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Quenching a **big** Thirst

Irrigation has changed — and so will its users.

There are no substitutes, no alternatives, for water. Irrigation expert Jeffrey Bruce, owner of Jeffrey L. Bruce & Co., North Kansas City, MO, believes that as water becomes more scarce and valued, high-volume users need to become more involved in the design process of their irrigation systems to get the most of this precious commodity. Providing services in irrigation water planning and management, as well as irrigation design and consulting, Bruce knows the ins and outs of irrigation. His company designed the irrigation system and engineered nine different soil profiles for a 97-acre Chicago campus that includes Soldier Field stadium, the Field Museum of Natural History, Adler Planetarium and the Shedd Aquarium. He is a Fellow of the American Society of Landscape Architects, and spoke with us regarding the changing world of irrigation.

restricting water use and restricting how much water can be used for lawns and ornamental purposes. That's going to be the next decade's focus — water permitting and water use. There is an interesting quote, and I'll paraphrase it: "The last war was for oil, the next war will be for water." What we are seeing is that water is a future utility; it's almost going to be a future commodity. We look at some of the arid locations of the US. [Communities] are growing and consuming vast amounts of water. What we have also seen in the past 30 years has been reclaimed water use (i.e., water recycled from treatment plants, on-site recycling, draining parking lots into storage basins and using it for landscape use).

AMERICAN NURSERYMAN: How have the uses of irrigation changed over the past 30 years?

Bruce: Irrigation users are becoming much more sophisticated in the use and application of water. We are really seeing an expansion in the commercial turf market. Thirty years ago, I would say the great majority of irrigation was found in agricultural use. The precision in which water is applied, monitored and operated, and the advent of sensors that would verify conditions for irrigation; these are the really significant changes.

Also the drip application as it relates to landscape. Drip is really focused on a precision application of water where water is not plentiful. A lot of municipalities are

AN: What's new, far out and coming up in the future?

Bruce: What we are really seeing in the future — and some of it is already here — is that management control systems are getting very sophisticated. There is a system currently for small homeowner use that you purchase as a subscription service. It is satellite-based, and it will read



The landscaped rise behind Bruce serves as the roof to a 2,500 vehicle underground parking garage.

evaporation transpiration of the landscape in that area off of the subscription service. It will automatically adjust clock time so you will save water.

Traditionally, you've got an irrigation controller that opens a valve that allows water to flow through a pipe to run sprinkler heads. Each one of those required a single wire to them in order to operate. Typically, the older systems had bigger wiring cables in the ground to control all those valves. The new systems out on the market now are what they call two-wire systems, where you just lay two wires in the ground, and the valves or decoders are addressable. So it's almost like a little network instead of something like an on/off switch in your house. It would be more like a computer network where the controller broadcasts and says, "Valve 103, open," and all the valves are listening. What that does is significantly reduce the amount of wiring required, and it makes it much simpler when troubleshooting the system.

What we are seeing coming out of the future really strong is wireless technology. Control systems in the future won't be wired to each other. The industry is currently looking at different unobstructed frequencies to file with the Federal Communications Commission in order to secure wireless frequencies for equipment like this. Once they get that set up, you will be calling the valves in the field by radio as opposed to wire. Ninety percent of the problems with irrigation systems can be found in the wiring harnesses. If you get rid of that wiring harness, it would create a fairly reliable system.

The other thing we are seeing are the capabilities of software and software management. These things can do incredibly sophisticated water management. You can attach a 500-gallon-per-minute pump to one of these systems and have 300 valves out in the field, and

the software will pick and choose and match up valves to run the pump at its maximum efficiency level. The system will turn on and off valves in an orchestrated way to keep the pump operating at a high efficiency.

AN: What's new in irrigation for the green industry?

Bruce: We here are heavily involved in understanding soil moisture management. As we develop urban areas, I just don't think it continues to be productive

to rob topsoil from agricultural lands. So what we have been very involved in is the development of engineered soils for urban applications. We make our own soils out of sand, compost, ground-up concrete. That's really what I think we will see a strong movement to — engineered growing mediums and soils. That's something the nursery business has been involved in for quite a while.

AN: How is the irrigation industry dealing with water use restrictions?

Bruce: That requires us to be much more precise and strategic in water use. It sort of spawned specialties like irrigation auditing — auditing the performance of an irrigation system to define how to make it more efficient. A lot of big water users will have systems audited to precisely see where areas can improve performance. The other thing is the permitting side. It's required additional sophistication in water permitting.

Some municipalities in California require landscape water use plans to be submitted in order to be permitted. It really has required the irrigation industry to be more sophisticated and strategic in water use. It fostered alternative water uses, like reclaimed water.



Bruce inspects a core sample of one of nine soils his firm engineered specifically for Chicago's Museum Campus.



North Kansas City-based Jeffrey L. Bruce & Co. designed specific irrigation systems for a variety of applications on the Museum Campus.

AN: How does irrigation figure into the prolonged Western drought?

Bruce: It continues to keep water usage as a key issue at the legislative level, and it continues to focus it as a critical resources issue. There have been good and bad attempts to react to it through codification or legislation. There have been municipalities that have just outlawed outdoor irrigation. I'm not sure that is necessarily an appropriate solution. In the past 10 or 15 years it has prompted hydro zoning, where a household is given a certain allowance of water and that water is zoned out in your back yard.

AN: What are some of the latest innovations in irrigation design?

Bruce: A lot of it's in the evaluation processes. There is some very sophisticated design program software coming out that will do automatic pipe sizing, zone layout and head layout. There are new sensors coming out that will shut a system down when it gets close to freezing; sensors that will measure soil moisture or rain. Those are becoming much more affordable for the lower-end commercial and residential markets.

AN: What does the green industry need to know about irrigation that it may not now know?

Bruce: Good irrigation design requires the knowledge of a lot of things, and it needs to be tailored to the owner's best use. What I consider to be a threat

to the industry is that the industry is being more and more driven by design/build. Owners, developers and managers do not understand the value of a properly designed system, and a design/build market in which initial construction cost drives the market, is driving the industry.

The capital cost of an irrigation system is probably 10 percent of its operating cost over its life cycle. So the end user is making a very poor decision on picking cheap equipment or not having a professional to design the system when for the next 20 or 30 years they are paying for water that is not being applied efficiently. The cost of the equipment and the design is negligible compared with the life cycle cost of the system, and the industry is too often making very short-sighted decisions on construction costs that have significant negative impact to the end user through the life of the system.

A lot of the design/build market is run by a different agenda. I think there's going to be a need to redress the design/build market in areas where water restrictions are gaining acceptance. It's going to require a much more sophisticated knowledge of water application and usage in order to get permits in the future. Right now most of the commercial work in Chicago or Kansas City is all design/build. There are very few professional irrigation consultants or designers in those areas because no one understands the value.



The 97-acre campus is located on the city's lakefront and includes the Field Museum of Natural History, Shedd Aquarium, Adler Planetarium and the unique Soldier Field (background), home of the Chicago Bears.

AN: What should the green industry anticipate?

Bruce: One thing we are going to see in the green industry is involvement, especially in large land development. We are going to need a greater range of specialists early on in the project in the planning process in order to make these systems sustainable and work right. Typically now we will see the green industry individual after the design plan is out on the street and almost bid. In the future I really think they need to be involved in project conception. That's going to require a lot of collaboration and innovation among those in the green industry. These urban problems are becoming more complicated and require much more planning and innovation in order to solve these problems within a sustainable approach.