

WEB CARTOGRAPHY

Using Open Source Software

Edward Mac Gillavry



webmapper
what the map can be



WEBMAPPER: what the map can be

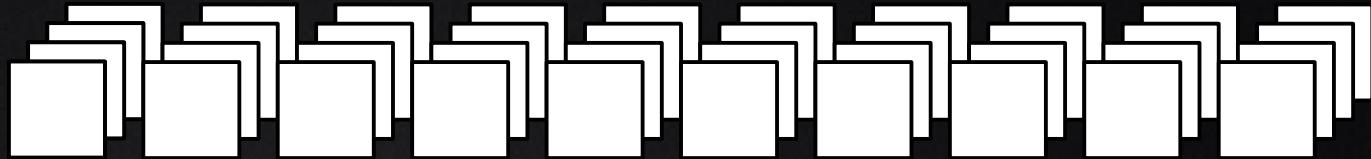
- Richard Duivenvoorde – biologist
- Edward Mac Gillavry – cartographer
- Haarlem/Utrecht (2009)
- Geo-applications for the (mobile) Web
- OpenGeoGroep



ONLINE MAPPING

CLASSIC VALUE CHAIN

- Application



- Service



- Platform



- Data



* Musser, J. (2007) Web 2.0 Principles and Best Practices

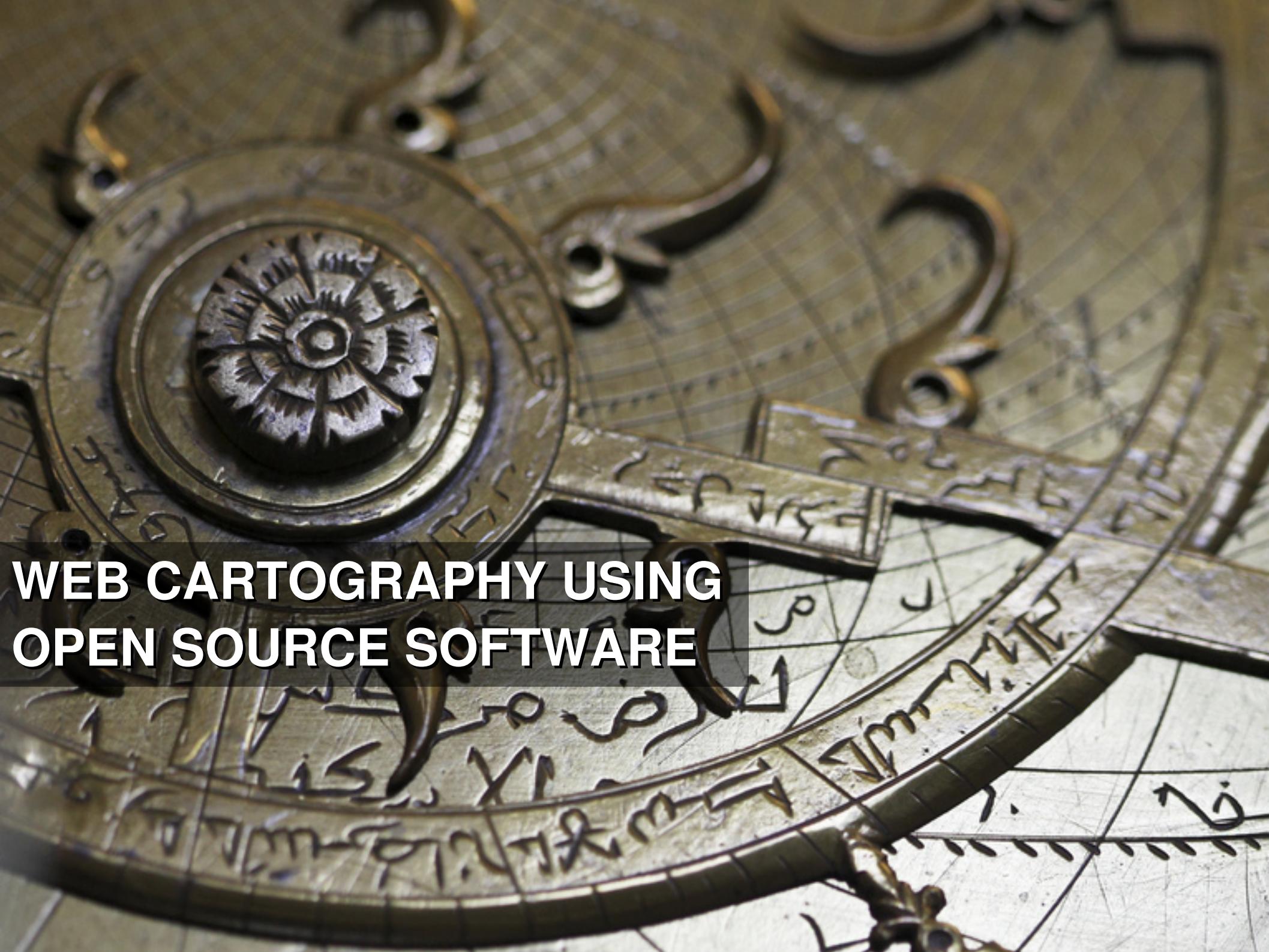
WEB MAP = ART IMITATES LIFE



<http://www.flickr.com/photos/zachklein/3609217246>

WEB MAPS = RED DOT FEVER





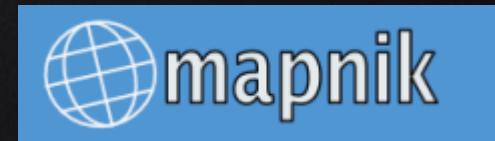
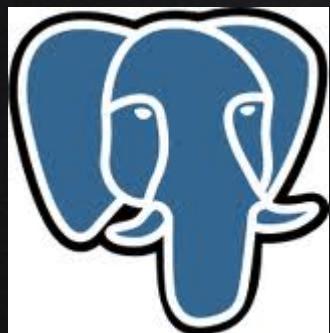
WEB CARTOGRAPHY USING OPEN SOURCE SOFTWARE

MAPPING AND THE TERMINAL



http://www.flickr.com/photos/andrew_sherman/156734298/

OUR OPEN SOURCE TOOLBOX



INKSCAPE

Icons, patterns, interface



File Edit View Layer Object Path Text Filters Extensions Help

Architectuur Horeca Industrieel erfgoed Culturmijl

Fill and Stroke (Shift+Ctrl+F)

Flat color

RGB HSL CMYK Wheel CMS

R: 180 G: 0 B: 119 A: 255

Layers (Shift+Ctrl+L)

rood border blauw kaart

Blend mode: Normal

Opacity, %: 100.0

Type hier een adres... of ?

N36 N748 N760 Vlezenveen

Ellipse in layer blauw. Click selection to toggle scale/rotation handles.

X: 972.19 Y: 2036.61 Z: 160%

A screenshot of the Inkscape application interface. The top menu bar includes File, Edit, View, Layer, Object, Path, Text, Filters, Extensions, and Help. Below the menu is a toolbar with various icons for selection, drawing, and editing. The main workspace shows four categories of icons: Architectuur, Horeca, Industrieel erfgoed, and Culturmijl. Each category has a preview icon and a larger version below it. To the right of the icons is a 'Fill and Stroke' panel with color selection tools and a color picker. The bottom half of the screen features a map of a region with roads labeled N36, N748, and N760, and a place labeled Vlezenveen. A blue search bar at the top of the map area contains placeholder text 'Type hier een adres...'. To the right of the map is a 'Layers' panel listing layers like rood, border, blauw, and kaart, each with lock and visibility icons. A color palette and a status bar at the bottom provide stroke and fill information along with coordinate and zoom details.

QuantumGIS

Explore, style, edit



Quantum GIS 1.8.0-Lisboa

File Edit View Layer Settings Plugins Vector Raster Database Help

Layers

Style Labels Fields General Metadata Actions

Graduated Old symbology

Column AANT_INW

Symbol change Classes 6

Color ramp [source]

Mode Pretty Breaks

Symbol Range Label

0.0000 - 50...	0.0000 - 5000.0000
5000.0000 - ...	5000.0000 - 10000.0000
10000.0000 ...	10000.0000 - 15000.0000
15000.0000 ...	15000.0000 - 20000.0000
20000.0000 ...	20000.0000 - 25000.0000
25000.0000 ...	25000.0000 - 271

Classify Add class Delete class

Restore Default Style Save As Default

Help

Control rendering order

Toggles the editing state of the current layer

Quantum GIS 1.8.0-Lisboa

File Edit View Layer Settings Plugins Vector Raster Database Help

Layers

- brt_2010_gn1
- Bevolkingsker...
- bag_woonpla...
- brt_2010_gn1

Attribute table - brt_2010_gn1 :: 0 / 11689 feature(s) selected

GM_CODE	GM_NAAM	AANT_INW	AANT_MAN	AANT_VROUW	P_00_14_JR	P_15_24_JR
0	GM0363	Amsterdam	4635	2380	2255	12
1	GM0363	Amsterdam	10255	5175	5075	13
2	GM0363	Amsterdam	7970	3955	4015	14
3	GM0363	Amsterdam	9295	4690	4605	17
4	GM0363	Amsterdam	9685	4600	5080	12
5	GM0363	Amsterdam	13510	6445	7065	18
6	GM0363	Amsterdam	3075	1440	1635	10
7	GM0363	Amsterdam	2010	1025	985	4
8	GM0363	Amsterdam	13770	6985	6785	10

Look for amsterdam in GM_NAAM Search

Show selected only Search selected only Case sensitive Advanced search ? Close

Coordinate: 131853.477634 Scale 1:113481 Render EPSG:28992

A screenshot of the QuantumGIS 1.8.0-Lisboa application. The interface includes a top menu bar with File, Edit, View, Layer, Settings, Plugins, Vector, Raster, Database, and Help. Below the menu is a toolbar with various icons for file operations, zooming, and styling. On the left, there's a 'Layers' panel showing a tree structure with several layers checked, including 'brt_2010_gn1', 'Bevolkingsker...', 'bag_woonpla...', and another 'brt_2010_gn1' entry. The main workspace displays a map of Amsterdam with different areas colored in orange, grey, and blue, representing different data categories. To the right of the map is an 'Attribute table' window titled 'Attribute table - brt_2010_gn1 :: 0 / 11689 feature(s) selected', showing a table with columns for GM_CODE, GM_NAAM, AANT_INW, AANT_MAN, AANT_VROUW, P_00_14_JR, and P_15_24_JR. The table lists data for various features in Amsterdam, with the first few rows matching the color-coded areas in the map. At the bottom, there are coordinate and scale controls, along with a render settings button.

