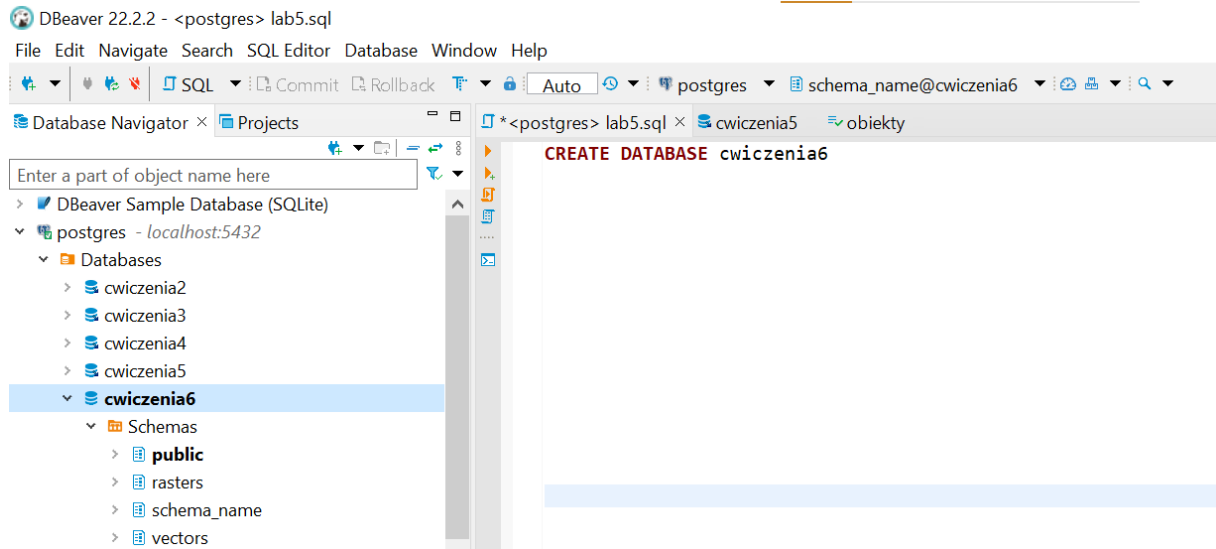
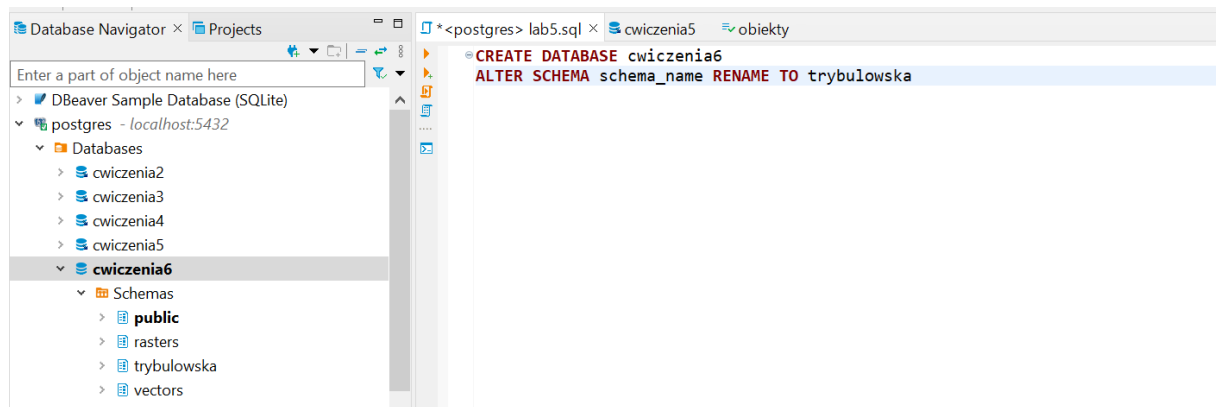


NOWA BAZA DANYCH



STRUKTURA BAZY DANYCH



ŁADOWANIE DANYCH

```
C:\Program Files\PostgreSQL\14\bin>.raster2pgsql.exe -s 3763 -N -32767 -t 100x100 -I -C -M -d C:\Users\Ewelina\Desktop\BDP-PROJECT\srtm_1arc_v3.tif rasters.dem > C:\Users\Ewelina\Desktop\BDP-PROJECT\dem.sql
Processing 1/1: C:\Users\Ewelina\Desktop\BDP-PROJECT\srtm_1arc_v3.tif
```



dem

28.11.2022 01:07

Microsoft SQL Server...

23 116 KB

```
C:\Program Files\PostgreSQL\14\bin>.raster2pgsql -s 3763 -N -32767 -t 100x100 -I -C -M -d C:\Users\Ewelina\Desktop\BDP-PROJECT\srtm_1arc_v3.tif rasters.dem | .\psql -d cwiczenia6 -U postgres
Processing 1/1: C:\Users\Ewelina\Desktop\BDP-PROJECT\srtm_1arc_v3.tif
Password for user postgres:
BEGIN
NOTICE: table "dem" does not exist, skipping
DROP TABLE
CREATE TABLE
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
```

```
C:\Program Files\PostgreSQL\14\bin>.raster2pgsql -s 3763 -N -32767 -t 128x128 -I -C -M -d C:\Users\Ewelina\Desktop\BDP-PROJECT\Landsat8_L1TP_RGBN.TIF rasters,landsat8 | .\psql -d cwiczenia6 -U postgres
Processing 1/1: C:\Users\Ewelina\Desktop\BDP-PROJECT\Landsat8_L1TP_RGBN.TIF
Password for user postgres:
BEGIN
NOTICE: table "landsat8" does not exist, skipping
DROP TABLE
CREATE TABLE
INSERT 0 1
INSERT 0 1
```

Database Navigator showing the structure of the 'cwiczenia6' database:

- Schemas**
 - public**
 - rasters**
 - Tables**
 - dem** (5.5M)
 - landsat8** (47M)
- Aggregate functions**
- rasters**
 - Tables**
 - dem** (5.5M)
 - Columns**
 - rid (serial4)
 - rast (raster)
 - Constraints**
 - Foreign Keys**
 - Indexes**
 - Dependencies**
 - References**
 - Partitions**
 - Triggers**
 - Rules**
 - Policies**
 - landsat8** (47M)
 - Columns**
 - rid (serial4)
 - rast (raster)
 - Constraints**
 - Foreign Keys**
 - Indexes**

Database Navigator showing the structure of the 'raster_columns' table:

- Schemas**
 - public**
 - Tables**
 - iso_metadata
 - iso_metadata_reference
 - spatial_ref_sys
 - Views**
 - geography_columns
 - geometry_columns
 - raster_columns**
 - Columns**
 - r_table_catalog (name)
 - r_table_schema (name)
 - r_table_name (name)
 - r_raster_column_name (name)
 - srid (int4)
 - scale_x (float8)
 - scale_y (float8)
 - blocksize_x (int4)
 - blocksize_y (int4)
 - same_alignment (bool)
 - regular_blocking (bool)
 - num_bands (int4)
 - pixel_types (text)
 - nodata_value (float8)

Properties window for 'raster_columns' (Object ID: 52592, Owner: postgres):

Columns	Column Name	#	Data type	Identity	Collation	Not Null	Default	Comment
Dependencies	r_table_cat...	1	name		C		[]	
Triggers	r_table_sch...	2	name		C		[]	
Rules	r_table_na...	3	name		C		[]	
	r_raster_col...	4	name		C		[]	
Statistics	srid	5	int4				[]	
Permissions	scale_x	6	float8				[]	
Source	scale_y	7	float8				[]	
Virtual	blocksize_x	8	int4				[]	
	blocksize_y	9	int4				[]	
	same_align...	10	bool				[]	
	regular_blo...	11	bool				[]	
	num_bands	12	int4				[]	
	pixel_types	13	text		C		[]	
	nodata_val...	14	float8				[]	
	out_db	15	bool				[]	
	extent	16	geometry				[]	
	spatial index	17	bool				[]	

