Data Dictionary for gwis@197.254.1.11

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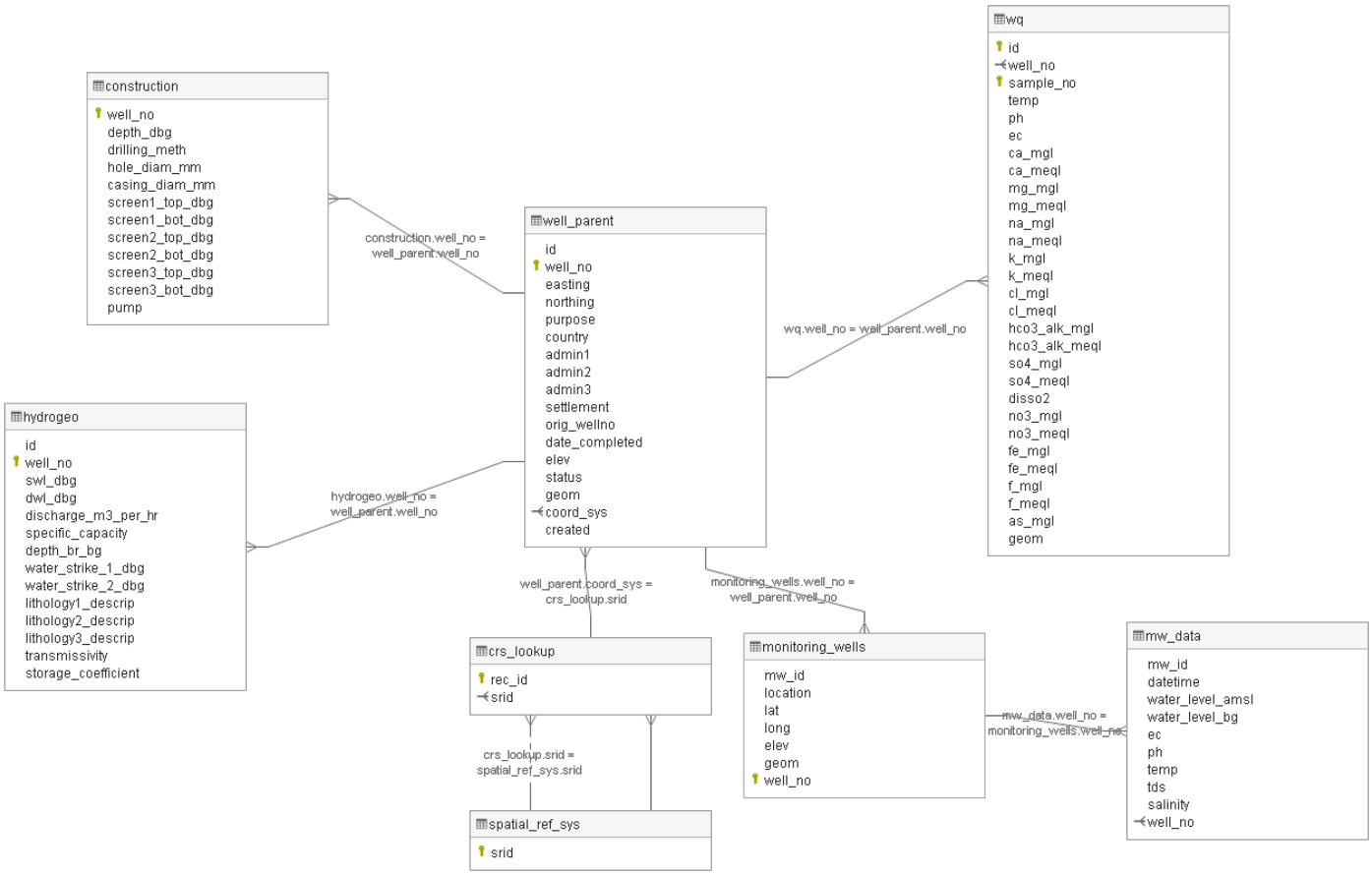
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Legend

- Primary key
- Primary key disabled
- User-defined primary key
- Unique key
- Unique key disabled
- User-defined unique key
- Active trigger
- Disabled trigger
- Many to one relation
- User-defined many to one relation
- One to many relation
- User-defined one to many relation
- Many to many relation
- User-defined many to many relation
- One to one relation
- User-defined one to one relation
- Input
- Output
- Input/Output
- Uses dependency
- User-defined uses dependency
- Used by dependency
- User-defined used by dependency

gwis@197.254.1.11

1. erd


construction
well_no
depth_dbg
drilling_meth
hole_diam_mm
casing_diam_mm
screen1_top_dbg
screen1_bot_dbg
screen2_top_dbg
screen2_bot_dbg
screen3_top_dbg
screen3_bot_dbg
pump
construction.well_no = well_parent.well_no
well_parent
id
well_no
easting
northing
purpose
country
admin1
admin2
admin3
settlement
orig_wellno
date_completed
elev
status
geom
coord_sys
created
wq.well_no = well_parent.well_no
wq
id
well_no
sample_no
temp
ph
ec
ca_mgl
ca_meql
mg_mgl
mg_meql
na_mgl
na_meql
k_mgl
k_meql
cl_mgl
cl_meql
hco3_alk_mgl
hco3_alk_meql
so4_mgl
so4_meql
disso2
no3_mgl
no3_meql
fe_mgl
fe_meql
f_mgl
f_meql
as_mgl
geom
hydrogeo
id
well_no
swl_dbg
dwl_dbg
discharge_m3_per_hr
specific_capacity
depth_br_bg
water_strike_1_dbg
water_strike_2_dbg
lithology1_descrip
lithology2_descrip
lithology3_descrip
transmissivity
storage_coefficient
hydrogeo.well_no = well_parent.well_no
well_parent.coord_sys = crs_lookup.srid
monitoring_wells.well_no = well_parent.well_no
crs_lookup
rec_id
srid
crs_lookup.srid = spatial_ref_sys.srid
spatial_ref_sys
srid
monitoring_wells
mw_id
location
lat
long
elev
geom
well_no
mw_data.well_no = monitoring_wells.well_no
mw_data
mw_id
datetime
water_level_amsl
water_level_bg
ec
ph
temp
tds
salinity
well_no

1.1. Tables

1.1.1. Table: construction

Physical details of well - drilling method, depth, diameters, screens

Columns

Name	Data type	Description / Attributes
well_no	character varying(50)	primary key and foreign key linked to well_parent table **References**: well_parent
depth_dbg	numeric(6, 2)	depth below ground level **Nullable**
drilling_meth	character varying(50)	drilling method **Nullable**
hole_diam_mm	numeric(3, 0)	Maximum hole diameter in millimeters **Nullable**
casing_diam_mm	numeric(3, 0)	Maximum casing diameter in millimeters **Nullable**
screen1_top_dbg	numeric(6, 2)	screen1 top to screen1 bot can be interval of mulitple screens **Nullable**
screen1_bot_dbg	numeric(6, 2)	bottom of first screen interval in meters below ground **Nullable**
screen2_top_dbg	numeric(6, 2)	screen2 top to screen2 bot can be interval of mulitple screens **Nullable**
screen2_bot_dbg	numeric(6, 2)	bottom of second screen interval in meters below ground **Nullable**
screen3_top_dbg	numeric(6, 2)	screen3 top to screen3 bot can be interval of mulitple screens **Nullable**
screen3_bot_dbg	numeric(6, 2)	bottom of third screen interval in meters below ground **Nullable**
pump	character varying(150)	type of pump **Nullable**

Links to

Table	Join	Title / Name / Description
well_parent	**construction**well_no = well_parentwell_no	well_no

Unique keys

Columns	Name / Description
well_no	well_construct_pkey primary key for well_construct table

Uses

Name
construction
well_parent

Used By

Name
construction
construction_elev
interp1
v_elev_scr

1.1.2. Table: crs_lookup

table that holds local coordinate systems

Columns

		Name	Data type	Description / Attributes
		rec_id	integer	**Default**: nextval('crs_lookup_rec_id_seq'::regclass)
		srid	integer	**References**: spatial_ref_sys
		system	character varying(100)	**Nullable**
		countries	character varying(255)	**Nullable**

Links to

	Table	Join	Title / Name / Description
	spatial_ref_sys	**crs_lookup**srid = spatial_ref_syssrid	fk_spatial_ref_sys_crs_lookup
	spatial_ref_sys	**crs_lookup**srid = spatial_ref_syssrid	f_key_srid

Linked from

	Table	Join	Title / Name / Description
	well_parent	**crs_lookup**srid = well_parentcoord_sys	crslookup

Unique keys

Columns	Name / Description
rec_id	crs_lookup_pkey
srid	unique_srid

Uses

Name
crs_lookup
spatial_ref_sys
spatial_ref_sys

Used By

Name
crs_lookup
well_parent

1.1.3. Table: hydrogeo

Holds parameters of hydrogeological interest - water levels, water strikes, pumping rates, specific capacity, lithologies, T & S

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('hydrogeo_id_seq'::regclass)
well_no	character varying(100)	primary key and foreign key linked to well_parent table **References**: well_parent
swl_dbg	numeric(6, 2)	static water level depth below ground **Nullable**
dwl_dbg	numeric(6, 2)	dynamic water level (during pumping) measured from ground surface **Nullable**
discharge_m3_per_hr	numeric(6, 2)	discharge rate of well in cubic meters per hour **Nullable**
specific_capacity	numeric(6, 2)	measured as discharge divided by drawdown **Nullable**
depth_br_bg	numeric(6, 2)	depth to bedrock measured from ground surface **Nullable**
water_strike_1_dbg	numeric(6, 2)	first encounter of water entering borehole **Nullable**
water_strike_2_dbg	numeric(6, 2)	second water inflow into borehole **Nullable**
lithology1_descrip	character varying(100)	lithology corresponding to first screen in construction table **Nullable**
lithology2_descrip	character varying(100)	lithology corresponding to second screen in construction table **Nullable**
lithology3_descrip	character varying(100)	lithology corresponding to third screen in construction table **Nullable**
transmissivity	numeric(6, 2)	transmissivity measured in meters squared per day measured from pumping tests **Nullable**
storage_coefficient	numeric(6, 6)	storage coefficient measured from pumping tests **Nullable**

Links to

Table	Join	Title / Name / Description
well_parent	**hydrogeo**well_no = well_parentwell_no	well_no

Unique keys

Columns	Name / Description
well_no	hydro_key Primary key and foreign key to link to other well tables

Uses

Name
hydrogeo
well_parent

Used By

Name
hydrogeo
aq_abstract
hydrogeo_elevation
hydrogeo_view
interp1
v_elev_scr
v_product_hydrogeo_2
v_well_hydrogeo
v_ws_elev

1.1.4. Table: monitoring_wells

table to hold monitoring wells.
well_no links is foreign key to well_parent table which holds other info about the well. Also linked to well table spatially hrough geom column.

