of Upper Main Canal of the Okanogan Project in Washington, taken October 7, 1907.

THE ENGINE OF OKANOGAN COUNTY

OKANOGAN IRRIGATION DISTRICT

Upgrading and maintaining water infrastructure is an ongoing challenge for many irrigation districts, and the Okanogan Irrigation District is no exception. Many of its facilities have been in operation for over a century and need to be upgraded in order for the district to continue meeting the needs of its customers. Newer infrastructure would also allow Okanogan to take advantage of new technologies that improve conservation and efficiency.

Brad Armstrong has been at the forefront of efforts to do just that since he became general manager at Okanogan 3 years ago, and with his staff of four, he has successfully upgraded many of the district's components. Mr. Armstrong sat down with Irrigation Leader*'s editor-in-chief, Kris Polly, to discuss the district's unique valve and reservoir systems, the ongoing efforts to modernize the water infrastructure, and how improved water conservation and efficiency benefits farmers and water users throughout the region.*

Kris Polly: Can you tell us about the Okanogan Irrigation District, its history, and its infrastructure?

Brad Armstrong: The original construction of this project was completed from 1905 to 1910. We currently serve 5,032 acres, and there are 1,007 turnouts for growers. All our growers are on the west side of the river. A variety of crops grow in the area, but the most common are apples, cherries, and pears.

The district's delivery system is both gravity fed and pressurized. We have 7 miles of open canals that come from the Conconully Lake Reservoir and the Salmon Lake Reservoir. The system is enclosed, and we have two pumping stations. One is a drought station on the other side of the Okanogan River, and the other is a backup station at Duck Lake. We also have five booster stations for the rest of the district. We provide 7.2 gallons per minute at 40 pounds per square inch for each grower.

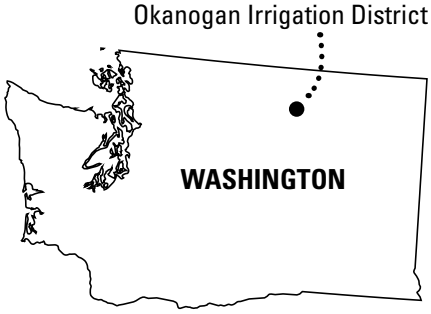
PHOTOS BY WALTER J. LUBKEN (1907); KELSEY DONCASTER (2010); COURTESY OF U.S. BUREAU OF RECLAMATION.

Upper Main Canal at same location of historic photo (left) of Okanogan Project in Washington, taken August 24, 2010.

Kris Polly: You mentioned that the district has a drought station. What purpose does that station serve?

Brad Armstrong: The drought station is a backup system to ensure that we can provide adequate water supplies. It sits idle until we deem that there is a drought in our reservoirs. We are supplied by mountain snow and rainfall, but sometimes drought can become so severe that the lakes will not be able to provide the required amount of water. When that happens, we use the drought station to supply district diversions 4 and 5 with water.

Kris Polly: What are some of the biggest challenges your district faces?



Brad Armstrong: The biggest issue is our aging valve system. We started replacing many of the valves in 2014, and we are finally catching back up in terms of output. Whole diversions had to be shut down to complete the replacement work. The valves always seemed to break down during the hottest times of the year, when they were most needed. The work is about 80 percent complete.

The valves are located throughout the system, and they were 25–30 years old when we started replacing them. All the work was done during the offseason. The new valves we are installing are exercised every year and work a lot better. Our downtime is much less than it used to be, and only small sections are affected rather than entire diversions.

We financed the project with capital funds that we had set aside at the beginning of the year. All the work on the diversion valves is done internally. We replace up to five valves per year.

Kris Polly: Are there any other aging infrastructure projects that you have been working to address?

Brad Armstrong: We had some cracking in the main canal in 2013. When we ended that irrigation season, we shut down the canal and brought in a machine to fill in the cracks. That is an ongoing project across the system.

Kris Polly: How does the fish passage infrastructure factor into your operations and your ability to deliver water?

Brad Armstrong: It does not affect our ability to deliver water right now. There are fish screens to protect Endangered Species Act–listed fish, which are monitored by the state fish and wildlife agency. We have a plan that will go into effect at the end of the year and will involve drawing down a diversion slowly to allow the fish to adjust and escape from the area. We have a memorandum of agreement through 2018 with the Colville Tribes in which the tribes buy excess runoff water from the district to run down the streams for the fish while they are spawning.

Kris Polly: Are you going to renegotiating or renewing that agreement?

Brad Armstrong: We just signed an agreement this year to put in a new diversion structure that will feed the upper Salmon Lake Reservoir. The tribe is installing it for us in exchange for 1,800 acre-feet of water annually for the next 50 years. Under the current agreement, we would have to release water whenever the lakes became too high, and the tribe was paying $72 per acre-foot for that runoff water. The U.S. Bureau of Reclamation and the state of Washington would cut us a check at the end of the year if the correct amount of water was released, and we would use that money for the capital improvement program. That prevented us from having to raise rates on the irrigators.

Kris Polly: Where do you hope to see the district go in the near future?

Booster station in Okanogan Irrigation District.

> "Keeping this project running efficiently is essential for Washington and for the country."
>
> —BRAD ARMSTRONG

Brad Armstrong: As we move forward, we have 10-year capital improvement plans that identify projects that need to be completed. At some point, I would like to close the open canal to mitigate evaporation and moss ingress. Future material and power costs will determine how soon we are able to complete those projects. We have tried to stay ahead of the curve as much as possible when it comes to managing our systems. One example was switching to a system that allowed us to control all the dams and valves with our smartphones. This upgrade cuts down on our overtime, saves fuel, and increases our efficiency. Our goal is to conserve water while still allowing the growers access to the water they need to grow crops successfully.

Kris Polly: What is your message to state and federal leaders about the project and what the district means for the entire surrounding area?

Brad Armstrong: We are providing a cost-effective water supply to these irrigators, and a lot of fruit production depends on it. Keeping this project running efficiently is essential for Washington and for the country. The fish also depend on the correct flows to, and water levels in, the lakes and reservoirs, as do fishermen who recreate there. All those groups would suffer considerably if we were not here to pump water to them. Many would have to dig wells or pump water in from even farther away, which would be more expensive and detrimental to the aquifer. IL

PHOTO COURTESY OF BRAD ARMSTRONG.

Greenfields Irrigation District Manager Erling A. Juel, PE, and Board Commissioner Chris Ostberg stand alongside the penstock pipe for the Johnson Drop project.

Building for the Next 100 Years at Greenfields Irrigation District

With General Manager Erling A. Juel, PE

Greenfields Irrigation District encompasses 133,000 acres in central Montana, between the Great Falls and the Rocky Mountains. Within its boundaries, the district manages 83,231 irrigated acres and nearly 24,000 acres of dryland pasture for a total of 450 water users. In Greenfields, barley is king. The district supports the town of Fairfield, the self-proclaimed Malting Barley Capital of the World.

The U.S. Bureau of Reclamation built the Sun River Project, of which Greenfields is a division, 100 years ago. The district relies on Rocky Mountain snowpack and, more importantly, the timing of its release into the 100,000 acre-foot Gibson Reservoir for its supplies. Greenfields releases water from Gibson into the Sun River, which runs about 3 miles to its diversion dam. From there, the 1,400-cubic-feet-per-second Pishkun supply canal feeds Pishkun Reservoir, an offstream reservoir with an active storage capacity of 31,000 acre-feet and a total storage of 46,700 acre-feet. From Pishkun, Greenfields releases water another 13 miles down through the Sun River Slope Canal at a maximum capacity of 1,700 cubic feet per second into the district. The district's third reservoir, Willow Creek, provides water to supplement downstream water rights during the irrigation season.

A native of Montana, Erling Juel worked for decades as a geotechnical engineer and project manager in the West. Following his retirement, he became Greenfields' general manager in 2015, and at the behest of his board of directors and with the support of his staff of 20, he is starting the process of modernizing the century-old district. Irrigation Leader's

PHOTO COURTESY OF GREENFIELDS IRRIGATION DISTRICT.

editor-in-chief, Kris Polly, spoke with Mr. Juel about aging infrastructure and planning and implementing projects for the next 100 years of the Sun River Project.

