

UPPER SAN PEDRO PARTNERSHIP MONITORING AND INDICATORS (dated December 2019)

For the full report on the establishment of these indicators see:

Gungle, Bruce, Callegary, J.B., Paretto, N.V., Kennedy, J.R., Eastoe, C.J., Turner, D.S., Dickinson, J.E., Levick, L.R., and Sugg, Z.P., 2016, [Hydrological conditions and evaluation of sustainable groundwater use in the Sierra Vista Subwatershed, Upper San Pedro Basin, southeastern Arizona \(ver. 1.3, April 2019\)](#): U.S. Geological Survey Scientific Investigations Report 2016–5114, 90 p., <https://doi.org/10.3133/sir20165114>.

GROUP 1: Sierra Vista Subwatershed-wide Indicators

Indicator 1: Regional-aquifer water levels

Data type: Groundwater elevations **Sites:** 38 wells

Data Location and Link: USGS NWIS (GWSI)

https://nwis.waterdata.usgs.gov/usa/nwis/gwlevels?site_no=312856110163801&site_no=312943110165401&site_no=312044110141901&site_no=313421110121401&site_no=313508110085701&site_no=313508110085702&site_no=312323110020901&site_no=312555110074301&site_no=313309110094301&site_no=313024110050701&site_no=313558110012001&site_no=312250110063901&site_no=312318110071901&site_no=312712110152101&site_no=312830110102301&site_no=312830110102302&site_no=313024110050701&site_no=313210110105701&site_no=313609110034901&site_no=314114110211201&site_no=313721110112401&site_no=313729110185601&site_no=313502110145701&site_no=313530110135601&site_no=313633110122501&site_no=313610110163201&site_no=313841110122201&site_no=313507110195101&site_no=313615110175601&site_no=313845110165201&site_no=313706110171601&site_no=313618110162301&site_no=313616110162301&site_no=313729110182501&site_no=313622110142101&site_no=312332110063801&site_no=312357110073901&site_no=312417110074801&agency_cd=USGS&format=gif

Indicator 2: Horizontal gradients (regional-aquifer wells)

Data type: Groundwater elevations **Sites:** 4 Regional-aquifer well transects

Data Location and Link: USGS NWIS (GWSI) (3 transects); BLM (contact [BLM](#)) (1 transect, southernmost)

https://nwis.waterdata.usgs.gov/usa/nwis/gwlevels?site_no=313615110175601&site_no=313706110171601&site_no=313845110165201&site_no=313507110195101&site_no=313618110162301&site_no=313841110122201&site_no=313502110145701&site_no

[=313530110135601&site_no=313633110122501&site_no=313721110112401&agency_cd=USGS&format=gif](#)

Indicator 3: Aquifer-storage change measured with microgravity

Data type: Numeric (microgals) **Sites:** 59 stations **Data Location:** Contact [USGS](#)

Indicator 4: Annual groundwater-budget balance

Data type: 14 individual water budget elements grouped into 4 categories

Data Location and Link: 2002-2012 data are available from USGS as Figure 19 of Sierra Vista Subwatershed Sustainability Report ([USGS SIR 2016-5114](#)); Contact [USGS](#)

GROUP 2: Riparian-System Indicators

Indicator 5: Near-stream alluvial-aquifer water levels

Data type: Groundwater elevations **Sites:** 45 wells **Data Location and Link:** USGS NWIS (GWSI)

https://nwis.waterdata.usgs.gov/usa/nwis/gwlevels?site_no=312127110073101&site_no=312127110073301&site_no=312207110070702&site_no=312208110070502&site_no=312214110071601&site_no=312214110071602&site_no=312226110062101&site_no=312453110061101&site_no=312453110061301&site_no=312453110061401&site_no=312642110063701&site_no=312642110063702&site_no=312716110063201&site_no=312716110063202&site_no=312716110063301&site_no=312716110063302&site_no=312843110070801&site_no=312853110070401&site_no=312859110070601&site_no=312900110071001&site_no=313105110074501&site_no=313108110075202&site_no=313110110074401&site_no=313110110074402&site_no=313310110081701&site_no=313312110081302&site_no=313312110082301&site_no=313312110082302&site_no=313312110082303&site_no=313312110082501&site_no=313312110082502&site_no=313508110085701&site_no=313508110085702&site_no=313638110095901&site_no=313642110100102&site_no=313643110100101&site_no=313643110100102&site_no=313738110102901&site_no=314124110105801&site_no=314144110104701&site_no=314144110104702&site_no=314248110105901&site_no=314317110113401&site_no=314318110113101&site_no=314511110120601&agency_cd=USGS&format=gif