SQL query results for 'select * from raster_columns':

	r_table_catalog	r_table_schema	r_table_name	r_raster_column	srid	scale_x	scale_y	blocksize_x	blocksize_y	same_align...	regular_blo...	num_bands	pixel_types	nodata_val...	out_db	extent	spatial index
1	cwiczenia6	rasters	dem	rast	3763	23.3527411668	-30.7891756029										
2	cwiczenia6	rasters	landsat8	rast	3763	30.3114020783	-29.7057939174										

TWORZENIE RASTRÓW Z ISTNIEJĄCYCH RASTRÓW I INTERAKCJA Z WEKTORAMI

PRZYKŁAD 1 - ST_INTERSECTS

```
--w powershellu w katalogu 14/bin:
--.\raster2pgsql.exe -s 3763 -M -32767 -t 100x100 -I -C -M -d C:\Users\swelw\
--.\raster2pgsql -s 3763 -M -32767 -t 100x100 -I -C -M -d C:\Users\swelw\
--.\raster2pgsql -s 3763 -M -32767 -t 128x128 -I -C -M -d C:\Users\swelw\

--Przykład 1 - ST_Intersects
CREATE TABLE trybulowska.intersects AS
SELECT a.rast, b.municipality
FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE ST_Intersects(a.rast, b.geom) AND b.municipality ilike 'porto';

--1. dodanie serial primary key:
alter table trybulowska.intersects
add column rid SERIAL PRIMARY KEY;

--2. utworzenie indeksu przestrzennego:
CREATE INDEX idx_intersects_rast_gist ON trybulowska.intersects
USING gist (ST_ConvexHull(rast));

--3. dodanie raster constraints:
-- schema: name table_name: name raster_column: name
SELECT AddRasterConstraints('trybulowska', name,
'intersects', name, 'rast', name);
```

PRZYKŁAD 2 - ST_CLIP

```
CREATE TABLE trybulowska.clip AS
SELECT ST_Clip(a.rast, b.geom, true), b.municipality
FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE ST_Intersects(a.rast, b.geom) AND b.municipality like 'PORTO';

select * from trybulowska.clip
```

--Przykład 3 - ST Union

clip 1 ×

select * from trybulowska.clip

st_clip	municipality
01000001006172BF3E4D5A374080318D6907CA3EC02C288A402D31E3C0D0979D709B5404410000000000000000	PORTO
01000001006172BF3E4D5A374080318D6907CA3EC0574768B43454E3C0474F11FE054A04410000000000000000	PORTO
01000001006172BF3E4D5A374080318D6907CA3EC02E358E1A7B3E2C079DC7A05D06804410000000000000000	PORTO
01000001006172BF3E4D5A374080318D6907CA3EC02E3C8390DE87E2C08B6D93EAF7D04410000000000000000	PORTO
01000001006172BF3E4D5A374080318D6907CA3EC00962D67B5CE2E2C0474F11FE054A04410000000000000000	PORTO

PRZYKŁAD 3 - ST_UNION

```
--Przykład 3 - ST_Union

CREATE TABLE trybulowska.union AS
SELECT ST_Union(ST_Clip(a.rast, b.geom, true))
FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom, a.rast);

select * from trybulowska.union
```

union 1 ×

select * from trybulowska.union

st_union
01000001006172BF3E4D5A374080318D6907CA3EC0D6994F2F08E0E6C0D9E35DC0089604410000000000

TWORZENIE RASTRÓW Z WEKTORÓW (RASTROWANIE)

PRZYKŁAD 1 - ST_ASRASTER

```

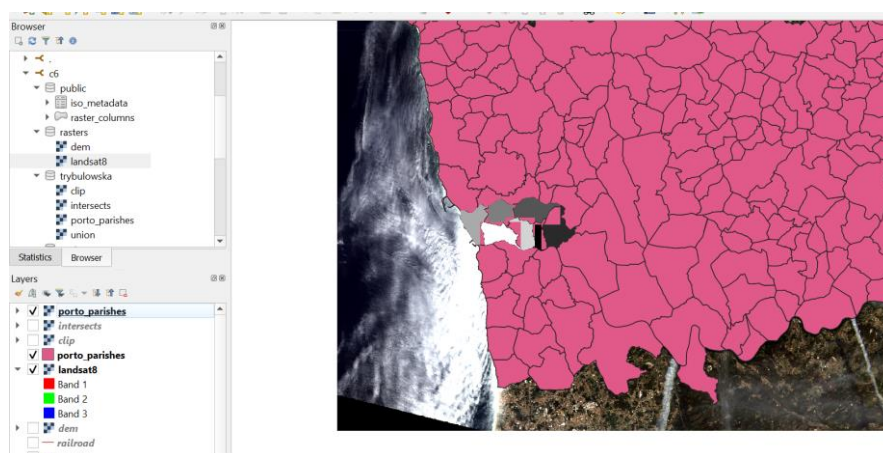
--CREATE TABLE trybulowska.porto_parishes AS
WITH r AS (
  SELECT rast FROM rasters.dem
  LIMIT 1
)
SELECT ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767) AS rast
FROM vectors.porto_parishes AS a, r
WHERE a.municipality ilike 'porto';

```

Jame	Value
Updated Rows	7
Query	CREATE TABLE trybulowska.porto_parishes AS WITH r AS (SELECT rast FROM rasters.dem LIMIT 1) SELECT ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767) AS rast FROM vectors.porto_parishes AS a, r WHERE a.municipality ilike 'porto'
Finish time	Mon Nov 28 20:34:28 CET 2022

```
select * from trybulowska.porto_parishes
```

porto_parishes 1 x	
	rast
1	01000001006172BF3E4D5A374080318D6907CA3EC0574768B43454E3C0D0979D709B5404410000000000
2	01000001006172BF3E4D5A374080318D6907CA3EC00A62D67B5CE2E2C08A6D93EAF7D04410000000000
3	01000001006172BF3E4D5A374080318D6907CA3EC0D268172037B9E5C0CA65352F399104410000000000
4	01000001006172BF3E4D5A374080318D6907CA3EC0D6994F2F08E0E6C05E060A8BE77F04410000000000
5	01000001006172BF3E4D5A374080318D6907CA3EC09A49D3957D46E4C0D9E35DC0089604410000000000
6	01000001006172BF3E4D5A374080318D6907CA3EC087977E37109EE4C0A3301411885604410000000000
7	01000001006172BF3E4D5A374080318D6907CA3EC00FB04D4A53D9E5C0474F11FE054A04410000000000



PRZYKŁAD 2 - ST_UNION

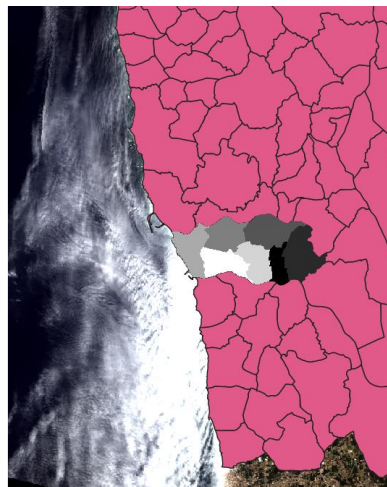
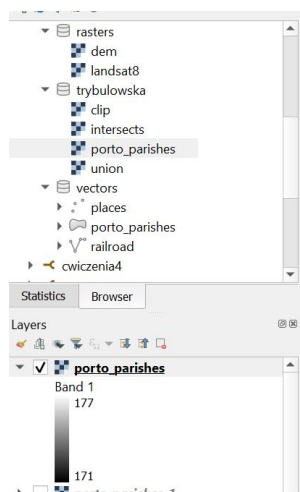
```
--Przykład 2 - ST_Union
DROP TABLE trybulowska.porto_parishes; --> drop table porto_parishes first
CREATE TABLE trybulowska.porto_parishes AS
WITH r AS (
SELECT rast FROM rasters.dem
LIMIT 1
)
SELECT st_union(ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767)) AS rast
FROM vectors.porto_parishes AS a, r
WHERE a.municipality ilike 'porto';

select* from trybulowska.porto_parishes|
```

porto_parishes 1 x

select* from trybulowska.porto_parishes *Enter a SQL expression to filter results (use Ctrl+Space)*

	rast
1	01000001006172BF3E4D5A374080318D6907CA3EC0D6994F2F0BE0E6C0DAE35DC00896044100000



PRZYKŁAD 3 - ST_TILE

```
--Przykład 3 - ST_Tile
DROP TABLE trybulowska.porto_parishes; --> drop table porto_parishes first
CREATE TABLE trybulowska.porto_parishes AS
WITH r AS (
SELECT rast FROM rasters.dem
LIMIT 1
)
SELECT st_tile(st_union(ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767)),128,128,true,-32767) AS rast
FROM vectors.porto_parishes AS a, r
WHERE a.municipality ilike 'porto';

--Konwertowanie rastrow na wektory (wektoryzowanie)
```