Kris Polly: Please describe the district's water supply situation and infrastructure.

Erling Juel: We are blessed with a good watershed and a relatively short river. Greenfields is the predominant water right on the Sun River. We take our water right out of the mountains—the Bob Marshall Wilderness Area. The size of our district dictates that we live off storage, meaning that we can't operate off our share of the water that comes down the river in July, August, and September. When our storage is depleted, our irrigation season is done for the year.

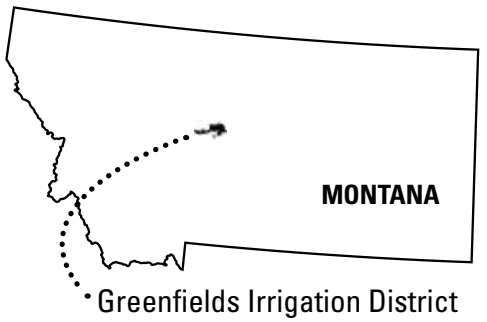
Our system was built 100 years ago for flood irrigation, so you have a simple gravity delivery system and a collection system. The drains collect excess water from the fields. Even though drains are becoming less important with the continued adoption of sprinkler irrigation, at the lower end of our district we use drain water to supplement irrigation demand.

Our main canal is predominantly a one-banked, contoured canal—a hill hugger. There are some lined canals at key locations where, historically, there have been some slope stability issues. In those locations, the canals are concrete lined to reduce instability. We have also lined canals in some areas to reduce subirrigation and to help control salinity. But, for the most part, our canals are earthen and unlined.

Kris Polly: What are the district's top issues?

Erling Juel: It is a recurring theme for districts featured in *Irrigation Leader* magazine: 100-year old infrastructure that we keep getting another year out of—it doesn't fix itself, and it doesn't get better with time. A century ago, there were multiple crews and workers building the entire project on a grand scale. Given that it was built all at once, you get the uneasy feeling that it will fall apart all at once.

Our board is aggressive and proactive. Our board members are long-term thinkers—they want to do what is right for their grandchildren. With that in mind, we have to modernize our district by first envisioning what the district should look like and then developing a strategy to implement that vision. It is a big undertaking.



If we were building Greenfields Irrigation District today, it would look totally different: the location of canals, the use of pipelines instead of canals, and the mode of operation. Currently, we operate in an upstream supply mode versus a preferred downstream demand mode. We essentially deliver water the same way it was done 100 years ago, even though our producers use the water differently. That gap continues to widen.

Kris Polly: What is Greenfields doing and what does it need to do to modernize the district?

Erling Juel: First, we have to look at how we deliver water. Right now, the producers order water two days prior to their need, and then we release that water from Pishkun Reservoir. We route that water through our system along the various main canals, submains, and laterals. Anything that happens along the way equates to inefficiencies and lost water.

We have a 2-day on, but only a 1-day off, requirement. So, if you order water 2 days ahead of time, and then change your mind, the water is already in the system and needs to go somewhere. Fortunately, we have enough users in the system and can usually find someone else able to take it. But, if a storm rolls in and brings enough moisture, a lot of folks shut off their irrigation, or the power may go out, disabling pivots and sprinklers. In either case, considerable unused water runs right through our system. All in all, there are a lot of inefficiencies with the upstream supply method and the 2-day lag.

Our goal is to transition to a downstream demand-driven system, which will require a lot of pools and main canal checks. We want to be able to stack up the water when we need to shut down. Those checks will need to be able to talk to each other and work in unison. Currently, our checks support a single turnout. These checks are independent and do not know that any other check exists along the canal.

The other side of our problem is a lack of sufficient storage. In two of the three irrigation seasons that I have been with Greenfields, we have had to terminate irrigation earlier than normal because we ran out of stored water. The reason we run out of storage, even though all our reservoirs fill up every year, is that runoff patterns have changed over the last 30 years. Runoff often starts earlier and can be more abrupt than it has been in the past—historically, it has been much more gradual, so that when we drew down the reservoirs, Mother Nature would replenish them. But climate fluctuations and adverse forest management practices in our watershed have hastened snowmelt and runoff.

During our peak irrigation season, demand exceeds 2,000 cubic feet per second. Our supply canal coming out of our supply reservoir is only 1,700 cubic feet per second. Our storage can be depleted quite quickly.

Given these water use and runoff patterns, we are looking at some creative offstream storage opportunities to give us another 30,000–40,000 acre-feet.

Kris Polly: What are those storage opportunities?

Erling Juel: Along the Pishkun supply canal, there are some areas where the canal drops across a large drainage. If we dammed those areas, we could create significant storage. We also have the chance to make improvements to Pishkun Reservoir, which consists of interconnected prairie potholes. When we draw it down to its lowest levels, there is one pool that becomes isolated, and we are unable to fully use its storage. If we can enhance interconnectivity between those pools, in addition to raising the reservoirs' dikes, we could easily add another 26,000 acre-feet of storage.

Kris Polly: This month, you will visit Naches-Selah Irrigation District on a fact-finding mission for your modernization project. What do you hope to learn?

Erling Juel: We will be visiting with Justin Harter, the general manager. Naches-Selah has incorporated Rubicon gates and network canal control systems. The Australians put a lot of money and effort into modernizing their irrigation systems—incorporating the latest in irrigation technology—and then making a commercial product out of it. We are going to talk with Justin, see how the system works, and kick the gates a little bit.

This year, one of our drop structures, the Johnson Drop, which runs at 300 cubic per second, experienced progressive erosional failure of the foundation soils. We were able to get it up and running for the remainder of the season, but now we are faced with replacing the entire structure. We are replacing it with a pipe drop and making it hydropower friendly and hydropower ready.

We are also going to have to move one of the check structures downstream, because it would conflict with the inlet to the new drop. This presents an opportunity to replace it with the first of a series of newer main canal checks. I want to make sure that if we start heading down a certain path, we stay on it, whether it is with Rubicon or another control system. The best way to do that is to talk with other irrigation district managers and learn from their successes and failures.

Kris Polly: How do you plan on financing this infrastructure overhaul?

Erling Juel: We generate revenue from two hydropower plants: the Upper and Lower Turnbull. The total capacity is nearly 15 megawatts. Greenfields has 10 percent ownership of that facility. We are also 50 percent owners of Gibson Hydro, a project that would provide another 15-megawatt-generating capacity year round. It is not off the ground