Indicator 6: Near-stream vertical gradients

Data type: Groundwater elevations **Sites:** 14 **Data Location and Link:** USGS NWIS (GWSI)

https://nwis.waterdata.usgs.gov/usa/nwis/gwlevels?site_no=312214110071601&site_no=312214110071602&site_no=312642110063701&site_no=312642110063702&site_no=313105110074501&site_no=313108110075202&site_no=313312110082302&site_no=313312110082303&site_no=313643110100101&site_no=313643110100102&site_no

[=314144110104701&site_no=314144110104702&site_no=314317110113401&site_no=314318110113101&agency_cd=USGS&format=gif](#)

Indicator 7: Annual fluctuation of near-stream alluvial-aquifer water levels

Data type: Alluvial well data **Sites:** 5 **Data Location and Link:** USGS NWIS (GWSI)

https://nwis.waterdata.usgs.gov/usa/nwis/gwlevels?site_no=312214110071601&site_no=312859110070601&site_no=313105110074501&site_no=313312110082302&site_no=313738110102901&agency_cd=USGS&format=gif

GROUP 3: San Pedro River Indicators

Indicator 8: Streamflow permanence

Data type: Gage data, Photo data **Sites:** 4 USGS gages; 6 ARS remote cameras

Data Location and Link: USGS NWIS; Contact [ARS](#)

https://nwis.waterdata.usgs.gov/usa/nwis/uv/?site_no=09470500&PARAMeter_cd=00065,00060&site_no=09470920&PARAMeter_cd=00065,00060&site_no=09471000&PARAMeter_cd=00065,00060&site_no=09471550&PARAMeter_cd=00065,00060

Indicator 9: Base-flow on San Pedro and Babocomari Rivers

Data type: Gage discharge data **Sites:** 4 **Data Location and Link:** Contact [USGS](#)

https://nwis.waterdata.usgs.gov/usa/nwis/uv/?site_no=09470500&site_no=09471000&site_no=09471400&site_no=09471550&PARAMeter_cd=00060

Indicator 10: June San Pedro River wet-dry status

Data type: GPS data **Sites:** San Pedro River through SPRNCA + Tributaries

Data Location and Link: Contact [The Nature Conservancy](#)

Maps (pdf): http://azconservation.org/downloads/san_pedro_wet_dry_mapping

Animation:

<http://tnc.maps.arcgis.com/apps/OnePane/azuretime/index.html?appid=2ec647b821654da79a52ffd795fbd70>

Indicator 11: San Pedro River water quality

Data type: Variety, numerical data **Sites:** 1 **Data Location and Link:** QW Data

https://nwis.waterdata.usgs.gov/az/nwis/qwdata/?site_no=09471000&agency_cd=USGS&inventory_output=0&rdb_inventory_output=file&TZoutput=0&pm_cd_compare=Greater%20than&radio_parm_cds=all_parm_cds&format=html_table&qw_attributes=0&qw_sample_wide=wide

[&rdb qw attributes=0&date format=YYYY-MM-DD&rdb compression=file&submitted form=brief list](#)

Indicator 12: San Pedro and Babocomari Rivers isotope analysis

Data type: Numeric, mass ratio **Sites:** 6 **Data Location & Link:** QWData NWIS Web

https://nwis.waterdata.usgs.gov/az/nwis/qwdata/?site_no=09470500&site_no=312621110062601&site_no=09470920&site_no=09471000&site_no=09471400&site_no=09471550&agency_cd=USGS&inventory_output=0&rdb_inventory_output=file&&TZoutput=0&pm_cd_va_search=82085&pm_cd_compare=Greater%20than&radio_parm_cds=parm_cd_list&radio_multiple_parm_cds=82082&format=html_table&qw_attributes=0&qw_sample_wide=wide&rdb_qw_attributes=0&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=brief_list

GROUP 4: Springs Indicators

Indicator 13: Springs discharge

Data type: Discharge data **Sites:** 5 **Data Location and Link:** NWIS (ADAPS)

https://waterdata.usgs.gov/nwis/measurements?site_no=312502110060701&site_no=313228110092701&site_no=313425110102301&site_no=313456110081901&site_no=313624110101401&agency_cd=USGS&format=gif

Indicator 14: Springs water quality

Data type: Variety, numerical data **Sites:** 3 **Data Location and Link:** QW Data

https://waterdata.usgs.gov/nwis/qwdata/?site_no=313228110092701&site_no=313425110102301&site_no=313456110081901&agency_cd=USGS&inventory_output=0&rdb_inventory_output=file&TZoutput=0&pm_cd_compare=Greater%20than&radio_parm_cds=all_parm_cds&format=html_table&qw_attributes=0&qw_sample_wide=wide&rdb_qw_attributes=0&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=brief_list