

ESTIMATING IRRIGATION ENTITY DIVERSIONS: SNAKE RIVER

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April 2003
Revised July 2003

Idaho Water Resources Research Institute
Technical Report 04-012

Eastern Snake Plain Aquifer Model Enhancement Project
Scenario Document Number DDW-012

DESIGN DOCUMENT OVERVIEW

Design documents are a series of technical papers addressing specific design topics on the Eastern Snake Plain Aquifer Model (ESPAM) Enhancement Project. Each design document will contain the following information: topic of the design document, how that topic fits into the whole project, which design alternatives were considered and which design alternative is proposed. In draft form, design documents are used to present proposed designs to reviewers. Reviewers are encouraged to submit suggested alternatives and comments to the design document. Reviewers include all members of the Eastern Snake Hydrologic Modeling (ESHM) Committee as well as selected experts outside of the committee. The design document author will consider all suggestions from reviewers, update the draft design document, and submit the design document to the ESPAM Enhancement Program Manager. The Program Manager will make a final decision regarding the technical design of the described component. The author will modify the design document and publish the document in its final form in .pdf format on the ESPAM Enhancement web site.

The goal of a draft design document is to allow all of the technical groups interested in the design of the ESPAM Enhancement Project to voice opinions on the upgrade design. The final design document serves the purpose of documenting the final design decision. Once the final design document has been published for a specific topic, that topic will no longer be open for reviewer comment. Many of the topics addressed in design documents are subjective in nature. It is acknowledged that some design decisions will be controversial. The goal of the Program Manager and the modeling team is to deliver a well-documented, defensible model, which is as technically representative of the physical system as possible, given the practical constraints of time, funding and manpower. Through the mechanism of design documents, complicated design decisions will be finalized and documented.

Final model documentation will include all of the design documents, edited to ensure that the “as-built” condition is appropriately represented.

INTRODUCTION

Percolation from surface water irrigation is the largest component of recharge to the eastern Snake Plain Aquifer. In order to effectively and accurately estimate this recharge component of the system, irrigation diversions from the river must be estimated with the highest degree of accuracy as possible. Return flow to the river and evapotranspiration are also components of calculating percolation from surface water irrigation, and are discussed in design documents DDW-005, DDW-006, DDW-007, and DDW-010.

This paper summarizes and analyzes the method of estimating irrigation entity diversions from the Snake River within the boundaries of the ESPAM study area. Non-Snake River diversions are discussed in DDW-025. The related topics of aggregating surface water canal companies into surface water irrigation entities and calculating return flow lag factors are discussed in design documents DDW-008 and DDW-005, respectively.

AVAILABLE DATA

Two sources of data were considered for use in estimating surface water irrigation diversions. The first source is diversion and return flow 'raw' daily data from the water districts, and the second source is 'processed' monthly data that is used in the Idaho Department of Water Resources' (IDWR) Reach Gain and Loss Program. For consistency with the IDWR Reach Gain and Loss Program calculations that will be used for model calibration, the 'processed' monthly data were used to estimate irrigation diversions.

As described in design document DDW-008, "Aggregating Surface Water Canal Companies into Surface Water Irrigation Entities", there are more than 100 surface water irrigation companies and numerous private surface water irrigators that were aggregated, or grouped, into a smaller number of irrigation entities. This aggregation resulted in a more accurate depiction of the delivery of surface water to the irrigated acres by maintaining a level of resolution consistent with available diversion and return flow data, as described in ESPAM design document DDW-008. The final aggregation is listed in Appendix 1.

Using both the data from the IDWR Reach Gain and Loss Program and the aggregated surface water irrigation entities, a spreadsheet was created in Microsoft Excel to calculate surface water irrigation diversions for each surface water irrigation entity. This spreadsheet was also used to perform the calculations to estimate return flows to the Snake River, using monthly diversion data and return flow percentages (see design document DDW-005).

SPREADSHEET DESCRIPTION

A Microsoft Excel spreadsheet was created to calculate total surface water irrigation diversions for each surface water aggregated entity. The spreadsheet contains a separate worksheet for each irrigation entity. Each worksheet contains diversion data and return flow data for all of the irrigation companies and private irrigators that comprise the associated irrigation entity. See Figure 1.