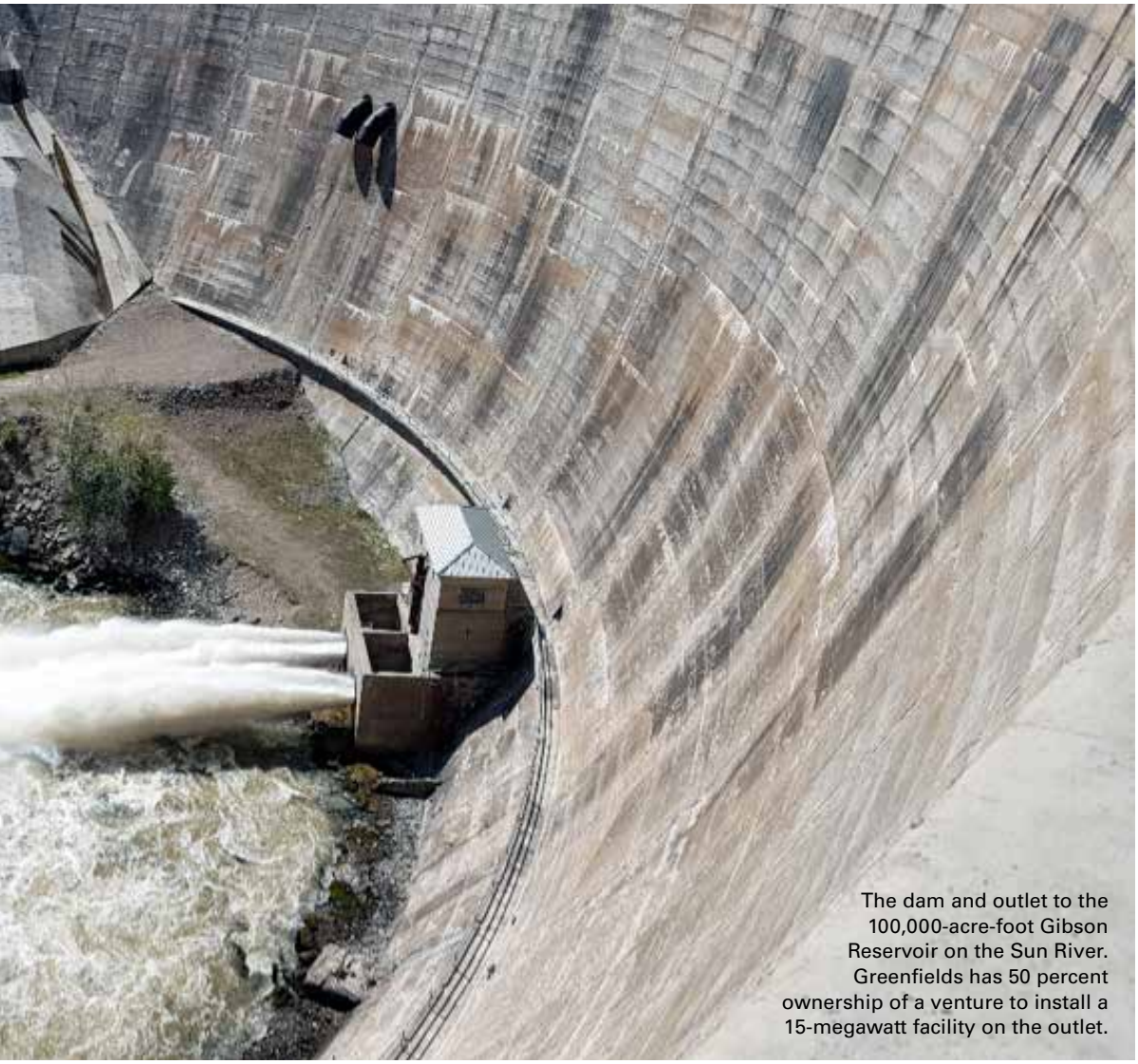
yet. We have completed several studies but ran up against FERC [Federal Energy Regulatory Commission] deadlines—we have legislation in Congress to get those reinstated and extended.

We are paying for Johnson Drop with our reserves. We could have just rebuilt it the same way it has been for the last 100 years, but that would have been a lost opportunity. We have studied a lot of our drops. Johnson Drop is marginal with respect to hydropower—if you are an individual looking to come in and develop the site, it is financially marginal at today's rates. But if you are an irrigation district that is going to be here for another 100 years, the concept of making money looks a little different. A longer repayment period maybe acceptable.

The failure of the drop structure forces the issue. We could spend $200,000–300,000 replacing the old structure with the exact same setup, or we could push the economic envelope toward the pipe drop option. This now makes hydropower more feasible. We are going to work with our local electric cooperative to make it hydropower ready. This generation unit will pencil out to about 1 megawatt.

Our relationship with our local co-op is symbiotic.

PHOTO COURTESY OF GREENFIELDS IRRIGATION DISTRICT.



The dam and outlet to the 100,000-acre-foot Gibson Reservoir on the Sun River. Greenfields has 50 percent ownership of a venture to install a 15-megawatt facility on the outlet.

"With my hands on the reigns as a district manager, I feel like I can help direct outcomes in a more cost-effective and timely way."

—ERLING JUEL

When we are running water, we could be generating electricity. At the same time, the co-op needs to provide energy because of all the irrigation pumps running. When we are not running water, there is less demand for electricity because there are no pivots turning. Greenfields is looking at more opportunities to partner with the co-op.

Kris Polly: You joined Greenfields Irrigation District following your retirement from the consulting world. How would you compare managing a district with the work you did as a consulting engineer?

Erling Juel: Much is the same: At the end of the day, you manage people, money, and resources and solve problems. As a consultant, every client was unique—some boards were progressive and some were complacent. At Greenfields, our board members are a sharp group of businessmen and are long-term thinkers. They embrace a sense of stewardship and the need to guide the district into the future.

As a consultant, much of the work that I did was on paper. As an irrigation district manager, I get to play in the dirt and water. We can abbreviate the design phase and get things done on the fly. As a consultant, you have to develop alternatives and recommendations. As a district manager, I can cut to the chase to solve problems. With my hands on the reigns as a district manager, I feel like I can help direct outcomes in a more cost-effective and timely way.

Kris Polly: What advice do you have for other managers looking to modernize their projects?

Erling Juel: Create a picture based on how you would build your district if you were building it today. Break that picture down into pieces and determine what you want to do first. Irrigation districts, especially those in northern climates that have challenges with pouring concrete and doing earthwork in the dead of winter, have limited resources and limited time to work in the offseason. Therefore, it is critical to have an implementation plan that will cover what's next and next after that.

Although we are relatively self-sufficient, funding will be a challenge. Reclamation is not in a position to invest in our system. We have to do it ourselves. IL

Irrigation Canal as Urban Amenity: **The Scottsdale Waterfront**

By Jim Duncan

The city of Scottsdale, Arizona, and the Salt River Project (SRP) have maintained a healthy and mutually beneficial partnership for many years. That relationship entered uncharted territory when the city began exploring the idea of carrying out extensive economic development along the banks of the Arizona Canal. The canal is approximately 65-feet wide and 7-feet deep, with a flow of approximately 3 feet per second. Owned by the U.S. Bureau of Reclamation but managed by SRP, the canal runs through the heart of downtown Scottsdale.

Breaking New Ground

Developing and building on the banks of the canal was something Scottsdale had been talking about since the mid-1980s. The city hired a design firm in California to brainstorm possibilities for the canal, including walkways, pedestrian bridges, and other amenities. At that time, SRP had not seriously considered a project of that nature before and was reluctant to become actively involved. Although the canals have always been open to the public for recreation, SRP had never been involved with that kind of development on its canal banks, so the process marked a real transition.

Initially, SRP was less concerned about what it could gain from the development than it was about the problems that it might cause as a result. The city had to provide SRP with assurances that it would not incur additional costs or complications. Those assurances convinced SRP's leadership to embrace the idea and encourage the development.

The only work done on the canals prior to this effort was to create multiuse trails, which were paved bicycle paths. The city worked with several developers to determine what could be done in the downtown area. Many of the ideas were outside the box, including the creation of side channels and boating in the main canal channel using small, electric-powered boats.

The city also proposed making the canal walls vertical rather than the normal trapezoidal shape. The city had envisioned cantilevered walkways out over the canals so people could be close to and stand over the water. The vertical walls were built in the mid-1990s, before the city knew what was going to happen on the banks, and they were solely based on the plan for cantilevered walkways from one end to the other on both sides of the canal. SRP built the walls, which are structurally reinforced to sustain the pressure exerted by the water. The city paid for them through the use of a special fund that SRP makes available to municipalities for development purposes. In the end, the city did not end up building the walkways, but it did install small lookout spots.

The Scottsdale Waterfront

Local developers and investors proposed and supported the project that was eventually built. This plan was simpler than the side channel development plan and focused on the main canal. The city invested nearly $20 million in infrastructure improvements along the canal banks, including walkways, landscapes, pedestrian bridges, and public art. The city funds helped make the project possible and incentivized private entities to invest and build shops,

PHOTOS COURTESY OF SALT RIVER PROJECT.

The Waterfront is one of the most popular venues in Scottsdale for large-scale outdoor events.

restaurants, condominiums, and offices adjacent to the banks.

The location of the complex near East Camelback Road has increased its appeal to developers and furthered the success of the businesses that have been built there. Today, walking trails, trees, and landscaped grassy areas built on the bank closest to the canal are popular locations for outdoor events.

Liability and Maintenance

One of the biggest concerns for any project on a multiuse area is liability. In this case, the challenge was the fact that the canals are owned by Reclamation but managed by SRP. Before anything could happen on the canal, a use authorization had to be executed between the city and SRP and blessed by Reclamation. SRP eventually reached such an agreement with the city. Although the authorization indemnifies both SRP and Reclamation, the city bears all day-to-day liability as the licensee.