PgAdmin

Explore, edit, pre-process



The screenshot shows the pgAdmin III interface for managing a PostgreSQL database named 'gisdb'. The 'Object browser' on the left lists the database structure, including 'gisdb' (Database), 'Catalogs' (2), 'Schemas' (2), and 'cbs' (Schema). Under 'cbs', there are 'Domains' (0), 'FTS Configurations' (0), 'FTS Dictionaries' (0), 'FTS Parsers' (0), 'FTS Templates' (0), 'Functions' (0), 'Sequences' (1), and 'Tables' (1). The 'gemeenteen2010' table is selected, showing 28 columns: ogc_fid, geom28992, gm_code, gm_naam, aant_inw, aant_man, aant_vrouw, p_00_14_jr, p_15_24_jr, p_25_44_jr.

The main window contains a 'Query - gisdb on gisuser@192.168.56.20:5432 *' tab with the following SQL command:

```
CREATE INDEX gemeenteen2010_geom_idx
ON cbs.gemeenteen2010
USING gist
(geom28992);
```

To the right, a 'Edit Data - Geo-warehouse (192.168.56.20:5432) - gisdb - cbs.gemeenteen2010' window displays data from the 'gemeenteen2010' table. The data includes columns: 899, gm_code, gm_naam, aant_inw, aant_man, aant_vrouw, p_00_14_jr, p_15_24_jr, p_25_44_jr. The table has 13 rows, with row 13 highlighted.

	899	gm_code	gm_naam	aant_inw	aant_man	aant_vrouw	p_00_14_jr	p_15_24_jr	p_25_44_jr
0	0020	GM0014	Groningen	187500	52075	54025	15	23	10
1	0020	GM0015	Grootegast	12140	6210	5930	21	11	11
2	0020	GM0017	Haren	18515	8720	9795	17	9	11
3	0020	GM0018	Hoogezaand	34755	17160	17595	17	11	11
4	0020	GM0022	Leek	19365	9570	9795	19	11	11
5	0020	GM0024	Loppersum	10450	5315	5140	18	11	11
6	0020	GM0025	Marum	10450	5390	5060	20	12	12
7	0020	GM0034	Almere	188160	93510	94650	21	14	14

At the bottom, the status bar indicates 'Retrieving Table details... Done.' and '0.02 secs'.

GeoServer

Styling



GeoServer

Logged in as admin. [Logout](#)

Style Editor

Edit the current SLD style. The editor can provide syntax highlight and be brought to full screen. Click on the "validate" button to verify the style is a valid SLD document.

Name: top50nl-wegdeel_lijn

Copy from existing style: Choose One

Code Editor:

```
<Stroke>
  <CssParameter name="stroke">#4e4e4e</CssParameter>
  <CssParameter name="stroke-width">3</CssParameter>
</Stroke>
<LineSymbolizer>
<Rule>
<Rule>
<Title>Straat: lijn</Title>
<ogc:Filter>
<ogc:And>
<ogc:PropertyIsGreaterThanOrEqualTo>
<ogc:PropertyName>visualisa</ogc:PropertyName>
<ogc:Literal>20900</ogc:Literal>
</ogc:PropertyIsGreaterThanOrEqualTo>
<ogc:PropertyIsLessThanOrEqualTo>
<ogc:PropertyName>visualisa</ogc:PropertyName>
<ogc:Literal>20960</ogc:Literal>
</ogc:PropertyIsLessThanOrEqualTo>
</ogc:And>
</ogc:Filter>
<MinScaleDenominator>0</MinScaleDenominator>
<MaxScaleDenominator>75000</MaxScaleDenominator>
<LineSymbolizer>
<Stroke>
  <CssParameter name="stroke">9c9c9c</CssParameter>
  <CssParameter name="stroke-width">2</CssParameter>
</Stroke>
</LineSymbolizer>
<Rule>
<Rule>
<Title>Lokale weg: lijn</Title>
<ogc:Filter>
<ogc:And>
<ogc:PropertyIsGreaterThanOrEqualTo>
```

MAP FILES, SLDs, MapnikXML

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<StyledLayerDescriptor version="1.0.0"
  xsi:schemaLocation="http://www.opengis.net/sld StyledLayerDescriptor.xsd"
  xmlns="http://www.opengis.net/sld"
  xmlns:ogc="http://www.opengis.net/ogc"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <NamedLayer>
    <Name>osm_line</Name>
    <UserStyle>
      <Title>A boring default style</Title>
      <Abstract>A sample style that just prints out a green line</Abstract>
      <FeatureTypeStyle>
        <Rule>
          <MinScaleDenominator>0</MinScaleDenominator>
          <MaxScaleDenominator>48000</MaxScaleDenominator>
          <Name>osm_line</Name>
          <Title>Start- en landingsbanen</Title>
          <Abstract>Visualisatie van start- en landingsbanen</Abstract>
          <ogc:Filter>
            <ogc:PropertyIsEqualTo>
              <ogc:PropertyName>aeroway</ogc:PropertyName>
              <ogc:Literal>runway</ogc:Literal>
            </ogc:PropertyIsEqualTo>
          </ogc:Filter>
          <LineSymbolizer>
            <Stroke>
              <CssParameter name="stroke">#ffffff</CssParameter>
              <CssParameter name="stroke-width">8</CssParameter>
              <CssParameter name="stroke-linecap">round</CssParameter>
              <CssParameter name="stroke-linejoin">miter</CssParameter>
            </Stroke>
          </LineSymbolizer>
        </Rule>
      </FeatureTypeStyle>
      <FeatureTypeStyle>
        <Rule>
          <MinScaleDenominator>0</MinScaleDenominator>
          <MaxScaleDenominator>48000</MaxScaleDenominator>
          <Name>osm_line</Name>
          <Title>Taxibanen</Title>
          <Abstract>Visualisatie van taxibanen</Abstract>
          <ogc:Filter>
            <ogc:PropertyIsEqualTo>
              <ogc:PropertyName>aeroway</ogc:PropertyName>
              <ogc:Literal>taxiway</ogc:Literal>
            </ogc:PropertyIsEqualTo>
          </ogc:Filter>
          <LineSymbolizer>
            <Stroke>
              <CssParameter name="stroke">#ffffff</CssParameter>
```

DESIGNERS V. TERMINALS

- Desktop GIS
 - QuantumGIS: Map file (plugin) and SLD (native)
 - OpenJUMP: SLDs (Geotools)
 - ESRI ArcGIS: GeoCat Bridge plugin
- CSS-like
 - GeoServer CSS plugin
 - Cascadenik
 - Carto

TILEMILL: A CARTO EDITOR

Editing geography_class

Zoom 4 + -

Layers

- #paper
- * #cities
- * #country-name

Colors

Fonts

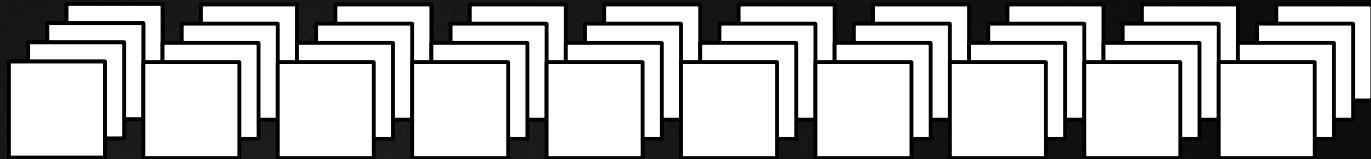
Saved Export X

