

DESIGNING INTERACTIVE MAPS

Interactive Map Design | Spring 2017

To map or not to map....

- Whether we are creating static or interactive maps, maps are designed to communicate & reveal information, knowledge, or an agenda to a specific audience
- Maps are all about communication; make each map with a purpose
- Data is becoming so readily available – you must decide which data is worth mapping

Interactive maps

- Map communication is a two-way process; no longer designing for just reading & interpreting
- Including interactive features just because they are 'cool' are distracting and will take away from the message

Design process

- Who is the intended audience?
 - ▣ Who WILL view this (not might, or could possibly)
- What data will best communicate these things?
- What are the 1-5 things I want this map to communicate clearly?
- Which design elements will help the map user receive the message most clearly?



Map Title: Coyotes in the City

Purpose: Highlighting the areas of the city where coyotes are sighted

Need to Map:

- Coyote sightings
- Reference streets / points
- Parks & open spaces

Might Map:

- Reports of attacked chickens & cats
- Population density
- Neighborhood boundaries

Design mantra

- Overview first
- Zoom & filter
- Details on demand

Ben Shneiderman, 1996.



Map Elements

Title

SHIGAR RIVER VALLEY, NORTHERN PAKISTAN

SubTitle

Villages and Road
Transportation



Inset Map
- Location
- Enlargement
- Thematic

Neatline

Main
Map

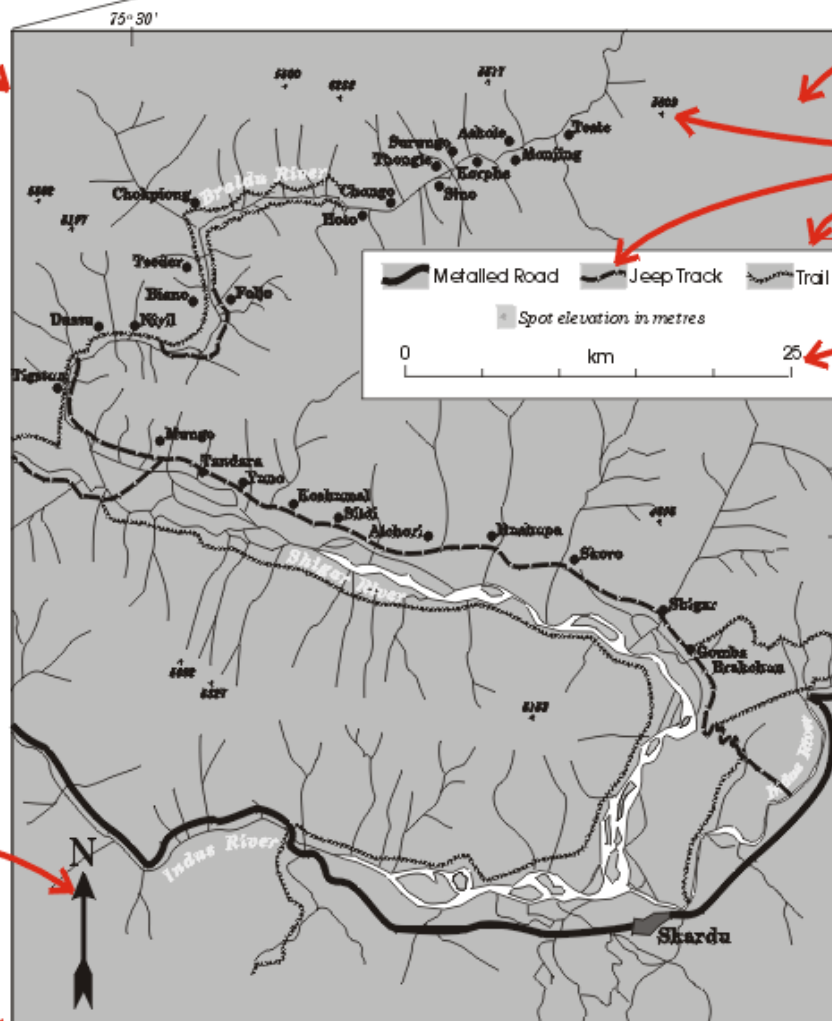
Symbols

Key

Scale

- Index
- Notes

Border



Orientation
Reference

Source
& Date

(Source: *Himalayan Research Bulletin* 16(1-2):28, 1996)

KM

Cartographer

What is unique to interactive maps?

Map elements as now best thought of as GUIs.

