

From: [Harden, Tasha](#)
To: [Culling, Stan](#)
Subject: Fw: Groundwater Level Logger
Date: Tuesday, June 2, 2020 3:04:16 PM

Stan-

Here is a good reason for you to get out of your house!

Will you please provide some good pictures of the well head and the overall well area at the triangle pond well? The one Monty and Cass have been helping with. Thank you much!

Tasha Harden
Assistant Manager
San Bernardino & Leslie Canyon NWRs
7628 N Hwy 191
PO Box 3509
Douglas AZ 85608
Office: 520-364-2104 x106
Cell: 520-368-6004
Fax: 520-364-2130

From: Reagan, Steve <steve_reagan@fws.gov>
Sent: Tuesday, June 2, 2020 1:40 PM
To: Harden, Tasha <Tasha_Harden@fws.gov>; Radke, Bill <bill_radke@fws.gov>; Fernandez, Juliette <juliette_fernandez@fws.gov>
Subject: Re: Groundwater Level Logger

Tasha / Bill,

If you get the chance someday when you or one of the staff is back near the well, could you take some close up photos of the wellhead so I can share with our Water Resources staff. Hang in there and I appreciate more and more all you have on your plate.

Steve

From: Harden, Tasha <Tasha_Harden@fws.gov>
Sent: Tuesday, June 2, 2020 14:36
To: Radke, Bill <bill_radke@fws.gov>; Fernandez, Juliette <juliette_fernandez@fws.gov>
Cc: Reagan, Steve <steve_reagan@fws.gov>
Subject: Re: Groundwater Level Logger

Just an FYI, SB staff assisted BA with outfitting triangle pond well with a flow meter and a drop

down level troll 500 transducer (the same type which is on all the SB wells). The transducer is getting hung up and apparently is not getting to the water. A similar thing happened to a piezometer tape which was broken when it got hung up in this well. Cassandra recommends videoing the well to see what is going on down there- but it is currently being used and as we recently found out at SB, if you mess with a well you take the risk of it not working as good once it is put back together.

My suggestions, with limited knowledge: Given the issues already encountered with this well, the *well head mounted logger* may be a good option for the BA triangle pond well- however I don't see where it measures head pressure (I might just be missing it), if that's something we want to measure at the BA like at SB that may limit device options. If it is decided to use an insitu troll, I'd suggest double checking the pressure range for the device to ensure it will work (the rugged troll maxes out at 250 ft and the level troll 500s max out at 1153 ft). Randy with D&M mentioned having an idea to protect our drop down level trolls in our pump wells which we would obviously share with BA if needed.

Tasha Harden
Assistant Manager
San Bernardino & Leslie Canyon NWRs
7628 N Hwy 191
PO Box 3509
Douglas AZ 85608
Office: 520-364-2104 x106
Cell: 520-368-6004
Fax: 520-364-2130

From: Reagan, Steve <steve_reagan@fws.gov>
Sent: Tuesday, June 2, 2020 9:40 AM
To: Fernandez, Juliette <juliette_fernandez@fws.gov>; Barnes, Michelle L CIV USARMY CESPL (USA) <MICHELLE.L.BARNES@usace.army.mil>; (b) (6), (b) (7) <(b) (6), (b) (7)(C)>; Nguyen, Brandon SPB <Brandon.Nguyen@usace.army.mil>; Range, Brent K <brent_range@ios.doi.gov>; (b) (6), (b) (7)(C) <(b) (6), (b) (7)(C)>; Radke, Bill <bill_radke@fws.gov>; Harden, Tasha <Tasha_Harden@fws.gov>
Subject: Groundwater Level Logger

All,

Here are the recommendations I received by our Hydrologist regarding a groundwater level logger.

Install groundwater level logger in the main NWR well.

This could be a down-hole logger, such as [InSitu RuggedTroll](#) (or similar). These hang in the

well using aircraft cable (1/32") and as the logger is unvented, it needs barometric pressure correction using an [InSitu baro logger](#) (or similar). The baro logger can be placed in a protected location (shed, building, etc.) within a few miles of the well.

We could also be a [wellhead mounted logger, such as WellIntel](#) (the [photo in this link is actually one of the units installed in a former ag irrigation well in the Delaware Basin, TX](#) to monitor effects of GW extraction for hydraulic fracturing; the price really varies depending on units etc.). Data are uploaded via cellular modem to [an analytics dashboard](#), which the refuge manager and others could have access to. This option is best if, in the case of the main NWR well, a pump is installed which precludes (or at least complicates) the installation of a down-logger because the WellIntel sensor does not intrude into the well itself -- only "pings" record water level from a sensor mounted on the wellhead.

Steve

Steven Reagan
Deputy Regional Chief - National Wildlife Refuge System
500 Gold Ave SW, Room 4236
PO Box 1306
Albuquerque, NM 87103
(505)248-6645 (office)
(505)238-4355 (cell)