

# Rural Water Use in an Urbanizing Environment

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## A. Introduction

This outline addresses some of the water law and policy issues raised when formerly surface-water-irrigated farmland is converted to residential subdivisions or other urban uses. The outline focuses primarily on the Treasure Valley in Southwest Idaho because it is a fast-growing region and this phenomenon is occurring there rapidly.<sup>1</sup> But the analysis applies equally to other areas of the State.

Due to state and local policies and laws, many, if not most, of the Treasure Valley's new residential subdivisions are irrigated under the same surface water rights that were used to irrigate crops on the agricultural land on which the subdivisions were established. In the typical situation, the canal company or irrigation district serving the agricultural area has continued to use its canal, ditch, and lateral system to deliver the full amount of water historically delivered to the entire tract, even though substantial portions of it may be converted, through subdivision and commercial development, to impervious or non-irrigated areas. This continued full water delivery provides the developed land substantially more water per acre for urban lawns and landscaping than the irrigated farm land received. This paper outlines several of the water law and policy considerations that come into play in this situation.

The outline presents information about water law and hydrology that are intended to help inform the ongoing discussion about how we are to maximize our water resources for the well-being of our citizens and for the benefit of future generations of Idahoans. Efficiency serves these interests; waste, non-use, and a failure to allow water markets to work undercuts them.

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<sup>1</sup> The Treasure Valley includes, among others, the cities of Nampa, Caldwell, Boise, Meridian, Eagle, Kuna, Star, Middleton, Notus, and Parma. It is Idaho's fastest-growing area, with a 2007 population of approximately 600,000.

## B. Legal principles

1. The basics from Idaho’s Constitution. “The right to divert and appropriate the unappropriated waters of any natural stream to beneficial uses shall never be denied, except that the state may regulate and limit the use thereof for power purposes.” Idaho Const. art. 15, § 3. “Priority of appropriation shall give the better right as between those using the water.” Idaho Const. art. 15, § 3.

- (a) It is a “constitutional requirement that priority over water be extended only to those using the water.” *American Falls Reservoir District No. 2 v. Idaho Department of Water Resources* (“*American Falls*”), 143 Idaho 862, 154 P.3d 433, 447-48 (2007).
- (b) The State is responsible for regulating the “just apportionment to, and economical use by, those making a beneficial application” of the “waters of the state,” and “in providing for its use, [the state] shall equally guard all the various interests involved.” I.C. § 42-101.
- (c) In a delivery call for water—that is, a situation where priorities are being asserted and senior users are asking the State to shut off juniors—the Idaho Department of Water Resources must consider not just priority, but also whether the senior has a need for the full amount of water being sought. The “Director ‘has the duty and authority’ to consider circumstances when the water user is not irrigating the full number of acres decreed under the water right.” *American Falls* at 447-48.

2. Duty of water. Irrigation water rights are limited to river or aquifer diversions of no more “than one second foot of water for each fifty (50) acres of land so irrigated,” unless more is shown to be necessary, in any event, and no one shall “use ... more water than can be beneficially applied on the lands” I.C. § 42-220.

- (a) A “second foot” is another way of saying a cubic foot per second (“cfs”), which is 448.8 gallons per minute. The “one second foot per 50 acres” rule expressed in section 42-220 means that the irrigator may divert from the source no more than .02 cfs per acre unless there is special justification for more. This rate of flow (.02 cfs, or 9 gallons per minute) is also known as a “miner’s inch.” There are fifty miner’s inches in a cfs. Accordingly, the permissible irrigation diversion rule is sometimes stated as one miner’s inch per acre.
- (b) “I.C. § 42-220 prohibits the senior appropriators, regardless of the amount of their decreed right, from ‘the use of more water than can be beneficially applied on the lands for the benefit of which such right may have been confirmed....’” *Briggs v. Golden Valley Land & Cattle Co.*, 97 Idaho 427, 435 n. 5 (1976).