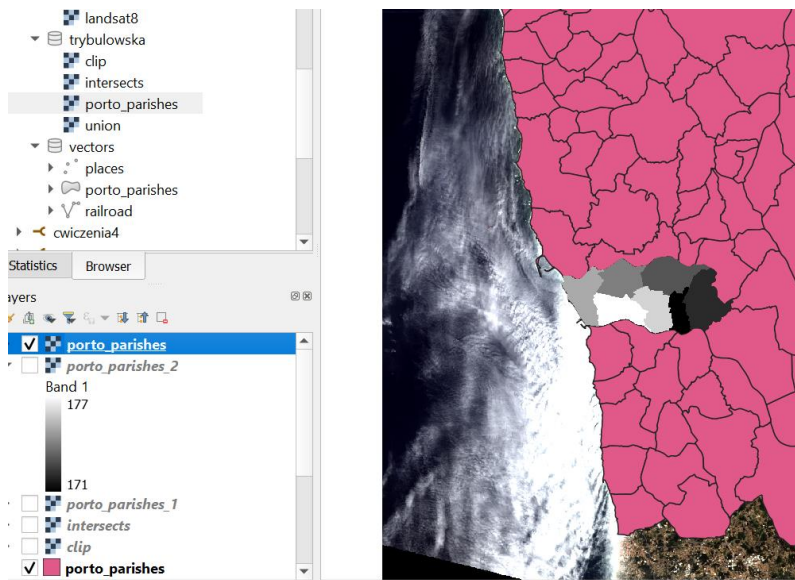
statistics 1 x

me	Value
dated Rows	8
ery	DROP TABLE trybulowska.porto_parishes; --> drop table porto_parishes first
	CREATE TABLE trybulowska.porto_parishes AS
	WITH r AS (
	SELECT rast FROM rasters.dem
	LIMIT 1)

```

select* from trybulowska.porto_parishes
--konwertowanie rastrow na wektory (wektoryzowanie)

```



KONWERTOWANIE RASTRÓW NA WEKTORY (WEKTORYZOWANIE)

PRZYKŁAD 1 - ST_INTERSECTION

```

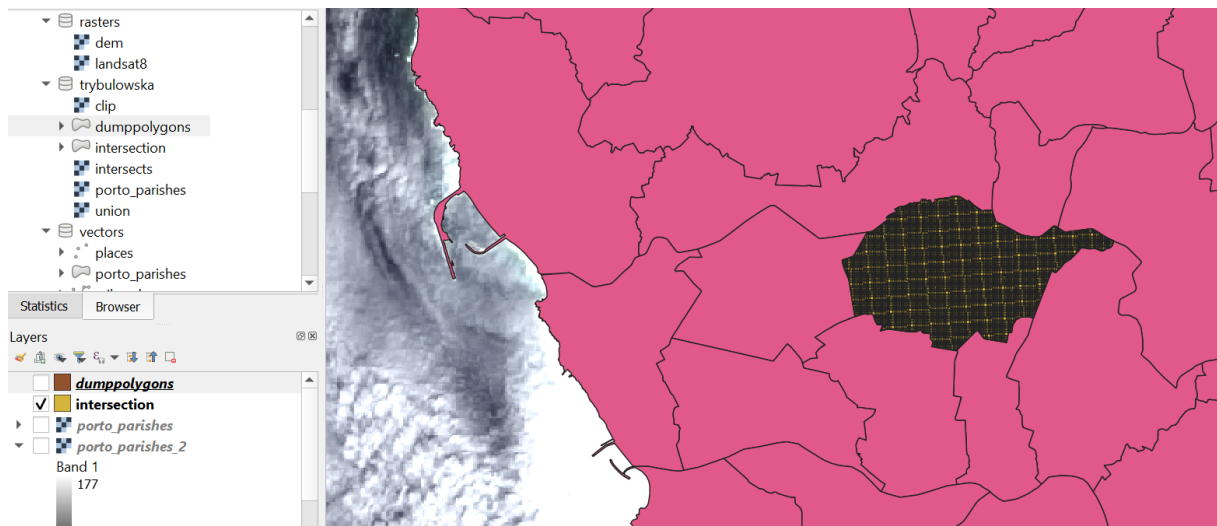
--Konwertowanie rastrow na wektory (wektoryzowanie)
--Przykład 1 - ST_Intersection
create table trybulowska.intersection as
SELECT
a.rid,(ST_Intersection(b.geom,a.rast)).geom,(ST_Intersection(b.geom,a.rast)
).val
FROM rasters.landsat8 AS a, vectors.porto_parishes AS b
WHERE b.parish ilike 'paranhos' and ST_Intersects(b.geom,a.rast);

select * from trybulowska.intersection

```

Adding alignment constraints
Adding number of bands
Adding pixel type constraints
Adding nodata value constraints
Adding out-of-database constraints
Adding maximum extent

id	rid	geom	val
1	221	POLYGON((-39604.86528035818 168624.02902255123, -39633.58795484908 168624.02902255123, -39628.66 10,648	
2	221	POLYGON((-39574.553878279854 168624.02902255123, -39604.86528035818 168624.02902255123, -39604.8 12,155	
3	221	POLYGON((-39786.73369282809 168594.3232286338, -39794.43786661896 168594.3232286338, -39786.7336 9,248	
4	221	POLYGON((-39756.42229074977 168594.3232286338, -39786.73369282809 168594.3232286338, -39786.7336 10,030	
5	221	POLYGON((-39726.1108867145 168594.3232286338, -39756.42229074977 168594.3232286338, -39756.4222 10,347	
6	221	POLYGON((-39695.79948659313 168594.3232286338, -39726.1108867145 168594.3232286338, -39726.1108 10,126	
7	221	POLYGON((-39665.488084514815 168594.3232286338, -39695.79948659313 168594.3232286338, -39695.799 10,611	

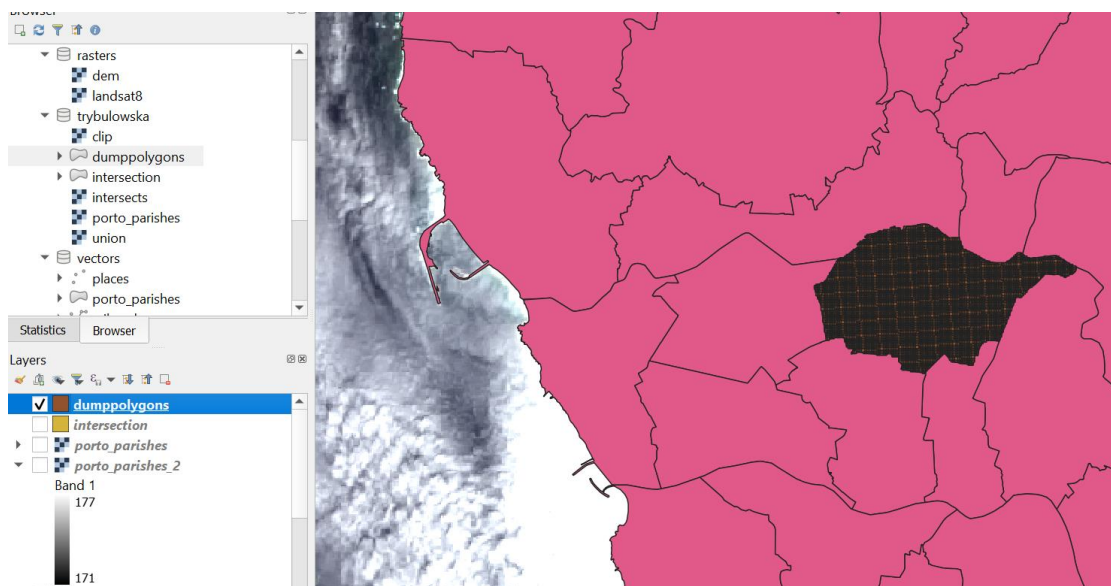


PRZYKŁAD 2 - ST_DUMPASPOLYGONS

```
CREATE TABLE trybulowska.dumpmpolygons AS
SELECT
a.rid,(ST_DumpAsPolygons(ST_Clip(a.rast,b.geom))).geom,(ST_DumpAsPolygons:
FROM rasters.landsat8 AS a, vectors.porto_parishes AS b
WHERE b.parish ilike 'paranhos' and ST_Intersects(b.geom,a.rast);

select * from trybulowska.dumpmpolygons|
```