```
35 #water: #ddccff;
36 #land: #ffffdd;
37 #line: #226688;
38
39 /* Water bodies */
40 Map {
41   background-color: #water;
42 }
43
44 #lakes[Name!=''][zoom>2],
45 #lakes[Name=''][zoom>4] {
46   polygon-fill:#water;
47   line-color:#line * 1.5;
48   line-width:0.4;
49   line-opacity:0.4;
50 }
51 #lakes[Name!=''][zoom=4] {
52   line-width:0.6;
53   line-opacity:0.6;
54 }
55 #lakes[zoom=5] {
56   line-width:2;
57   line-opacity:0.8;
58 }
59 #rivers[ScaleRank=1][zoom>=3],
60 #rivers[ScaleRank=2][zoom>=4],
61
```

TileMill Design beautiful maps

CLASSIC VALUE CHAIN

- Application



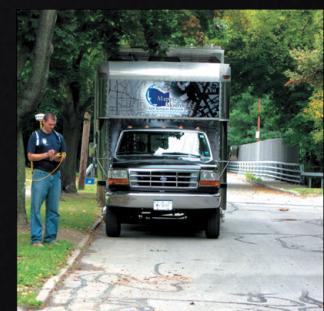
- Service



- Platform

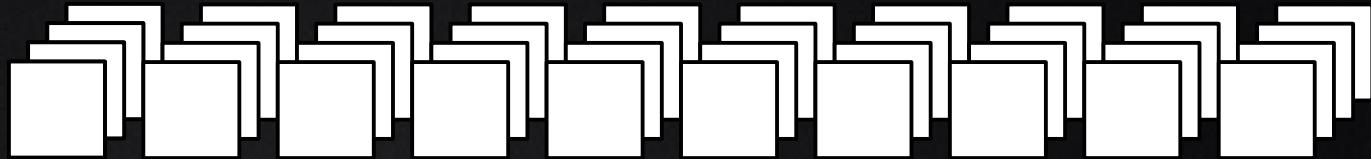


- Data



NEW VALUE CHAIN

- Application



- Service

YOU!

- Platform



- Data



DIR. GEN. PUBLIC WORKS

Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

Home Water Wegen Actueel RWS-loket Over ons Kenniscentrum zoek Sitemap Uitgebreid zoeken

Print Stuur door

Gerelateerde informatie

- > Actuele verkeersinformatie
- < Zie van A naar Beter voor hinderinformatie
- > Wegenoverzicht

Andere categorie: Werkzaamheden Selecteer kaart: Geplande werkzaamheden weg

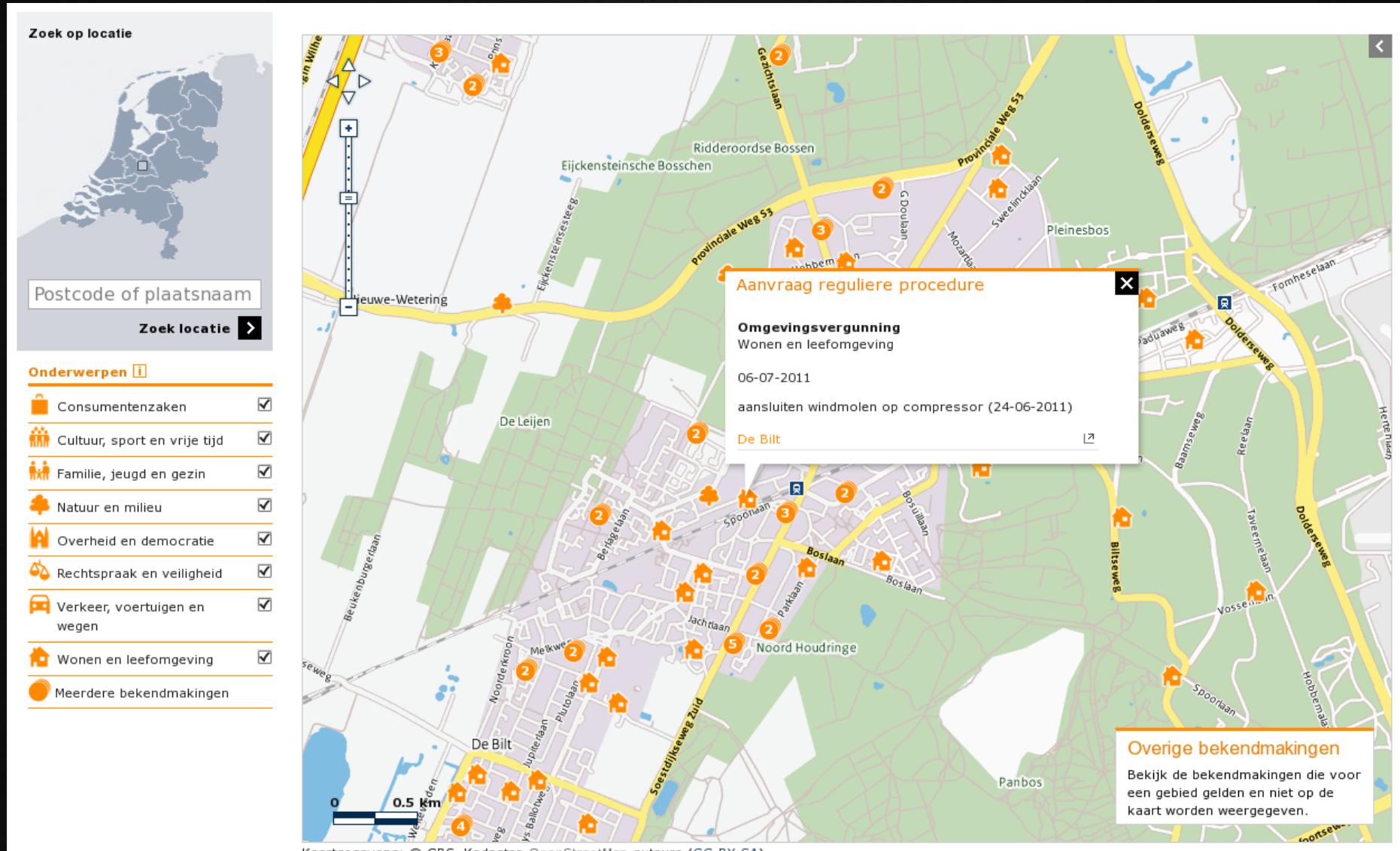
Selecteer hinderklasse: Werk in voorbereiding Van: 12-08-201 Tot: 19-08-201

Zoek locatie: Adressen Griffioenlaan 2 Utrecht Zoek > Link Postcode, plaatsnaam en/of adres

Maarssen Oud-Zuilen Groenekan Bilthoven Huis ter H...
H zuilens Vle... Alendorp Utrecht De Bilt Zeist
A2 N230 N230 N234 N237 N412 N224
A12 N198 N228 A27 A28
A12 Den Haag-Utrecht 10
hinder < 10 min. extra reistijd Klik voor details
hinder hinder
Legenda