- (c) This is the concept of duty of water: the amount the beneficial use needs, and no more. “It is a cardinal principle established by law and the adjudications of this court that the highest and greatest duty of water be required.” *Munn v. Twin Falls Canal Co.*, 43 Idaho 198, 207 (1926).
- (d) One inch per acre of diversions actually is quite a lot of water. Even the most consumptive irrigated crop in Idaho (alfalfa) consumes about 3 acre-feet per acre during an irrigation season. Diverting one inch fulltime for a 200 day irrigation season results in about 8 acre-feet of diversions—that is, such a diversion is only about 38% efficient. Indeed, many irrigation water rights have been decreed for less than an inch; 5/8 inch per acre (0.0125 cfs) is a commonly decreed amount that often is used. Of course, canals need water to carry sufficient amounts to users, so it is understood that more is diverted than actually is needed for the crop’s consumptive needs.

3. Continuing obligation to place water to beneficial use. “[T]he legislature has and does exercise a certain control over all the waters of the state while they are flowing in the natural channel of the stream, and the law follows the water, after it is diverted therefrom, to see that it is applied to a beneficial use.” *Boise Irrig. & Land Co. v. Stewart*, 10 Idaho 38, 48 (1904).

- (a) “Waters of the state belong to the public, and the private right which the individual acquires by appropriation or purchase is usufructuary only, and . . . at any given time the extent of his reasonable need is the measure of the maximum amount he is entitled for the time being to divert from the stream or to receive and use.” *Caldwell v. Twin Falls Salmon River Land & Water Co.*, 225 F.584, 595 (D. Idaho 1915).
- (b) “Concurrent with the right to use water in Idaho ‘first in time’ is the obligation to put that water to beneficial use. *Id.* “[T]he extent of beneficial use [i]s an inherent and necessary limitation upon the right to appropriate.” *Schodde v. Twin Falls Land & Water Co.*, 224 U.S. 107 (1912). “Neither the Idaho Constitution, nor statutes, permit irrigation districts and individual water right holders to waste water or unnecessarily hoard it without putting it to some beneficial use.” *American Falls* at 451.
- (c) “[I]t is the duty of a prior appropriator to allow the water, which he has the right to use, to flow down the channel for the benefit of junior appropriators at times when he has no immediate need for the use thereof.” *Mountain Home Irrig. Dist. v. Duffy*, 79 Idaho 435, 442 (1957). Again, the concept of first in time—the priority element—does not even come into play, and cannot be used, except between those beneficially “using the water.” Idaho Const. Art. 15 § 3; *American Falls* at 447-48.

4. The Federal Reclamation Act of 1902. The Reclamation Act comes into play in the Treasure Valley because approximately 1 million acre-feet of storage water is

held under Bureau contracts for irrigation here. While the Act was adopted primarily to provide agricultural irrigation water to farms and ranches—mainly by means of federal storage projects—increasing amounts of this storage are being held or delivered by irrigation entities to irrigate suburban lawns and similar non-agricultural areas.

- (a) The United States, in carrying out the mandates of the Reclamation Act, must proceed pursuant to state water law, at least so long as such law does not frustrate the purposes of the federal act.<sup>2</sup>
- (b) The Reclamation Act also provides: “The right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right.” 43 U.S.C. § 372. The second clause of this statement succinctly describes the essence of western water law.
- (c) The Bureau has recognized the beneficial use requirement in relation to the question of whether, or to what extent, to renew storage water contracts with irrigation entities (e.g., contracts, involving Lucky Peak Reservoir storage on the Boise River):
  - A 1998 Bureau Memo contains no mention of beneficial use as an element to consider in water service contract renewals. *Memorandum from Commissioner to Regional Directors Re: Policy for Guidance on Interpretation of the Act of July 2, 1956, “Administration of Contracts Under Section 9, Reclamation Project Act of 1939”* (September 18, 1998).
  - In contrast, a 2000 Bureau Memo states that “[u]se of Reclamation project water is subject to state and Federal laws requiring beneficial use. An opportunity for a determination of beneficial use is the performance of a water needs assessment prior to entering contract renewals, amendments, or new contract initiatives. If a non-beneficial use of water is found to exist, the contracting process shall be used, as appropriate, to eliminate such use.” *Memorandum from Commissioner to Regional Directors Re: Water-Related Contracts and Repayment Policy* at 1 (March 20, 2000).
  - With regard to Lucky Peak storage contract renewals in recent years, no assessments were performed to determine the extent of beneficial use of Bureau storage water.