rid	geom
221	POLYGON ((-39665.488084514815 168624.02902255123, -39665.488084514815 168564.61, -39635.17668243649 168624.02902255123, -39635.17668243649 168564.61, -39604.86528035817 168624.02902255123, -39604.86528035817 168564.61, -39665.488084514815 168624.02902255123))



ANALIZA RASTRÓW

PRZYKŁAD 1 - ST_BAND

```
-- Przykład 1 - ST_Band
CREATE TABLE trybulowska.landsat_nir AS
SELECT rid, ST_Band(rast,4) AS rast
FROM rasters.landsat8;

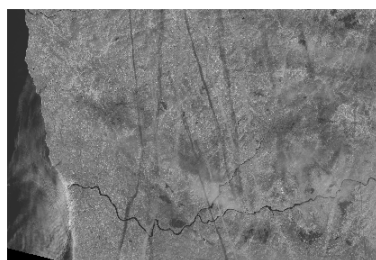
select * from trybulowska.landsat_nir
```

Project Browser

- rasters
 - dem
 - landsat8
- trybulowska
 - clip
 - dumppolygons
 - intersection
 - intersects
 - landsat_nir
 - porto_parishes
 - union
- vectors
 - places

Layers

- landsat_nir
 - Band 1
 - 30 195
 - 0
- dumppolygons



PRZYKŁAD 2 - ST_CLIP

```
--Przykład 2 - ST_Clip
CREATE TABLE trybulowska.paranhos_dem AS
SELECT a.rid,ST_Clip(a.rast, b.geom,true) as rast
FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE b.parish ilike 'paranhos' and ST_Intersects(b.geom,a.rast);

select * from trybulowska.paranhos_dem
```

Adding out of data
Adding maximum extent

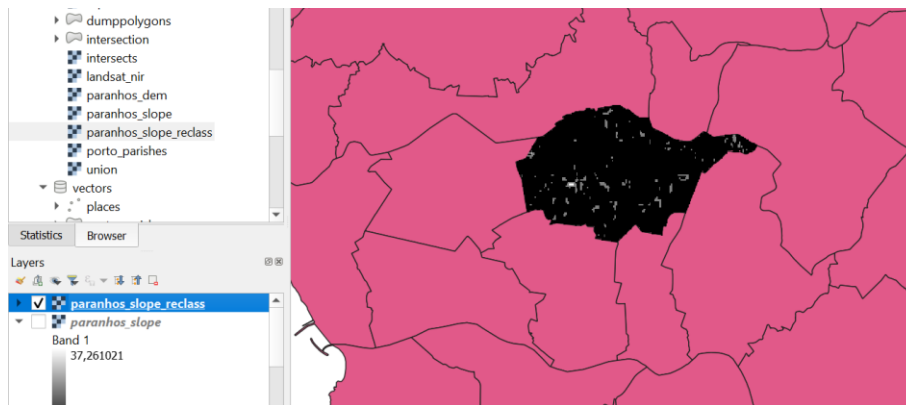
Data Flow Task

Project Browser

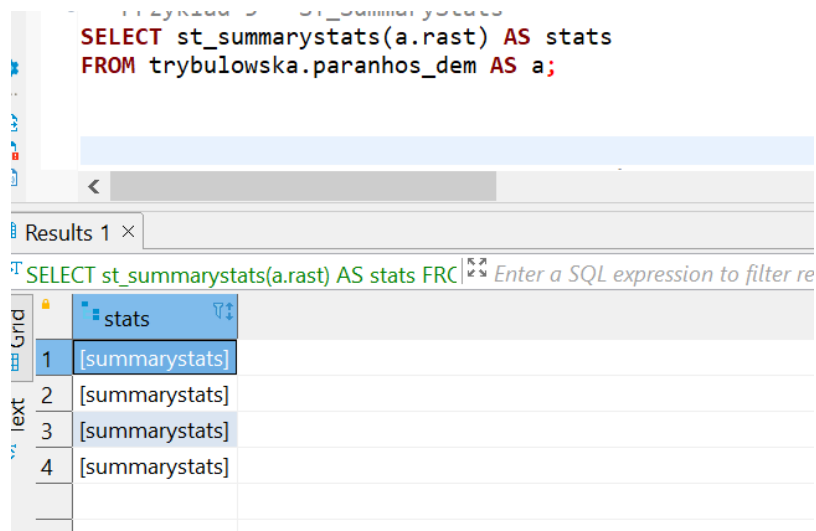
- rasters
 - dem
 - landsat8
- trybulowska
 - clip
 - dumppolygons
 - intersection
 - intersects
 - landsat_nir
 - porto_parishes
 - union
- vectors
 - places

Layers

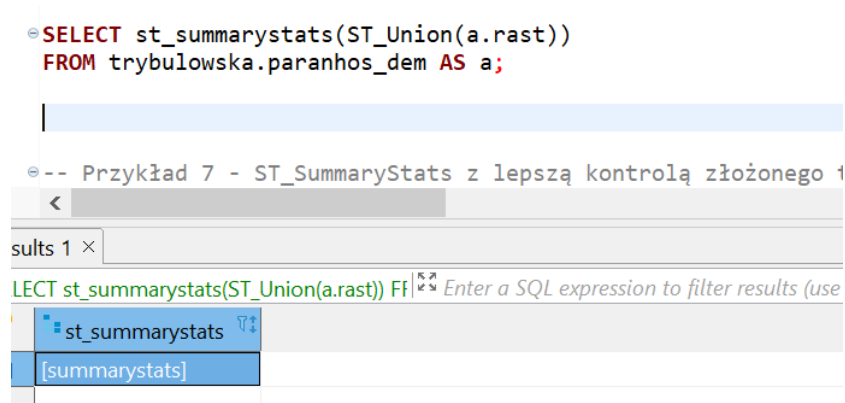
- paranhos_dem
- dumppolygons



PRZYKŁAD 5 - ST_SUMMARYSTATS



PRZYKŁAD 6 - ST_SUMMARYSTATS ORAZ UNION



PRZYKŁAD 7 - ST_SUMMARYSTATS Z LEPSZĄ KONTROLĄ ZŁOŻONEGO TYPU DANYCH

```

WITH t AS (
  SELECT st_summarystats(ST_Union(a.rast)) AS stats
  FROM trybulowska.paranhos_dem AS a
)
SELECT (stats).min,(stats).max,(stats).mean FROM t;

```

results 1 x

WITH t AS (SELECT st_summarystats(ST_Union(a.rast)) AS stats FROM trybulowska.paranhos_dem AS a)

	min	max	mean
1	87	158	122.5273128195

PRZYKŁAD 8 - ST_SUMMARYSTATS W POŁĄCZENIU Z GROUP BY

```

WITH t AS (
  SELECT b.parish AS parish, st_summarystats(ST_Union(ST_Clip(a.rast,
    b.geom,true))) AS stats
  FROM rasters.dem AS a, vectors.porto_parishes AS b
  WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast)
  group by b.parish
)
SELECT parish,(stats).min,(stats).max,(stats).mean FROM t;