Columns

Name	Data type	Description / Attributes
mw_id	character varying(12)	
location	character varying(50)	**Nullable**
lat	numeric(14, 6)	**Nullable**
long	numeric(14, 6)	**Nullable**
elev	numeric(6, 2)	**Nullable**
geom	geometry	**Nullable**
well_no	character varying(50)	**References**: well_parent

Links to

Table	Join	Title / Name / Description
well_parent	**monitoring_wells**well_no = well_parentwell_no	f_key_linkto_wp

Linked from

Table	Join	Title / Name / Description
mw_data	**monitoring_wells**well_no = mw_datawell_no	wellnumber_link_to_monitoring wells

Unique keys

Columns	Name / Description
well_no	monitoring_wells pkey links monitroing wells to time series data

Uses

Name
monitoring_wells
well_parent

Used By

Name
monitoring_wells
mw_record
total_decline2
wl_interp
mw_data

1.1.5. Table: mw_data

Columns

		Name	Data type	Description / Attributes
		mw_id	character varying(12)	
		datetime	timestamp(6) without time zone)	date & time of measurement
		water_level_amsl	numeric(6, 2)	water level above mean sea level **Nullable**
		water_level_bg	numeric(5, 2)	water level measured from ground surface **Nullable**
		ec	smallint	electrical conductivity in microsiemens per centimeter (µs/cm). **Nullable**
		ph	numeric(4, 2)	pH **Nullable**
		temp	numeric(5, 2)	temperature in degrees Celsius **Nullable**
		tds	numeric(6, 2)	total dissolved solids in mg/l **Nullable**
		salinity	numeric(5, 2)	measured in grams/liter **Nullable**
		well_no	character varying(50)	**Nullable** **References**: monitoring_wells

Links to

	Table	Join	Title / Name / Description
	monitoring_wells	**mw_data**well_no = monitoring_wellswell_no	wellnumber_link_to_monitoring wells

Uses

Name
mw_data
monitoring_wells

Used By

Name
mw_data
monthly_fluct
mw_record
total_decline
wl_interp

1.1.6. Table: spatial_ref_sys

Columns

Name	Data type	Description / Attributes
srid	integer	
auth_name	character varying(256)	Nullable
auth_srid	integer	Nullable
srtext	character varying(2048)	Nullable
proj4text	character varying(2048)	Nullable

Linked from

Table	Join	Title / Name / Description
crs_lookup	spatial_ref_sys.srid = crs_lookup.srid	fk_spatial_ref_sys_crs_lookup
crs_lookup	spatial_ref_sys.srid = crs_lookup.srid	f_key_srid

Unique keys

Columns	Name / Description
srid	spatial_ref_sys_pkey

Used By

Name
spatial_ref_sys
crs_lookup
crs_lookup

1.1.7. Table: well_parent

Main table with location details, purpose and use, date completed

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('well_parent_id_seq'::regclass)
		well_no	character varying(50)	This is the primary key of the table and the foreign key for all child tables
		easting	numeric(14, 6)	x coordinate for projected systems, longitude for geographic systems **Nullable**
		northing	numeric(14, 6)	y coordinate for projected systems, latitude for geographic systems **Nullable**
		purpose	character varying(25)	denotes use of well
		country	character varying(50)	
		admin1	character varying(50)	region or province **Nullable**
		admin2	character varying(50)	**Nullable**
		admin3	character varying(50)	**Nullable**
		settlement	character varying(250)	**Nullable**
		orig_wellno	character varying(50)	original borehole number in submitted data
		date_completed	date	
		elev	numeric(7, 2)	**Nullable**
		status	boolean	**Nullable**
		geom	geometry(Point, 4326)	**Nullable**
		coord_sys	integer	coordinate reference system - needed to convert text input of form input into binary geometry objects **Nullable** **References**: crs_lookup
		created	timestamp without time zone	time at which the rcord was entered **Nullable** **Default**: CURRENT_TIMESTAMP

Links to

	Table	Join	Title / Name / Description
	crs_lookup	**well_parent**coord_sys = crs_lookupsrid	crslookup

Linked from

	Table	Join	Title / Name / Description
	construction	**well_parent**well_no = constructionwell_no	well_no
	hydrogeo	**well_parent**well_no = hydrogeowell_no	well_no
	monitoring_wells	**well_parent**well_no = monitoring_wellswell_no	f_key_linkto_wp
	wq	**well_parent**well_no = wqwell_no	well_no_fkey

Unique keys

Columns		Name / Description
	well_no	well_parent_pkey

Triggers

Name	When	Description
tr_make_pointgeom	Before Insert, Update	fires off function fn_make_pointgeom
`EXECUTE FUNCTION fn_make_pointgeom()`		
tr_monitoring_well_insert	After Insert, Update	
`EXECUTE FUNCTION fn_monitoring_well_insert()`		

Uses

Name
well_parent
crs_lookup

Used By

Name
well_parent
aq_abstract
construction_elev
hydrogeo_elevation
hydrogeo_view
interp1
v_conjunctive
v_elev_scr
v_product_hydrogeo_2
v_well_hydrogeo
v_ws_elev
construction
hydrogeo
monitoring_wells
wq

1.1.8. Table: wq

Table to hold chemical analyses

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('wq_id_seq'::regclass)
well_no	character varying(50)	**References**: well_parent
sample_no	character varying(50)	primary key & unique identifier for sample - one well can have more than 1 sample but sample can only belong to 1 well
temp	numeric(5, 2)	temperature in degrees celsius **Nullable**
ph	numeric(4, 2)	pH **Nullable**
ec	numeric(6, 0)	electrical conductivity in microsiemens per centimeter (µs/cm). **Nullable**
ca_mgl	numeric(6, 2)	calcium in milligrams per liter **Nullable**
ca_meql	numeric(9, 6)	calcium in milliequivalents per liter - this is a generated column **Nullable**
mg_mgl	numeric(6, 2)	magnesium in milligrams per liter **Nullable**
mg_meql	numeric(9, 6)	magnesium in milliequivalents per liter - this is a generated column **Nullable**
na_mgl	numeric(6, 2)	sodium in milligrams per liter **Nullable**
na_meql	numeric(9, 6)	sodium in milliequivalents per liter - this is a generated column **Nullable**
k_mgl	numeric(6, 2)	potassium in milligrams per liter **Nullable**
k_meql	numeric(9, 6)	potassium in milliequivalents per liter - this is a generated column **Nullable**
cl_mgl	numeric(6, 2)	chloride in milligrams per liter **Nullable**
cl_meql	numeric(9, 6)	chloride in milliequivalents per liter - this is a generated column **Nullable**
hco3_alk_mgl	numeric(6, 2)	bicarbonate alkalinity measured in milligrams per liter **Nullable**
hco3_alk_meql	numeric(9, 2)	bicarbonate alkalinity measured in milliequivalents per liter - this is a generated column **Nullable**
so4_mgl	numeric(6, 2)	sulfate measured in milligrams per liter **Nullable**
so4_meql	numeric(9, 6)	sulfate in milliequivalents per liter - this is a generated column **Nullable**
disso2	numeric(6, 2)	dissolved oxygen in milligrams per liter **Nullable**
no3_mgl	numeric(6, 2)	nitrate in milligrams per liter **Nullable**

		Name	Data type	Description / Attributes
		no3_meql	numeric(9, 6)	nitrate in milliequivalents per liter - this is a generated column **Nullable**
		fe_mgl	numeric(6, 2)	iron measured in milligrams per liter **Nullable**
		fe_meql	numeric(9, 6)	iron in milliequivalents per liter - this is a generated column **Nullable**
		f_mgl	numeric(6, 2)	fluoride measured in milligrams per liter **Nullable**
		f_meql	numeric(9, 6)	fluoride in milliequivalents per liter - this is a generated column **Nullable**
		as_mgl	numeric(6, 2)	arsenic measured in milligrams per liter **Nullable**
		geom	geometry(Point, 4326)	**Nullable**

Links to

	Table	Join	Title / Name / Description
⟜	well_parent	**wq**well_no = well_parentwell_no	well_no_fkey

Unique keys

	Columns	Name / Description
	id	wq_primary_key

Uses

Name
wq
⟜ well_parent

Used By

Name
wq
interp1
wq_error

2. Other

2.1. Tables

2.1.1. Table: drilling_meth

lookup table to provide valid values for construction input form

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('drilling_meth_id_seq'::regclass)
		method	character varying(100)	drilling method used to construct bore **Nullable**

Unique keys

Columns		Name / Description
	id	drilling meth_pkey

2.1.2. Table: garissa_ke_rain

Columns

		Name	Data type	Description / Attributes
		datetime	date	**Nullable**
		rainfall	numeric(5, 2)	**Nullable**
		station_code	smallint	**Nullable** **References**: rain_gauge

Links to

	Table	Join	Title / Name / Description
	rain_gauge	**garissa_ke_rain**station_code = rain_gaugecode	rain_gauge_code

Uses

Name
garissa_ke_rain
rain_gauge

Used By

Name
garissa_ke_rain
garissa_ke_annual_total
garissa_ke_monthly_avg

2.1.3. Table: geo_fsm_zone1

Shapefile from catchment modeling

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('"Geo_fsm_zone1_id_seq"'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		gridcode	bigint	**Nullable**
		area_m2	bigint	**Nullable**
		area_km2	double precision	**Nullable**

Unique keys

Columns		Name / Description
	id	Geo_fsm_zone1_pkey

2.1.4. Table: geo_fsm_zone2

Catchments shapefile from GeoFSM model

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('geo_fsm_zone2_id_seq'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		gridcode	bigint	**Nullable**
		area_m2	bigint	**Nullable**
		area_km2	double precision	**Nullable**

Unique keys

Columns		Name / Description
	id	geo_fsm_zone2_pkey

2.1.5. Table: geo_fsm_zone3

shapefile from runoff modeling (model?)

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('geo_fsm_zone3_id_seq'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		cat_name	character varying(60)	**Nullable**
		cat_area	character varying(60)	**Nullable**
		area_m2	bigint	**Nullable**
		area_km2	double precision	**Nullable**

Unique keys

Columns		Name / Description
	id	geo_fsm_zone3_pkey

2.1.6. Table: geo_fsm_zone4

shapefile of model catchments

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('geo_fsm_zone4_id_seq'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		gridcode	bigint	**Nullable**
		area_m2	bigint	**Nullable**
		area_km2	double precision	**Nullable**

Unique keys

Columns		Name / Description
	id	geo_fsm_zone4_pkey

2.1.7. Table: geo_fsm_zone5

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('geo_fsm_zone5_id_seq'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		hybas_id	bigint	**Nullable**
		area_m2	bigint	**Nullable**
		area_km2	double precision	**Nullable**

Unique keys

Columns		Name / Description
	id	geo_fsm_zone5_pkey

2.1.8. Table: geo_fsm_zone6

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('geo_fsm_zone6_id_seq'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		gridcode	bigint	**Nullable**
		area_m2	bigint	**Nullable**
		area_km2	double precision	**Nullable**

Unique keys

Columns		Name / Description
	id	geo_fsm_zone6_pkey

2.1.9. Table: hydromet_station

table to hold attributes of all hydromet stations, linked to data by code column

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('hydromet_station_id_seq'::regclass)
name	character varying(100)	**Nullable**
location	character varying(100)	**Nullable**
code	smallint	**Nullable**
x	numeric(8, 2)	**Nullable**
y	numeric(8, 2)	**Nullable**

Linked from

Table	Join	Title / Name / Description
temp	**hydromet_station**code = tempstation_code	station_link

Unique keys

Columns	Name / Description
id	hydromet_pkey
code	uniquecode

Used By

Name
hydromet_station
temp

2.1.10. Table: jomo_ke_rain

time series of daily rainfall for Jomo Kenyatta airport

Columns

		Name	Data type	Description / Attributes
		datetime	date	Nullable
		rainfall	numeric(5, 2)	Nullable
		station_code	smallint	Nullable

Used By

Name
jomo_ke_rain
jomo_ke_annual_total
jomo_ke_monthly_avg

2.1.11. Table: kesomet_hydrogeo

Hydrogeoloical map of Kenya, Somalia, Ethiopia

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('kesomet_hydrogeo_id_seq'::regclass)
		geom	geometry(MultiPolygon, 4326)	**Nullable**
		hydrogeo_u	character varying(100)	**Nullable**