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<sup>2</sup> “Nothing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or in any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this Act, shall proceed in conformity with such law, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to or from any interstate stream or waters thereof.” Section 8 of the Reclamation Act of 1902, 43 U.S.C. §§ 372 and 383.

## C. Urbanization and Surface Water Irrigation in Idaho

1. Rapid urbanization of agricultural lands in some areas. In Idaho’s Treasure Valley, about 3,000 acres are transitioning each year from irrigated agriculture to urban or suburban land uses, such as residential subdivisions, roads, and commercial areas. Other areas are experiencing similar growth onto formerly agricultural lands, particularly Twin Falls, Idaho Falls, and parts of Blaine County.

2. Local government ordinances require that suburban lawns be irrigated with surface water from canal companies and irrigation districts. Irrigation water from ditches and canals is supplied to most new subdivisions in Treasure Valley. City ordinances strongly encourage, or require, use of canal-delivered water for lawns and common areas—typically in pressurized systems that can supply standard in-ground sprinkler systems.

(a) For example, the Boise City Code provides:

No subdivision plat shall be approved for residential development unless the developer has provided for the design, construction, and installation of a pressurized individual lot irrigation system. Irrigation system maintenance and operation shall be provided by the irrigation district or canal company within which the development lies, by a municipal irrigation district, or by the formation of another entity capable of operating and maintaining a pressurized irrigation system.

Boise City Ord. No. 5819 as amended 10/28/1997.

(b) The City of Meridian’s pressurized irrigation ordinance requires constant surface water flow of 15 gallons per minute per user (21,600 gpd), delivered at the point of use.

(c) Eagle’s “Pressure Irrigation Standards” employ a “probability factor” to account for the possibility that all homeowners will sprinkle their lawns at the same time. This could lead to the situation where, for example, all 40 acres of subdivision irrigation in an 80-acre tract are irrigated at the same time, and water flows are required to provide this. In contrast, the farmer originally irrigated the tract at no more than about 9 acres at a time (see sections C.5 and 6, below.)

(d) Blaine County has adopted an ordinance to the effect that existing on-site surface and ground water irrigation rights should be used before allowing new water rights to be established for housing developments. Blaine County Code §§ 9-21B-15.B.8.d; and 10-5-3.F. The effect of this typically is to require a “dual” system, with the existing surface or ground water irrigation rights supplying the irrigation component, leaving the in-house culinary uses to be supplied by a new municipal water right.

- (e) These requirements come with no directive or comment about principles such as duty of water, the rotation of deliveries among users, or the sizing of facilities to avoid diverting more than reasonably can be put to beneficial use.

3. State law. A recently enacted state statute also addresses this subject:

(1) The intent of this section is to encourage the use of surface water for irrigation. All applicants proposing to make land use changes shall be required to use surface water, where reasonably available, as the primary water source for irrigation. Surface water shall be deemed reasonably available if:

- (a) A surface water right is, or reasonably can be made, appurtenant to the land;
- (b) The land is entitled to distribution of surface water from an irrigation district, canal company, ditch users associations, or other irrigation delivery entity, and the entity's distribution system is capable of delivering the water to the land; or
- (c) An irrigation district, canal company, or other irrigation delivery entity has sufficient available surface water rights to apportion or allocate to the land and has a distribution system capable of delivering the water to the land.

