



Lindo Channel Recharge Feasibility

Assessing Recharge Potential

The Vina Groundwater Sustainability Agency (GSA) is working with the City of Chico and state agencies to assess the feasibility of redirecting a portion of flows from Big Chico Creek into the Lindo Channel to increase natural recharge and raise groundwater levels. Recharging flows from Big Chico Creek via the unlined, natural Lindo Channel may help improve groundwater levels for domestic well users and support the Channel's groundwater dependent ecosystems. The objective of the study is to better understand the possible benefits and barriers of implementing this natural recharge approach.

To assess the potential for groundwater recharge, several tasks and activities are planned or are underway.

1. Review of well logs and creation of model to understand characteristics of materials in and around the Channel

The first task included review of existing geologic well logs available from the California Department of WaterResources. Descriptions from these well logs were used to construct a three-dimensional (3-D) geologic model to provide a preliminary assessment of where recharged water might migrate. Figure 1 shows a screen shot from the model that covers the majority of Lindo Channel.

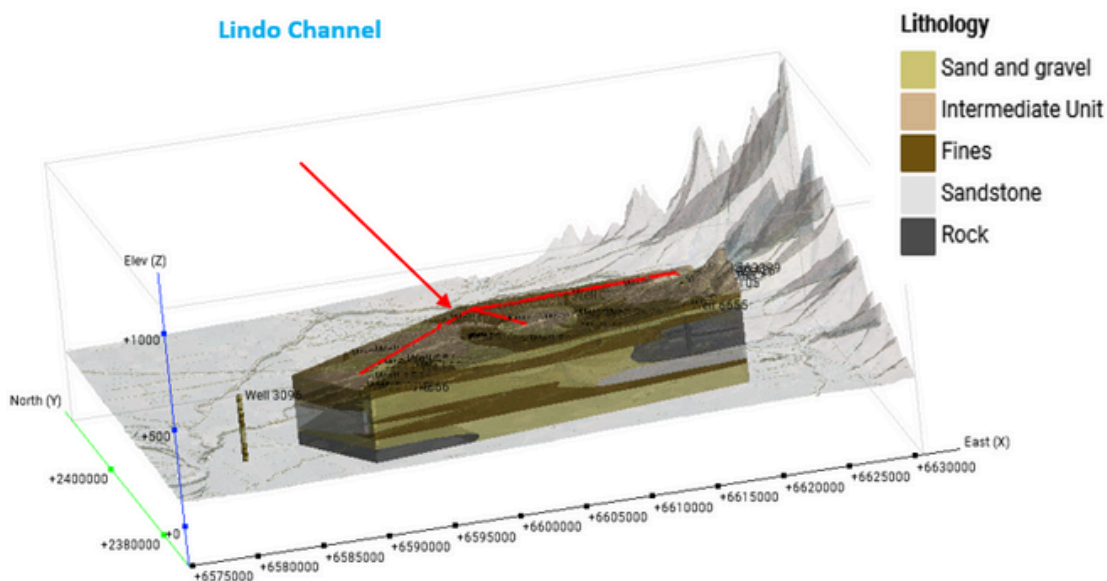


Figure 1. Still shot from 3-D Geologic model.



Photograph 1. Cemented Units within Lindo Channel

The initial model divides the area into 5 units based on permeability characteristics (i.e. how well water is able to move through the material) – permeable sands and gravels, less permeable (intermediate) silty sands, low permeable fines, low permeable rock units (most likely the Lovejoy Basalt) and cemented sandstones – and suggests that very little recharge would occur from the mouth of the Channel to around where the Channel crosses Highway 99. This interpretation is consistent with a previous study, referred to as the Lower Tuscan Aquifer Project, that indicated there was no appreciable recharge occurring within Big Chico Creek at and upstream of the 5-mile diversion system at Lindo Channel.

2. Review of shallow groundwater level data

Review of California’s “GeoTraker” system that maintains data from sites with environmental issues was also reviewed. Two sites were identified with water levels recorded between 2002 and 2010 from shallow wells adjacent to Lindo Channel (Figure 2). All these wells are abandoned and no longer exist.

Figure 3 shows the hydrograph from these wells with both sites having wells screened from about 10 to 30 feet below ground surface (bgs) and 35 to 50 feet bgs. As seen on Figure 3, there is a distinct difference between the water levels from the shallower set of wells and the deeper set of wells. A report prepared for the site at 580 East 10th Street indicated that the shallower set of wells were completed within a perched water system with the source of water from the Lindo Channel.



Figure 2. Location of Geotracker sites with shallow monitoring wells.

Understanding the relationship between this perched water system and the underlying regional groundwater system will be critical to assessing the migration and flow pathways of recharged water. Using this information, we requested the installation of new nested monitoring wells (separate wells within perched water system and deeper groundwater system), to be completed as part of the Vina GSA Data Gap Identification and Improvement project, near the two sites shown on Figure 2. When installed, new monitoring sites would be equipped with pressure transducers to record water levels at a minimum of every hour.

In the immediate term, we are also looking for existing domestic wells adjacent to the entire reach of Lindo Channel that could be monitored while water is within the channel. If you are aware of any potential wells in these areas that could be used, please contact Becky Fairbanks at **530.552.3587** or RFairbanks@buttecounty.net.