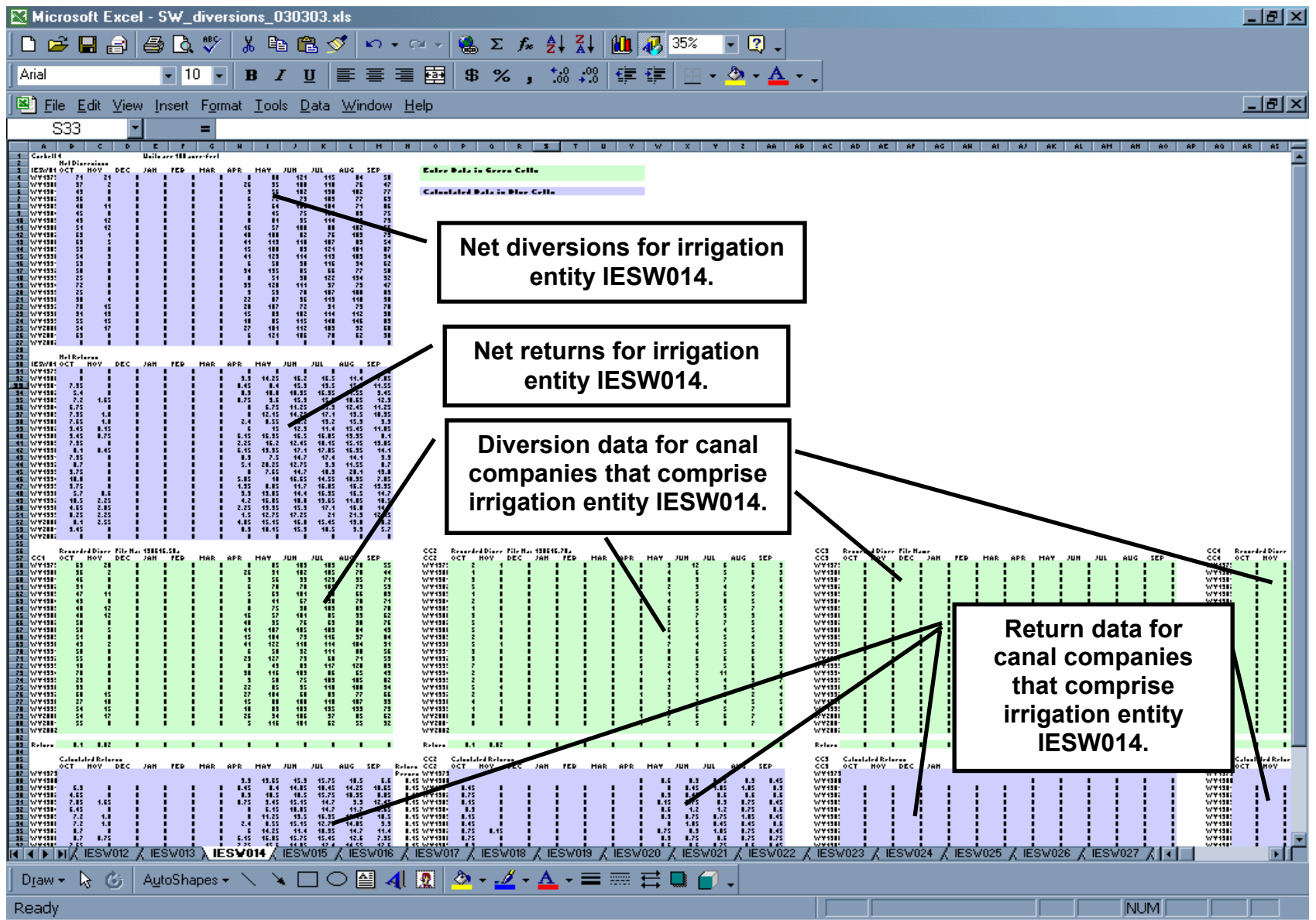


Figure 1. Diversion and return flow spreadsheet.

Many of the diversion files that are assigned to an irrigation entity also have return flow percentages associated with the diversion file. Return flow percentages are applied to the respective diversion data on each worksheet of the spreadsheet file. The monthly diversions and returns for each irrigation company and private irrigator are summed to yield the monthly diversions and returns for the irrigation entity. Diversion and return flow data are in units of 100 acre-feet.

RESULTS

The diversion and return flow spreadsheet uses the same monthly diversion data that are used for calculation in the IDWR Reach Gain and Loss Program. This monthly diversion data is used to calculate total monthly diversions and return flows within each surface water aggregated irrigation entity discussed in design document DDW-008.