Although maintenance is generally an area of concern for such large development projects, SRP and Scottsdale easily worked through those concerns. The section of the Arizona Canal where the waterfront development took place has no SRP equipment at all for nearly one-quarter mile, simplifying maintenance concerns. In fact, the only maintenance SRP undertakes in that section is cleaning accumulated silt at the bottom of the canal when demand is low, but this is only done once every 10 years.

There are some power facilities buried in the banks of the canal, and the city bore the infrastructure costs of providing access to them. Those facilities are positioned in such a way that SRP can access any component without the general public noticing its presence.

Risk Rewarded

The downtown Scottsdale Waterfront project was unlike any other endeavor SRP had ever embarked on, but it has proven to be beneficial for SRP as well as for the city. Increased growth and prosperity increases SRP's power revenue and benefits the economy of the entire city. This project has shown the potential rewards for irrigation and power entities if they are willing to step outside their comfort zone and consider new, innovative ideas with local partners. There is real merit to such partnerships. IL

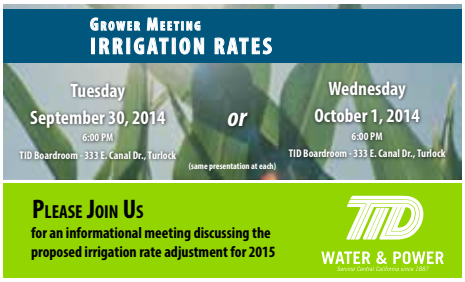
Jim Duncan is the principal engineering analyst in SRP's Water Engineering Department. He has worked with SRP for 34 years. You can reach him at Jim.Duncan@srpnet.com.

Frame Your Message for Successful Water Rate Increases: A Conversation With Turlock Irrigation District's Michelle Reimers

Public outreach is essential for irrigation districts when they need to increase water rates. A communication strategy that uses the right messages is one of the most critical elements in getting approval for rate increases. Rates are not easy to explain, so framing messages so that they convey the right information and values is key to public communication and, ultimately, approval of proposed rates.

Michelle Reimers of Turlock Irrigation District knows this all too well. She has been with the district for more than a decade, and currently serves as the assistant general manager of external affairs. Mrs. Reimers recently spoke with Irrigation Leader*'s editor-in-chief, Kris Polly, about her district's outreach efforts, why outreach is important when increasing water rates, and how to frame an effective message.*

Michelle Reimers.



Postcard mailer for a public meeting inviting customers to participate in the rates discussion.

Kris Polly: Please tell us about your background and how long you've been at Turlock Irrigation District.

Michelle Reimers: I have served Turlock Irrigation District customers for more than 11 years. Currently, I am the assistant general manager of external affairs. I oversee all the communications, community engagement, and government affairs efforts for our district. I graduated with a bachelor's degree in organizational communications and have been fortunate to have jobs that have related to my degree.

Kris Polly: How do you communicate the value of water and engage the public?

Michelle Reimers: Our communications methods vary because our target audience changes. Our target audience includes children, educating them about where our water comes from, as well as growers and other stakeholders, informing them about complex topics. We use print and digital media to communicate and engage with the public. Our communications tools include postcard and newsletter mailings, advertisements, physical meetings, emails, and social media.

Kris Polly: How important is public outreach for irrigation districts when they need to inform their customers about rate changes?

Michelle Reimers: Because we are accountable to our customers, there's nothing more important than openly explaining the rationale and benefits of proposed rate increases. Rate increases must be viewed by districts as opportunities to share our not-for-profit dynamic. Educating customers on the importance of the projects

PHOTOS COURTESY OF CV STRATEGIES.

or regulations that are forcing increases is essential. Also important is sharing district attempts to reduce costs without sacrificing the reliability of customers' water supply.

Kris Polly: What is a strong rates outreach strategy based on?

Michelle Reimers: Honesty and transparency, as well as a genuine desire to be fiscally and ethically responsible to customers.

Kris Polly: What components need to be included in a successful public outreach campaign?

Michelle Reimers: Multiple communication tactics need to be executed for successful outreach. We have found that going out in the community is the best way to engage stakeholders and being flexible regarding the time of day we meet them. Our main audience is farmers, and they are busy from sun up to sun down, so we usually put on meetings in the evening. We often hold informal meetings at their tried-and-true gathering spots.

Kris Polly: How unique and custom does outreach need to be for irrigation districts?

Michelle Reimers: Every irrigation district is different—in physical land characteristics, political environments, and customer demographics. That said, outreach plans must be based on audience; you can't be out of touch with your audience's needs. After you identify your audience, you need to understand how they want to engage in information sharing and conversation and what their motivations are. We have held many focus groups to determine customer expectations and preferred communication methods and regularity.

Kris Polly: When do you begin public outreach on a water rate increase?

Michelle Reimers: After the internal decision has been made that a rate increase proposal is warranted, an outreach plan should be developed. That usually takes up to 2 months to prepare. Never talk about a proposed increase, or any major undertaking, until fully prepared. Actual public outreach should begin no less than 3 months before the first rate increase presentation.

Kris Polly: What kind of messages are effective in rate-setting communication campaigns?

Michelle Reimers: We have referred to our history, longevity, and visionary nature many times. The fact that we have been serving the region for 130 years often speaks to our earned credibility and trust. We also talk about our efficient management and stewardship of water—the region's most iconic and finite resource.

Kris Polly: How do you frame messages in a manner that is relatable and understandable to your target audience?

Michelle Reimers: Our customers—farmers—are business professionals. I never underestimate the knowledge of our customers. They are smart. They make business decisions every day, manage complex operations in changing times, and go through the budget process just like we do. They analyze their operations and make adjustments. Tapping this knowledge and experience is helpful when we are explaining our business functions and the need for an increase.

Kris Polly: Do you believe in using emotional connections as a strategy?

Michelle Reimers: Absolutely. As long as you are being truthful. Trust is a powerful tool. I grew up in the community in which I work. Seeing the people we serve at the supermarket or community events allows me the opportunity to develop relationships. Relationships can grow and trust can be built with a person. And to them, I am Turlock Irrigation District, as is every district employee, whether on or off duty.

Kris Polly: Is social media an effective tool for a rate increase outreach plan?

Michelle Reimers: It depends on your audience and customers. For us, social media has not been a major tool thus far, but we recognize its potential. We use it heavily in engaging with electric service customers. Social media is great for sending a message quickly or reminding stakeholders of a meeting, but it lacks the personal interaction growers have come to expect from Turlock Irrigation District.

Kris Polly: How do you measure the results of outreach plans?

Michelle Reimers: On a numbers basis, it's easily measured by the number of written or public comments regarding the rate increase. Attendance at meetings and hearings is key, too. A few years back, we basically doubled irrigation rates with almost no outcry. Qualitatively, that told us that the rationale we presented in support of the increase was communicated clearly.

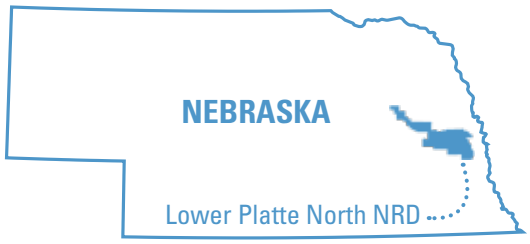
Kris Polly: What should every district manager know about developing a rate increase outreach campaign?

Michelle Reimers: There are a few things every district manager should know when developing such a campaign. Be open and transparent. Go to where your customers are. Describe the need for the increase and articulate the benefits. Be prepared. Do not send people out that can't answer questions. IL

John Miyoshi at the Lower Platte North Natural Resources District office.

Leading on the Lower Platte

A Conversation With John Miyoshi of the Lower Platte North Natural Resources District



Many aspects of water management have changed since John Miyoshi first joined the Lower Platte North Natural Resources District (NRD) in 1984. Many projects have been completed, the district's workforce has expanded, and technology has improved. All these changes have helped shape how the district performs its work, allowing it to better collaborate with local, state, and federal stakeholders. Through such innovation and cooperation, the Lower Platte North NRD has pioneered new ways of managing water that serve as an example to the rest of Nebraska.