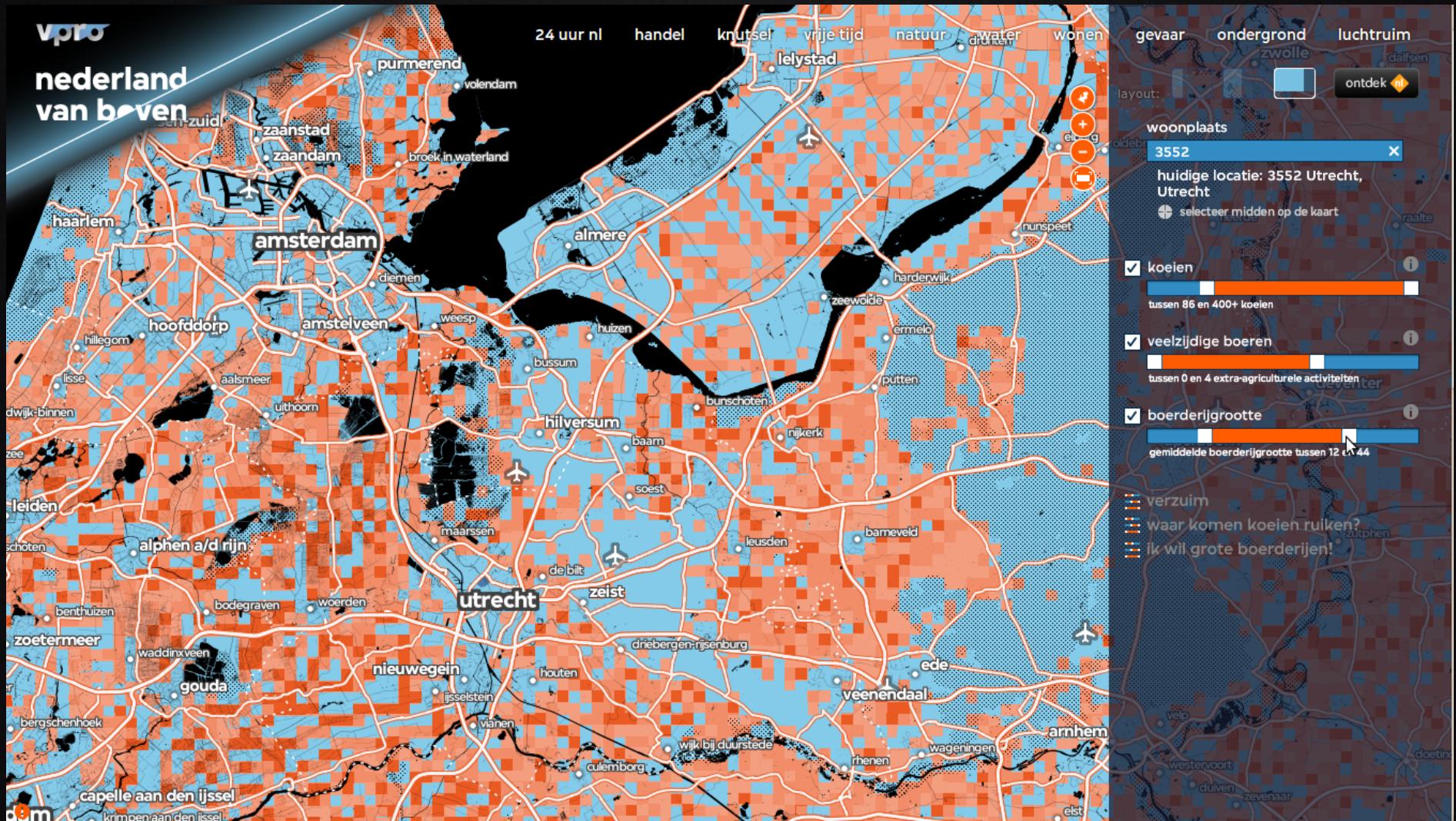
MapServer open source web mapping

PUBLIC SERVICE ON THE MAP



GeoServer

NETHERLANDS FROM ABOVE

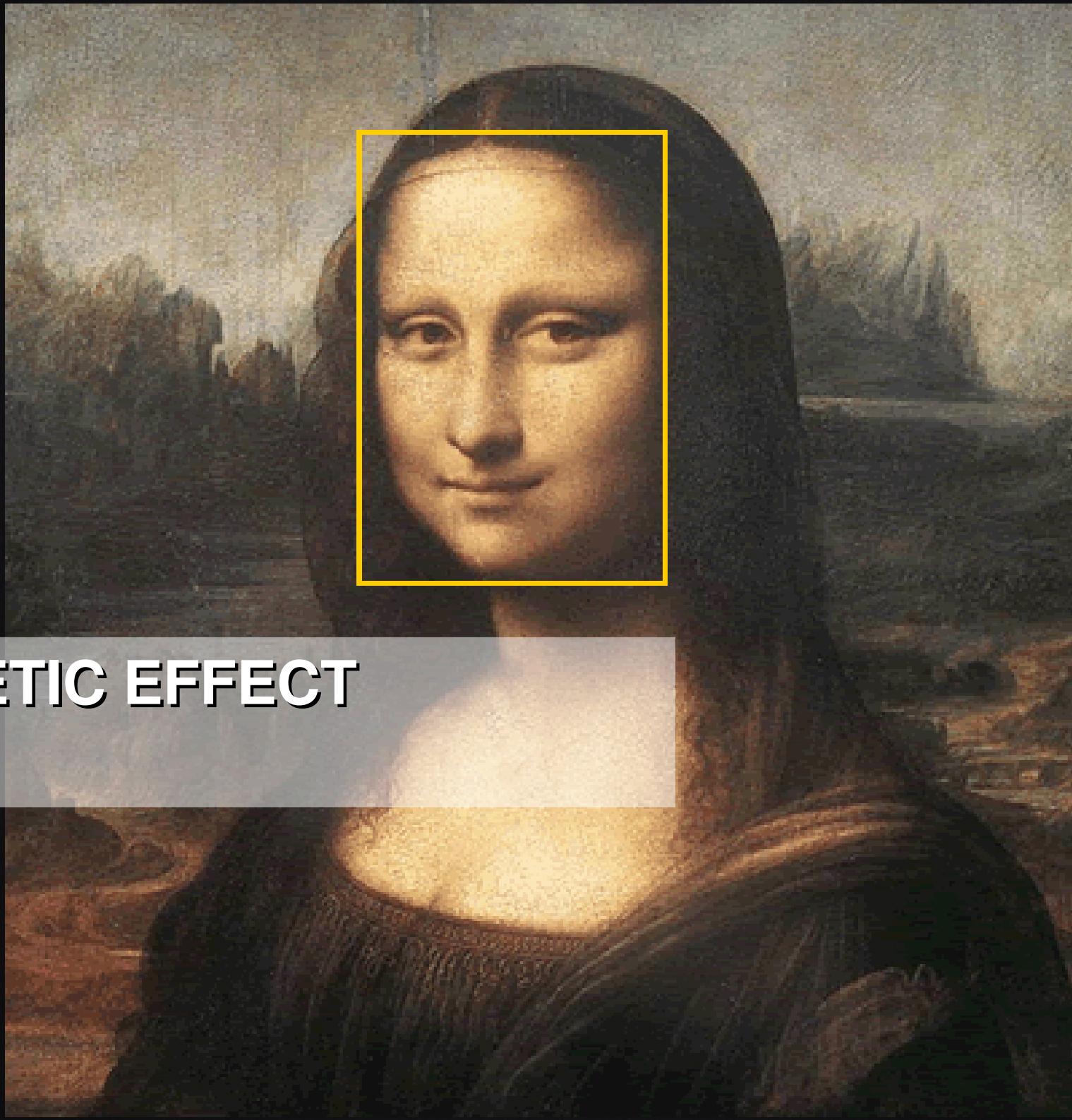


Cartography

is
the science,
the technology and

the art

of making maps



ESTHETIC EFFECT

Beautiful designs
are perceived as
more user-friendly
and better

MARINETRAFFIC

 [Kaart](#) [Schepen](#) [Havens](#) [Fotogalerij](#)

| Wereldkaart | Uw ontvangstgebied | Veel gestelde vragen | Diensten | [Zoek](#) [Nederland](#)

Scheepskaart

Ga naar gebied... ?
Ga naar Haven... ?
Ga naar Schip ?

Opties Vermelding & Visualisatie:

- Toon scheepsnamen
- Mijn Vloot
- Wind Now
- Meer...**
- Passagiersboot
- Cargoschip
- Tankers
- HogeSnelheidsSchip
- Sleepboot, Loods, etc
- Jachten & Overige
- Navigatiehulp
- Niet gespecificeerde
- Schip onderweg
- Voor anker

Snelle links:
Get an AIS receiver for free!
Verwachte aankomsten
Ontvangstations

Available on the iPhone [App Store](#)


50 km / 50 mi
N50°55'35.80" E005°17'46.99"
BELUGA [BE] 6.5 knots / 304°

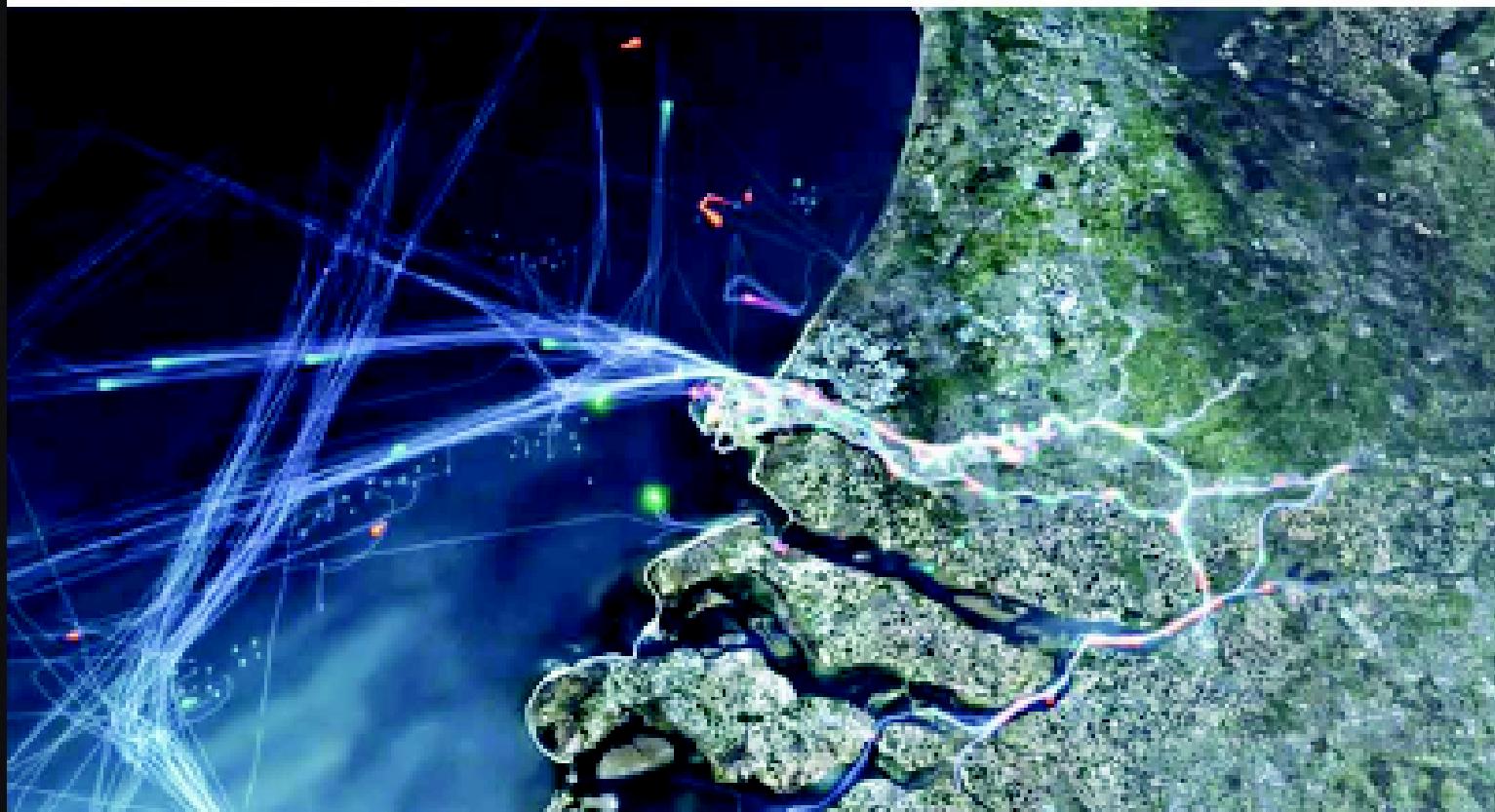
Ververs binnen: 77 Ververs nu! **Schepen Binnen Ontvangstbereik: 34705.** Getoond Schepen: 915.

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Microsoft CRM Online
werkt zeer eenvoudig

Supported by: 

NETHERLANDS FROM ABOVE

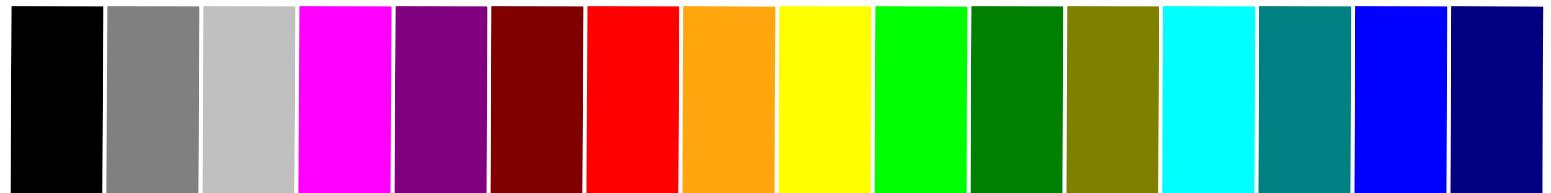
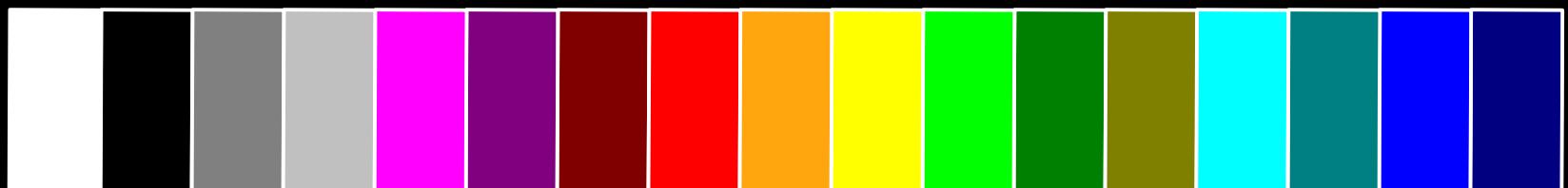


COLOUR USE



WEB COLOURS

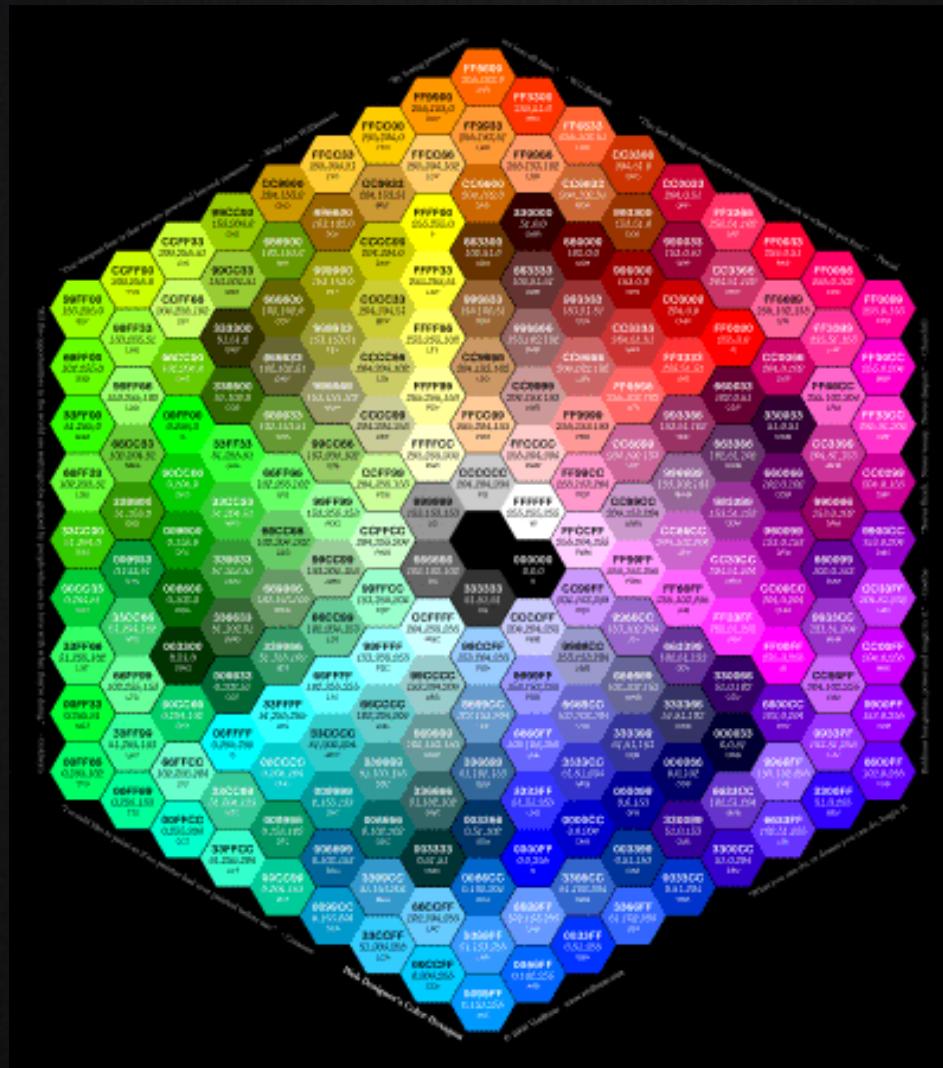
HTML4 and CSS 2.1: 16 + 1



+130 colours in SVG 1.0 = 147 in CSS 3

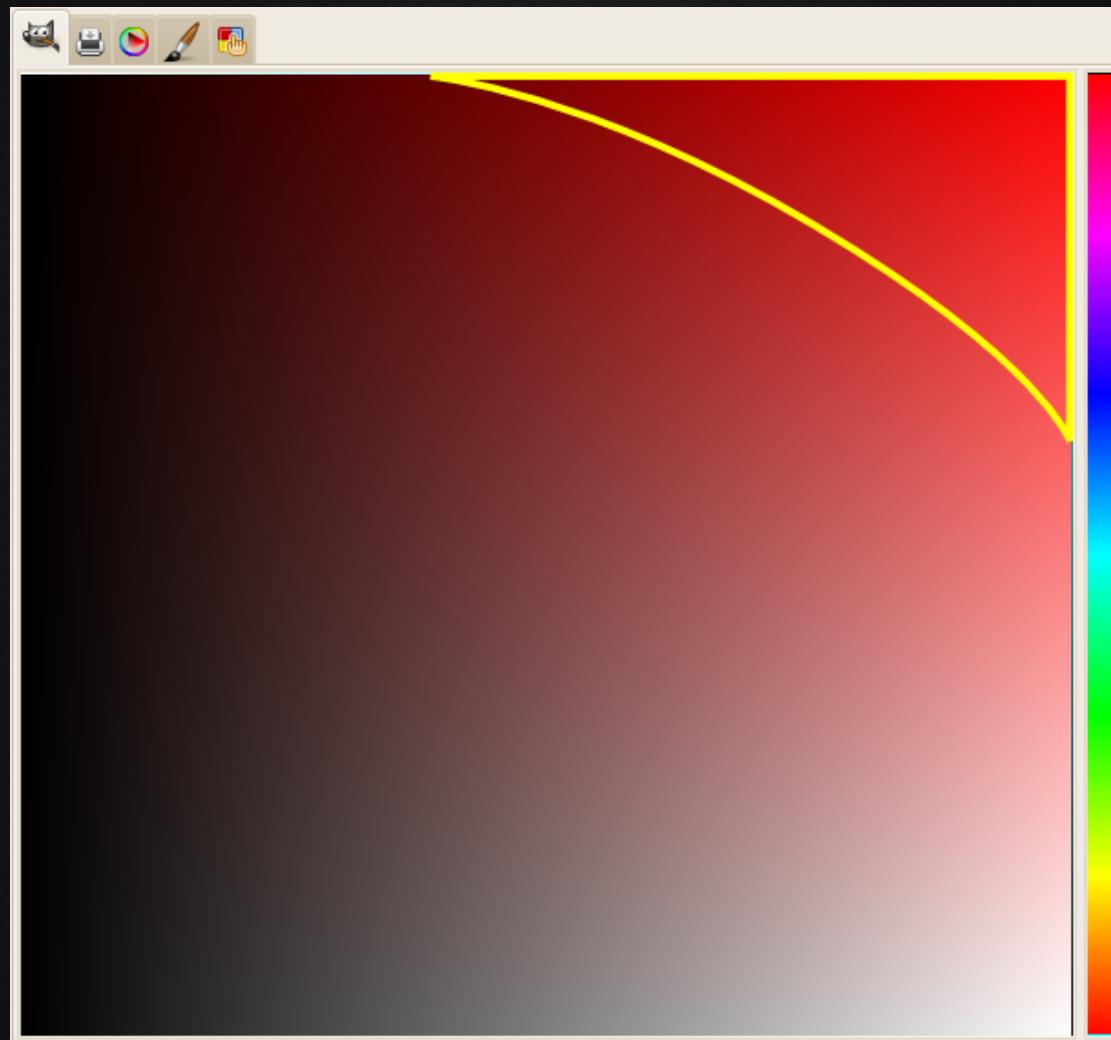
WEB COLOURS

216 “web safe” colours



SATURATION

Hue, Saturation, Lightness (HSL)