Unique keys

Columns		Name / Description
	id	kesomet_hydrogeo_pkey

Used By

Name
kesomet_hydrogeo
v_product_hydrogeo_2
v_well_hydrogeo

2.1.12. Table: kesomet_rivers

Rivers of Kenya, Somalia, Ethiopia

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('kesomet_rivers_id_seq'::regclass)
		geom	geometry(MultiLineString, 4326)	**Nullable**
		objectid	bigint	**Nullable**
		hyriv_id	bigint	**Nullable**
		next_down	bigint	**Nullable**
		main_riv	bigint	**Nullable**
		length_km	double precision	**Nullable**
		dist_dn_km	double precision	**Nullable**
		dist_up_km	double precision	**Nullable**
		catch_skm	double precision	**Nullable**
		upland_skm	double precision	**Nullable**
		endorheic	integer	**Nullable**
		dis_av_cms	double precision	**Nullable**
		ord_stra	integer	**Nullable**
		ord_clas	integer	**Nullable**
		ord_flow	integer	**Nullable**
		hybas_l12	double precision	**Nullable**
		shape_leng	double precision	**Nullable**
		layer	character varying(254)	**Nullable**
		path	character varying(254)	**Nullable**

Unique keys

Columns		Name / Description
	id	kesomet_rivers_pkey

Used By

Name
kesomet_rivers
v_conjunctive

2.1.13. Table: mandera_ke_rain

time series data from mandera rain station

Columns

		Name	Data type	Description / Attributes
		datetime	date	**Nullable**
		rainfall	numeric(5, 2)	**Nullable**
		station_code	smallint	**Nullable** **References**: rain_gauge

Links to

	Table	Join	Title / Name / Description
	rain_gauge	**mandera_ke_rain**station_code = rain_gaugecode	station_linkg

Uses

Name
mandera_ke_rain
rain_gauge

Used By

Name
mandera_ke_rain
mandera_ke_annual_total
mandera_ke_monthly_avg

2.1.14. Table: moyale_ke_rain

Columns

		Name	Data type	Description / Attributes
		datetime	date	**Nullable**
		rainfall	numeric(5, 2)	**Nullable**
		station_code	smallint	**Nullable** **References**: rain_gauge

Links to

	Table	Join	Title / Name / Description
	rain_gauge	**moyale_ke_rain**station_code = rain_gaugecode	station_link

Uses

Name
moyale_ke_rain
rain_gauge

Used By

Name
moyale_ke_rain
moyale_ke_annual_total
moyale_ke_monthly_avg

2.1.15. Table: pump

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('pump_id_seq'::regclass)
pump_type	character varying(150)	
setting_bg	numeric	**Nullable**

Unique keys

Columns	Name / Description
id	pump_pkey

2.1.16. Table: purpose

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('purpose_id_seq'::regclass)
purpose	character varying(100)	**Nullable**

Unique keys

Columns	Name / Description
id	Purpose_pkey
purpose	purpose unique To enable foreign key link in well_parent table

2.1.17. Table: rain_gauge

Links rain data to stations in this table

Columns

Name	Data type	Description / Attributes
station	character varying	
name	character varying(100)	Nullable
location	character varying(100)	Nullable
code	smallint	
x	numeric(8, 2)	Nullable
y	numeric(8, 2)	Nullable
elevation	numeric(6, 2)	Nullable
geom	geometry(Point, 4326)	Nullable

Linked from

Table	Join	Title / Name / Description
garissa_ke_rain	rain_gaugecode = garissa_ke_rainstation_code	rain_gauge_code
mandera_ke_rain	rain_gaugecode = mandera_ke_rainstation_code	station_linkg
moyale_ke_rain	rain_gaugecode = moyale_ke_rainstation_code	station_link
tororo_ug_rain	rain_gaugecode = tororo_ug_rainstation_code	rain_gauge_link

Unique keys

Columns	Name / Description
code	stationcode

Used By

Name
rain_gauge
garissa_ke_annual_total
jomo_ke_annual_total
mandera_ke_annual_total
moyale_ke_annual_total
tororo_ug_annual_total
garissa_ke_rain
mandera_ke_rain
moyale_ke_rain
tororo_ug_rain

2.1.18. Table: river_discharge

Columns

Name	Data type	Description / Attributes
date_time	timestamp without time zone	
discharge_cumecs	numeric(5, 2)	river discharge in cubic meters per second **Nullable**
station_code	smallint	**Nullable** **References**: river_gauge_station

Links to

Table	Join	Title / Name / Description
river_gauge_station	**river_discharge**station_code = river_gauge_stationcode	station_link

Unique keys

Columns	Name / Description
date_time	pk_river _disharge Act as unique idneifier and indexes measurement date
date_time	dateandtime

Uses

Name
river_discharge
river_gauge_station

2.1.19. Table: river_gauge_station

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('river_gauge_station_id_seq'::regclass)
name	character varying(100)	**Nullable**
location	character varying(100)	**Nullable**
code	smallint	**Nullable**
x	numeric(8, 2)	**Nullable**
y	numeric(8, 2)	**Nullable**
catch_area	numeric(8, 2)	**Nullable**

Linked from

Table	Join	Title / Name / Description
river_discharge	**river_gauge_station**code = river_dischargestation_code	station_link

Unique keys

Columns	Name / Description
id	river_gauge_pkey
code	uniquefcode

Used By

Name
river_gauge_station
river_discharge

2.1.20. Table: spring_data

time series of spring discharge

Columns

		Name	Data type	Description / Attributes
		spring_id	character varying(12)	**References**: springs
		datetime	timestamp(6) without time zone)	**Nullable**
		discharge_m3_hr	numeric(6, 2)	**Nullable**

Links to

	Table	Join	Title / Name / Description
	springs	**spring_data**spring_id = springsspring_id	srping_link

Unique keys

	Columns	Name / Description
	spring_id	spring_data_pkey

Uses

Name
spring_data
springs

2.1.21. Table: springs

table of spring locations, names, and other attributes

Columns

		Name	Data type	Description / Attributes
		spring_id	character varying(12)	
		location	character varying(50)	Nullable
		lat	numeric(14, 6)	Nullable
		long	numeric(14, 6)	Nullable
		elev	numeric(6, 2)	Nullable
		geom	geometry	Nullable

Linked from

	Table	Join	Title / Name / Description
	spring_data	springsspring_id = spring_dataspring_id	srping_link

Unique keys

	Columns	Name / Description
	spring_id	springs_pkey

Used By

Name
springs
spring_data

2.1.22. Table: temp

time series of temperature data

Columns

		Name	Data type	Description / Attributes
		date_time	timestamp without time zone	
		temp	numeric(5, 2)	**Nullable**
		station_code	smallint	**Nullable** **References**: hydromet_station

Links to

	Table	Join	Title / Name / Description
	hydromet_station	**temp**station_code = hydromet_stationcode	station_link

Unique keys

	Columns	Name / Description
	date_time	date_time

Uses

Name
temp
hydromet_station

2.1.23. Table: tororo_ug_rain

time series of daily rainfall at Tororo station

Columns

		Name	Data type	Description / Attributes
		datetime	date	**Nullable**
		rainfall	numeric(5, 2)	**Nullable**
		station_code	smallint	**Nullable** **References**: rain_gauge

Links to

	Table	Join	Title / Name / Description
	rain_gauge	**tororo_ug_rain**station_code = rain_gaugecode	rain_gauge_link

Uses

Name
tororo_ug_rain
rain_gauge

Used By

Name
tororo_ug_rain
tororo_ug_annual_total
tororo_ug_monthly_avg

2.1.24. Table: trans_ann_climate

time series by year of hydrologic variables over transboundary aquifer areas from Jan 1981 to end Dec 2023

and of actual evapotranspiration from Jan 1 2000 to end Dec 2023

Columns

		Name	Data type	Description / Attributes
		code	character varying(12)	**References**: trans_aquifers
		year	character varying(5)	**Nullable**
		rainfall	numeric(6, 2)	**Nullable**
		actual_et	numeric(6, 2)	**Nullable**
		runoff	numeric(6, 2)	**Nullable**

Links to

	Table	Join	Title / Name / Description
	trans_aquifers	**trans_ann_climate**code = trans_aquiferscode	aq_code_link

Uses

Name
trans_ann_climate
trans_aquifers

2.1.25. Table: trans_aquifers

newest version of tranboundary aquifer to incorporate Gedaref aquifer

Columns

		Name	Data type	Description / Attributes
		id	integer	
		geom	geometry(MultiPolygon, 4326)	Nullable
		code	character varying(7)	
		name	character varying	Nullable
		area_km	integer	Nullable
		numb_count	integer	Nullable
		countries	character varying(200)	Nullable
		population	integer	Nullable
		annual_rainfall_mm	integer	Nullable
		annual_et	integer	Nullable
		annual_runoff	integer	Nullable

Linked from

	Table	Join	Title / Name / Description
	trans_ann_climate	**trans_aquifers**code = trans_ann_climatecode	aq_code_link
	trans_clime_monthly	**trans_aquifers**code = trans_clime_monthlycode	fk_to_trans_aq

Unique keys

	Columns	Name / Description
	code	pkey_transaquifer unique idenifier for transboundary aquifers
	code	trans_aquifers_code_key

Used By

Name
trans_aquifers
aq_abstract
v_conjunctive
v_trans_view
v_well_hydrogeo
trans_ann_climate
trans_clime_monthly

2.1.26. Table: trans_clime_monthly

Holds monthly averages of environmental variables over the period of record for rainfall (1981-2023) and evapotranspiration (2000-2023)

Columns

		Name	Data type	Description / Attributes
		code	character varying(6)	**References**: trans_aquifers
		month	character varying(4)	
		avg_rainfall	numeric(6, 2)	
		avg_aet	numeric(6, 2)	**Nullable**
		avg_runoff	numeric(6, 2)	**Nullable**

Links to

	Table	Join	Title / Name / Description
	trans_aquifers	**trans_clime_monthly**code = trans_aquiferscode	fk_to_trans_aq

Uses

Name
trans_clime_monthly
trans_aquifers

2.1.27. Table: user_org

Needed to activate accounts and to determine write permissions for editing tables

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('user_org_id_seq'::regclass)
org	character varying(100)	**Nullable**
country	character varying(100)	**Nullable**
org_code	smallint	**Nullable**

Linked from

Table	Join	Title / Name / Description
users	**user_org**org_code = usersorg_code	org_code_fkey

Unique keys

Columns	Name / Description
id	user_org_pkey
org_code	org_code_unique

Used By

Name
user_org
users

2.1.28. Table: users

Columns

Name	Data type	Description / Attributes
id	integer	**Default**: nextval('users_id_seq'::regclass)
fullname	character varying(100)	**Nullable**
username	character varying(25)	**Nullable**
password	character varying(255)	**Nullable**
validationcode	character varying(255)	**Nullable**
email	character varying(100)	**Nullable**
joined	date	**Nullable**
last_login	date	**Nullable**
country	character varying(100)	**Nullable**
org_code	bigint	**Nullable** **References**: user_org
active	smallint	**Nullable**

Links to

Table	Join	Title / Name / Description
user_org	**users**org_code = user_orgorg_code	org_code_fkey

