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/*
-- Joe Tayabji GEOG 6150
CREATE SCHEMA utah_mtb;

-- the states table was imported from qgis
-- check that it loaded
SELECT * FROM utah_mtb.states
      WHERE state_abbr = 'UT';

-- this table is in WGS 84 (4326)
-- transform to NAD83 UTM 12N (26912)
ALTER TABLE utah_mtb.states
      ALTER COLUMN geom TYPE geometry(MultiPolygon, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.states;

-- the counties table was imported from qgis
SELECT * FROM utah_mtb.counties

-- check that data is in 26912
SELECT st_srid(geom) as spref
      FROM utah_mtb.counties;

-- the cities table was imported from qgis
SELECT * FROM utah_mtb.cities;
-- composite key needed to account for cities (i.e. Park City) in multiple counties
ALTER TABLE utah_mtb.cities
      ADD PRIMARY KEY (countynbr, name);

-- this table is in WGS 84 (4326)
-- transform to NAD83 UTM 12N (26912)
ALTER TABLE utah_mtb.cities
      ALTER COLUMN geom TYPE geometry(MultiPolygon, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.cities;

-- the emergency medical services table was imported from qgis
SELECT * FROM utah_mtb.emergency_medical_services;

-- transform to 26912
ALTER TABLE utah_mtb.emergency_medical_services
      ALTER COLUMN geom TYPE geometry(MultiPoint, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.emergency_medical_services;

-- the trailhead table was imported from qgis
SELECT * FROM utah_mtb.trailheads;

-- transform to 26912
ALTER TABLE utah_mtb.trailheads
      ALTER COLUMN geom TYPE geometry(MultiPoint, 26912)
      USING ST_Transform(geom, 26912);
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SELECT st_srid(geom) as spref
      FROM utah_mtb.trailheads;

-- the ski areas table was imported from qgis
SELECT * FROM utah_mtb.ski_areas;

-- transform to 26912
ALTER TABLE utah_mtb.ski_areas
      ALTER COLUMN geom TYPE geometry(MultiPolygon, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.ski_areas;

-- the trails table was imported from qgis
SELECT * FROM utah_mtb.trails_paths;

ALTER TABLE utah_mtb.trails_paths
      ALTER COLUMN geom TYPE geometry(MultiLineString, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.trails_paths;

-- a landmark_features table was imported from qgis. it includes campgrounds.
-- select campgrounds and make a new tabe
CREATE TABLE utah_mtb.state_campgrounds AS
      SELECT *
      FROM utah_mtb.landmark_features
      WHERE landmark_t = 'Campground';

--data is in 26912
SELECT st_srid(geom) as spref
      FROM utah_mtb.state_campgrounds;

-- create bike shops table
-- date was self sourced from google maps
CREATE TABLE utah_mtb.bike_shops (
      name varchar(50) PRIMARY KEY,
      city varchar(30),
      county varchar(25),
      state varchar(2),
      address varchar(50),
      lat double precision,
      lon double precision,
      geom GEOMETRY(MultiPoint, 4326)
);

-- below was ran in psql
-- \copy utah_mtb.bike_shops(name, city, county, state, address, lat, lon)
-- FROM 'C:/Users/jtaya/bikeshops.csv' WITH CSV HEADER DELIMITER ',';

-- check that it loaded
SELECT * FROM utah_mtb.bike_shops;

-- add geometry
-- coordinates were from google maps, so wgs 84
UPDATE utah_mtb.bike_shops
      SET geom = ST_SetSRID(ST_MakePoint(lon, lat), 4326);
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-- transform to 26912
ALTER TABLE utah_mtb.bike_shops
      ALTER COLUMN geom TYPE geometry(MultiPoint, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.bike_shops;

-- create bike shops table
-- date was self sourced from google maps
CREATE TABLE utah_mtb.showers (
      name varchar(50) PRIMARY KEY,
      city varchar(30),
      county varchar(25),
      state varchar(2),
      address varchar(50),
      lat double precision,
      lon double precision,
      geom GEOMETRY(MultiPoint, 4326)
);