I.C. § 67-6537. In addition, I.C. § 31-3805 requires subdivision developers of former agricultural land to either: 1) transfer the water rights to uses off the parcel; 2) install an irrigation system, approved by the local government with advice from the irrigation entity, for the subdivision that will use water provided by the irrigation entity; or 3) inform the lot buyers that neither of the above has been done and that the owner will remain obligated to pay any legal assessments the irrigation entity may impose on the lot owners. It is unclear how these two statutes operate together.

As is the case with the local ordinances, neither of these state statutes addresses the question of duty of water, rotation, or system sizing, nor the issue of beneficial use. However, as noted above, it remains a mandate of Idaho's Constitution that no more water be diverted than can be placed to beneficial use.

4. Reduced irrigation water use after development of farmland. About 30,000 acres of pressurized systems exist in the Treasure Valley. These have been constructed, for the most part, on formerly irrigated agricultural land. Not surprisingly, IDWR has found evidence that "less surface water is used for irrigation after the conversion of irrigated agriculture to suburban/urban land uses." *Final Report, Urban/Suburban Outdoor Water Use, Lower Boise River Valley* (August 2006) at 11.

Subdivision of former agricultural land usually results in 40% to 65% reduction in irrigated area; the reduction of irrigated area is particularly acute where substantial transportation infrastructure, shopping centers, apartment buildings, industries and other urban land uses are involved.

5. Historical rates of diversion usually not reduced. Irrigation district and canal company policy in the Treasure Valley and elsewhere in Idaho is not to reduce their river diversions to these subdivided, former agriculture areas, despite decreases in irrigated area.<sup>3</sup>

- (a) For example, consider an 80-acre alfalfa field receiving 80 miner's inches (1.6 cfs) of diversions. When it is subdivided into a 200-lot subdivision, the 80-acre parcel now has only, say, 40 irrigable acres. However, the irrigation entity continues to divert and deliver the full 80 inches for the development.
- (b) The transition from an 80-acre farm field to a dozen suburban lawns is even more complicated by this fact: in the farmer's hands, the field would be irrigated at a maximum rate of about 16 acres per day, with the sprinklers rotating to the next 16 acres the following day, and so on. In fact, it is common for turf farms to irrigate only once every seven days, even on 100-degree days.<sup>4</sup> However, if the residences built on the parcel together have 40 acres of lawn, with no rotation in place, they will have the perverse effect on the system of demanding more peak flow than the farmer needed.
- (c) Several reasons have been advanced for this approach. It provides a peaking capability for the irrigation system during periods of extreme temperature and irrigation demand, particularly systems that are not on a rotation or other watering schedule. It also minimizes both complaints from homeowners (concerned about low water pressure during peak irrigation times) and labor and management costs for the delivery entity. But it also raises legal and policy issues for future water management.

The following photograph illustrates the situation. This turf farmer is using a quarter-mile-long side roll sprinkler to irrigate an 80-acre field. The device puts water down on only about 1.8 acres at any given time, and then is moved after sets of 8-12 hours to cover

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<sup>3</sup> Officials with the Twin Falls Canal Company, for example, have confirmed that they do not attempt to reduce diversions as lands are taken out of production for subdivisions and similar non-irrigation uses. See, e.g., Deposition of Vince Alberdi, *In the Matter of Distribution of Water to Various Water Rights Held by or for A & B Irrig. Dist, et al. Idaho Department of Water Resources* (September 22, 2005).