Unique keys

Columns	Name / Description
id	users_pkey

Uses

Name
users
user_org

2.1.29. Table: zone2_data

Columns

		Name	Data type	Description / Attributes
		id	integer	**Default**: nextval('zone2_data_id_seq'::regclass)
		date	date	**Nullable**
		cid_192	numeric(6, 2)	**Nullable**
		cid_187	numeric(6, 2)	**Nullable**
		cid_188	numeric(6, 2)	**Nullable**
		cid_190	numeric(6, 2)	**Nullable**
		cid_198	numeric(6, 2)	**Nullable**
		cid_210	numeric(6, 2)	**Nullable**
		cid_220	numeric(6, 2)	**Nullable**
		cid_222	numeric(6, 2)	**Nullable**
		cid_223	numeric(6, 2)	**Nullable**
		cid_228	numeric(6, 2)	**Nullable**
		cid_229	numeric(6, 2)	**Nullable**
		cid_233	numeric(6, 2)	**Nullable**
		cid_238	numeric(6, 2)	**Nullable**
		cid_239	numeric(6, 2)	**Nullable**
		cid_138	numeric(6, 2)	**Nullable**
		cid_241	numeric(6, 2)	**Nullable**
		cid_197	numeric(6, 2)	**Nullable**
		cid_242	numeric(6, 2)	**Nullable**
		cid_181	numeric(6, 2)	**Nullable**
		cid_136	numeric(6, 2)	**Nullable**
		cid_171	numeric(6, 2)	**Nullable**
		cid_163	numeric(6, 2)	**Nullable**
		cid_133	numeric(6, 2)	**Nullable**
		cid_154	numeric(6, 2)	**Nullable**
		cid_123	numeric(6, 2)	**Nullable**
		cid_152	numeric(6, 2)	**Nullable**
		cid_236	numeric(6, 2)	**Nullable**
		cid_143	numeric(6, 2)	**Nullable**
		cid_211	numeric(6, 2)	**Nullable**
		cid_107	numeric(6, 2)	**Nullable**
		cid_47	numeric(6, 2)	**Nullable**
		cid_137	numeric(6, 2)	**Nullable**
		cid_186	numeric(6, 2)	**Nullable**

		Name	Data type	Description / Attributes
		cid_95	numeric(6, 2)	Nullable
		cid_49	numeric(6, 2)	Nullable
		cid_245	numeric(6, 2)	Nullable
		cid_209	numeric(6, 2)	Nullable
		cid_111	numeric(6, 2)	Nullable
		cid_206	numeric(6, 2)	Nullable
		cid_102	numeric(6, 2)	Nullable
		cid_77	numeric(6, 2)	Nullable
		cid_201	numeric(6, 2)	Nullable
		cid_57	numeric(6, 2)	Nullable
		cid_164	numeric(6, 2)	Nullable
		cid_99	numeric(6, 2)	Nullable
		cid_93	numeric(6, 2)	Nullable
		cid_131	numeric(6, 2)	Nullable
		cid_196	numeric(6, 2)	Nullable
		cid_79	numeric(6, 2)	Nullable
		cid_246	numeric(6, 2)	Nullable
		cid_129	numeric(6, 2)	Nullable
		cid_85	numeric(6, 2)	Nullable
		cid_122	numeric(6, 2)	Nullable
		cid_216	numeric(6, 2)	Nullable
		cid_73	numeric(6, 2)	Nullable
		cid_237	numeric(6, 2)	Nullable
		cid_121	numeric(6, 2)	Nullable
		cid_53	numeric(6, 2)	Nullable
		cid_240	numeric(6, 2)	Nullable
		cid_125	numeric(6, 2)	Nullable
		cid_219	numeric(6, 2)	Nullable
		cid_119	numeric(6, 2)	Nullable
		cid_46	numeric(6, 2)	Nullable
		cid_148	numeric(6, 2)	Nullable
		cid_159	numeric(6, 2)	Nullable
		cid_253	numeric(6, 2)	Nullable
		cid_215	numeric(6, 2)	Nullable
		cid_184	numeric(6, 2)	Nullable
		cid_33	numeric(6, 2)	Nullable
		cid_180	numeric(6, 2)	Nullable
		cid_87	numeric(6, 2)	Nullable

		Name	Data type	Description / Attributes
		cid_71	numeric(6, 2)	Nullable
		cid_247	numeric(6, 2)	Nullable
		cid_145	numeric(6, 2)	Nullable
		cid_205	numeric(6, 2)	Nullable
		cid_72	numeric(6, 2)	Nullable
		cid_212	numeric(6, 2)	Nullable
		cid_84	numeric(6, 2)	Nullable
		cid_56	numeric(6, 2)	Nullable
		cid_92	numeric(6, 2)	Nullable
		cid_178	numeric(6, 2)	Nullable
		cid_254	numeric(6, 2)	Nullable
		cid_165	numeric(6, 2)	Nullable
		cid_113	numeric(6, 2)	Nullable
		cid_96	numeric(6, 2)	Nullable
		cid_69	numeric(6, 2)	Nullable
		cid_250	numeric(6, 2)	Nullable
		cid_54	numeric(6, 2)	Nullable
		cid_158	numeric(6, 2)	Nullable
		cid_157	numeric(6, 2)	Nullable
		cid_105	numeric(6, 2)	Nullable
		cid_12	numeric(6, 2)	Nullable
		cid_14	numeric(6, 2)	Nullable
		cid_173	numeric(6, 2)	Nullable
		cid_200	numeric(6, 2)	Nullable
		cid_30	numeric(6, 2)	Nullable
		cid_104	numeric(6, 2)	Nullable
		cid_243	numeric(6, 2)	Nullable
		cid_172	numeric(6, 2)	Nullable
		cid_199	numeric(6, 2)	Nullable
		cid_36	numeric(6, 2)	Nullable
		cid_4	numeric(6, 2)	Nullable
		cid_61	numeric(6, 2)	Nullable
		cid_13	numeric(6, 2)	Nullable
		cid_29	numeric(6, 2)	Nullable
		cid_177	numeric(6, 2)	Nullable
		cid_101	numeric(6, 2)	Nullable
		cid_43	numeric(6, 2)	Nullable
		cid_62	numeric(6, 2)	Nullable

		Name	Data type	Description / Attributes
		cid_191	numeric(6, 2)	Nullable
		cid_31	numeric(6, 2)	Nullable
		cid_170	numeric(6, 2)	Nullable
		cid_37	numeric(6, 2)	Nullable
		cid_63	numeric(6, 2)	Nullable
		cid_41	numeric(6, 2)	Nullable
		cid_182	numeric(6, 2)	Nullable
		cid_76	numeric(6, 2)	Nullable
		cid_103	numeric(6, 2)	Nullable
		cid_16	numeric(6, 2)	Nullable
		cid_17	numeric(6, 2)	Nullable
		cid_3	numeric(6, 2)	Nullable
		cid_144	numeric(6, 2)	Nullable
		cid_88	numeric(6, 2)	Nullable
		cid_45	numeric(6, 2)	Nullable
		cid_142	numeric(6, 2)	Nullable
		cid_127	numeric(6, 2)	Nullable
		cid_174	numeric(6, 2)	Nullable
		cid_81	numeric(6, 2)	Nullable
		cid_166	numeric(6, 2)	Nullable
		cid_251	numeric(6, 2)	Nullable
		cid_162	numeric(6, 2)	Nullable
		cid_160	numeric(6, 2)	Nullable
		cid_185	numeric(6, 2)	Nullable
		cid_80	numeric(6, 2)	Nullable
		cid_135	numeric(6, 2)	Nullable
		cid_90	numeric(6, 2)	Nullable
		cid_70	numeric(6, 2)	Nullable
		cid_68	numeric(6, 2)	Nullable
		cid_74	numeric(6, 2)	Nullable
		cid_167	numeric(6, 2)	Nullable
		cid_66	numeric(6, 2)	Nullable
		cid_42	numeric(6, 2)	Nullable
		cid_7	numeric(6, 2)	Nullable
		cid_24	numeric(6, 2)	Nullable
		cid_183	numeric(6, 2)	Nullable
		cid_23	numeric(6, 2)	Nullable
		cid_208	numeric(6, 2)	Nullable

		Name	Data type	Description / Attributes
		cid_202	numeric(6, 2)	Nullable
		cid_83	numeric(6, 2)	Nullable
		cid_221	numeric(6, 2)	Nullable
		cid_21	numeric(6, 2)	Nullable
		cid_18	numeric(6, 2)	Nullable
		cid_38	numeric(6, 2)	Nullable
		cid_231	numeric(6, 2)	Nullable
		cid_5	numeric(6, 2)	Nullable
		cid_151	numeric(6, 2)	Nullable
		cid_204	numeric(6, 2)	Nullable
		cid_155	numeric(6, 2)	Nullable
		cid_139	numeric(6, 2)	Nullable
		cid_118	numeric(6, 2)	Nullable
		cid_232	numeric(6, 2)	Nullable
		cid_248	numeric(6, 2)	Nullable
		cid_227	numeric(6, 2)	Nullable
		cid_147	numeric(6, 2)	Nullable
		cid_112	numeric(6, 2)	Nullable
		cid_224	numeric(6, 2)	Nullable
		cid_8	numeric(6, 2)	Nullable
		cid_39	numeric(6, 2)	Nullable
		cid_252	numeric(6, 2)	Nullable
		cid_225	numeric(6, 2)	Nullable
		cid_91	numeric(6, 2)	Nullable
		cid_20	numeric(6, 2)	Nullable
		cid_195	numeric(6, 2)	Nullable
		cid_156	numeric(6, 2)	Nullable
		cid_249	numeric(6, 2)	Nullable
		cid_55	numeric(6, 2)	Nullable
		cid_124	numeric(6, 2)	Nullable
		cid_6	numeric(6, 2)	Nullable
		cid_108	numeric(6, 2)	Nullable
		cid_153	numeric(6, 2)	Nullable
		cid_22	numeric(6, 2)	Nullable
		cid_140	numeric(6, 2)	Nullable
		cid_150	numeric(6, 2)	Nullable
		cid_115	numeric(6, 2)	Nullable
		cid_130	numeric(6, 2)	Nullable

		Name	Data type	Description / Attributes
		cid_193	numeric(6, 2)	Nullable
		cid_126	numeric(6, 2)	Nullable
		cid_82	numeric(6, 2)	Nullable
		cid_110	numeric(6, 2)	Nullable
		cid_141	numeric(6, 2)	Nullable
		cid_27	numeric(6, 2)	Nullable
		cid_2	numeric(6, 2)	Nullable
		cid_146	numeric(6, 2)	Nullable
		cid_218	numeric(6, 2)	Nullable
		cid_179	numeric(6, 2)	Nullable
		cid_52	numeric(6, 2)	Nullable
		cid_78	numeric(6, 2)	Nullable
		cid_213	numeric(6, 2)	Nullable
		cid_35	numeric(6, 2)	Nullable
		cid_226	numeric(6, 2)	Nullable
		cid_89	numeric(6, 2)	Nullable
		cid_26	numeric(6, 2)	Nullable
		cid_194	numeric(6, 2)	Nullable
		cid_44	numeric(6, 2)	Nullable
		cid_25	numeric(6, 2)	Nullable
		cid_48	numeric(6, 2)	Nullable
		cid_64	numeric(6, 2)	Nullable
		cid_65	numeric(6, 2)	Nullable
		cid_207	numeric(6, 2)	Nullable
		cid_15	numeric(6, 2)	Nullable
		cid_189	numeric(6, 2)	Nullable
		cid_86	numeric(6, 2)	Nullable
		cid_161	numeric(6, 2)	Nullable
		cid_10	numeric(6, 2)	Nullable
		cid_128	numeric(6, 2)	Nullable
		cid_100	numeric(6, 2)	Nullable
		cid_217	numeric(6, 2)	Nullable
		cid_168	numeric(6, 2)	Nullable
		cid_94	numeric(6, 2)	Nullable
		cid_58	numeric(6, 2)	Nullable
		cid_106	numeric(6, 2)	Nullable
		cid_51	numeric(6, 2)	Nullable
		cid_1	numeric(6, 2)	Nullable

