Is *Parsimony* the Word I Want?

ESHMC Meeting April 2013

B. Contor

We will never know everything.

What if we know something exists,
But we don't know much about it?

Option One: Leave it Out

IV. C1. b. Model Layers

ESPAM 1.1 and ESPAM2.1 are single-layer models of the ESPA. It is generally agreed that

the ESPA resides in a single large stratigraphic unit, consistent with a single layer model

(Whitehead, 1986), however there are localized lenses of sediments in some locations on the plain

(the Egin-Henrys Fork area, the Rigby Fan, and the Burley-Rupert area), which may support locally

elevated water levels. When ESPAM1.1 was being designed, it was agreed among the ESHMC that

the option of adding a top layer to represent localized sedimentary units would be explored only if

time permitted and data were available. Investigation showed that there are little data available

to support calibration of separate layers representing these locally elevated zones and ESHMC

members agreed that a single layer model was sufficient. More information on the choice of using

a single layer representation is available in ESPAM1.1 Design Document DDM-003. This decision

(ESPAM2.1 Final Report)

Rocky Mountain
ENVIRONMENTAL
ASSOCIATES, INC.

Although evidence available since the late 1990s (see, for example, Gruenenfelder, 1997) indicates that an extensive clay layer divides the SVRP aquifer into an upper, unconfined unit and a lower, confined unit in Hillyard Trough and the Little Spokane River Arm, all four previous models treat the aquifer effectively as a single, unconfined, hydrogeologic unit.

(SVRP Final Report)

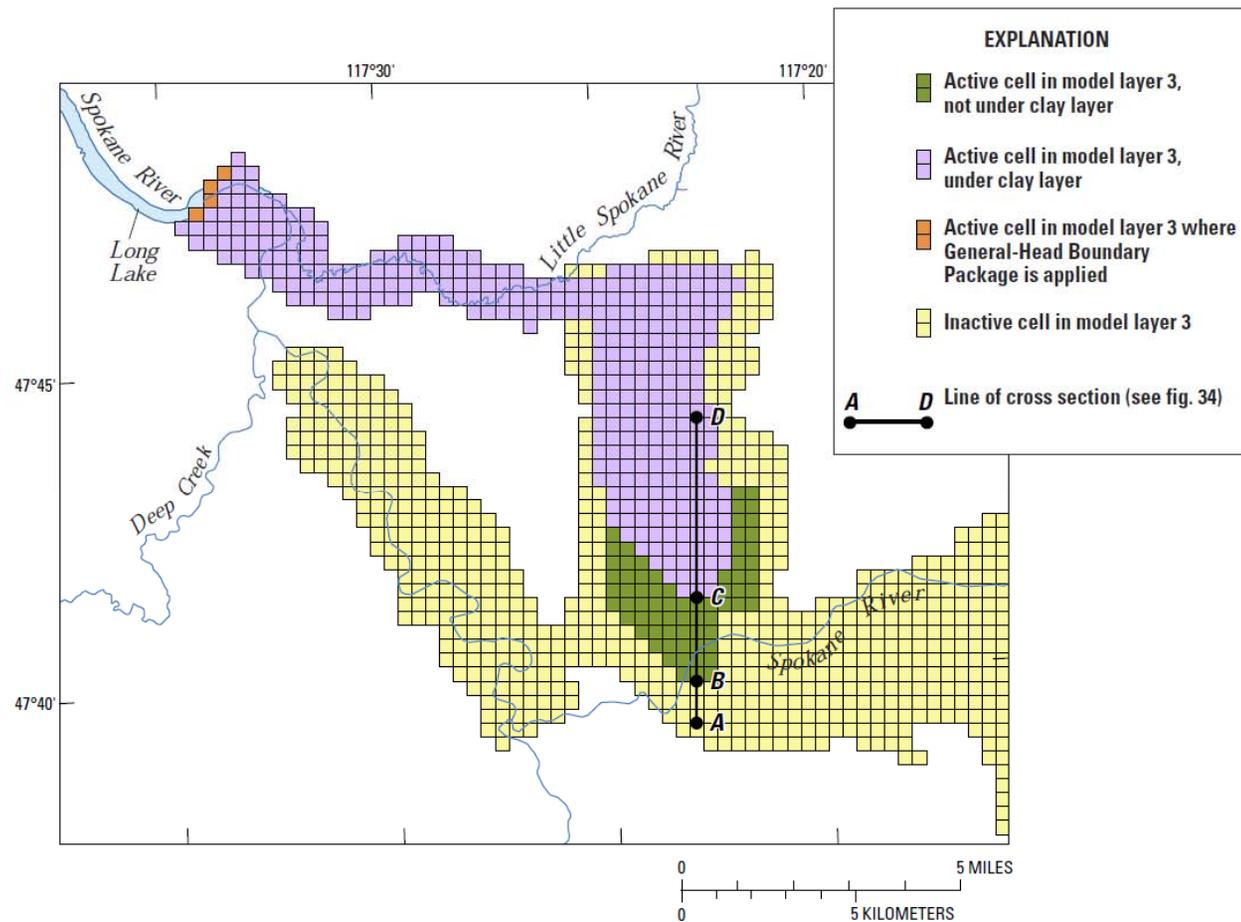# Option Two: Represent The Qualitative Knowledge We Do Have