```

Adding pixel type c
Adding nodata value
Adding out-of-datab
Adding maximum exte

porto_parishes 1 x

WITH t AS (SELECT b.parish AS parish, st_summarystats(ST_Union(ST_Clip(a.rast, b.geom,true))) AS stats FROM rasters.dem AS a, vectors.porto_parishes AS b WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast) group by b.parish)

parish	min	max	mean
Bonfim	1	159	107.5658842668
Campanhã	0	178	74.6673221309
Paranhos	87	158	122.5273128195
Ramalde	48	108	77.5844444444
União das freguesias de Aldoar, Foz do Douro e Nevogilde	-4	83	34.6673548979
União das freguesias de Cedofeita, Santo Ildefonso, Sé, Miragaia, São Nicolau e Vitória	1	157	95.0027774104
União das freguesias de Lordelo do Ouro e Massarelos	-1	117	49.5005144033

PRZYKŁAD 9 - ST_VALUE

trybulowska

- clip 88K
- intersection 1.1M
- intersects 264K
- porto_parishes 16K
- union 80K

Views

- Materialized Views
- Indexes
- Functions
- Sequences
- Data types
- Aggregate functions

```

SELECT b.name,st_value(a.rast,(ST_Dump(b.geom)).geom)
FROM
  rasters.dem a, vectors.places AS b
WHERE ST_Intersects(a.rast,b.geom)
ORDER BY b.name;

```

places 1 x

SELECT b.name,st_value(a.rast,(ST_Dump(b.geom)).geom) FROM rasters.dem a, vectors.places AS b WHERE ST_Intersects(a.rast,b.geom) ORDER BY b.name;

name	st_value
Aldéia São Miguel	96
Alpendurada e Matos	145
Amarante	71
Baião	581
Cabeceiras de Basto	[NULL]
Castelo de Paiva	284
Celorico de Basto	227
Cinfães	405
Espinho	14

TOPOGRAPHIC POSITION INDEX (TPI)

PRZYKŁAD 10 - ST_TPI

```

create table trybulowska.tpi30 as
select ST_TPI(a.rast,1) as rast
from rasters.dem a;

-- indeks przestrzenny
CREATE INDEX idx_tpi30_rast_gist ON trybulowska.tpi30
USING gist (ST_ConvexHull(rast));
-- dodanie constraintow
SELECT AddRasterConstraints('trybulowska'::name,
'tpi30'::name,'rast'::name);

```

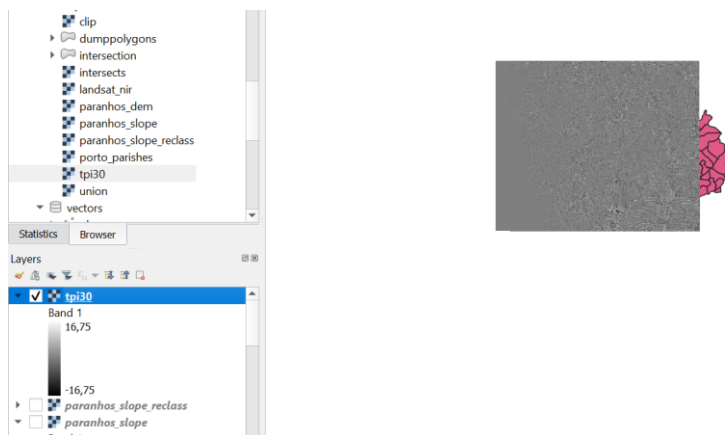
Results 1 x

SELECT AddRasterConstraints('trybulowska': Enter a SQL expression to filter results (use Ctrl+Space)

addrasterconstraints

[v]

Rows: 1 1 row(s) fetched - 36.967s, on 2022-11-28 at 21:40:5



PROBLEM DO SAMODZIELNEGO ROZWIĄZANIA

```

create table trybulowska.tpi30_porto as
SELECT ST_TPI(a.rast,1) as rast
FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE ST_Intersects(a.rast, b.geom) AND b.municipality ilike 'porto'

--Dodanie indeksu przestrzennego:
CREATE INDEX idx_tpi30_porto_rast_gist ON trybulowska.tpi30_porto
USING gist (ST_ConvexHull(rast));
--Dodanie constraintów:
SELECT AddRasterConstraints('trybulowska'::name,
'tpi30_porto'::name,'rast'::name);

```

Results 1 x

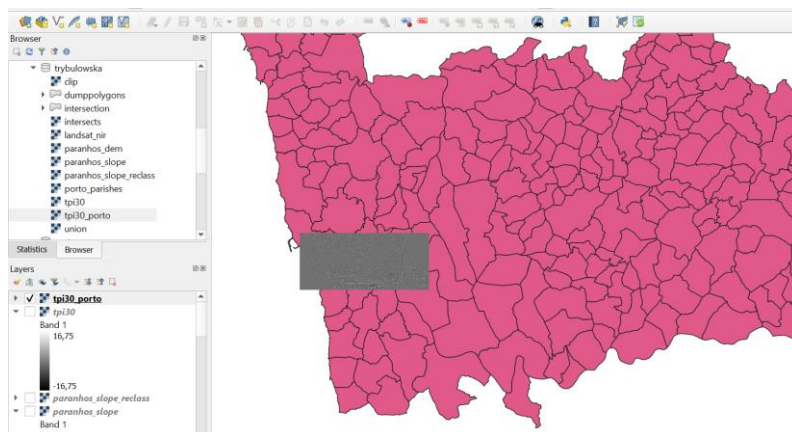
SELECT AddRasterConstraints('trybulowska': Enter a SQL expression to filter results (use Ctrl+Space)

addrasterconstraints

[v]

1 row(s) fetched - 1.652s, on 2022-11-28 at 21:43:46

1 : 6788 Sel: 0 | 0



ALGEBRA MAP

PRZYKŁAD 1 - WYRAŻENIE ALGEBRY MAP

```
-- Algebra map

-- CREATE TABLE trybulowska.porto_ndvi AS
WITH r AS (
  SELECT a.rid,ST_Clip(a.rast, b.geom,true) AS rast
  FROM rasters.landsat8 AS a, vectors.porto_parishes AS b
  WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast)
)
SELECT
  r.rid,ST_MapAlgebra(
    r.rast, 1,
    r.rast, 4,
    '([rast2.val] - [rast1.val]) / ([rast2.val] +
    [rast1.val])::float','32BF'
  ) AS rast
FROM r;

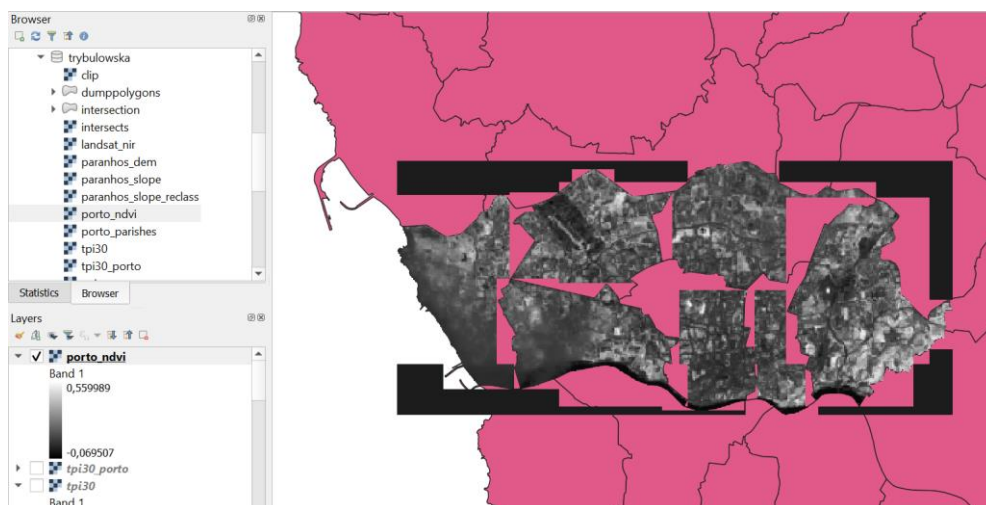
-- indeks przestrzenny
CREATE INDEX idx_porto_ndvi_rast_gist ON trybulowska.porto_ndvi
USING gist (ST_ConvexHull(rast));

-- dodanie constraintow
SELECT AddRasterConstraints('trybulowska'::name,
  'porto_ndvi'::name,'rast'::name);
```