		Name	Data type	Description / Attributes
		cid_34	numeric(6, 2)	Nullable
		cid_28	numeric(6, 2)	Nullable
		cid_235	numeric(6, 2)	Nullable
		cid_116	numeric(6, 2)	Nullable
		cid_11	numeric(6, 2)	Nullable
		cid_234	numeric(6, 2)	Nullable
		cid_50	numeric(6, 2)	Nullable
		cid_9	numeric(6, 2)	Nullable
		cid_98	numeric(6, 2)	Nullable
		cid_75	numeric(6, 2)	Nullable
		cid_244	numeric(6, 2)	Nullable
		cid_175	numeric(6, 2)	Nullable
		cid_32	numeric(6, 2)	Nullable
		cid_114	numeric(6, 2)	Nullable
		cid_67	numeric(6, 2)	Nullable
		cid_203	numeric(6, 2)	Nullable
		cid_214	numeric(6, 2)	Nullable
		cid_109	numeric(6, 2)	Nullable
		cid_134	numeric(6, 2)	Nullable
		cid_149	numeric(6, 2)	Nullable
		cid_169	numeric(6, 2)	Nullable
		cid_59	numeric(6, 2)	Nullable
		cid_117	numeric(6, 2)	Nullable
		cid_97	numeric(6, 2)	Nullable
		cid_230	numeric(6, 2)	Nullable
		cid_40	numeric(6, 2)	Nullable
		cid_132	numeric(6, 2)	Nullable
		cid_19	numeric(6, 2)	Nullable
		cid_176	numeric(6, 2)	Nullable
		cid_60	numeric(6, 2)	Nullable
		cid_120	numeric(6, 2)	Nullable

2.2. Views

2.2.1. View: aq_abstract

Columns

		Name	Data type	Description / Attributes
		aquifer	character varying	Nullable
		total number of wells	bigint	Nullable
		annual total abstaction	numeric	Nullable

Uses

Name
aq_abstract
hydrogeo
trans_aquifers
well_parent

Script

```
SELECT ta.name AS aquifer,
    count(wp.well_no) AS "total number of wells",
    (sum(h.discharge_m3_per_hr) * (180)::numeric) AS "annual total abstaction"
   FROM ((well_parent wp
     JOIN hydrogeo h ON (((h.well_no)::text = (wp.well_no)::text)))
     JOIN trans_aquifers ta ON (st_covers(ta.geom, wp.geom)))
  GROUP BY ta.name;
```

2.2.2. View: construction_elev

Columns

Name	Data type	Description / Attributes
elev	numeric(7, 2)	Nullable
depth_dbg	numeric(6, 2)	Nullable
elevation well bottom	numeric	Nullable
elevation screen 1 top	numeric	Nullable
elevation screen 1 bottom	numeric	Nullable
elevation screen 2 top	numeric	Nullable
elevation screen 2 bottom	numeric	Nullable
elevation screen 3 top	numeric	Nullable
elevation screen 3 bottom	numeric	Nullable

Uses

Name
construction_elev
construction
well_parent

Script

```
SELECT wp.elev,
    c.depth_dbg,
    (wp.elev - c.depth_dbg) AS "elevation well bottom",
    (wp.elev - c.screen1_top_dbg) AS "elevation screen 1 top",
    (wp.elev - c.screen1_bot_dbg) AS "elevation screen 1 bottom",
    (wp.elev - c.screen2_top_dbg) AS "elevation screen 2 top",
    (wp.elev - c.screen2_bot_dbg) AS "elevation screen 2 bottom",
    (wp.elev - c.screen3_top_dbg) AS "elevation screen 3 top",
    (wp.elev - c.screen3_bot_dbg) AS "elevation screen 3 bottom"
   FROM (well_parent wp
     JOIN construction c ON (((c.well_no)::text = (wp.well_no)::text)));
```

2.2.3. View: garissa_ke_annual_total

avg annual rainfall for Garissa station over the period of record

Columns

		Name	Data type	Description / Attributes
		year	numeric	Nullable
		total_precipitation	numeric	Nullable
		name	character varying(100)	Nullable

Uses

Name
garissa_ke_annual_total
garissa_ke_rain
rain_gauge

Script

```
SELECT EXTRACT(year FROM garissa_ke_rain.datetime) AS year,
    round(sum(garissa_ke_rain.rainfall), 2) AS total_precipitation,
    rain_gauge.name
   FROM (garissa_ke_rain
     JOIN rain_gauge ON ((garissa_ke_rain.station_code = rain_gauge.code)))
  GROUP BY (EXTRACT(year FROM garissa_ke_rain.datetime)), rain_gauge.name
  ORDER BY (EXTRACT(year FROM garissa_ke_rain.datetime)), (round(sum(garissa_ke_rain.rainfall), 2));
```

2.2.4. View: garissa_ke_monthly_avg

Columns

		Name	Data type	Description / Attributes
		monthno	numeric	Nullable
		month	text	Nullable
		monthly average	numeric	Nullable

Uses

Name
garissa_ke_monthly_avg
garissa_ke_rain

Script

```
WITH monthly_totals AS (
         SELECT EXTRACT(year FROM garissa_ke_rain.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (garissa_ke_rain.datetime)::timestamp with time zone)) AS monthno,
            to_char((garissa_ke_rain.datetime)::timestamp with time zone, 'Month'::text) AS month,
            sum(garissa_ke_rain.rainfall) AS "monthly total"
           FROM garissa_ke_rain
          GROUP BY (EXTRACT(year FROM garissa_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(garissa_ke_rain.datetime)::timestamp with time zone))), (to_char((garissa_ke_rain.datetime)::timestamp with time zone,
'Month'::text))
          ORDER BY (EXTRACT(year FROM garissa_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(garissa_ke_rain.datetime)::timestamp with time zone)))
        )
 SELECT monthno,
    month,
    round(avg("monthly total"), 2) AS "monthly average"
   FROM monthly_totals
  GROUP BY month, monthno
  ORDER BY monthno;
```

2.2.5. View: geography_columns

Columns

		Name	Data type	Description / Attributes
		f_table_catalog	name	Nullable
		f_table_schema	name	Nullable
		f_table_name	name	Nullable
		f_geography_column	name	Nullable
		coord_dimension	integer	Nullable
		srid	integer	Nullable
		type	text	Nullable

Script

```
SELECT current_database() AS f_table_catalog,
    n.nspname AS f_table_schema,
    c.relname AS f_table_name,
    a.attname AS f_geography_column,
    postgis_typmod_dims(a.atttypmod) AS coord_dimension,
    postgis_typmod_srid(a.atttypmod) AS srid,
    postgis_typmod_type(a.atttypmod) AS type
   FROM pg_class c,
    pg_attribute a,
    pg_type t,
    pg_namespace n
  WHERE ((t.typname = 'geography'::name) AND (a.attisdropped = false) AND (a.atttypid = t.oid) AND (a.attrelid = c.oid) AND
(c.relnamespace = n.oid) AND (c.relkind = ANY (ARRAY['r'::"char", 'v'::"char", 'm'::"char", 'f'::"char", 'p'::"char"])) AND
(NOT pg_is_other_temp_schema(c.relnamespace)) AND has_table_privilege(c.oid, 'SELECT'::text));
```

2.2.6. View: geometry_columns

Columns

		Name	Data type	Description / Attributes
		f_table_catalog	character varying(256)	Nullable
		f_table_schema	name	Nullable
		f_table_name	name	Nullable
		f_geometry_column	name	Nullable
		coord_dimension	integer	Nullable
		srid	integer	Nullable
		type	character varying(30)	Nullable

Script

```
SELECT (current_database())::character varying(256) AS f_table_catalog,
    n.nspname AS f_table_schema,
    c.relname AS f_table_name,
    a.attname AS f_geometry_column,
    COALESCE(postgis_typmod_dims(a.atttypmod), sn.ndims, 2) AS coord_dimension,
    COALESCE(NULLIF(postgis_typmod_srid(a.atttypmod), 0), sr.srid, 0) AS srid,
    (replace(replace(COALESCE(NULLIF(upper(postgis_typmod_type(a.atttypmod)), 'GEOMETRY'::text), st.type, 'GEOMETRY'::text),
'ZM'::text, ''::text), 'Z'::text, ''::text))::character varying(30) AS type
   FROM ((((((pg_class c
     JOIN pg_attribute a ON (((a.attrelid = c.oid) AND (NOT a.attisdropped))))
     JOIN pg_namespace n ON ((c.relnamespace = n.oid)))
     JOIN pg_type t ON ((a.atttypid = t.oid)))
     LEFT JOIN ( SELECT s.connamespace,
            s.conrelid,
            s.conkey,
            replace(split_part(s.consrc, ''''::text, 2), ')'::text, ''::text) AS type
           FROM ( SELECT pg_constraint.connamespace,
                    pg_constraint.conrelid,
                    pg_constraint.conkey,
                    pg_get_constraintdef(pg_constraint.oid) AS consrc
                   FROM pg_constraint) s
          WHERE (s.consrc ~~* '%geometrytype(% = %'::text)) st ON (((st.connamespace = n.oid) AND (st.conrelid = c.oid) AND
(a.attnum = ANY (st.conkey)))))
     LEFT JOIN ( SELECT s.connamespace,
            s.conrelid,
            s.conkey,
            (replace(split_part(s.consrc, ' = '::text, 2), ')'::text, ''::text))::integer AS ndims
           FROM ( SELECT pg_constraint.connamespace,
                    pg_constraint.conrelid,
                    pg_constraint.conkey,
                    pg_get_constraintdef(pg_constraint.oid) AS consrc
                   FROM pg_constraint) s
          WHERE (s.consrc ~~* '%ndims(% = %'::text)) sn ON (((sn.connamespace = n.oid) AND (sn.conrelid = c.oid) AND
(a.attnum = ANY (sn.conkey)))))
     LEFT JOIN ( SELECT s.connamespace,
            s.conrelid,
            s.conkey,
            (replace(replace(split_part(s.consrc, ' = '::text, 2), ')'::text, ''::text), '('::text, ''::text))::integer AS
srid
           FROM ( SELECT pg_constraint.connamespace,
                    pg_constraint.conrelid,
                    pg_constraint.conkey,
                    pg_get_constraintdef(pg_constraint.oid) AS consrc
                   FROM pg_constraint) s
          WHERE (s.consrc ~~* '%srid(% = %'::text)) sr ON (((sr.connamespace = n.oid) AND (sr.conrelid = c.oid) AND (a.attnum
= ANY (sr.conkey)))))
  WHERE ((c.relkind = ANY (ARRAY['r'::"char", 'v'::"char", 'm'::"char", 'f'::"char", 'p'::"char"])) AND (NOT (c.relname =
'raster_columns'::name)) AND (t.typname = 'geometry'::name) AND (NOT pg_is_other_temp_schema(c.relnamespace)) AND
has_table_privilege(c.oid, 'SELECT'::text));
```

2.2.7. View: hydrogeo_elevation

calculates elevation of water levels, depth to bedrock, and water strikes from elevation in parent well table

Columns

		Name	Data type	Description / Attributes
		well_no	character varying(100)	Nullable
		elev	numeric(7, 2)	Nullable
		swl	numeric(6, 2)	Nullable
		elevation swl	numeric	Nullable
		dwl	numeric(6, 2)	Nullable
		elevation dwl	numeric	Nullable
		depth to bedrock	numeric(6, 2)	Nullable
		elevation of bedrock	numeric	Nullable
		first water strike	numeric(6, 2)	Nullable
		elevation first strike	numeric	Nullable
		second water strike	numeric(6, 2)	Nullable
		elevation second water strike	numeric	Nullable