SATURATION: WHITE



SATURATION: BLACK

+Edward Zoeken Afbeeldingen Maps Play YouTube Nieuws Gmail Documenten Agenda Meer ▾

Google 0 + Delen Edward Mac Gillavry

Routebeschrijving Mijn plaatsen

Standaardlocatie instellen Zet uw bedrijf op Google Maps

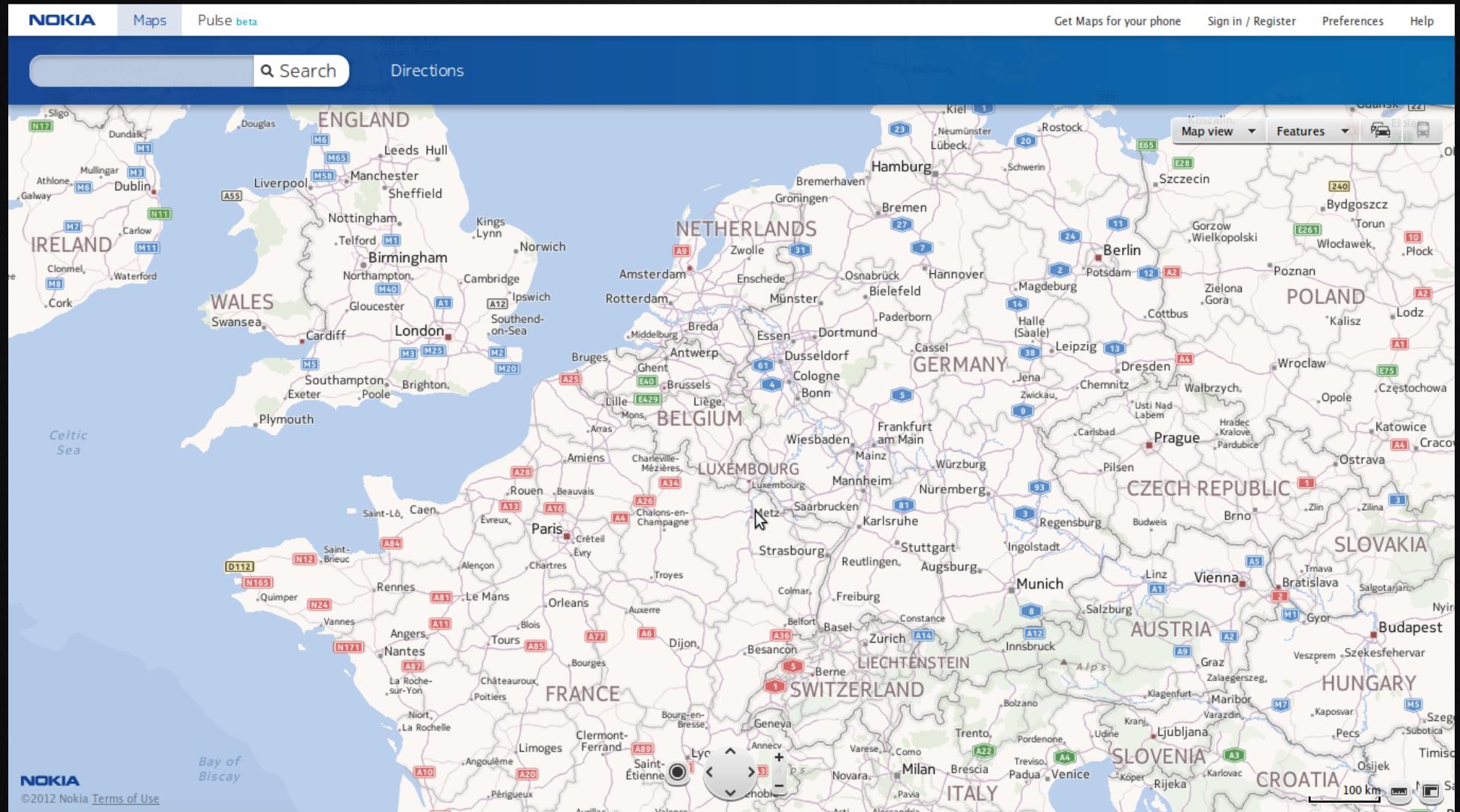
Ervaar MapsGL

Een probleem melden - Labs-functies voor Maps - Help

Google Maps - ©2012 Google - gebruiksvoorwaarden - Privacy

Kaartgegevens ©2012 GeoBasis-DE/BKG (©2009), Google, Tele Atlas - Een probleem melden

SATURATION: BLACK



COLOUR COMBINATIONS



Create
From a Color
From an image
Themes
Community
Pulse
Links

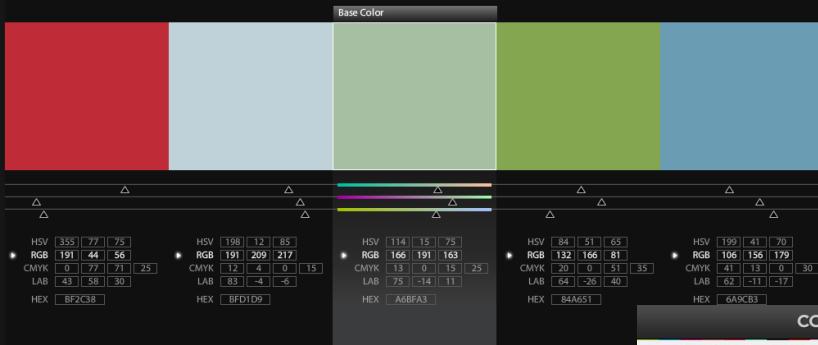
Select a Rule
Analogous
Monochromatic
Triad
Complementary
Compound
Shades
Custom



Register Sign In

Title:
Copy of City Map
Save
Public
Private

Please sign in to save your theme.



help | about kuler | kuler talk | developers | privacy policy | terms of use (updated 10/15/08)
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kuler.adobe.com

COLOURlovers

Browse Community Channels Trends Tools Store

Search palettes... Log In

CREATE

Google Maps

LOVE THIS +

16 LOVES

7 COMMENTS

210 VIEWS

ROTATE TOGGLE WIDTHS CREATE PATTERN

ABOUT THIS PALETTE

By parafinity Mar 10, 2010 with COPASO

210 COLOURlovers viewed this page and think parafinity has the magic touch.

RANK

N/A TODAY	N/A WEEK	39,984 MONTH	29,276 ALL-TIME
-----------	----------	--------------	-----------------

SHARE THIS PALETTE

SHANE ON

GRAB THIS BADGE CODE

<a href="http://www.colourlovers.com/palette/1129886/C

GET THIS PALETTE IMAGE

Your Screen [1366x768] // Preview // iPhone
390x300 // 800x600 // 1024x768 // 1600x1200