APPENDIX 1

Aggregated Surface Water Irrigation Entities

Entity ID	Entity Name	Irrigation Company(ies) Included in Entity
IESW001	A & B 1	A & B Irrigation District
IESW002	Aberdeen Springfield 1	Aberdeen Springfield Canal Co
IESW005	Big Lost River 3 (with 5 mile buffer)	Big Lost River Irrigation District Moore Water Users Association Darlington Land & Irrigation Co
IESW007	Big Wood 4	Justice Ditch Co Thorpe Ditch Co Big Wood Canal Company
IESW008	Blaine 1	Blaine County Canal Co
IESW009	Burgess 5	Burgess Canal & Irrigating Co North Rigby Irrigation & Canal Co Inc Parks & Lewisville Irrigation Co Inc Rigby Canal & Irrigation Co Clark & Edwards Canal Company
IESW010	Burley 1	Burley Irrigation District
IESW011	Butte and Market 1	Butte & Market Lake Canal Co
IESW012	Canyon Creek 3	Enterprise Irrigation District Canyon Creek Lateral Ditch Assn Canyon Creek Canal Co Inc
IESW014	Corbett 4	Corbett Slough Ditch Company Eastern Idaho Water Co Little Butte Irrigation Co Ltd Younie Ditch Co
IESW015	Dewey 1	Dewey Canal Co
IESW016	Egin 2	Egin Bench Canals Inc St Anthony Union Canal Co
IESW018	Falls 2	Falls Irrigation District Warm Creek Irrigation Co
IESW019	Fort Hall 1	Fort Hall Indian Reservation
IESW020	Harrison 6	Butler Island Canal Co Enterprise Canal Co Ltd Harrison Canal & Irrigation Co Heise Canal Kite And Nord Ditch Rudy Irrigation Canal Co Ltd
IESW022	Idaho 2	Idaho Irrigation District Snake River Valley Irrigation District
IESW025	Little Wood 2 (with 5 mile buffer)	Fish Creek Reservoir Company Inc Little Wood River Canal Co
IESW027	Milner 1	Milner Irrigation District
IESW028	Minidoka 1	Minidoka Irrigation District
IESW029	Mud Lake 4	Level Canal Co Inc Holley Water Users Assn Mud Lake Water Users Inc Owsley Canal Company
IESW030	New Sweden 7	Smith-Maxwell Ditch Co New Sweden Irrigation District Shattuck Irrigation Co. Stattuck Irrigation Co

		Long Island Canal Co Blackfoot Irrigation Co Woodville Canal Co
IESW031	North Fremont 2	North Fremont Canal Systems Inc
IESW032	North Side 7	Arcadia Reservoir & Canal Co Ltd King Hill Irrigation District North Side Canal Company Ltd American Falls Reservoir Dist #2 Dba Bs Farms & Irrigation Co Banbury Pipe Company, Inc. Big Spring Water Users Association Hagerman Water Users Association
IESW033	Osgood 4	Owners Mutual Irrigation Co Osgood Canal Co Inc H & W Water Users Association
IESW034	Peoples 8	Bear Island Water Assn Watson Slough Ditch And Irrigation Companies Peoples Canal & Irrigation Co Parsons Ditch Co Wearyrick Ditch Co Trego Ditch Co Danskin Ditch Company New Lavaside Ditch Company Limited Riverside Canal Co
IESW035	Progressive 2	Poplar Irrigation District Progressive Irrigation District
IESW036	Reid 6	Consolidated Feeder Canal Co Liberty Park Irrigation Co Inc Texas Slough Irrigating Canal Co Reid Canal Co Lenroot Canal Co Sunnydell Irrigation District
IESW037	Reno 1 (with 2 mile buffer)	Reno Ditch Company Inc
IESW038	Rexburg 1	Rexburg Irrigation Co C/O Keith Erikson
IESW039	Silky 2	Silky Lateral Ditch Water Users Assn Silky Irrigation District
IESW040	Southwest 2	Oakley Canal Co Southwest Irrigation District
IESW041	Twin Falls 1	Twin Falls Canal Co
IESW044	Jefferson 3 (with 2 mile buffer)	Jefferson Irrigation Co Producers Irrigation Co Monteview Canal Co Inc
IESW051	Private Basin 31 (with 5 mile buffer)	
IESW052	Private Basin 32 (with 5 mile buffer)	
IESW053	Private Basin 33 (with 5 mile buffer)	
IESW054	Richfield 1 (with 2 mile buffer)	(Richfield Tract)
IESW055	Long Island 8 (Dry Bed)	Lowder Slough Canal Co West Labelle Irrigation Co Ltd Dilts Irrigation Company

Ellis-Bramwell Ditch CO
Independent Irrigation Co
Labelle Irrigating Co
Island Irrigation Co
Long Island Irrigation Co

IESW056 Fall River 17
 (Henry's Fork)

Roxana Canal Co
Consolidated Farmers Canal Co Ltd
Saurey-Sommer Ditch
Island Ward Canal Co
Fall River Irrigation Co
Wilford Irrigation And Mfg Co
Pioneer Ditch Co Ltd
Twin Groves Irrigation & Manufacturing
Salem Union Canal Co Ltd
Farmers Friend Irrigation Co Ltd
North Salem Agr & Mill Canal Inc
Woodmansee-Johnson Canal Company
Teton Irrigation And Manufacturing Co
Pincock Garner Ditch Association
Pincock-Byington Ditch Co
Wolf Ditch Company
Teton Island Feeder Canal Co
Basin 27 – Blackfoot River Basin

IESW057 Basin 27