Uses

Name
hydrogeo_elevation
hydrogeo
well_parent

Script

```
SELECT h.well_no,
    wp.elev,
    h.swl_dbg AS swl,
    (wp.elev - h.swl_dbg) AS "elevation swl",
    h.dwl_dbg AS dwl,
    (wp.elev - h.dwl_dbg) AS "elevation dwl",
    h.depth_br_bg AS "depth to bedrock",
    (wp.elev - h.depth_br_bg) AS "elevation of bedrock",
    h.water_strike_1_dbg AS "first water strike",
    (wp.elev - h.water_strike_1_dbg) AS "elevation first strike",
    h.water_strike_2_dbg AS "second water strike",
    (wp.elev - h.water_strike_2_dbg) AS "elevation second water strike"
   FROM (well_parent wp
     JOIN hydrogeo h ON (((h.well_no)::text = (wp.well_no)::text)));
```

2.2.8. View: hydrogeo_view

calculates elevation of water levels, depth to bedrock, and water strikes from elevation in parent well table

Columns

		Name	Data type	Description / Attributes
		well_no	character varying(100)	Nullable
		swl_dbg	numeric(6, 2)	Nullable
		dwl_dbg	numeric(6, 2)	Nullable
		water_strike_1_dbg	numeric(6, 2)	Nullable
		depth_br_bg	numeric(6, 2)	Nullable
		elevation static water level	numeric	Nullable
		pumping water level	numeric	Nullable
		elevation of first water strike	numeric	Nullable
		elevation of bedrock	numeric	Nullable

Uses

Name
hydrogeo_view
hydrogeo
well_parent

Script

```
SELECT h.well_no,
    h.swl_dbg,
    h.dwl_dbg,
    h.water_strike_1_dbg,
    h.depth_br_bg,
    (wp.elev - h.swl_dbg) AS "elevation static water level",
    (wp.elev - h.dwl_dbg) AS "pumping water level",
    (wp.elev - h.water_strike_1_dbg) AS "elevation of first water strike",
    (wp.elev - h.depth_br_bg) AS "elevation of bedrock"
   FROM (hydrogeo h
     JOIN well_parent wp ON (((wp.well_no)::text = (h.well_no)::text)));
```

2.2.9. View: interp1

View showing variables for map interpolation

Columns

Name	Data type	Description / Attributes
well_no	character varying(50)	Nullable
geom	geometry(Point, 4326)	Nullable
depth_dbg	numeric(6, 2)	Nullable
elevation_bottom_of_first_screen	numeric	Nullable
elevation_bottom_of_second_screen	numeric	Nullable
elevation_bottom_of_third_screen	numeric	Nullable
water_strike_1_elevation	numeric	Nullable
water_strike_2_elevation	numeric	Nullable
discharge_m3_per_hr	numeric(6, 2)	Nullable
depth_br_bg	numeric(6, 2)	Nullable
specific_capacity	numeric(6, 2)	Nullable
transmissivity	numeric(6, 2)	Nullable
storage_coefficient	numeric(6, 6)	Nullable
ca_meql	numeric(9, 6)	Nullable
mg_meql	numeric(9, 6)	Nullable
na_meql	numeric(9, 6)	Nullable
k_meql	numeric(9, 6)	Nullable
cl_meql	numeric(9, 6)	Nullable
so4_meql	numeric(9, 6)	Nullable
hco3_alk_meql	numeric(9, 2)	Nullable

Uses

Name
interp1
construction
hydrogeo
well_parent
wq

Script

```
SELECT wp.well_no,
    wp.geom,
    c.depth_dbg,
    (wp.elev - c.screen1_bot_dbg) AS elevation_bottom_of_first_screen,
    (wp.elev - c.screen2_bot_dbg) AS elevation_bottom_of_second_screen,
    (wp.elev - c.screen3_bot_dbg) AS elevation_bottom_of_third_screen,
    (wp.elev - h.water_strike_1_dbg) AS water_strike_1_elevation,
    (wp.elev - h.water_strike_2_dbg) AS water_strike_2_elevation,
    h.discharge_m3_per_hr,
    h.depth_br_bg,
    h.specific_capacity,
    h.transmissivity,
    h.storage_coefficient,
    wq.ca_meql,
    wq.mg_meql,
    wq.na_meql,
    wq.k_meql,
    wq.cl_meql,
    wq.so4_meql,
    wq.hco3_alk_meql
   FROM (((well_parent wp
     JOIN construction c ON (((c.well_no)::text = (wp.well_no)::text)))
     JOIN hydrogeo h ON (((h.well_no)::text = (wp.well_no)::text)))
     JOIN wq ON (((wq.well_no)::text = (wp.well_no)::text)));
```

2.2.10. View: jomo_ke_annual_total

annual rainfall at this station

Columns

		Name	Data type	Description / Attributes
		year	numeric	Nullable
		total_precipitation	numeric	Nullable
		name	character varying(100)	Nullable

Uses

Name
jomo_ke_annual_total
jomo_ke_rain
rain_gauge

Script

```
SELECT EXTRACT(year FROM jomo_ke_rain.datetime) AS year,
    round(sum(jomo_ke_rain.rainfall), 2) AS total_precipitation,
    rain_gauge.name
   FROM (jomo_ke_rain
     JOIN rain_gauge ON ((jomo_ke_rain.station_code = rain_gauge.code)))
  GROUP BY (EXTRACT(year FROM jomo_ke_rain.datetime)), rain_gauge.name
  ORDER BY (EXTRACT(year FROM jomo_ke_rain.datetime)), (round(sum(jomo_ke_rain.rainfall), 2));
```

2.2.11. View: jomo_ke_monthly_avg

monthly averages over the period of record at this station

Columns

		Name	Data type	Description / Attributes
		monthno	numeric	Nullable
		month	text	Nullable
		monthly average	numeric	Nullable

Uses

Name
jomo_ke_monthly_avg
jomo_ke_rain

Script

```
WITH monthly_totals AS (
         SELECT EXTRACT(year FROM jomo_ke_rain.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (jomo_ke_rain.datetime)::timestamp with time zone)) AS monthno,
            to_char((jomo_ke_rain.datetime)::timestamp with time zone, 'Month'::text) AS month,
            sum(jomo_ke_rain.rainfall) AS "monthly total"
           FROM jomo_ke_rain
          GROUP BY (EXTRACT(year FROM jomo_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(jomo_ke_rain.datetime)::timestamp with time zone))), (to_char((jomo_ke_rain.datetime)::timestamp with time zone,
'Month'::text))
          ORDER BY (EXTRACT(year FROM jomo_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(jomo_ke_rain.datetime)::timestamp with time zone)))
        )
 SELECT monthno,
    month,
    round(avg("monthly total"), 2) AS "monthly average"
   FROM monthly_totals
  GROUP BY month, monthno
  ORDER BY monthno;
```

2.2.12. View: mandera_ke_annual_total

avg annual rainfall at Mandera over period of record

Columns

		Name	Data type	Description / Attributes
		year	numeric	Nullable
		total_precipitation	numeric	Nullable
		name	character varying(100)	Nullable

Uses

Name
mandera_ke_annual_total
mandera_ke_rain
rain_gauge

Script

```
SELECT EXTRACT(year FROM mandera_ke_rain.datetime) AS year,
    round(sum(mandera_ke_rain.rainfall), 2) AS total_precipitation,
    rain_gauge.name
   FROM (mandera_ke_rain
     JOIN rain_gauge ON ((mandera_ke_rain.station_code = rain_gauge.code)))
  GROUP BY (EXTRACT(year FROM mandera_ke_rain.datetime)), rain_gauge.name
  ORDER BY (EXTRACT(year FROM mandera_ke_rain.datetime)), (round(sum(mandera_ke_rain.rainfall), 2));
```

2.2.13. View: mandera_ke_monthly_avg

monthly averages over the period of record at mandera station

Columns

		Name	Data type	Description / Attributes
		monthno	numeric	Nullable
		month	text	Nullable
		monthly average	numeric	Nullable

Uses

Name
mandera_ke_monthly_avg
mandera_ke_rain

Script

```
WITH monthly_totals AS (
         SELECT EXTRACT(year FROM mandera_ke_rain.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (mandera_ke_rain.datetime)::timestamp with time zone)) AS monthno,
            to_char((mandera_ke_rain.datetime)::timestamp with time zone, 'Month'::text) AS month,
            sum(mandera_ke_rain.rainfall) AS "monthly total"
           FROM mandera_ke_rain
          GROUP BY (EXTRACT(year FROM mandera_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mandera_ke_rain.datetime)::timestamp with time zone))), (to_char((mandera_ke_rain.datetime)::timestamp with time zone,
'Month'::text))
          ORDER BY (EXTRACT(year FROM mandera_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mandera_ke_rain.datetime)::timestamp with time zone)))
        )
 SELECT monthno,
    month,
    round(avg("monthly total"), 2) AS "monthly average"
   FROM monthly_totals
  GROUP BY month, monthno
  ORDER BY monthno;
```

2.2.14. View: monthly_fluct

Columns

Name	Data type	Description / Attributes
mw_id	character varying(12)	Nullable
year	numeric	Nullable
month	text	Nullable
monthno	numeric	Nullable
monthly_avg	numeric	Nullable
previous	numeric	Nullable
diff	numeric	Nullable

Uses

Name
monthly_fluct
mw_data

Script

```
WITH monthly_wl AS (
         SELECT mw_data.mw_id,
            EXTRACT(year FROM mw_data.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (mw_data.datetime)::timestamp with time zone)) AS monthno,
            to_char((mw_data.datetime)::timestamp with time zone, 'Month'::text) AS month,
            avg(mw_data.water_level_amsl) AS monthly_avg
           FROM mw_data
          GROUP BY mw_data.mw_id, (EXTRACT(year FROM mw_data.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mw_data.datetime)::timestamp with time zone))), (to_char((mw_data.datetime)::timestamp with time zone, 'Month'::text))
          ORDER BY mw_data.mw_id DESC, (EXTRACT(year FROM mw_data.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mw_data.datetime)::timestamp with time zone)))
        ), monthchange AS (
         SELECT monthly_wl.mw_id,
            monthly_wl.year,
            monthly_wl.month,
            monthly_wl.monthno,
            monthly_wl.monthly_avg,
            lag(monthly_wl.monthly_avg, 1) OVER (PARTITION BY monthly_wl.mw_id ORDER BY monthly_wl.year, monthly_wl.monthno)
AS previous
           FROM monthly_wl
        )
 SELECT mw_id,
    year,
    month,
    monthno,
    monthly_avg,
    previous,
    (monthly_avg - previous) AS diff
   FROM monthchange
  ORDER BY mw_id DESC, year, monthno;
```

2.2.15. View: moyale_ke_annual_total

annual rainfall at Moyale station

Columns

		Name	Data type	Description / Attributes
		year	numeric	Nullable
		total_precipitation	numeric	Nullable
		name	character varying(100)	Nullable

Uses

Name
moyale_ke_annual_total
moyale_ke_rain
rain_gauge

Script

```
SELECT EXTRACT(year FROM moyale_ke_rain.datetime) AS year,
    round(sum(moyale_ke_rain.rainfall), 2) AS total_precipitation,
    rain_gauge.name
   FROM (moyale_ke_rain
     JOIN rain_gauge ON ((moyale_ke_rain.station_code = rain_gauge.code)))
  GROUP BY (EXTRACT(year FROM moyale_ke_rain.datetime)), rain_gauge.name
  ORDER BY (EXTRACT(year FROM moyale_ke_rain.datetime)), (round(sum(moyale_ke_rain.rainfall), 2));
```