Statistics 1 Results 2 ×

CREATE TABLE trybulowska.porto_ndvi AS W [⌨] Enter a SQL expression to filter results (use Ctrl+Space)

	addrasterconstraints
1	[v]



PRZYKŁAD 2 – FUNKCJA ZWROTNA

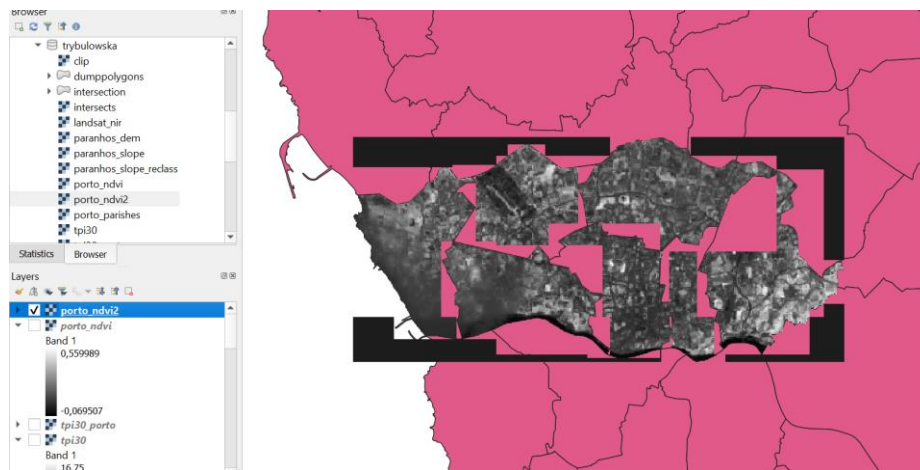
The screenshot shows the PostgreSQL Database Navigator interface. On the left, the 'trybulowska' schema is expanded, showing various tables and views. The main window displays the SQL script for creating a function 'trybulowska.ndvi' and adding constraints. The script includes comments in Polish and SQL code for creating a table, inserting data, and adding a spatial index. The 'Output' pane on the right shows the execution results, including the creation of the table and the addition of constraints.

```

-- create or replace function trybulowska.ndvi
-- add raster constraints
-- index spatial
CREATE TABLE trybulowska.porto_ndvi2 AS
WITH r AS (
  SELECT a.rid, ST_Clip(a.rast, b.geom, true) AS rast
  FROM rasters.landsat8 AS a, vectors.porto_parishes AS b
  WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom, a.rast)
)
SELECT
  r.rid, ST_MapAlgebra(
    r.rast, ARRAY[1,4],
    'trybulowska.ndvi(double precision[],
    integer[], text[])::regprocedure, --> This is the function!
    '32BF'::text
  ) AS rast
FROM r;

-- dodanie constraintow
SELECT AddRasterConstraints('trybulowska'::name,
  'porto_ndvi2'::name, 'rast'::name);

-- indeks przestrzenny
CREATE INDEX idx_porto_ndvi2_rast_gist ON trybulowska.porto_ndvi2
USING gist (ST_ConvexHull(rast));
  
```



PRZYKŁAD 3 - FUNKCJE TPI

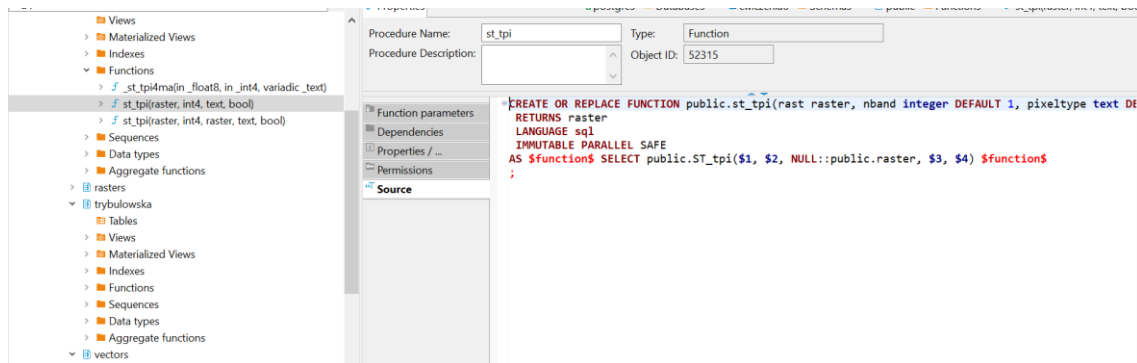
The screenshot shows the PostgreSQL Database Navigator interface. On the left, the 'public' schema is expanded, showing various functions. The main window displays the SQL script for creating a function 'public._st_tpi4ma'. The script includes comments in Polish and SQL code for creating a function that calculates the 4-month moving average of the TPI (Topographic Position Index) for a given area. The 'Properties' pane on the right shows the function's parameters and its type.

```

CREATE OR REPLACE FUNCTION public._st_tpi4ma(value double precision[], pos integer[], VARIADIC ndims integer)
RETURNS double precision
LANGUAGE plpgsql
IMMUTABLE PARALLEL SAFE
AS $function$
DECLARE
  x integer;
  y integer;
  z integer;

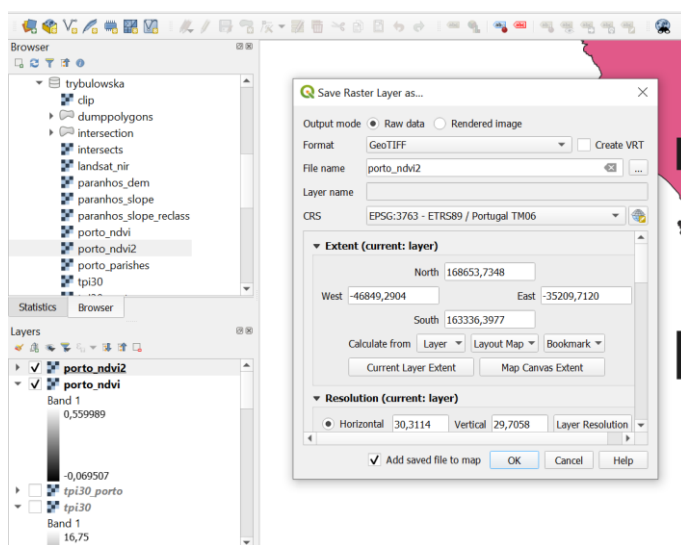
  Z1 double precision;
  Z2 double precision;
  Z3 double precision;
  Z4 double precision;
  Z5 double precision;
  Z6 double precision;
  Z7 double precision;
  Z8 double precision;
  Z9 double precision;

  tpi double precision;
  mean double precision;
  _value double precision[][][];
  ndims int;
BEGIN
  ndims := array_ndims(value);
  -- add a third dimension if 2-dimension
  
```

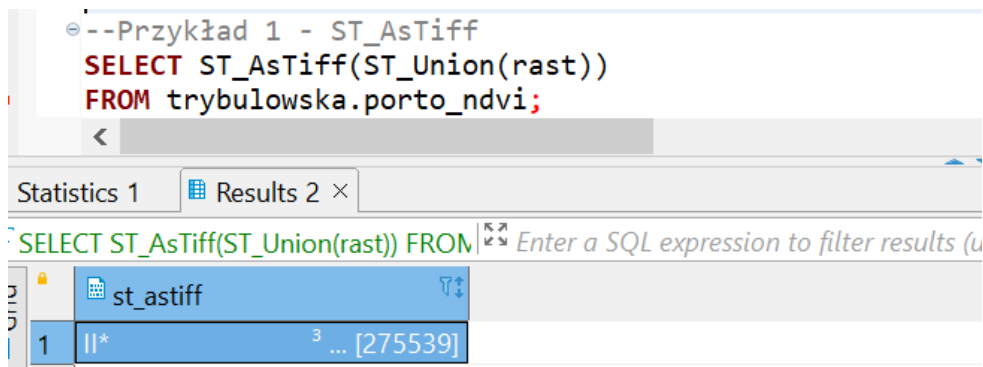



EKSPORT DANYCH

PRZYKŁAD 0 - QGIS



PRZYKŁAD 1 - ST_ASTIFF



PRZYKŁAD 2 - ST_ASGDALRASTER

```
SELECT ST_AsGDALRaster(ST_Union(rast), 'GTiff', ARRAY['COMPRESS=DEFLATE',
'PREDICTOR=2', 'PZLEVEL=9'])
FROM trybulowska.porto_ndvi;
```