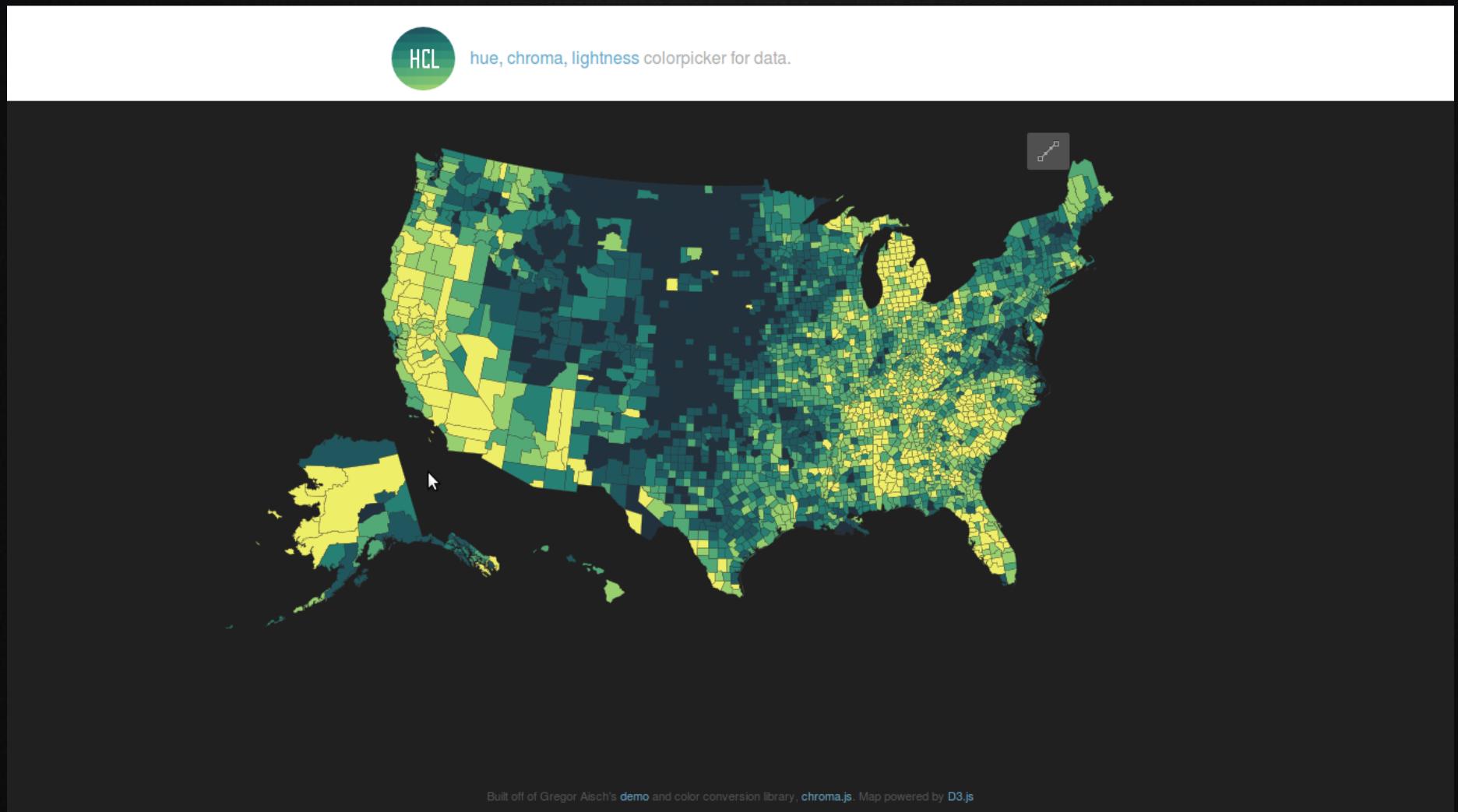
FAVORITED BY

10 FAVORITES FAVORITE THIS PALETTE +

Hier ► *Voorbeeld van een toekomstige deal

www.colourlovers.com

COLOUR COMBINATIONS



tristen.ca/hcl-picker/

COLOUR COMBINATIONS

number of data classes on your map
5 [learn more >](#)

the nature of your data
sequential [learn more](#)

pick a color scheme: Oranges

(optional) only show schemes that are
 colorblind safe print friendly
 photocopy-able [learn more >](#)

pick a color system
254, 237, 222 RGB CMYK HEB
253, 190, 133
253, 141, 60
230, 85, 13
166, 54, 3
adjust map context
 roads
 cities
 borders
select a background
 solid color
 terrain
[EXPORT YOUR COLORS >>](#)

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[Back to ColorBrewer 1.0](#)

COLORBREWER 2.0
color advice for cartography

axm

www.colorbrewer2.org

COLOUR BLINDNESS



COLOUR BLINDNESS

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A Enschede The Netherlands

Directions Search nearby more ▾

Explore this area »

Photos

Places

ITC Enschede University of Twente De Grolsch Veste

2 mi 5 km

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A Enschede The Netherlands

Directions Search nearby more ▾

Explore this area »

Photos

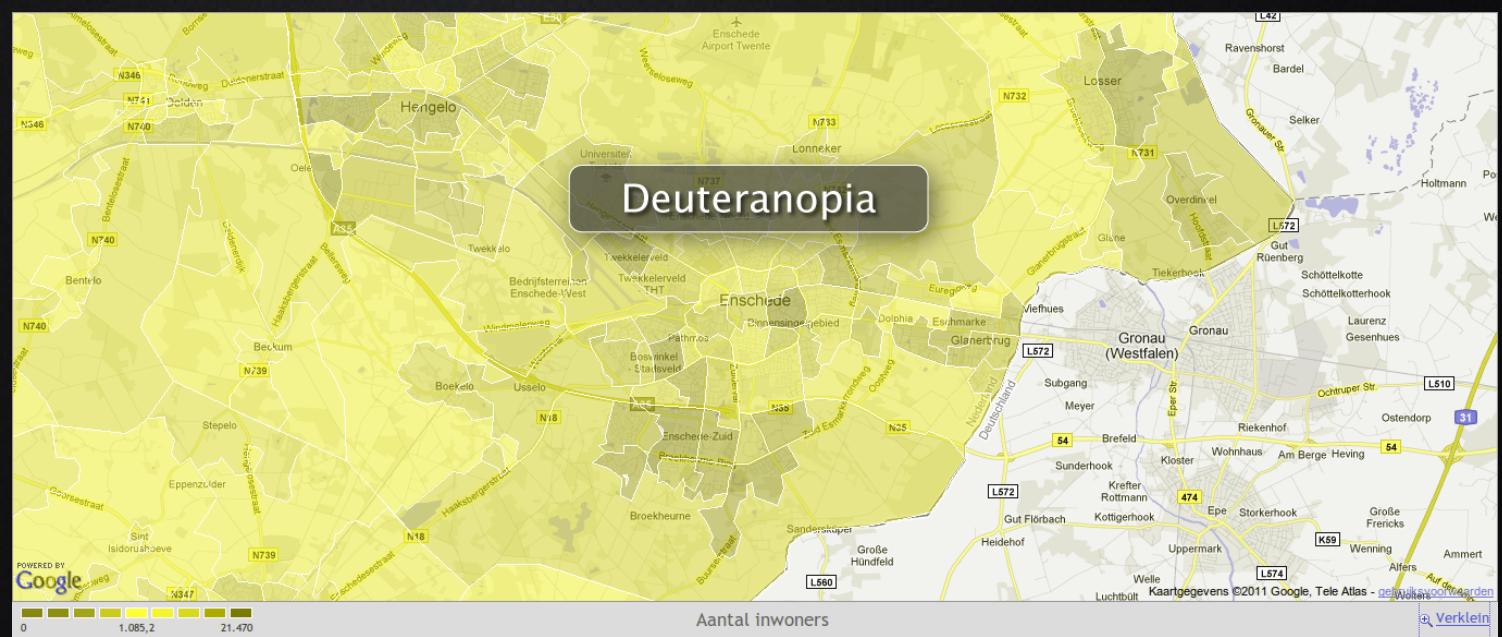
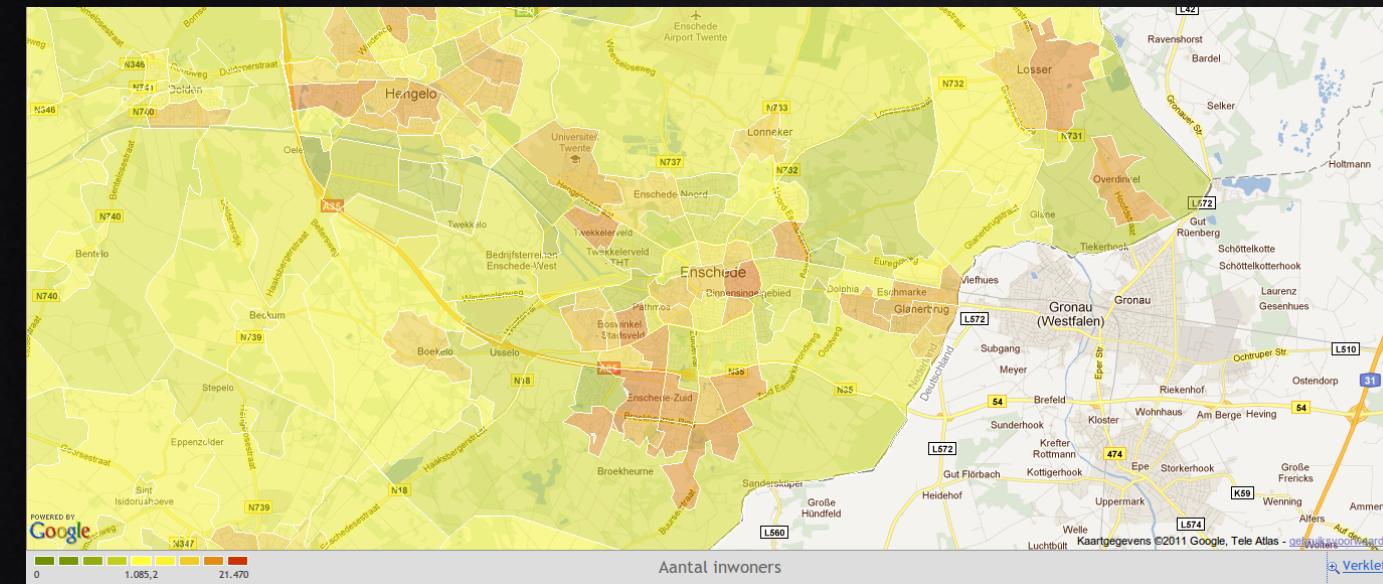
Places

ITC Enschede University of Twente De Grolsch Veste

2 mi 5 km

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COLOUR BLINDNESS





TYPOGRAPHY

TYPEFACE SELECTION

- Sans-serif or serif ?
- Different weights:
 - Medium, Semi-bold
 - Bold
- Condensed

COMBINING TYPEFACES

Type Brewer

EXPLORE Learn More >>