-- below was ran in psql
-- \copy utah_mtb.showers(name, city, county, state, address, lat, lon)
-- FROM 'C:/Users/jtaya/showers.csv' WITH CSV HEADER DELIMITER ',';

-- check that it loaded
SELECT * FROM utah_mtb.showers;

-- add geometry
-- coordinates were from google maps, so wgs 84
UPDATE utah_mtb.showers
      SET geom = ST_SetSRID(ST_MakePoint(lon, lat), 4326);

-- transform to 26912
ALTER TABLE utah_mtb.showers
      ALTER COLUMN geom TYPE geometry(MultiPoint, 26912)
      USING ST_Transform(geom, 26912);

SELECT st_srid(geom) as spref
      FROM utah_mtb.showers;

-- create a spatial index for each table
CREATE INDEX shop_ind
      ON utah_mtb.bike_shops
      USING GIST (geom);
CREATE INDEX city_ind
      ON utah_mtb.cities
      USING GIST (geom);
CREATE INDEX cnty_ind
      ON utah_mtb.counties
      USING GIST (geom);
CREATE INDEX ems_ind
      ON utah_mtb.emergency_medical_services
      USING GIST (geom);
CREATE INDEX shr_ind
      ON utah_mtb.showers
      USING GIST (geom);
CREATE INDEX ski_ind
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      ON utah_mtb.ski_areas
      USING GIST (geom);
CREATE INDEX st_ind
      ON utah_mtb.states
      USING GIST (geom);
CREATE INDEX th_ind
      ON utah_mtb.trailheads
      USING GIST (geom);
CREATE INDEX trails_ind
      ON utah_mtb.trails_paths
      USING GIST (geom);

-- create new table for trails that bikes are allowed
-- the first character of cartocode is a number indicator
-- removing hike only trails, equestrian, and steps
CREATE TABLE utah_mtb.bike_trails_allowed AS
      SELECT *
      FROM utah_mtb.trails_paths
      WHERE SUBSTRING(cartocode FROM 1 FOR 1) NOT IN ('1', '6', '7');

-- create a table of bike only trails
CREATE TABLE utah_mtb.bike_only_trails AS
      SELECT *
      FROM utah_mtb.trails_paths
      WHERE SUBSTRING(cartocode FROM 1 FOR 1) = '5';

-- create table of trailheads that are within 1500m of a trail
CREATE TABLE utah_mtb.accessible_trailheads AS
      SELECT DISTINCT ON(th.id) th.*
      FROM utah_mtb.trailheads th
      JOIN utah_mtb.bike_trails_allowed bt
      ON ST_DWithin(th.geom, bt.geom, 1500);

-- add closest EMS facility to trailhead
ALTER TABLE utah_mtb.accessible_trailheads
ADD COLUMN closest_ems VARCHAR(100);

UPDATE utah_mtb.accessible_trailheads th
SET closest_ems = (
    SELECT ems.name
    FROM utah_mtb.emergency_medical_services ems
    ORDER BY th.geom <-> ems.geom
    LIMIT 1
);
*/
SELECT c.countyname, SUM(ST_Length(b.geom))/1000 AS total_trail_km
      FROM utah_mtb.counties c
      JOIN utah_mtb.bike_trails_allowed b ON ST_Intersects(c.geom, b.geom)
      GROUP BY c.countyname
      ORDER BY total_trail_km DESC
      LIMIT 3;

SELECT c.countyname, SUM(ST_Length(b.geom))/1000 AS total_trail_km
      FROM utah_mtb.counties c
      JOIN utah_mtb.bike_only_trails b ON ST_Intersects(c.geom, b.geom)
      GROUP BY c.countyname
      ORDER BY total_trail_km DESC
      LIMIT 3;
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SELECT t.primarynam, MAX(ST_Distance(e.geom, t.geom))/1000 AS max_distance
      FROM utah_mtb.accessible_trailheads t
      JOIN utah_mtb.emergency_medical_services e ON t.closest_ems = e.name
      GROUP BY t.primarynam
      ORDER BY max_distance DESC
      LIMIT 3;
```