Statistics 1 Results 2 ×

SELECT ST_AsGDALRaster(ST_Union(rast) Enter a SQL expression to filter results (use Ctrl+Space)

st_asgdalraster
1 * 3 ... [148838]

```
SELECT ST_GDALDrivers();
```

Statistics 1 Results 2 ×

SELECT ST_GDALDrivers() Enter a SQL expression to filter results (use Ctrl+Space)

st_gdaldrivers
1 (0,GTiff,GeoTIFF,t,t,"<CreationOptionList> <Option name='COMPRESS' type='string-select'> <Value>NONE</Value>
2 (1,AALGrid,"Arc/Info ASCII Grid",t,t,"<CreationOptionList>¶ <Option name='FORCE_CELLSIZE' type='boolean' descripti
3 (2,DTED,"DTED Elevation Raster",t,t,"")
4 (3,PNG,"Portable Network Graphics",t,t,"<CreationOptionList>¶ <Option name='WORLDFILE' type='boolean' descripti
5 (4,JPEG,"JPEG JFIF",t,t,"<CreationOptionList>¶ <Option name='PROGRESSIVE' type='boolean' description='whether to
6 (5,GIF,"Graphics Interchange Format (.gif)",t,t,"<CreationOptionList>¶ <Option name='INTERLACING' type='boolean'>
7 (6,USGSDEM,"USGS Optional ASCII DEM (and CDED)",t,t,"<CreationOptionList> <Option name='PRODUCT' type='stri

PRZYKŁAD 3 - ZAPISYWANIE DANYCH NA DYSKU ZA POMOCĄ DUŻEGO OBIEKTU (LARGE OBJECT, LO)

```
--Przykład 3 - Zapisywanie danych na dysku za pomocą dużego obiektu (large object)
CREATE TABLE tmp_out AS
SELECT lo_from_bytea(0,
ST_AsGDALRaster(ST_Union(rast), 'GTiff', ARRAY['COMPRESS=DEFLATE',
'PREDICTOR=2', 'PZLEVEL=9']))
) AS loid
FROM trybulowska.porto_ndvi;

SELECT lo_export(loid, 'C:\cw6_bd\myraster.tiff') --> Save the file in a place
--where the user postgres have access. In windows a flash drive usually works
--fine.
FROM tmp_out;

SELECT lo_unlink(loid)
FROM tmp_out; --> Delete the large object.
```

Statistics 1 Results 2 Results 2 (2) ×

CREATE TABLE tmp_out AS SELECT lo_l Data filter is not supported

lo_unlink
1 1

Ten komputer > Dysk lokalny (C:) > cw6_bd

Przeszukaj: c

myraster

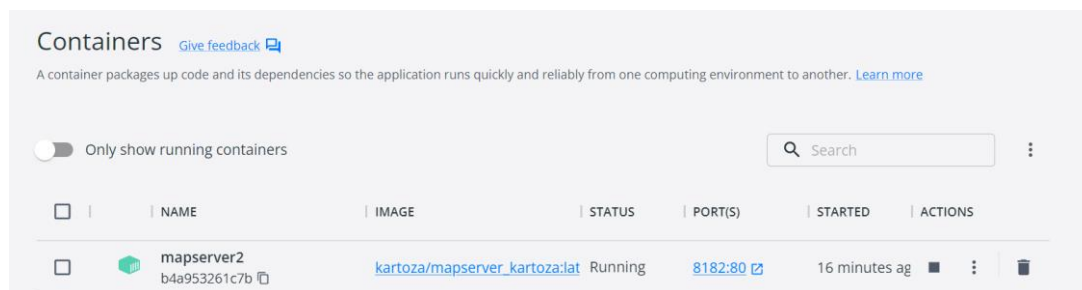
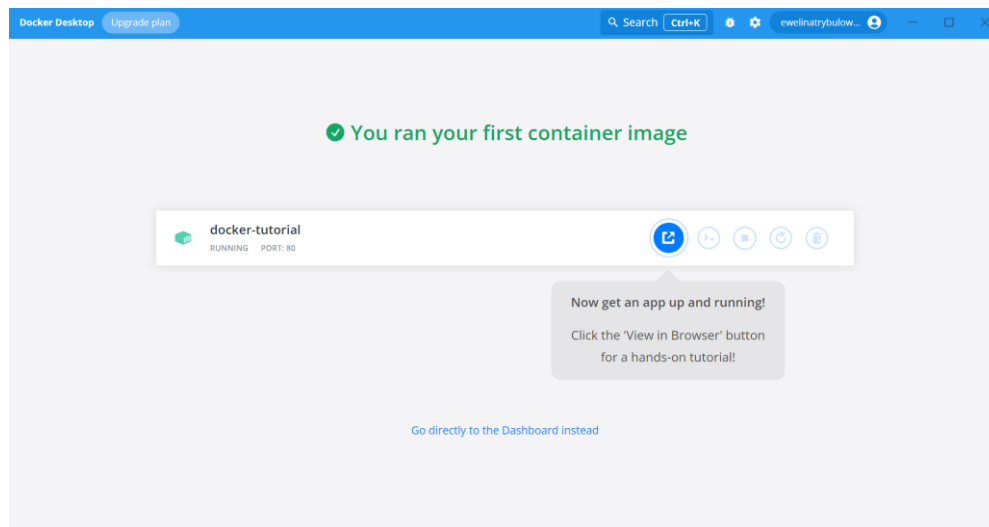
PRZYKŁAD 4 - UŻYCIE GDAL

```

Input file size is 384, 179
ERROR 1: PROJ: proj_create_from_database: C:\Program Files\PostgreSQL\14\share\contrib\postgis-3.3\proj\proj.db contains
DATABASE.LAYOUT.VERSION.MINOR = 0 whereas a number >= 2 is expected. It comes from another PROJ installation.
Warning 1: PROJ: proj_create_from_database: C:\Program Files\PostgreSQL\14\share\contrib\postgis-3.3\proj\proj.db contains
DATABASE.LAYOUT.VERSION.MINOR = 0 whereas a number >= 2 is expected. It comes from another PROJ installation.
Warning 1: The definition of projected CRS EPSG:3763 got from GeoTIFF keys is not the same as the one from the EPSG registry,
which may cause issues during reprojection operations. Set GTIFF_SRS_SOURCE configuration option to EPSG to use official
parameters (overriding the ones from GeoTIFF keys), or to GEOKEYS to use custom values from GeoTIFF keys and drop the
EPSG code.
0 10 20 30 40 50 60 70 80 90 100 ~ done

```

DOCKER MAPSERVER



```

ewelina@DESKTOP-BEQ825K:/mnt/c/windows/system32$ git clone https://github.com/kartoza/docker-mapserver
Cloning into 'docker-mapserver'...
remote: Enumerating objects: 231, done.
remote: Counting objects: 100% (35/35), done.
remote: Compressing objects: 100% (7/7), done.
remote: Total 231 (delta 28), reused 28 (delta 28), pack-reused 196
Receiving objects: 100% (231/231), 39.95 MiB | 584.00 KiB/s, done.
Resolving deltas: 100% (104/104), done.
Updating files: 100% (20/20), done.