EXPLANATION

- Active cell in model layer 3, not under clay layer
- Active cell in model layer 3, under clay layer
- Active cell in model layer 3 where General-Head Boundary Package is applied
- Inactive cell in model layer 3

A ●——● D   Line of cross section (see fig. 34)

Figure 33. Active cells in model layer 3, Spokane Valley-Rathdrum Prairie aquifer, Washington and Idaho.

(SVRP Final Report)

But *Be Sure* to Acknowledge Limitations.

local parts of the aquifer. The largest discrepancy between measured and simulated water levels occurs in the lower unit in northern Hillyard Trough and the Little Spokane River Arm. These discrepancies indicate that the lower unit might not be accurately represented by the model.

Rocky Mountain
ENVIRONMENTAL
ASSOCIATES, INC.

But *Be Sure* to Acknowledge Limitations.

local parts of the aquifer. The largest discrepancy between

Valleys to the SVRP aquifer. In Hillyard Trough and the Little Spokane River Arm, ground-water flow in the lower unit is not well understood, and simulated water levels do not fit measured water levels as well as in other parts of the aquifer.

But *Be Sure* to Acknowledge Limitations.

local parts of the aquifer. The largest discrepancy between

Valleys to the SVRP aquifer. In Hillyard Trough and the Little

measured water levels. Considered together, the relatively poor fits to measured water levels in wells 115 and 99 indicate that the lower unit might not be represented accurately by the model.

Rocky Mountain
ENVIRONMENTAL
ASSOCIATES, INC.

But *Be Sure* to Acknowledge Limitations.

local parts of the aquifer. The largest discrepancy between
Valleys to the SVRP aquifer. In Hillyard Trough and the Little
measured water levels. Considered together, the relatively

September 2004 are shown in figure 43. Because water-level
measurements are available for only two wells in the lower
unit, too few data are available to construct a map of measured
water levels in the lower unit.

But *Be Sure* to Acknowledge Limitations.

local parts of the aquifer. The largest discrepancy between

Valleys to the SVRP aquifer. In Hillyard Trough and the Little
measured water levels. Considered together, the relatively

September 2004 are shown in figure 43. Because water-level

In Hillyard Trough and the Little Spokane River Arm, ground-water flow in the lower unit is not well understood. Water levels in the lower unit are monitored in only two wells, and the horizontal and vertical extents of the clay layer separating the upper and lower units are not well known.

But *Be Sure* to Acknowledge Limitations.

local parts of the aquifer. The largest discrepancy between

Valleys to the SVRP aquifer. In Hillyard Trough and the Little

measured water levels. Considered together, the relatively

September 2004 are shown in figure 43. Because water-level

In Hillyard Trough and the Little Spokane River Arm,

Valleys to the SVRP aquifer. In Hillyard Trough and the Lit

Spokane River Arm, ground-water flow in the lower unit is

not well understood, and simulated water levels do not fit

measured water levels as well as in other parts of the aquife

Rocky Mountain
ENVIRONMENTAL
ASSOCIATES, INC.

Not-hypothetical Example: What We Know

North Fork

Rexburg Bench

Geologic Faults

South Fork

Rocky Mountain ENVIRONMENTAL ASSOCIATES, INC.

Not-hypothetical Example:
What We Think

North Fork

Rexburg Bench

$Zero < K_{fault} < K_{local}$

Geologic Faults

South
Fork

Rocky Mountain
ENVIRONMENTAL
ASSOCIATES, INC.

ESPAM2.1

North Fork

Rexburg Bench

$K_{fault} = K_{local}$

Geologic Faults

South
Fork

Alternate Option

North Fork

Rexburg Bench

Geologic Faults

South
Fork

K_{fault} =
Estimate < K_{local}

Beware Precedent for Precedent's Sake!

—"Tom, a word with you."

"Be quick, then, for I'm in a hurry."

"What did you give your sick horse t'other day?"

"A pint o' turpentine."

John hurries home and administers the same dose to a favourite hunter, which, strange to say, drops off defunct in half an hour. His opinion of his friend Tom's veterinary ability is somewhat staggered. He meets him the next day—

"Well, Tom!"

"Well, John, what is it?"

"I gave my horse a pint o' turpentine, and it killed him as dead as Julius Cæsar."

"So 't did mine."

Audience Participation

- Reasons to Include
- Reasons to Exclude

Pie I have eaten

Pie I have not yet eaten