With his retirement from the district at the end of September 2017, Mr. Miyoshi spoke with Irrigation Leader*'s senior writer, John Crotty, about how the Lower Platte North NRD is addressing flood damage reduction and groundwater challenges, the importance of cooperation and collaboration in completing complicated projects, and the benefits of technological and managerial innovations to the success of the district's mission.*

John Crotty: Please describe Lower Platte North NRD, the area it serves, and the functions the district carries out.

John Miyoshi: There are 23 NRDs in Nebraska, with Lower Platte North being located in the east-central portion of the state. Our district has 28 communities, 4 of which are county seat towns. The total population is approximately 60,000 people, with Fremont being the largest city with over 20,000 people.

The NRD serves over 350,000 acres of irrigated land,

PHOTOS COURTESY OF LISA BRICHACEK/WAHOO NEWSPAPER AND LOWER PLATTE NRD.

Lake Wanahoo.

virtually all of which is irrigated with groundwater. Most of the land is used for agriculture: Corn and soybeans are the predominant crops, and wheat, alfalfa, and other specialty crops are also grown. We have 20 sizeable beef feed lots and a healthy number of swine operations.

John Crotty: What are some of the activities that the district has undertaken to improve water quality and operations?

John Miyoshi: The NRD is in charge of the groundwater, and ensuring high levels of groundwater quality and quantity are among the top issues we face. The Platte River bisects our district, and we have two groundwater management areas along the river that were created approximately 15 years ago to deal with rising nitrate levels. In the Bellwood area, we have focused on educating water users about the importance of testing their water and soil for residual nitrates, and we require farmers to perform an annual nitrogen balance on each of their production fields. After 13 years of diligent cooperation, we are finally seeing the nitrate levels trend downward.

North of the Platte River, the situation is a bit different. We have the same restrictions and balance requirements in place, but the nitrate levels continue to increase. Nearly 60 percent of the irrigation wells are testing over 10 parts per million, which is the EPA [U.S. Environmental Protection Agency] maximum contaminant level for nitrates. Restrictions in that area have moved to phase III, including added education and restrictions on growers.

John Crotty: Please describe the district's innovative work on the conjunctive management of surface water and groundwater and how that effort has attempted to address both water supply and quality issues.

John Miyoshi: In Nebraska, the NRDs are in charge of groundwater and the state is in charge of surface water. Until 1986, state law specified that surface water and groundwater were not connected, which made conjunctive management more difficult. Once the law was changed to recognize the actual interconnection between the two types of water, we were able to modify how we manage our water. If a basin is using more water than it can recharge, it is required to implement a plan to balance that deficit, called an integrated management plan (IMP). Under those plans, the NRD and the state come together to determine what can be done keep water use in the basin sustainable. Voluntary IMPs can also be implemented to come up with proper use of current water as well as to plan for future expansion. All 23 NRDs either have an IMP in place or are working on one.

Our plan is virtually complete, but it has not been approved by our board or the state because we are working with the two Loup River NRDs, the Elkhorn River NRDs, and the other Lower Platte districts to create a unified basin plan. We will enact our local IMP once the basin plan is finalized; however, we are already operating our programs as if the IMP were in place.

John Crotty: What accomplishments are you the most proud of in your time as general manager?

John Miyoshi explains the wetland retention structure to Lower Platte North NRD staff above Lake Wanahoo in 2009.

John Miyoshi: The most memorable achievements are the large projects that took a lot of cooperation and work to complete. One example is the Sand Creek environmental restoration project, which is a $42 million effort that was cost shared with the U.S. Army Corps of Engineers. There was also a large levee project near Ashland at the lower end of the district called the Western Sarpy/Clear Creek Project that was completed with the help of three NRDs. I am also proud of the Rawhide flood damage reduction project that began in 1984 and was completed in 1993.

John Crotty: What has been the greatest challenge you have faced?

John Miyoshi: There were originally 126 units of local government that were combined into the 23 NRDs; because of that, the districts tend to have very large boards. Our board has 19 members, and it is always a challenge to unify that many different people with different ideas and arrive at a consensus during meetings. Those 19 board members are also an additional connection to the citizens we serve, which can further complicate matters, but it also helps us understand what the local community is thinking.

John Crotty: Have there been any surprises since you joined the district?

John Miyoshi: The greatest surprise has been the rapid growth of technology. When I started with the district in 1984, we had 4 employees, and my first job was buying the first computer the district ever had. Today, we have 21 staff members and have made great technological strides since those early days.

I served on the state GIS [geographic information systems] steering committee for 16 years, so I have always appreciated the role technology plays in helping us do our job. Keeping up with advancements in technology and hiring people who know how to use it have been long-standing priorities for me, and those practices have greatly benefitted the district over the years.

John Crotty: How has GIS changed natural resources management?

John Miyoshi: In the 1980s, just having aerial photos for mapping purposes was considered a huge leap forward. When I started with the district, we were using aerial photographs from 1969. As time went on and computer modeling improved, we were able to begin tracking groundwater flow on the computer, which could allow better tracking and analysis of water. This technology also allowed us to determine which agricultural users were overapplying manure to fields, washing it out into the waterways, and even pumping it through center pivots. With that information, we were able to help them better use that nutrient source.

We have also worked with the University of Nebraska on a project that allows someone to take scans of corn leaves while driving a field sprayer loaded with fertilizer through the fields. The scan results allow the nitrogen to be placed exactly where it is most needed.

John Crotty: Over your career, what has been the most important lesson you have learned about managing and leading people?

John Miyoshi: As we have expanded our workforce, each person has been able to specialize the work they do more precisely. The best lesson I have learned is to hire the best people possible and then get out of their way so they can do their jobs. Our employees are among the best in the state at what they do, and we are fortunate to have them. IL

PHOTO COURTESY OF LOWER PLATTE NRD.

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WEDNESDAY, JANUARY 31, 2018, AGENDA