2.2.16. View: moyale_ke_monthly_avg

monthly averages over the period of record at Moyale station

Columns

		Name	Data type	Description / Attributes
		monthno	numeric	Nullable
		month	text	Nullable
		monthly average	numeric	Nullable

Uses

Name
moyale_ke_monthly_avg
moyale_ke_rain

Script

```
WITH monthly_totals AS (
         SELECT EXTRACT(year FROM moyale_ke_rain.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (moyale_ke_rain.datetime)::timestamp with time zone)) AS monthno,
            to_char((moyale_ke_rain.datetime)::timestamp with time zone, 'Month'::text) AS month,
            sum(moyale_ke_rain.rainfall) AS "monthly total"
           FROM moyale_ke_rain
          GROUP BY (EXTRACT(year FROM moyale_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(moyale_ke_rain.datetime)::timestamp with time zone))), (to_char((moyale_ke_rain.datetime)::timestamp with time zone,
'Month'::text))
          ORDER BY (EXTRACT(year FROM moyale_ke_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(moyale_ke_rain.datetime)::timestamp with time zone)))
        )
 SELECT monthno,
    month,
    round(avg("monthly total"), 2) AS "monthly average"
   FROM monthly_totals
  GROUP BY month, monthno
  ORDER BY monthno;
```

2.2.17. View: mw_record

Columns

		Name	Data type	Description / Attributes
		mw_id	character varying(12)	Nullable
		start_date	timestamp without time zone	Nullable
		end_date	timestamp without time zone	Nullable
		record_length	interval	Nullable
		geom	geometry	Nullable

Uses

Name
mw_record
monitoring_wells
mw_data

Script

```
SELECT mwd.mw_id,
    min(mwd.datetime) AS start_date,
    max(mwd.datetime) AS end_date,
    (max(mwd.datetime) - min(mwd.datetime)) AS record_length,
    mw.geom
   FROM (mw_data mwd
     JOIN monitoring_wells mw ON (((mw.mw_id)::text = (mwd.mw_id)::text)))
  GROUP BY mwd.mw_id, mw.geom
  ORDER BY (max(mwd.datetime) - min(mwd.datetime)), mwd.mw_id;
```

2.2.18. View: raster_columns

Columns

Name	Data type	Description / Attributes
r_table_catalog	name	Nullable
r_table_schema	name	Nullable
r_table_name	name	Nullable
r_raster_column	name	Nullable
srid	integer	Nullable
scale_x	double precision	Nullable
scale_y	double precision	Nullable
blocksize_x	integer	Nullable
blocksize_y	integer	Nullable
same_alignment	boolean	Nullable
regular_blocking	boolean	Nullable
num_bands	integer	Nullable
pixel_types	text[]	Nullable
nodata_values	double precision[]	Nullable
out_db	boolean[]	Nullable
extent	geometry	Nullable
spatial_index	boolean	Nullable

Script

```
SELECT current_database() AS r_table_catalog,
    n.nspname AS r_table_schema,
    c.relname AS r_table_name,
    a.attname AS r_raster_column,
    COALESCE(_raster_constraint_info_srid(n.nspname, c.relname, a.attname), ( SELECT
st_srid('0101000000000000000000000000000000000000000000000000'::geometry) AS st_srid)) AS srid,
    _raster_constraint_info_scale(n.nspname, c.relname, a.attname, 'x'::bpchar) AS scale_x,
    _raster_constraint_info_scale(n.nspname, c.relname, a.attname, 'y'::bpchar) AS scale_y,
    _raster_constraint_info_blocksize(n.nspname, c.relname, a.attname, 'width'::text) AS blocksize_x,
    _raster_constraint_info_blocksize(n.nspname, c.relname, a.attname, 'height'::text) AS blocksize_y,
    COALESCE(_raster_constraint_info_alignment(n.nspname, c.relname, a.attname), false) AS same_alignment,
    COALESCE(_raster_constraint_info_regular_blocking(n.nspname, c.relname, a.attname), false) AS regular_blocking,
    _raster_constraint_info_num_bands(n.nspname, c.relname, a.attname) AS num_bands,
    _raster_constraint_info_pixel_types(n.nspname, c.relname, a.attname) AS pixel_types,
    _raster_constraint_info_nodata_values(n.nspname, c.relname, a.attname) AS nodata_values,
    _raster_constraint_info_out_db(n.nspname, c.relname, a.attname) AS out_db,
    _raster_constraint_info_extent(n.nspname, c.relname, a.attname) AS extent,
    COALESCE(_raster_constraint_info_index(n.nspname, c.relname, a.attname), false) AS spatial_index
   FROM pg_class c,
    pg_attribute a,
    pg_type t,
    pg_namespace n
  WHERE ((t.typname = 'raster'::name) AND (a.attisdropped = false) AND (a.atttypid = t.oid) AND (a.attrelid = c.oid) AND
(c.relnamespace = n.oid) AND (c.relkind = ANY (ARRAY['r'::"char", 'v'::"char", 'm'::"char", 'f'::"char", 'p'::"char"])) AND
(NOT pg_is_other_temp_schema(c.relnamespace)) AND has_table_privilege(c.oid, 'SELECT'::text));
```

2.2.19. View: raster_overviews

Columns

Name	Data type	Description / Attributes
o_table_catalog	name	Nullable
o_table_schema	name	Nullable
o_table_name	name	Nullable
o_raster_column	name	Nullable
r_table_catalog	name	Nullable
r_table_schema	name	Nullable
r_table_name	name	Nullable
r_raster_column	name	Nullable
overview_factor	integer	Nullable

Script

```
SELECT current_database() AS o_table_catalog,
    n.nspname AS o_table_schema,
    c.relname AS o_table_name,
    a.attname AS o_raster_column,
    current_database() AS r_table_catalog,
    (split_part(split_part(s.consrc, ''::name'::text, 1), ''''::text, 2))::name AS r_table_schema,
    (split_part(split_part(s.consrc, ''::name'::text, 2), ''''::text, 2))::name AS r_table_name,
    (split_part(split_part(s.consrc, ''::name'::text, 3), ''''::text, 2))::name AS r_raster_column,
    (TRIM(BOTH FROM split_part(s.consrc, ','::text, 2)))::integer AS overview_factor
   FROM pg_class c,
    pg_attribute a,
    pg_type t,
    pg_namespace n,
    ( SELECT pg_constraint.connamespace,
            pg_constraint.conrelid,
            pg_constraint.conkey,
            pg_get_constraintdef(pg_constraint.oid) AS consrc
           FROM pg_constraint) s
  WHERE ((t.typname = 'raster'::name) AND (a.attisdropped = false) AND (a.atttypid = t.oid) AND (a.attrelid = c.oid) AND
(c.relnamespace = n.oid) AND ((c.relkind)::text = ANY ((ARRAY['r'::character(1), 'v'::character(1), 'm'::character(1),
'f'::character(1)])::text[])) AND (s.connamespace = n.oid) AND (s.conrelid = c.oid) AND (s.consrc ~~
'%_overview_constraint(%'::text) AND (NOT pg_is_other_temp_schema(c.relnamespace)) AND has_table_privilege(c.oid,
'SELECT'::text));
```

2.2.20. View: tororo_ug_annual_total

annual rainfall at Moyale station

Columns

		Name	Data type	Description / Attributes
		year	numeric	Nullable
		total_precipitation	numeric	Nullable
		name	character varying(100)	Nullable

Uses

Name
tororo_ug_annual_total
rain_gauge
tororo_ug_rain

Script

```
SELECT EXTRACT(year FROM tororo_ug_rain.datetime) AS year,
    round(sum(tororo_ug_rain.rainfall), 2) AS total_precipitation,
    rain_gauge.name
   FROM (tororo_ug_rain
     JOIN rain_gauge ON ((tororo_ug_rain.station_code = rain_gauge.code)))
  GROUP BY (EXTRACT(year FROM tororo_ug_rain.datetime)), rain_gauge.name
  ORDER BY (EXTRACT(year FROM tororo_ug_rain.datetime)), (round(sum(tororo_ug_rain.rainfall), 2));
```

2.2.21. View: tororo_ug_monthly_avg

monthly averages over the period of record at Tororo station

Columns

		Name	Data type	Description / Attributes
		monthno	numeric	Nullable
		month	text	Nullable
		monthly average	numeric	Nullable

Uses

Name
tororo_ug_monthly_avg
tororo_ug_rain

Script

```
WITH monthly_totals AS (
         SELECT EXTRACT(year FROM tororo_ug_rain.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (tororo_ug_rain.datetime)::timestamp with time zone)) AS monthno,
            to_char((tororo_ug_rain.datetime)::timestamp with time zone, 'Month'::text) AS month,
            sum(tororo_ug_rain.rainfall) AS "monthly total"
           FROM tororo_ug_rain
          GROUP BY (EXTRACT(year FROM tororo_ug_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(tororo_ug_rain.datetime)::timestamp with time zone))), (to_char((tororo_ug_rain.datetime)::timestamp with time zone,
'Month'::text))
          ORDER BY (EXTRACT(year FROM tororo_ug_rain.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(tororo_ug_rain.datetime)::timestamp with time zone)))
        )
 SELECT monthno,
    month,
    round(avg("monthly total"), 2) AS "monthly average"
   FROM monthly_totals
  GROUP BY month, monthno
  ORDER BY monthno;
```

2.2.22. View: total_decline

Columns

		Name	Data type	Description / Attributes
		mw_id	character varying(12)	Nullable
		year	numeric	Nullable
		yearly_average	numeric	Nullable
		previous	numeric	Nullable
		diff	numeric	Nullable
		total_decline	numeric	Nullable

Uses

Name
total_decline
mw_data

Used By

Name
total_decline
total_decline2

Script

```
WITH monthly_wl AS (
         SELECT mw_data.mw_id,
            EXTRACT(year FROM mw_data.datetime) AS year,
            EXTRACT(month FROM date_trunc('month'::text, (mw_data.datetime)::timestamp with time zone)) AS monthno,
            to_char((mw_data.datetime)::timestamp with time zone, 'Month'::text) AS month,
            avg(mw_data.water_level_amsl) AS monthly_avg
           FROM mw_data
          GROUP BY mw_data.mw_id, (EXTRACT(year FROM mw_data.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mw_data.datetime)::timestamp with time zone))), (to_char((mw_data.datetime)::timestamp with time zone, 'Month'::text))
          ORDER BY mw_data.mw_id DESC, (EXTRACT(year FROM mw_data.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mw_data.datetime)::timestamp with time zone)))
        ), yearchange AS (
         SELECT monthly_wl.mw_id,
            monthly_wl.year,
            (sum(monthly_wl.monthly_avg) / (count(*))::numeric) AS yearly_average,
            lag((sum(monthly_wl.monthly_avg) / (count(*))::numeric), 1) OVER (PARTITION BY monthly_wl.mw_id ORDER BY
monthly_wl.year) AS previous
           FROM monthly_wl
          GROUP BY monthly_wl.mw_id, monthly_wl.year
        )
 SELECT mw_id,
    year,
    yearly_average,
    previous,
    (yearly_average - previous) AS diff,
    sum((yearly_average - previous)) OVER (PARTITION BY mw_id ORDER BY year) AS total_decline
   FROM yearchange;
```

2.2.23. View: total_decline2

Columns

		Name	Data type	Description / Attributes
		mw_id	character varying(12)	Nullable
		year	numeric	Nullable
		total_decline	numeric	Nullable
		start_year	numeric	Nullable
		geom	geometry	Nullable