Restart Reload CONTEMPORARY | B

Size Density Tracking

Terrain Highlight Text Only

GET SPECS Learn More >>

Map for: Screen Print

Labels Other Text

Countries
Font: Glypha 55 Roman
Size(pt): 10.5 - 21 Track: 0

Capital Cities
Font: Univers 57 Condensed
Size(pt): 14 Track: 0

Cities
Font: Univers 45 Light
Size(pt): 11.5 Track: 0

Mountains
Font: Univers 45 Light Obl
Size(pt): 12 - 23 Track: 37 - 875

Oceans
Font: Glypha 55 Obl
Size(pt): 12 - 18.5 Track: 25 - 50

Rivers
Font: Glypha 55 Obl
Size(pt): 11.5 Track: 12

Islands
Font: Glypha 55 Obl
Size(pt): 14 Track: 25

COMPARE Your Fonts Font Alternatives Font Info

Type Families: Glypha / Univers

Major Places and Natural Features

LAMBERT CONFORMAL CONIC PROJECTION

0 150 300 miles

Info on Corsica and Sardinia: <http://en.wikipedia.org>
Places and Natural Features: CIA World Fact Book: <http://www.cia.gov/cia/publications/factbook/>

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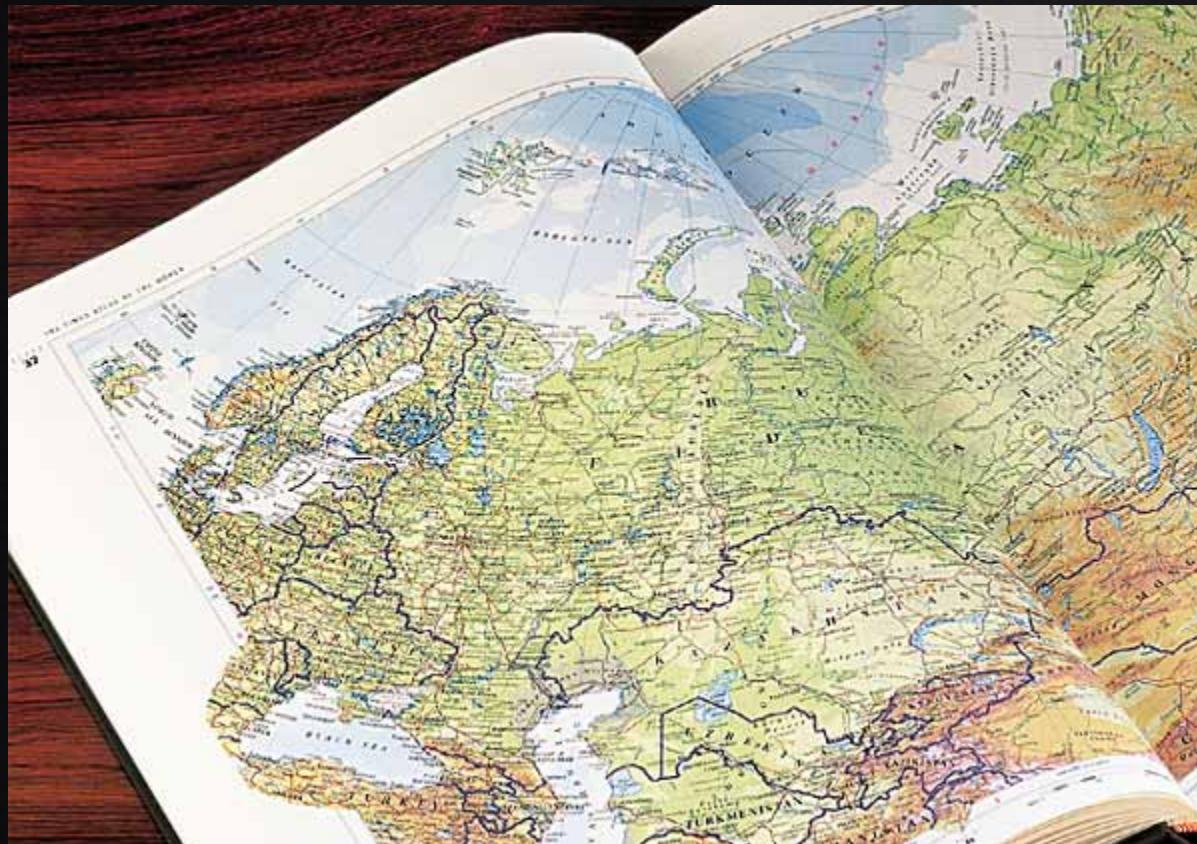
HELP

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The map displays a variety of typefaces across the continent, demonstrating how different fonts can be used effectively in a single design. The font families used include Glypha and Univers, with specific sizes and tracking values assigned to each element.

www.typebrewer.org

FONT SIZE



6pt Amsterdam
7pt Amsterdam
8pt Amsterdam
9pt Amsterdam
10pt Amsterdam
11pt Amsterdam
12pt Amsterdam
13pt Amsterdam
14pt Amsterdam

6px Amsterdam
7px Amsterdam
8px Amsterdam
9px Amsterdam
10px Amsterdam
11px Amsterdam
12px Amsterdam
13px Amsterdam
14px Amsterdam



FIGURE-GROUND



WIDGETS v. MAP