<sup>4</sup> Turf, such as bluegrass in most suburban lawns, needs water every 4 to 7 days during the heat of the summer, the variation depending on soil type and other factors. Personal communication with Todd Moon, Stonecreek Turf Co., Meridian Idaho (October 24, 2007). Mr. Moon explained that he irrigates any given parcel of turf only once every seven days, even when temperatures are in the triple digits, Fahrenheit.

a new area. Typically, in a turf farm like this, the irrigator would use 4 or 5 such wheel lines, thus allowing about 9 acres to be irrigated at any one time. Under no circumstances does the farmer irrigate as much as half of the 80 acres at once, or pump into the sprinkler system the amount of water that would be required to irrigate, say, 40 acres at a time. He or she never irrigates any portion every day. In round numbers, the irrigator expects to irrigate every piece of turf once in 4-7 days.



6. Duty of water for suburban lawns and landscape. Delivery of, for example, 80 acres of water to 40 acres of use also makes the delivery rate outstrip the duty of water for the water right on the developed land. In the above example, the amount delivered per acre would increase from one inch per acre to two inches per acre as portions of the irrigation water right now are appurtenant to a house footprint, street, parking lot, highway interchange, commercial building, or similar use.

- (a) This presumably is inconsistent with the goal of water conservation, the decreed duty of water for the delivered right, and Idaho law imposing a standard duty of water allowing diversion flow rates of no more than one miner's inch (0.02 cfs) per acre.
- (b) More fundamentally, such a failure to reduce diversions in response to reduced irrigated area also assures that water is being diverted that is not being put to beneficial use. As the Idaho Supreme Court ruled in *American Falls Reservoir District No. 2 v. Idaho Department of Water Resources*, 143 Idaho 862, 154 P.3d 433, 447-48 (2007), it is a "constitutional requirement that priority over water be extended only to those using the water." (Emphasis added.)

7. Infrastructure sizing. The current practice also can result in construction of pressure irrigation delivery infrastructure that, to operate properly, continues to require the full historical head of water in the system. This can make it difficult to commit the unneeded portions of the water right to alternative uses. Typically, pumps and other water delivery facilities are sized to accommodate the full rate of flow formerly delivered to the overall site; they usually are not sized to deliver at a rate proportional to the part of the area that will remain in irrigation post-development. Therefore, changing to a lesser amount of flow after this equipment is in place would be expensive.

8. Water use management. Many subdivisions fail to impose rotation or other water use arrangement requirements, and the irrigation entities supplying the water (and controlling the water rights) do not see this as their responsibility.

9. Little conservation incentive. Pressurized irrigation water is inexpensive; fees and assessments paid to irrigation districts and canal companies are not based on the amount used, and deliveries to individual homes usually are not metered. Annual fees or assessments for this water typically range from \$30 to \$90 per household. Non-metering and low rates are disincentives to conservation of water.

10. Changes in ground water recharge. Conversion of significant areas of agricultural land to subdivisions, shopping malls and roadways also usually reduces both natural and incidental ground water recharge, particularly to shallow aquifers.

- (a) Lands that formerly were flood irrigated to grow row crops are giving way to development. Even though urban developments often retain significant areas of irrigated lawn and open space, typically more than half of the land in urbanized areas consists of impervious, non-irrigated surfaces.<sup>5</sup> These impervious surfaces increase surface runoff and preclude infiltration of precipitation.
- (b) Moreover, urban landscaped acres usually are served by sprinklers or drip systems that are more efficient than the gravity flood irrigation systems they may have replaced. In these cases, the result is less incidental recharge to ground water.<sup>6</sup> In the Treasure Valley, these pressurized irrigation systems receive the same surface irrigation water through the same canal system that served the cropland on which the urban development occurred, and the canal systems themselves continue to contribute to ground water recharge.
- (c) But the net effect of urbanization on formerly agricultural areas still appears to be a decline in both the amount of beneficial use of surface water for irrigation and declines in natural and incidental ground water recharge.

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<sup>5</sup> Personal communication, Zena Cook, Idaho Dep't of Water Resources, October 28, 2002.