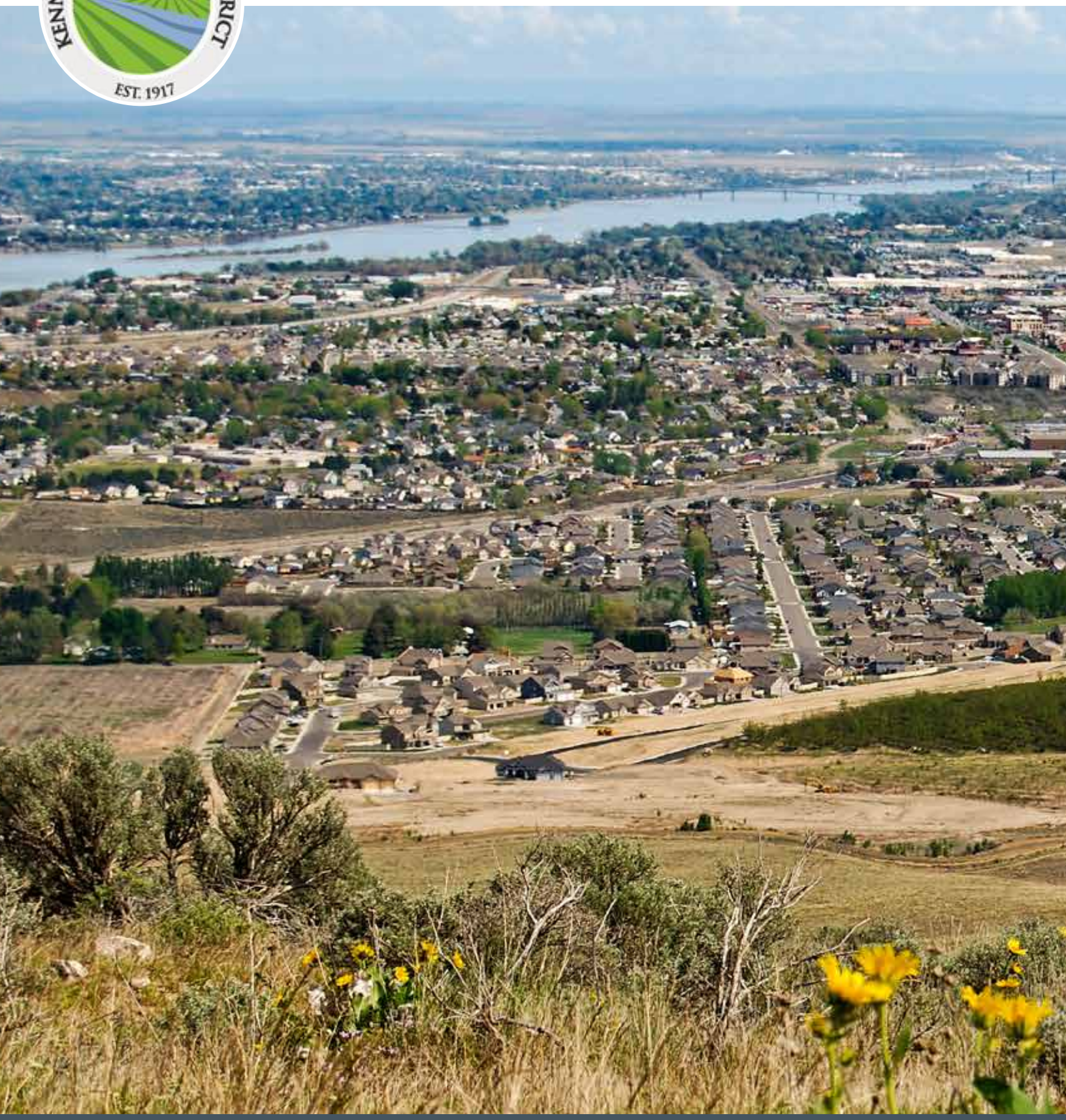
8:00 a.m.	Military Leadership and Delegation of Command
8:30 a.m.	Management Styles, Motivating and Retaining Employees
10:00 a.m.	Networking Break
10:30 a.m.	Educating New Board Members/Retaining Institutional Knowledge
11:30 a.m.	Leading Through Video
12:00 p.m.	Lunch on Your Own
1:30 p.m.	Pump Timing and Upgrades to Reduce Load
2:30 p.m.	Australian Flood Irrigation Methods
3:00 p.m.	Ice Cream Sundae Break
3:30 p.m.	Efficient Customer Service with On-Screen Customer Displays
4:00 p.m.	Canal Maintenance and Development Partnerships
5:00 p.m.	Canal Tour and Reception

THURSDAY, FEBRUARY 1, 2018, AGENDA

8:00 a.m.	Arc Flash Protection and Panel Replacement Plans
9:00 a.m.	Keeping Your People Safe: Facility and Personnel Attack Indicators
10:00 a.m.	Networking Break
10:30 a.m.	Ideal Canal Structure Configurations and Materials for Safety/Reduced Liability Around Headworks
12:00 p.m.	Sponsored Lunch
1:30 p.m.	New Zealand Irrigation Education Tour Observations
3:00 p.m.	Networking Break
3:30 p.m.	Innovative Technologies • Low-Head Hydro Turbines • Low-Maintenance Meters • Pickup-Mounted Ditch Burner
5:00 p.m.	Open Forum
5:30 p.m.	Reception; Australia Irrigation Education Tour (February 17–24, 2018)

PHOTO COURTESY OF CROWNE PLAZA PHOENIX AIRPORT HOTEL.

MAKING THE DES



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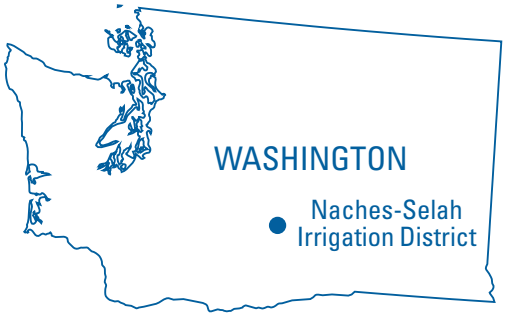
Naches-Selah Irrigation District Reigning in Debris With Worthington Debris Barriers

Irrigation districts face many operational challenges, including the risk of physical damage to their facilities from debris in the rivers from which they draw water. Forest fires, mudslides, tornadoes, and even seasonal changes can deposit ice, logs, dirt, and other debris into a river and hinder the effectiveness of irrigation systems. Such damage can be costly and time consuming for a district to repair, but Worthington Products, Inc. is leading the way with solutions to prevent canals and diversions from being damaged in the first place. The company's floating booms are designed to stop logs and other large debris from moving into important water systems and to adapt to the size of a river or canal in which they may be needed.



One of many water entities that have seen firsthand the effectiveness of Worthington's boom products is the Naches-Selah Irrigation District in Selah, Washington. Justin Harter, the district's general manager, purchased the booms after several automated gates at one of Naches-Selah's structures were damaged by log debris.

Mr. Harter had first seen a TUFFBOOM model in use at the Washington State Department of Fish and Wildlife's (WDFW) Manastach Creek canal diversion project. He also discussed boom solutions with representatives at a Worthington exhibitor booth during a conference. Positive reviews from the WDFW and the other customers helped convince Naches-Selah Irrigation District and Mr. Harter that Worthington's booms could prevent damage to district facilities, particularly the newer gates the district had recently purchased and wanted to protect. Mr. Harter noted, "The greatest motivation we had for getting these booms was attaining the ability to deal with these debris issues—to remove the logs on our terms in a way that was safer and more efficient."

The Naches-Selah Irrigation District purchased two booms to

PHOTO COURTESY OF NACHES-SELAH IRRIGATION DISTRICT.

Naches River diversion. The TUFFBOOM protected facilities during a flood event, helping to maintain canal diversion flows.

protect its gates and diversion facilities. The booms consist of 10-foot sections with polystyrene foam injected inside the plastic housing tube. Options of screens or rubber can be added to extend from the bottom of the boom assemblies to prevent logs from submerging and passing beneath the boom or to keep leaves and forest litter from reaching and plugging downstream fish screens.

Worthington booms are also designed to stop and even save a person who may have fallen into the river. Rather than being made as simple round tubes, the boom sections include shapes with protrusions that can provide handholds that a person can grab onto if he or she were in the water. Some models can even help provide security for water systems by stopping boats and other vehicles from continuing downstream. Other large booms have additional safety features that include protected walkway areas.

Mr. Harter has purchased two of Worthington's TUFFBOOM models, which is the standard model of the product line. Naches-Selah purchased a 50-foot boom in 2013 and, after having success with it, a 30-foot boom in 2015. "We were able to order as many 10-foot sections as we needed to achieve the correct length. The 10-foot sections were light enough for two people to pick up and handle. When we received them, our workers assembled them onsite by following the clear instructions that were included, and they installed the assembly in the canal. We also experienced very good customer support from Worthington," Mr. Harter said.

> "The greatest motivation we had for getting these booms was attaining the ability to deal with these debris issues and remove the logs on our terms in a way that was safer and more efficient."
>
> —JUSTIN HARTER

Each boom captures logs and other debris as they come downstream, especially during high water events when it is not safe for district personnel to be on the diversion canal, thus protecting both the district's infrastructure and its workers. The booms also help protect a nearby fish ladder that must be maintained as part of Washington State regulations for fish passage. Once the flood event subsides and the water level recedes, workers can remove the logs and clean up any other debris.

Mr. Harter noted that the district has been satisfied thus far with the durability of the Worthington products. "The booms can take a lot of abuse, especially the TUFFBOOM version that we have. We have noticed a small amount of wear and tear on ours from the river, but they are holding up very well overall. It seems they could last a couple of decades without any problems," he said. IL

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THE SCREENS SEEN AROUND THE WORLD

Versatility and adaptability are among the keys to success in any business, and companies with those traits can set themselves up for sustained growth. Riverscreen, Inc., is one of these companies. It has worked to maximize the appeal and utility of its products to as many industries as possible. The company has not only established itself in the United States, but it is also known around the world.