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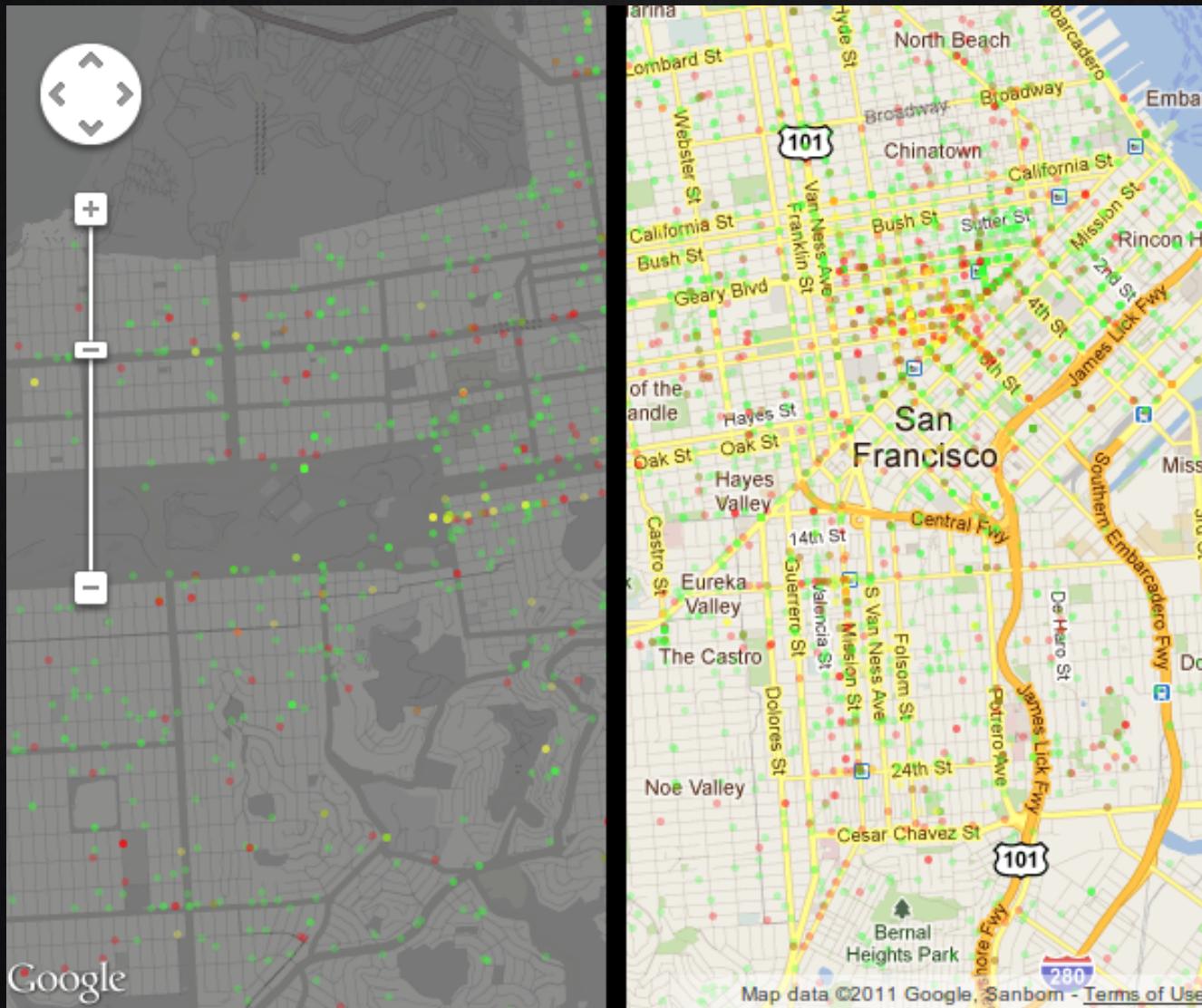
OFFER ENDS 11/20/11



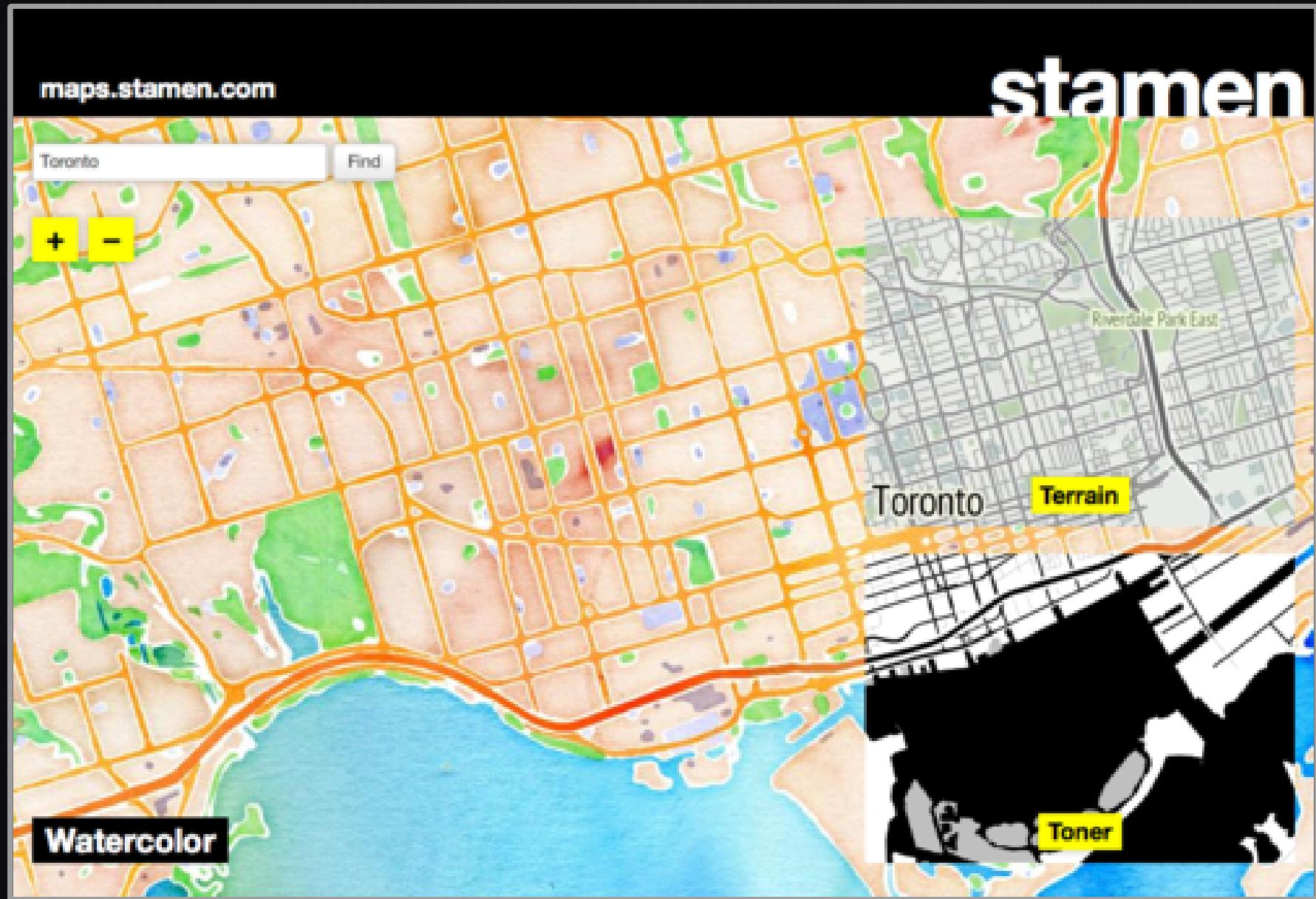

Detailed map description: This is a detailed map of the central United States, specifically focusing on the states of Colorado, Nebraska, Kansas, and parts of Wyoming and Missouri. The map shows a dense network of roads, with major routes like Interstate 70, Interstate 25, Interstate 80, Interstate 35, and Interstate 44 highlighted in blue. Numerous US Highways are shown in red. Major cities are marked with black dots and labeled, including Denver, Cheyenne, Laramie, Scottsbluff, Alliance, North Platte, O'Neill, Norfolk, Fremont, Omaha, Lincoln, Grand Island, Holdrege, McCook, Oberlin, Marysville, St. Joseph, Topeka, Wichita, Emporia, Iola, Great Bend, Hays, Salina, Burlington, Limon, Brush, Sterling, Greeley, Julesburg, Benkelman, Oakley, Pratt, Garden City, Dodge City, Liberal, Lamar, La Junta, Walsenburg, Pueblo, Colorado Springs, and Raton. National monuments and grasslands are also indicated by green shaded areas and labeled: Fort Laramie National Monument, Agate Fossil Beds National Monument, Pine Ridge National Recreation Area, Pawnee National Grassland, Comanche National Grasslands, Cimarron National Grasslands, Capulin Volcano National Monument, and George M. Carver National Monument. A scale bar at the bottom left indicates distances up to 100 km/miles.

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THEME v. ORIENTATION



STAMEN



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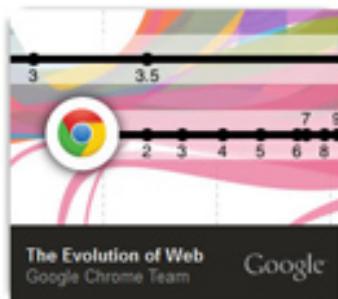
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