Uses

Name
total_decline2
monitoring_wells
total_decline

Script

```
SELECT td.mw_id,
    td.year,
    td.total_decline,
    min(td.year) OVER (PARTITION BY td.mw_id ORDER BY td.year) AS start_year,
    mw.geom
   FROM (total_decline td
     JOIN monitoring_wells mw ON (((mw.mw_id)::text = (td.mw_id)::text)));
```

2.2.24. View: v_conjunctive

View showing distance from well to nearest stream along with other parameters to assess potential for conjunctive use

Columns

		Name	Data type	Description / Attributes
		well_no	character varying(50)	Nullable
		orig_wellno	character varying(50)	Nullable
		nearest distance to stream km	double precision	Nullable
		aquifer	character varying	Nullable
		catchment area	double precision	Nullable
		annual excess precipitation mm	integer	Nullable
		annual excess precipitation cubic meters	double precision	Nullable

Uses

Name
v_conjunctive
kesomet_rivers
trans_aquifers
well_parent

Script

```
SELECT wp.well_no,
    wp.orig_wellno,
    (st_distance((wp.geom)::geography, (ksm.geom)::geography) / ((1000)::numeric)::double precision) AS "nearest distance to
stream km",
    ta.name AS aquifer,
    ksm.catch_skm AS "catchment area",
    (ta.annual_rainfall_mm - ta.annual_et) AS "annual excess precipitation mm",
    (((((ta.annual_rainfall_mm - ta.annual_et) * 1000))::numeric)::double precision * ksm.catch_skm) AS "annual excess
precipitation cubic meters"
   FROM ((well_parent wp
     JOIN trans_aquifers ta ON (st_covers((ta.geom)::geography, (wp.geom)::geography)))
     JOIN kesomet_rivers ksm ON (st_dwithin((ksm.geom)::geography, (wp.geom)::geography, (5000)::double precision)))
  ORDER BY (st_distance((wp.geom)::geography, (ksm.geom)::geography) / ((1000)::numeric)::double precision);
```

2.2.25. View: v_elev_scr

Table View showing elevations of screens and screen intervals

Columns

		Name	Data type	Description / Attributes
		easting	numeric(14, 6)	Nullable
		northing	numeric(14, 6)	Nullable
		elevation_bottom_of_first_screen	numeric	Nullable
		screened_interval_1	numeric	Nullable
		elevation_bottom_of_second_screen	numeric	Nullable
		screened_interval_2	numeric	Nullable
		elevation_bottom_of_third_screen	numeric	Nullable
		screened_interval_3	numeric	Nullable
		discharge_m3_per_hr	numeric(6, 2)	Nullable

Uses

Name
v_elev_scr
construction
hydrogeo
well_parent

Script

```
SELECT wp.easting,
    wp.northing,
    (wp.elev - c.screen1_bot_dbg) AS elevation_bottom_of_first_screen,
    (c.screen1_bot_dbg - c.screen1_top_dbg) AS screened_interval_1,
    (wp.elev - c.screen2_bot_dbg) AS elevation_bottom_of_second_screen,
    (c.screen2_bot_dbg - c.screen2_top_dbg) AS screened_interval_2,
    (wp.elev - c.screen3_bot_dbg) AS elevation_bottom_of_third_screen,
    (c.screen3_bot_dbg - c.screen3_top_dbg) AS screened_interval_3,
    h.discharge_m3_per_hr
   FROM ((well_parent wp
     JOIN construction c ON (((c.well_no)::text = (wp.well_no)::text)))
     JOIN hydrogeo h ON (((h.well_no)::text = (wp.well_no)::text)));
```

2.2.26. View: v_product_hydrogeo_2

Productivity of BGS Hydrogeological Units

Columns

		Name	Data type	Description / Attributes
		well_no	character varying(50)	Nullable
		orig_wellno	character varying(50)	Nullable
		discharge_m3_per_hr	numeric(6, 2)	Nullable
		specific_capacity	numeric(6, 2)	Nullable
		water_strike_1_dbg	numeric(6, 2)	Nullable
		BGS Hydrogeological unit	character varying(100)	Nullable

Uses

Name
v_product_hydrogeo_2
hydrogeo
kesomet_hydrogeo
well_parent

Script

```
SELECT wp.well_no,
    wp.orig_wellno,
    h.discharge_m3_per_hr,
    h.specific_capacity,
    h.water_strike_1_dbg,
    kse.hydrogeo_u AS "BGS Hydrogeological unit"
   FROM ((well_parent wp
     JOIN hydrogeo h ON (((wp.well_no)::text = (h.well_no)::text)))
     JOIN kesomet_hydrogeo kse ON (st_covers(kse.geom, wp.geom)))
  ORDER BY h.discharge_m3_per_hr DESC NULLS LAST;
```

2.2.27. View: v_trans_view

Columns

		Name	Data type	Description / Attributes
		code	character varying(7)	Nullable
		name	character varying	Nullable
		area_km	integer	Nullable
		countries_sharing	character varying(200)	Nullable
		population	integer	Nullable
		annual_rainfall_in_millimeters	integer	Nullable
		annual_evapotranspiration	integer	Nullable
		annual_runoff	integer	Nullable

Uses

Name
v_trans_view
trans_aquifers

Script

```
SELECT code,
    name,
    area_km,
    countries AS countries_sharing,
    population,
    annual_rainfall_mm AS annual_rainfall_in_millimeters,
    annual_et AS annual_evapotranspiration,
    annual_runoff
   FROM trans_aquifers
  ORDER BY name;
```

2.2.28. View: v_well_hydrogeo

shows lithology encountered at well screens, together with BGS hydrogeo unit and transboundary aquifer

Columns

		Name	Data type	Description / Attributes
		well_no	character varying(50)	Nullable
		orig_wellno	character varying(50)	Nullable
		lithology at screen 1	character varying(100)	Nullable
		lithology at screen 2	character varying(100)	Nullable
		lithology at screen 3	character varying(100)	Nullable
		BGS Hydrogeological unit	character varying(100)	Nullable
		aquifer	character varying	Nullable

Uses

Name
v_well_hydrogeo
hydrogeo
kesomet_hydrogeo
trans_aquifers
well_parent

Script

```
SELECT wp.well_no,
    wp.orig_wellno,
    h.lithology1_descrip AS "lithology at screen 1",
    h.lithology2_descrip AS "lithology at screen 2",
    h.lithology3_descrip AS "lithology at screen 3",
    kse.hydrogeo_u AS "BGS Hydrogeological unit",
    ta.name AS aquifer
   FROM (((well_parent wp
     JOIN hydrogeo h ON (((wp.well_no)::text = (h.well_no)::text)))
     JOIN kesomet_hydrogeo kse ON (st_covers(kse.geom, wp.geom)))
     JOIN trans_aquifers ta ON (st_covers(ta.geom, wp.geom)))
  ORDER BY h.lithology1_descrip DESC NULLS LAST;
```

2.2.29. View: v_ws_elev

Table view showing elevations of water strikes

Columns

		Name	Data type	Description / Attributes
		easting	numeric(14, 6)	Nullable
		northing	numeric(14, 6)	Nullable
		elevation_first_water_strike	numeric	Nullable
		elevation_second_water_strike	numeric	Nullable
		discharge_m3_per_hr	numeric(6, 2)	Nullable

Uses

Name
v_ws_elev
hydrogeo
well_parent

Script

```
SELECT wp.easting,
    wp.northing,
    (wp.elev - h.water_strike_1_dbg) AS elevation_first_water_strike,
    (wp.elev - h.water_strike_2_dbg) AS elevation_second_water_strike,
    h.discharge_m3_per_hr
   FROM (well_parent wp
     JOIN hydrogeo h ON (((h.well_no)::text = (wp.well_no)::text)));
```

2.2.30. View: wl_interp

Columns

		Name	Data type	Description / Attributes
		mw_id	character varying(12)	Nullable
		well_no	character varying(50)	Nullable
		year	numeric	Nullable
		monthno	numeric	Nullable
		month	text	Nullable
		monthly_avg	numeric	Nullable
		geom	geometry	Nullable

Uses

Name
wl_interp
monitoring_wells
mw_data

Script

```
SELECT mw.mw_id,
    mw.well_no,
    EXTRACT(year FROM mwd.datetime) AS year,
    EXTRACT(month FROM date_trunc('month'::text, (mwd.datetime)::timestamp with time zone)) AS monthno,
    to_char((mwd.datetime)::timestamp with time zone, 'Month'::text) AS month,
    avg(mwd.water_level_amsl) AS monthly_avg,
    mw.geom
   FROM (mw_data mwd
     JOIN monitoring_wells mw ON (((mw.well_no)::text = (mwd.well_no)::text)))
  GROUP BY mw.mw_id, mw.well_no, (EXTRACT(year FROM mwd.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mwd.datetime)::timestamp with time zone))), (to_char((mwd.datetime)::timestamp with time zone, 'Month'::text)), mw.geom
  ORDER BY mw.mw_id DESC, (EXTRACT(year FROM mwd.datetime)), (EXTRACT(month FROM date_trunc('month'::text,
(mwd.datetime)::timestamp with time zone)));
```

2.2.31. View: wq_error

Columns

		Name	Data type	Description / Attributes
		well_no	character varying(50)	Nullable
		sample_no	character varying(50)	Nullable
		total cations	numeric	Nullable
		total anions	numeric	Nullable
		tdi	numeric	Nullable
		percent error	numeric	Nullable

Uses

Name
wq_error
wq

Script

```
WITH wqsums AS (
         SELECT wq.well_no,
            wq.sample_no,
            (((wq.ca_meql + wq.mg_meql) + wq.na_meql) + wq.k_meql) AS sumcat,
            ((wq.cl_meql + wq.hco3_alk_meql) + wq.so4_meql) AS suman,
            ((((((wq.ca_meql + wq.mg_meql) + wq.na_meql) + wq.k_meql) + wq.cl_meql) + wq.hco3_alk_meql) + wq.so4_meql) AS tdi
           FROM wq
        )
 SELECT well_no,
    sample_no,
    sumcat AS "total cations",
    suman AS "total anions",
    tdi,
    (((sumcat - suman) / tdi) * (100)::numeric) AS "percent error"
   FROM wqsums;
```

2.3.207. Function: fn_make_pointgeom

to convert text input into binary geometry objects

Input/Output

	Name	Data type	Description
@	Returns	trigger	

Script

```
CREATE OR REPLACE FUNCTION public.fn_make_pointgeom()
 RETURNS trigger
 LANGUAGE plpgsql
AS $function$
begin

            if          new.coord_sys = 4326 then

            new.geom = ST_Point(new.easting::float, new.northing::float, 4326);

            else

            new.geom = ST_Transform(ST_Point(new.easting::float, new.northing::float, new.coord_sys), 4326);

            end if;
            raise notice 'trigger fired';
            return new;

end;
$function$
```

2.3.208. Function: fn_monitoring_well_insert

function to add well to monitoring wells table when a new well with purpose = monitoring is inserted into well_parent table

Input/Output

	Name	Data type	Description
@	Returns	trigger	

Script

```
CREATE OR REPLACE FUNCTION public.fn_monitoring_well_insert()
 RETURNS trigger
 LANGUAGE plpgsql
AS $function$
begin
--perform pg_sleep(1);
           insert into monitoring_wells (mw_id, location, lat, long, elev, geom, well_no )

select well_parent.orig_wellno, well_parent.settlement,
well_parent.northing, well_parent.easting, well_parent.elev, well_parent.geom,
well_parent.well_no from well_parent
where purpose='monitoring'
and created = current_timestamp;

--extract(minutes from created)= extract(minutes from localtimestamp);

return new ;

end;
$function$
```