Riverscreens are found in over 40 countries. Company founder, Bob Wietharn, explained, "We sell Riverscreens to the five pivot manufacturers, which gives us a lot of exposure on a global basis. We recently set up dealers in Russia, which is currently a hotspot in the market for irrigation equipment. Riverscreen, Inc., has dealers in Australia, Canada, New Zealand, and South Africa, as well as other countries that market the Riverscreen products. Currently, we are working to establish dealers in Spain, Sudan, and Ukraine."

Riverscreen products are used by agricultural, municipal, and industrial water users in dozens of nations. However, despite the company's expanding global profile, Mr. Wietharn has maintained a commitment to providing personalized products and customer service to address the challenges of each individual customer.

Riverscreen, Inc., is a family business. Sixteen individuals work for the company, including Mr. Wietharn, his wife, his son, and his daughter. Responsibilities can vary on any given day among the team members. He explained, "We rely on all team members to pitch in wherever needed every day, especially during our busy season."

Distinguishing Characteristics

Riverscreens come in a variety of sizes. According to Mr. Wietharn, "We make 3-, 4-, 6-, 8-, 10-, and 12-inch screens (matching the size of the suction line) for creek, river, lagoon, and similar applications. Our gravity flow system comes in four different sizes (4-, 8-, 12-, and 16-inch) for wet wells, floating pumps, and similar setups. With the gravity flow system, the output lines are submerged, which negates the need for priming."

The standard on the Riverscreen is 8 mesh; however, the company has the capability to customize the mesh size on the screen based on customer preference. The mesh size ranges from 8 to 300; the number represents the number

PHOTOS COURTESY OF RIVERSCREEN, INC.

of wires per inch. To put that range into perspective, a typical screen door has a screen that is approximately 20–30 mesh.

Mr. Wietharn describes the screens as fish approved, meaning they are designed to ensure that fish do not get caught in them. He explained, "This makes our product very attractive to water users who must operate in waterways with high fish populations or who are required to use screens that are safe for fish. Customers in the United States, Canada, and Russia have purchased Riverscreens to meet their local requirements."

Riverscreens at work.

Applications Beyond Irrigation

Riverscreen, Inc., has sold products to customers undertaking a variety of projects. One example of such customers are almond growers in an irrigation district near Ripon, California. These growers use 120-mesh screen for their drip tape, as they need to filter the water for irrigating their orchards. In another example, the building of a section for the Keystone XL pipeline used Riverscreens to pump water out of shallow creeks to pressurize the pipeline. Mr. Wietharn stated, "We have also sold to the logging industry, which pumps water onto logs to keep them wet until they are cut into smaller pieces, and to the fracking industry, which uses our screens for the water sources used to help fracture shale formations."

"We have sold a unit to a village in Papua, New Guinea, that filters the sediment from the water they drink and bathe in. My landlord's daughter and son-in-law are currently doing missionary work there and spoke with me about how we might be able to help the village they work in. They sent me bottles of water containing sediment, to show me what is available to the villagers. Our screen was able to filter out most of the sediment, allowing the villagers access to much cleaner water."

Pressure and Flow

A standard Riverscreen allows a centrifugal pump to draw water from as little as 4 inches while screening out the debris and trash. According to Mr. Wietharn, the drum will turn if there is a flow in the stream equivalent to an average walking speed of 3 to 4 miles per hour. "The key is to have enough flow coming through one side of the drum to rotate it. Water pressure is taken from the discharge side of the pump to clean the screen from the inside out. If the Riverscreen is in still water, for example, a pond or tail water pit, we can use water-driven jets that blow onto angle iron to turn the drum."

For more severe conditions like those found at food processing plants, municipal lagoons, and farms with livestock lagoons, Riverscreen uses an electric motor drive to turn the drum. Because pumping requirements vary, Riverscreen offers a 12 volt for engine-driven pumps, and single or three-phase in a low- or high-voltage option(s) at 120, 240, and 480, available in 50 or 60 hertz.

Riverscreen also offers an optional foot valve to help prime the pump. Mr. Wietharn explained, "We designed the foot valve to help customers who struggle to get their pumps primed. There is also a pressure relief component, which was added after several customers had problems with a water hammer coming back after they stopped pumping water uphill. I designed a pressure relief with a stainless steel spring, which resists rust, to prevent a water hammer from damaging the foot valve in the Riverscreen when the pump shuts down."

Personalized Customer Service

For Bob Wietharn and Riverscreen, Inc., the goal is to make a screen that will work and serve the needs of the customer. "Customers can call me personally, and I will do whatever I can to help solve their problem(s). It is a core principle of how we operate our business, and it has been well received. Our designs are versatile enough that they can usually be adapted to almost any application. I personally like the challenge of assisting customers with their irrigation needs." IL

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The Ram Flame Ditch Burner's vertical lift allows the boom to be lowered deep into the ditch.

BURNING WEEDS FROM THE BACK OF A PICKUP

Wayne Bistodeau of Multi-Trail Enterprises and Ram Flame

Many people would find it difficult to establish and grow a business based on either snow or fire, let alone one based on both. But that is precisely what Wayne Bistodeau of Multi-Trail Enterprises has done. After growing up and living much of his life in southern Michigan as a farrier and metalworker, Mr. Bistodeau moved his family to northern Idaho. There, he founded Multi-Trail Enterprises, which began making versatile trailers for off-road vehicles and snowblowers and has grown to include the Ram Flame line of flamers designed to incinerate weeds in crop fields and irrigation ditches.

Multi-Trail Enterprises now has a full line of products for summer and winter applications. The company is a family business run by Mr. Bistodeau and his daughter, who remain committed to quality products and personalized customer service. Mr. Bistodeau recently spoke with Irrigation Leader*'s editor-in-chief, Kris Polly, about the importance of running a family business that cares about its customers and the innovative products Multi-Trail Enterprises is developing.*

Wayne Bistodeau and his daughter, Jamie Bistodeau.

Kris Polly: Please provide a general overview of your company and what it does.

Wayne Bistodeau: We build agricultural burners for irrigation ditch burning, row-crop burning, and field burning for preemergence on weeds and insects. We started out doing general fabrication and metal work, but snowblowers quickly became our predominant product line. We make models that can be mounted on the front of ATVs, pickup trucks, or tractors that range from 19 to 40 horsepower.

We bought Ram Flame a few years ago to focus on equipment for burning irrigation ditches. Our first flamers burned diesel, but we now use propane, which is cleaner, more efficient, and easier to use. The burners can be mounted on the back of tractors, on the back of flatbed trucks, or on towed trailers. Our newest model can even be placed in the bed of pickup trucks.

Kris Polly: What was the first product you manufactured after starting your business?

Wayne Bistodeau: Our first product was called the Multi-Trailer, and it was what the business was named for. It was a 4-x-8-foot trailer that customers could load their

PHOTOS COURTESY OF WAYNE BISTODEAU.

ATV onto, hook up to their vehicle, unload the ATV from, and then fold in the sides and wheels so that the trailer could then be towed by the ATV. We also made a version that had skis so customers could do the same thing with snowmobiles. It was a versatile trailer that could fold up and fit in the back of a station wagon if needed. We built that product for about 10 years before it went away, but we are considering bringing it back this fall, because we have received requests from customers to reintroduce it.

Kris Polly: How many employees do you have?

Wayne Bistodeau: Multi-Trail Enterprises is a family business—a father-daughter business. My daughter does a lot of the welding, powder coating, steel cutting, accounting, purchasing, and anything else that needs to be done to keep the business going. We have three to eight employees at any given time, depending on the season.

Kris Polly: Please tell us more about the new truck-mounted flamer.

Wayne Bistodeau: It is manually guided and based around a 15-foot hand-held wand that the operator in the back of the truck can manipulate to place the flamer where it is needed in the ditch. We wanted the flamer to fit in a pickup because although not every irrigation district has tractors, they all have pickup trucks—and many have propane tanks and hoses in the back already. Our product augments and works with the equipment districts already have, saving the customer time and money.

The reach of the wand allows the operator to reach the ditch with the flamer without having to walk and stumble through the vegetation in the ditch itself. The flamer also has an adjustable head that can be set to burn straight down to the center of the ditch, to either side of the ditch, or even to both sides simultaneously. Operators ride in the bed of the truck and ignite the ditch from there, and the other crewmember drives. The wand can be rotated 360 degrees and can operate in any direction as needed. Another safety feature is the grip of the wand, which will cut off the flame if the operator lets go of it.

