

## Johnson, Bill H (DNR)

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**From:** Fred Marinelli <[REDACTED]>  
**Sent:** Saturday, July 21, 2012 7:15 PM  
**To:** Cory D. Anderson  
**Cc:** Peter J. Hinck; Carlson, Erik (DNR); David Blaha; Paul Haby; Tina Pint  
**Subject:** Re: GoldSim Question

Thanks Cory. Your explanation clears it up for me. Regards, Fred.

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On Thu, Jul 19, 2012 at 8:32 AM, Cory D. Anderson <[REDACTED]> wrote:  
Great question Fred. It's simply a product of the different stages of the project.

First, the annual infiltration which you are plotting shows the annual average, and spatially averaged infiltration to the North Beach.

Spigotting of plant water to the beach forms a delta where infiltration is very high (at saturated conductivity). In other areas of the beach where the plant is not spigotting, infiltration is controlled by the climate conditions so the rate is much lower. The annual infiltration is the spatial average of a very high rate over a small delta, and a lower rate of the rest of the area, AND a time average of the plant discharge period and the non-plant discharge period.

During years 0 to 7 (your first time period), the Plant is discharging ONLY to the North Beach. So at all times, the plant is discharging somewhere along the North Beach, keeping the spatially averaged infiltration rate high, around 300 in/yr. No time average is necessary because conditions don't change throughout the year.

During years 7 to 20 (your second period), the Plant is discharging, but the discharge is shared between all of the beaches. So not only is a spatial average taken, but now a time average. The rate is reduced because now the North Beach is only receiving plant discharge for maybe 1/3 of the year or so, rather than all of the year.

After year 20 (your third period), there is no plant discharge to the beach so the infiltration rate is only a function of climate conditions. At this time, the infiltration rate to all of the beaches should be the same since the same climate model is affecting all of the beaches in the same way.

The East and South beaches should also have high infiltration rates (~100 in/yr) at year 12, and low infiltration rates (~6 in/yr) at year 22.

Additionally, there is a fourth time period, when closure activities are occurring (year 18 to 20). There is a fourth beach added to the system called the closure beach. There is a very short distinct period which is also visible in the graph you provided Fred.

I hope this clears things up,  
Thanks for the great question,  
Cory

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From: Fred Marinelli [REDACTED]  
Sent: Wednesday, July 18, 2012 6:07 PM  
To: Cory D. Anderson; Peter J. Hinck  
Cc: Carlson, Erik (DNR); David Blaha; Paul Haby; Tina Pint; Fred Marinelli  
Subject: GoldSim Question

Cory and Peter,

This is the start of several emails asking questions about the GoldSim models. I hope these are easy things for you to answer.

The attached figure shows annual infiltration in the North Beach. There are three distinct periods exemplified by:

313 in/yr at t = 4 yr  
138 in/yr at t = 12 yr  
5.48 in/yr at t = 22 yr

Can you explain what controls annual infiltration at the North Beach for each of these years? Please feel free to be informal in your response.

Thanks,

Fred

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Fred Marinelli  
Senior Groundwater Hydrologist

Interralogic, Inc.  
4715 Innovation Dr., Ste. 110  
Fort Collins, CO 80525  
Phone: [REDACTED]  
E-mail: [REDACTED]mailto:[REDACTED]  
Website: [www.interralogic.com](http://www.interralogic.com)<<http://www.interralogic.com>>

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**Fred Marinelli**  
Senior Groundwater Hydrologist

**Interralogic, Inc.**  
4715 Innovation Dr., Ste. 110  
Fort Collins, CO 80525  
Phone: [REDACTED]  
E-mail: [REDACTED]  
Website: [www.interralogic.com](http://www.interralogic.com)