<sup>6</sup> Recent studies have suggested that, for several reasons, suburban or commercial site lawn and landscape irrigation likely provides little direct ground water recharge. Many recharge-inducing lateral ditches are abandoned, lined or piped to accommodate urban development; lawn irrigation systems typically use sprinklers; and there is evidence that lawn irrigation itself often results in reduced soil perviousness due to compaction of soils and effects of grading during home construction. See e.g., NRDC, et al., *Paving Our Way to Water Shortages: How Sprawl Aggravates the Effects of Drought* at 5-6 (2002), citing EPA, *Clean Water Through Conservation*, EPA 841-B-95-002 (April 1995); Sakrison, R., *Water Use In Compact Communities: The Effect of New Urbanism, Growth Management and Conservation Measures on Residential Water Demands* (University of Washington, 1997); and Schueler, T., *The Peculiarities of Perviousness*, *Watershed Protection Techniques*, Vol. 2, Issue 1, 1995.

**D. Data gaps and questions concerning suburban surface water use in Idaho**

1. No studies or published data. There is no published data on the amount of water supplied to lawns and similar areas by canal entities in Idaho. As noted, these deliveries are not metered, and there are limited evaluations of pressurized systems. The area in Idaho in which this question has attracted the most attention is the Treasure Valley. However, the Bureau has observed that irrigation “drain flow data in the Boise Valley is relatively sparse.” *A Distributed Parameter Water Budget Data Base for the Boise Valley* (Jan. 2007) at 12. Irrigation entities not supplying drain flow information.

2. Bureau policy unclear. A significant amount of Bureau storage now is being supplied to suburban lawns from the Bureau reservoirs. The Bureau has not yet decided how to treat the use of federal storage for small tract irrigation (i.e., suburban lawns and landscaping).

3. What we know about irrigation water use in the Treasure Valley. Annual maximum irrigation consumptive use in the Valley is about 3.2 af/acre per year. It would be slightly less for most landscape shrubs.

- (a) To meet this duty of water, the standard permissible river diversion of one miner’s inch (9 gpm or 0.02 cfs) per acre results in a volume diverted from the river over the course of an irrigation season of up to 8 acre-feet per acre per year (e.g., .02 x 1.98 x 200 days = diversions of 7.92 af/acre). A “5/8 inch” right = diversion of 4.95 af/acre/year.
- (b) Amount supplied from the ditch into a pressure system could be close to consumptive use amount. Some pressurized systems use a pond for storage to meet peak demands.

**E. Potential downstream pressures for Boise River water.**

1. Endangered Species Act. There is always the possibility that there will be calls for Idaho to release additional water for salmon passage. This situation, and other “regulatory droughts” based on environmental concerns, could make it more difficult for Idaho to meet new demands for water use in the Treasure Valley.

2. Interstate allocation. *Washington v. Oregon*, 297 U.S. 517, 527 (1936) (“there must be no waste...of the treasure of a river.... Only diligence and good faith will keep the privilege alive.”); *Colorado v. New Mexico*, 459 U.S. 176 (1982) (“Wasteful and inefficient uses will not be protected.”)

3. In-basin delivery calls. River diverters may seek to shut off junior ground water users to supply these flow rates and volume to subdivisions. Conjunctive administration may mean these delivery calls are made against tributary ground water users in the Valley.

## **F. Conclusions**

There appear to be more irrigation diversions than can be put to beneficial use in subdivision systems in the Treasure Valley and elsewhere in Idaho.

The physical implications likely include:

- Excess water diverted but unused; foregone opportunities for new uses of this water.
- More water in drains.
- More water for some junior surface users with established water rights, but not necessarily for new businesses or new municipal uses.
- Some irrigators also may be short of water, particularly storage, due to failure to make full use of natural flows that could be available to them.
- In the Treasure Valley, this may mean more water in the Boise River below Star, more flowing to the Snake River and out of state.

It is in everyone's interest to obtain the data and understand what water use actually is going on with the irrigation water that serves parts of our State that are changing from agricultural to suburban uses. All interests are served when water is put to beneficial use, without waste.