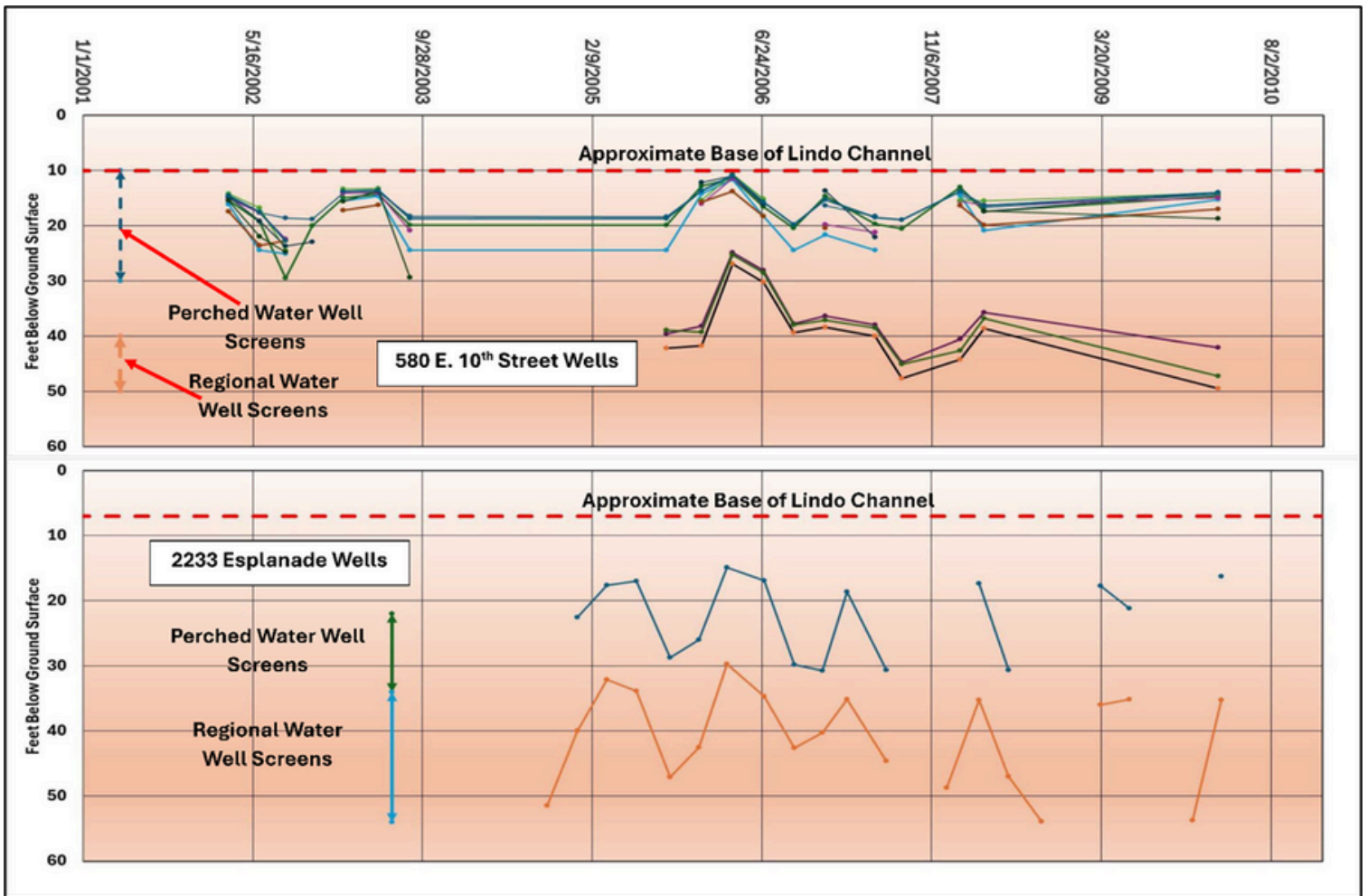


Figure 3. Hydrographs for wells located at sites shown on Figure 2.



Photograph 2. Stilling well and staff gauge installed in Big Chico Creek near the 5-mile recreation area.

3. Monitoring Lindo Channel Flows

To assess the connection between water recharging from Lindo Channel and the shallow groundwater systems, a stilling well(s) will be installed at selected location(s) within Lindo Channel depending on the location of monitored shallow wells.

A stilling well is a pipe placed within the channel with a pressure transducer placed within the pipe that allows measurement of water levels. For this project, the pressure transducers in stilling wells will be programmed to record water levels at the same time as monitored shallow wells allowing assessment of the relationship between changes in water levels within the Channel and the shallow groundwater systems. A staff gauge will also be attached to the stilling well to allow visual recordings of the channel water levels. Photograph 2 shows the stilling well within Big Chico Creek at the 5-mile recreation area installed as part of the Lower Tuscan Aquifer Project.



Photograph 3. Double Ring Infiltrometer

4. Measuring Characteristics of the Channel Bed Infiltration rates within Lindo Channel will be estimated by conducting infiltrometer tests at selected locations over the entire reach of Lindo Channel using a double ring infiltrometer (Photograph 3). These data will be used to estimate the volume of water being recharged from Lindo Channel into the shallow groundwater system.

Anticipated Timeline For These Activities

Infiltrometer tests to estimate infiltration rates within Lindo Channel will occur after the first few precipitation events most likely in December 2024. Allowing the soils within Lindo Channel to become wet will allow more accurate evaluations

of infiltration rates (dry soils absorb water and initial infiltration rates in these conditions would be higher than expected for a recharge evaluation). Currently we are working with the team conducting Data Gap Identification and Improvement project who estimate the shallow wells described above would not be installed until Spring 2025. If existing wells are identified that can be used for this project, then these wells will be installed with pressure transducers as soon as possible along with installation and equipping of the stilling well to assess interactions between Lindo Channel and the shallow groundwater during the 2024 wet season.

If you have insights on other available data sources or any questions regarding activities or methods planned to assess recharge for this project, please contact Becky Fairbanks, SGM Grant Project Manager at **530.552.3587** or **rfairbanks@buttecounty.net**.