


## ADMINISTRATOR'S MEMORANDUM

To: Regional Offices  
Water Allocation Bureau

Application Processing No. 76  
Licensing No. 15  
Transfer Processing No. 30  
Water Supply Bank Processing No. 3

From: Jeff Peppersack 

RE: **SEEPAGE LOSS STANDARDS FOR PONDS AND RESERVOIRS**

Date: March 5, 2015

### BACKGROUND

Idaho Code § 42-203A(5)(f) requires the Department to ensure that proposed water uses are not contrary to conservation of water resources when reviewing new water right applications. Idaho Code § 42-222(1) provides a similar requirement for transfer applications. For many water uses, the Idaho legislature or the Department has established standards intended to promote the efficient use of water. For example, irrigation use is limited to 0.02 cfs per acre unless the applicant can show a compelling need for additional water.

The need to address seepage loss has developed as the Department has seen an increase in water right applications and transfers which propose to store water in small impoundments for purposes, such as aesthetics, that require a full reservoir. The ability to keep a reservoir full requires an appropriation of water not just for a one-time early season fill, but also for the replacement of evaporation and seepage losses throughout the year.

On occasion, applicants or permit holders may have a geotechnical or site engineering report describing seepage loss expectations or test results. In such a case, the reviewer should reference and utilize the measured soil properties presented in the report. Oftentimes, no such report is available to the reviewer. This memorandum establishes guidelines for reviewing seepage losses from ponds and reservoirs to ensure that water rights for storage promote efficiency by meeting a reasonable conservation standard. Without a storage efficiency standard, the diversion of water to replace storage losses could reduce the availability of water for other appropriators.<sup>1</sup>

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<sup>1</sup> This guidance does not apply to applications seeking one fill annually with no refill provisions.

## SEEPAGE LOSS STANDARDS

The Alabama Agricultural Experiment Station Bulletin 599<sup>2</sup> provided the following mean seepage rates for ponds based on the following Unified Soil Classification System groups:

**SM** (silty sand, sand silt mixtures) = **0.2 ft per day**

**SC** (clayey sands, sand clay mixtures) = **0.007 ft per day**

**ML** (inorganic silts – very fine sands, silty, or clayey fine sands) = **0.02 ft per day**

**CL** (low to medium plasticity clays) = **0.003 ft per day**

**CH** (high plasticity clays) = **0.0003 ft per day.**

These published seepage rates provide reasonable seepage loss expectations for appropriately designed small ponds and reservoirs. In addition, soil type OL is very similar to ML; use 0.02 ft per day with this soil type. Soil types MH, OH, and PT are very similar to CH; use 0.0003 for these soils.

The maximum allowable seepage rate is 0.2 ft per day. In general, the Department should not authorize the appropriation of water to replace seepage losses in excess of these rates, except as described in this memorandum.

The following soil types are all sandy and/or gravelly soils that would likely exceed 0.2 ft per day.

**GW** (well-graded gravels and gravel-sand mixtures)

**GP** (poorly graded gravels and sandy gravel mixtures with little or no fines)

**GM** (silty gravel and poorly graded gravel/sand-silt mixtures)

**GC** (clayey gravels and poorly graded gravel-sand-clay mixtures)

**SW** (well-graded sands and gravelly sands with little or no fines)

**SP** (poorly graded sands and gravelly sands with little or no fines)

Ponds developed in these soils should be equipped with a liner or other construction modifications to reduce seepage.<sup>3</sup>

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<sup>2</sup> Stone, Nathan M., and Claude E. Boyd. Alabama Agricultural Experiment Station Bulletin 599. Auburn University, Alabama. *Seepage from Fishponds*. 1989.

<sup>3</sup> There are many ways to reduce seepage losses. The United States Department of Agriculture through the Natural Resources Conservation Service ("NRCS") Agriculture Handbook Number 590, *Pond – Planning, Design, Construction* recommends that pond sites should have at least 20 percent clay soils (page 63). If a pond site doesn't have at least 20 percent clay, the NRCS recommends a variety of methods to seal the pond using chemical additives, bentonite, water proof liners, or compaction (pages 62-65).

## **EXCEPTIONS**

There are some circumstances where it is not reasonable to apply the seepage rate standards described above. The following are some situations where the seepage rates listed above may be exceeded without further review:

- Storage facilities being used as infiltration basins for ground water recharge purposes should not be expected to comply with the seepage rate standards listed above. The purpose of recharge is to cause water to seep into the ground, not to maintain a full reservoir for aesthetics or similar purposes. Such uses are mutually exclusive. Water users should not be allowed to exceed the seepage rate standards by referring to ponds for other uses as recharge ponds.
- Excavated ponds filled by intercepting ground water should not be expected to comply with the seepage rate standards listed above. Under normal conditions water seeps *into* these ponds, not out of these ponds.
- Idaho Code §42-202 provides for a maximum of 5 acre-feet of stored water per acre of land irrigated. It is not necessary to apply seepage rate standards to reservoirs used to store water for irrigation purposes. Irrigation storage amounts in excess of 5 acre feet per irrigated acre require justification for the total amounts.

## **NEW APPLICATIONS FOR PERMIT, TRANSFERS, AND WATER SUPPLY BANK RENTALS**

The seepage rate standards described in this memorandum should be applied to new appropriations, transfers of water to new ponds or reservoirs, and Water Supply Bank rentals resulting in new ponds or reservoirs. Applications exceeding the standards need to justify the additional seepage amounts by demonstrating that they are consistent with the conservation of water resources or that the exception is necessary to accomplish the proposed beneficial use. If the additional seepage amounts are not justified, the approvals should be based on the standards set forth in this memo.

## **LICENSING OF EXISTING PERMITS**

The seepage rate expectations discussed in this administrative memorandum will be applied when licensing water rights that have already been permitted as of the date of this memorandum. In general, replacement of seepage losses exceeding the standards set forth in this memorandum will not be considered to constitute a beneficial use of water. Therefore, seepage losses factored into the storage volume for water right licenses should not exceed the seepage loss standards listed above unless they meet one of the exceptions listed above, even if the permit pre-dates the issuance of this memorandum. Department staff members authorized to sign water right licenses may evaluate established storage facilities that exceed the seepage rate standards described in this memorandum on a case by case basis to determine if replacement of the additional seepage losses constitutes a beneficial use of water. Such determinations should be documented in the water right file.

## **SEEPAGE LOSS EVALUATION SPREADSHEET**

The Department has developed a spreadsheet for estimating reservoir fill capacity, evaporation losses, and seepage losses. Department staff members are encouraged to share the spreadsheet with prospective applicants, consultants, and certified water right examiners for preparing and evaluating applications, as well as for conducting beneficial use field examinations. Applicants may utilize the NRCS Web Soil Survey, NRCS Published Soil Surveys, or the GIS layer 'PondSoils' found on the Department's website. Other technically sound methods for evaluating seepage losses may also be employed or accepted in IDWR's water right processes; however, alternate methods must consider conservation of water when determining acceptable seepage rates.