Kris Polly: Can the truck-mounted flamer easily be moved from one truck to another, or does it have to be set up for one specific truck with proprietary mounting hardware?

Wayne Bistodeau: It is mounted via a 4-x-8-foot plate of ⅜-inch-thick steel that it sits on. A tractor or forklift can pick up the entire machine using that plate and place it in the back of any pickup truck. There is no special bracket or hardware needed to secure the unit. The propane tank sits on top of the flamer in the back of the truck, which helps hold it in place.

Kris Polly: How big is the propane tank?

Wayne Bistodeau: The flamer can use any size tank from 7 to 120 gallons, depending on what the customer wants to use. We do not supply the tank due to the financial and regulatory challenges of shipping them. Customers will usually rent a tank from their local propane company.

Kris Polly: Please describe your field flamer products.

Wayne Bistodeau: We have several different models, including a full-field flamer that is 8- to 24-feet wide and designed to work on preemergence during the preparation of the field prior to planting. This kills any weeds, seeds, and insects that may be present. We also have row crop models that can be run as open flamers or can work between rows of crops. We have just developed a new model for crops that cannot withstand the heat of a flamer, such as sugar beets, peanuts, or melons. This version keeps the flame contained in a box that prevents it from harming the crop. Customers who grow other specialty crops have asked us to develop other one-off products, and we have been able to accommodate those requests.

Kris Polly: What makes your company different from others in the market?

Wayne Bistodeau: We are unique because we do not mass produce thousands of units and place them in box stores or a large network of dealerships. We build a limited number every year based on what we believe our customers will require. We build to order, and our goal is to make the highest-quality machines on the market rather than simply producing and selling large numbers of units. All production, sales, service, and warranty work is done directly through us. We build 99 percent of everything in-house and have a small machine shop. We do our own fabricating, breaking, bending, cutting, and finishing work, which includes sandblasting and powder coating. This allows us to maintain high levels of quality and control our production and delivery schedule rather than depend on a third party.

Being small and centralized also allows us to efficiently respond to customer issues. End users can always call us if they ever have any issue with our product, and we will resolve it. Because we are the ones who designed and built the machines, we can quickly and easily help customers with any issues they are having, and our customers greatly appreciate that. This process also allows us to obtain feedback from our customers; we use that feedback to improve our current products and develop new ones based on our customers' needs. If a flaw or an issue with a design is discovered, we will proactively send customers parts and guidance to prevent the machine from breaking down later. The goal is always to keep the machines up and running, so the customer can get the most out of them. IL

For more information about the Ram Flame, contact Wayne Bistodeau at mte@sandpoint.net.

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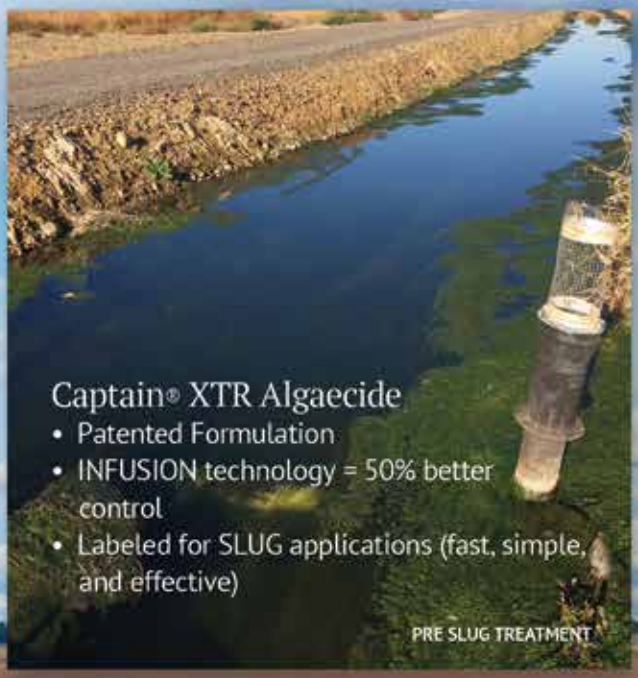

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For more information, please contact Robert Boling, PE, Robert.Boling@hdrinc.com

"Your team's diligent execution of this challenging project in a severely constricted construction window surpassed expectations."

Julie L. Labonte, P.E. M.S.
Director - Water System Improvement Program
San Francisco Public Utilities Commission

HDR supported the USACE during the construction phase for the Joint Federal Project control structure and spillway.

HDR's construction management helps the San Francisco Public Utilities Commission (SFPUC) meet state requirements for dam and spillway safety.

FOLSOM DAM, CA

Services for USACE:

- Performed structural and mechanical engineering related tasks during construction
- Completed a study to evaluate the safe and efficient operation of Folsom Dam after the JFP auxiliary spillway construction, including detailed analysis of impacts to seasonal storage variations and how those impacts affect:
  - Water supply/power generation
  - Critical environmental factors such as temperature, sedimentation and water quality
- Developed a new Water Control Manual

LOWER CRYSTAL SPRINGS DAM, CA

Services for SFPUC:

- Full spectrum of construction management services
  - Overseeing the successful spillway widening construction
  - Raising the parapet wall
  - Replacing the stilling basin with a larger new facility
- APWA 2013 Award for Lower Crystal Springs Dam CM

HDR provided monitoring, evaluation, inspection and design services in response to the Oroville Dam spillway failure and recovery in support of the California Department of Water Resources (DWR).

The proposed Centennial Dam for Nevada Irrigation District (NID) will create much needed new water supply options for the Sierra Nevada Foothills north of Sacramento, CA.

OROVILLE DAM, CA

Ongoing dam safety services provided:

- Structural, hydraulic and geotechnical analyses
- Rope access radial gate, penstock and pipeline inspections; forensic investigations; and seepage and stability analyses
- Probable Maximum Precipitation (PMP) and Probably Maximum Flood (PMF) development and spillway routing

CENTENNIAL DAM, CA

Services for NID:

- Leading the environmental permitting for the proposed dam since 2016
- Extensive FERC licensing support for other projects that include hydropower facilities

Upcoming Events

October 3	CLE International, Texas Water Law Conference, San Antonio, TX
October 5	Oregon Water Resources Congress, Water Law Seminar, Redmond, OR
October 8–14	International Commission on Irrigation and Drainage International Congress, Mexico City, Mexico
October 10–14	Association of California Water Agencies, Northern California Tour 2017, Sacramento, CA
October 12–13	CLE International, Tribal Water Law Conference, Las Vegas, NV
October 14–15	United States Society on Dams, Lessons Learned from Recent Tailings Dam Failures: A Path Forward, San Antonio, TX
October 18–20	Texas Water Conservation Association, Fall Meeting, San Antonio, TX
October 20–22	United States Society on Dams, The Challenges of Dams in Cold Climates, Girdwood, AK
October 24–27	United States Committee on Irrigation and Drainage, Conference, Sacramento, CA
October 24–27	Wyoming Water Association, 2017 Annual Meeting and Education Seminar, Sheridan, WY
October 25	Utah Water Users Association, Utah Water Summit, Provo, UT
November 1	Association of California Water Agencies, San Joaquin River Restoration Tour 2017, Fresno, CA
November 6–10	Irrigation Association, 2017 Irrigation Show & Education Conference, Orlando, FL
November 9–10	Idaho Water Users Association, 34th Water Law Seminar, Boise, ID
November 11–12	CLE International, Utah Water Conference, Salt Lake City, UT
November 15–17	National Water Resources Association, Annual Meeting, Tucson, AZ
November 20–22	Nebraska Water Resource Association & Nebraska State Irrigation Association Joint Convention, Kearney, NE
November 28–December 1	Oregon Water Resources Congress Annual Conference, Hood River, OR
November 28–December 1	Association of California Water Agencies, Fall Conference & Exhibition, Anaheim, CA
January 31–February 1, 2018	*Irrigation Leader* Magazine's 6th Annual Operations and Management Workshop, Phoenix, AZ
February 17–24, 2018	Australia Irrigation Education Tour

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