```

```
ewelina@DESKTOP-BEQ82SK:/mnt/c/Windows/system32$ cd docker-mapserver
```

```
[+] Building 1298.3s (14/27)
=> [internal] load build definition from Dockerfile
[+] Building 1298.9s (14/27)
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 3.43kB
[+] Building 1299.0s (14/27)
[+] Building 1522.7s (14/27)
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 3.43kB
=> [internal] load .dockerignore
=> => transferring context: 2B
[+] Building 1523.1s (14/27)
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 3.43kB
[+] Building 1756.3s (28/28) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 3.43kB
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:focal
=> [auth] library/ubuntu:pull token for registry-1.docker.io
```

```
9/22] RUN setup.sh /setup.sh 0.19
9/22] RUN chmod 0755 /setup.sh 0.6s
10/22] RUN /setup.sh 907.2s
11/22] RUN cp /tmp/resources/000-default.conf /etc/apache2/sites-available/ 0.6s
12/22] RUN wget http://mirrors.kernel.org/ubuntu/pool/multiverse/liba/libapache2-mod-fastcgi/libapache2-mod-fastcgi_2.4.7-0910052141-1.2_amd64.deb -O libapache2- 3.9s
13/22] RUN cp /tmp/resources/php7-fpm.conf /etc/apache2/conf-available/ 0.8s
14/22] RUN a2enmod actions cgi alias proxy_fcgi fastcgi headers 0.7s
15/22] RUN a2enconf php7.4-fpm 0.8s
16/22] RUN chmod o+x /usr/local/bin/mapserv 0.6s
17/22] RUN ln -s /usr/local/bin/mapserv /usr/lib/cgi-bin/mapserv 0.5s
18/22] RUN chmod 755 /usr/lib/cgi-bin 0.6s
19/22] RUN wget https://github.com/jwilder/dockerize/releases/download/v0.6.1/dockerize-linux-amd64-v0.6.1.tar.gz && tar -C /usr/local/bin -xzf dockerize- 48.2s
20/22] RUN apt-get install -y net-tools 6.2s
21/22] RUN mv /usr/local/lib/libcurl.so.4.4.0 /usr/local/lib/libcurl.so.4.4.0.backup 0.7s
22/22] RUN apt-get clean && rm -rf /var/lib/apt/lists/* /tmp/* /var/tmp/* 1.1s
=> exporting to image 9.7s
=> writing image sha256:2ebd94554f43a32ecf848859612e0cad988965b091a122d903a8bc437079e7cf 0.0s
=> naming to docker.io/kartoza/mapserver_kartoza 0.0s
```

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

```
ewelina@DESKTOP-BEQ82SK:/mnt/c/Windows/system32/docker-mapserver$
```

```
ewelina@DESKTOP-BEQ82SK:/mnt/c/Windows/system32/docker-mapserver$ sudo docker run -d -p 8182:80 --name mapserver2 kartoza/mapserver_kartoza
```

```
[sudo] password for ewelina:
```

```
1675da271e160d0fd5ef18b594ae429c07c8e49a6500c63da2b6ccb7cf2da071
```

```
ewelina@DESKTOP-BEQ82SK:/mnt/c/Windows/system32/docker-mapserver$ ls -la
```

```
total 381
drwxrwxrwx 1 ewelina ewelina 512 Nov 30 02:17
drwxrwxrwx 1 ewelina ewelina 512 Nov 29 23:57
drwxr-xr-x 1 ewelina ewelina 512 Nov 29 23:59 .git
-rw-r--r-- 1 ewelina ewelina 11 Nov 29 23:59 .gitignore
-rw-r--r-- 1 ewelina ewelina 428 Nov 29 23:59 71-apt-cacher-ng
-rw-r--r-- 1 ewelina ewelina 3382 Nov 29 23:59 Dockerfile
-rw-r--r-- 1 ewelina ewelina 2421 Nov 29 23:59 README.md
-rw-r--r-- 1 ewelina ewelina 57 Nov 29 23:59 build.sh
-rwxrwxrwx 1 ewelina ewelina 581 Nov 30 02:17 dem.map
-rw-r--r-- 1 ewelina ewelina 990 Nov 29 23:59 docker-compose.yml
-rw-r--r-- 1 ewelina ewelina 368657 Nov 29 23:59 generic-map-browse-mode-screenshot.png
drwxr-xr-x 1 ewelina ewelina 512 Nov 30 02:16 map
drwxr-xr-x 1 ewelina ewelina 512 Nov 29 23:59 resources
-rwxr-xr-x 1 ewelina ewelina 2407 Nov 29 23:59 setup.sh
```

```
ewelina@DESKTOP-BEQ82SK:/mnt/c/Windows/system32/docker-mapserver$ sudo docker exec -it mapserver2 /bin/bash
```

```
root@1675da271e16:/# ls -la
```

```
total 76
drwxr-xr-x 1 root root 4096 Nov 30 11:51 .
drwxr-xr-x 1 root root 4096 Nov 30 11:51 ..
-rwxr-xr-x 1 root root 0 Nov 30 11:51 .dockerenv
```

```
root@1675da271e16:/# mkdir /map && touch /map/dem.map && chown -R root /map && chmod -R 777 /map
root@1675da271e16:/# ls -la
total 80
drwxr-xr-x 1 root root 4096 Nov 30 11:57 .
drwxr-xr-x 1 root root 4096 Nov 30 11:57 ..
-rwxr-xr-x 1 root root 0 Nov 30 11:51 .dockerenv
lrwxrwxrwx 1 root root 7 Oct 19 16:47 bin -> usr/bin
drwxr-xr-x 2 root root 4096 Apr 15 2020 boot
drwxr-xr-x 5 root root 340 Nov 30 11:51 dev
drwxr-xr-x 1 root root 4096 Nov 30 11:51 etc
drwxr-xr-x 2 root root 4096 Apr 15 2020 home
lrwxrwxrwx 1 root root 7 Oct 19 16:47 lib -> usr/lib
lrwxrwxrwx 1 root root 9 Oct 19 16:47 lib32 -> usr/lib32
lrwxrwxrwx 1 root root 9 Oct 19 16:47 lib64 -> usr/lib64
lrwxrwxrwx 1 root root 10 Oct 19 16:47 libx32 -> usr/libx32
drwxrwxrwx 2 root root 4096 Nov 30 11:57 map
```

```
root@1675da271e16:/# apt-get update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [967 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:5 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:6 http://security.ubuntu.com/ubuntu focal/restricted amd64 Packages [33.4 kB]
Get:7 http://archive.ubuntu.com/ubuntu focal/universe amd64 Packages [11.3 MB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [1712 kB]
Get:9 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 Packages [27.5 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2315 kB]
Get:11 http://archive.ubuntu.com/ubuntu focal/main amd64 Packages [1275 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [177 kB]
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1268 kB]
Get:14 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [30.2 kB]
Get:15 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1829 kB]
Get:16 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2786 kB]
Get:17 http://archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [55.2 kB]
Get:18 http://archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [27.4 kB]
Fetched 24.4 MB in 21s (1191 kB/s)
Reading package lists... Done
root@1675da271e16:/# apt-get install vim
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libjpeg62
Use 'apt autoremove' to remove it.
The following additional packages will be installed:
  alsa-topology-conf alsa-ucm-conf libasound2 libasound2-data libcanberra0 libgpm2 libogg0 libtdb1 libvorbis0a libvorbis
  vim-runtime xxd
Suggested packages:
```

```
root@1675da271e16:/map# vim dem.map
root@1675da271e16:/map# ls -la
total 12
drwxrwxrwx 2 root root 4096 Nov 30 12:01 .
drwxr-xr-x 1 root root 4096 Nov 30 11:57 ..
-rwxrwxrwx 1 root root 581 Nov 30 12:01 dem.map
root@1675da271e16:/map#
```

```
root@1675da271e16:/map# apt-get install -y postgresql-client
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libjpeg62
Use 'apt autoremove' to remove it.
The following additional packages will be installed:
  postgresql-client-12 postgresql-client-common
Suggested packages:
  postgresql-12 postgresql-doc-12
The following NEW packages will be installed:
  postgresql-client postgresql-client-12 postgresql-client-common
```

```
root@1675da271e16:/map# psql postgresql://postgres:[REDACTED]@host.docker.internal/cwiczenia6
psql (12.12 (Ubuntu 12.12-0ubuntu0.20.04.1), server 14.5)
WARNING: psql major version 12, server major version 14.
        Some psql features might not work.
Type "help" for help.
```

```
cwiczenia6=# \dn
      List of schemas
  Name  | Owner
-----+-----
 public | postgres
 rasters | postgres
 trybulowska | postgres
 vectors | postgres
(4 rows)
```

