Summary of IWRRI Crop-mix Report

In 2008, Idaho Water Resources Research Institute (IWRRI) of University of Idaho produced a report titled "Effect of Changes in Crop Mix Upon Consumptive Use of Irrigation Water in the Eastern Snake Plain of Idaho. This was IWRRI Technical Completion report 2008-001 by B.A. Contor and P.L. Pelot. Its Executive Summary and Conclusions are presented below.

> ***EXECUTIVE SUMMARY***
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> *The Idaho Water Resource Board is concerned about potential changes in water use that may have occurred due to changes in crop mix. One option for benefiting the aquifer water budget is to consider policy options that would affect crop mix.*
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> *Data indicate that the effect of cropping changes since 1980 has been an increase in consumptive use of about 120,000 acre feet per year. A hypothetical change in crop mix that could be achieved by an incentive program was tested. The potential benefit to the aquifer could be as much as 350,000 acre feet per year....*
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> ***CONCLUSIONS***
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> *On an individual county basis, changes range from negligible to an increase in consumptive use of over 20 percent. The aggregate effect across the entire plain has been an increase of 2% to 2.5% in annual consumptive use over the 27-year period. Though this is a small percentage, it amounts to about 120,000 acre feet per year.*
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> *As a policy option for benefiting the aquifer, a modest adjustment in current crop mix could reduce consumptive use by approximately 350,000 acre feet per year across the plain. Reductions that occur on ground-water irrigated acres will without doubt produce a benefit to the aquifer. If full diversions of surface water are maintained in conjunction with reductions on surface-water irrigated acres, these reductions will also benefit the aquifer.*

For context, these annual volumes are over an irrigated area of approximately two million acres with consumptive use in the range of four million acre feet to one significant figure. On a percentage basis, the 120,000 acre feet per year increase over 26 years was approximately three percent. The estimated 350,000 acre feet of aquifer benefit from incentivized changes in crop mix was approximately nine percent.

The hypothesized changes in crop mix to achieve this aquifer benefit were as follows:

1. *"10% of alfalfa acreage was converted to barley.*
2. *10% of silage corn acreage was converted to barley.*
3. *A reduction of barley acreage, equivalent to 50% of the potato acreage, was applied. The reasoning behind this reduction was that barley is often grown in rotation with potatoes primarily for agronomic, rather than economic, reasons. Fallow is equally beneficial in a crop rotation, and the economic return of barley (at least with*

historically-normal small-grains prices) is often low enough that inducements to fallow might be feasible."

The report does not identify the general crop mix on the Snake Plain during the years considered, but Contor's recollection is that it was along the lines of approximately 20% to 25% in potatoes, with the balance approximately uniformly split between high-consumption crops (alfalfa and silage corn) and low-consumption crops (small grains and a very small acreage of dry edible beans). Pasture acreages were very low.

Recollection of "windshield surveys" of the Wood River Valleys and a brief review of aerial imagery suggests that the crop mix and therefore potential savings from adjusting crop mix are similar. The primary difference likely is the percentage of irrigated lands devoted to pasture. Like alfalfa, pasture is usually a perennial crop. Its consumptive use has an upper limit constrained by crop physiology and the evaporative power of the atmosphere, and a lower limit constrained by water supply. Hypothetically this offers the opportunity to adjust consumptive use by partial irrigation without giving up acres, though the ability to quantify historical past practice and verify compliance with an agreement to reduce would be challenging on a practical level.

The report speculates that an apparent dip in evapotranspiration in the 2005 data may have been a data problem or blunder in processing. It turns out that this was the case, which affects the representation of historical changes but not the estimation of the potential benefit of crop changes as a mechanism to reduce net aquifer extraction.