- ❑ Splash screens
- ❑ Mapped areas
- ❑ Panning
- ❑ Zooming
- ❑ Map rotation
- ❑ Pop-up info windows
- ❑ Menus
- ❑ Smart legends
- ❑ Multi-media graphics or videos

Title/Splash Screen

- In mobile map apps, titles are redundant –
 - ▣ most likely already on the app icon or provided when it was downloaded from the app store
 - ▣ Screen real estate is precious on mobile apps
- In web maps, titles are still necessary –
 - ▣ People need to know what information they are looking at on the map
 - ▣ Useful for framing map purpose & providing clues on how the map should be used
 - ▣ Partially ornamental and can make a web map appear more permanent

THE HOBBIT

FILMING LOCATIONS MAP

Click on each location to discover pics of the places and comments from the production videos.

The data is hosted on [CartoDB](#) and was assembled from various data sources.

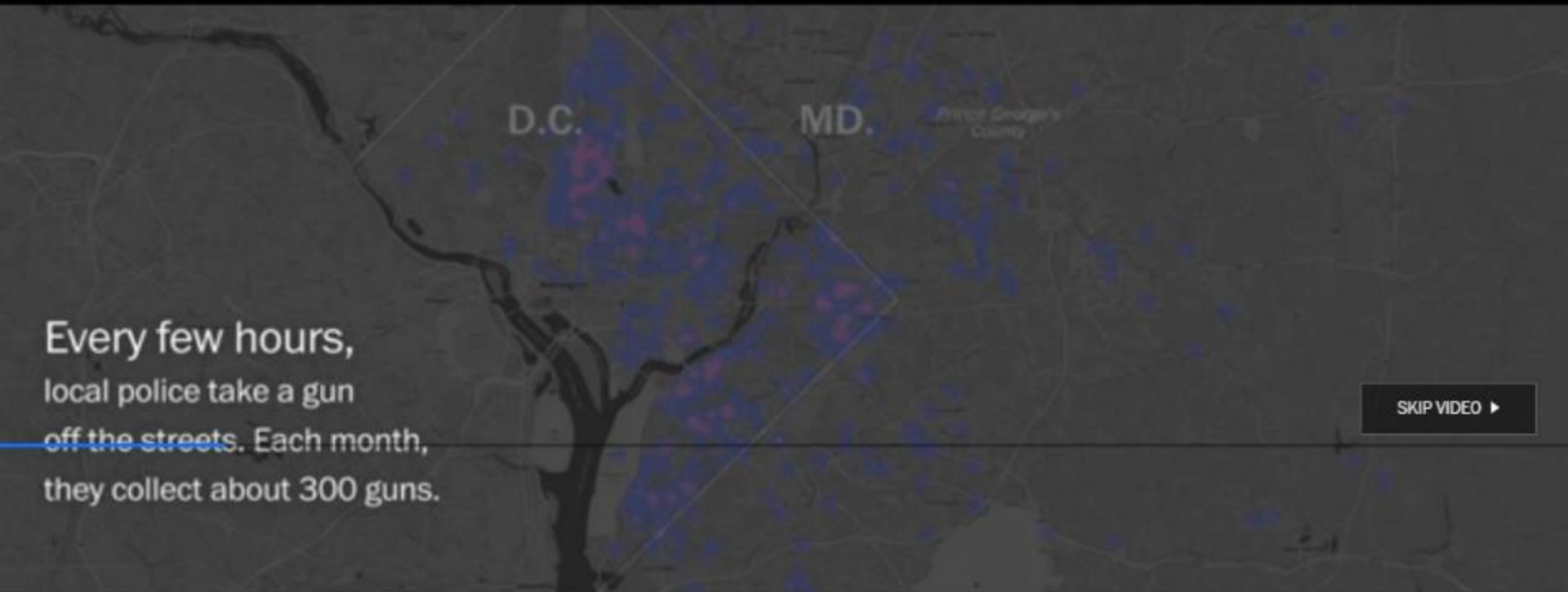
This map was developed using the [CartoDB JavaScript library](#), [Cartodb.js](#). Fork it and create your own.

- Natural Parks
- Villages
- Rivers
- Fields
- Caves



Title/Splash Screen

- Splash screen appears when the map is opening – can include information like title, image or logo, and description of map
- Effective map apps can use a title splash screen
 - ▣ Promotes maps as a production - makes it feel more legitimate
- Can also be effective in a web map if it is difficult to incorporate a title/description of the map into the map itself



Every few hours,
local police take a gun
off the streets. Each month,
they collect about 300 guns.

SKIP VIDEO ▶

Regional Differences in Costs and Care

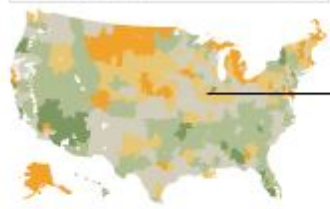
Geographic variation in quality and cost of health care is a result of many complicating factors. These maps, which use 2003 Medicare patient data, show the variability of cost in the Medicare system and the rates of several kinds of surgery. Among the factors affecting rate variation by region are the health of the population, the economy, the availability of and access to care and the methods for care and treatment.

CLICK TO START

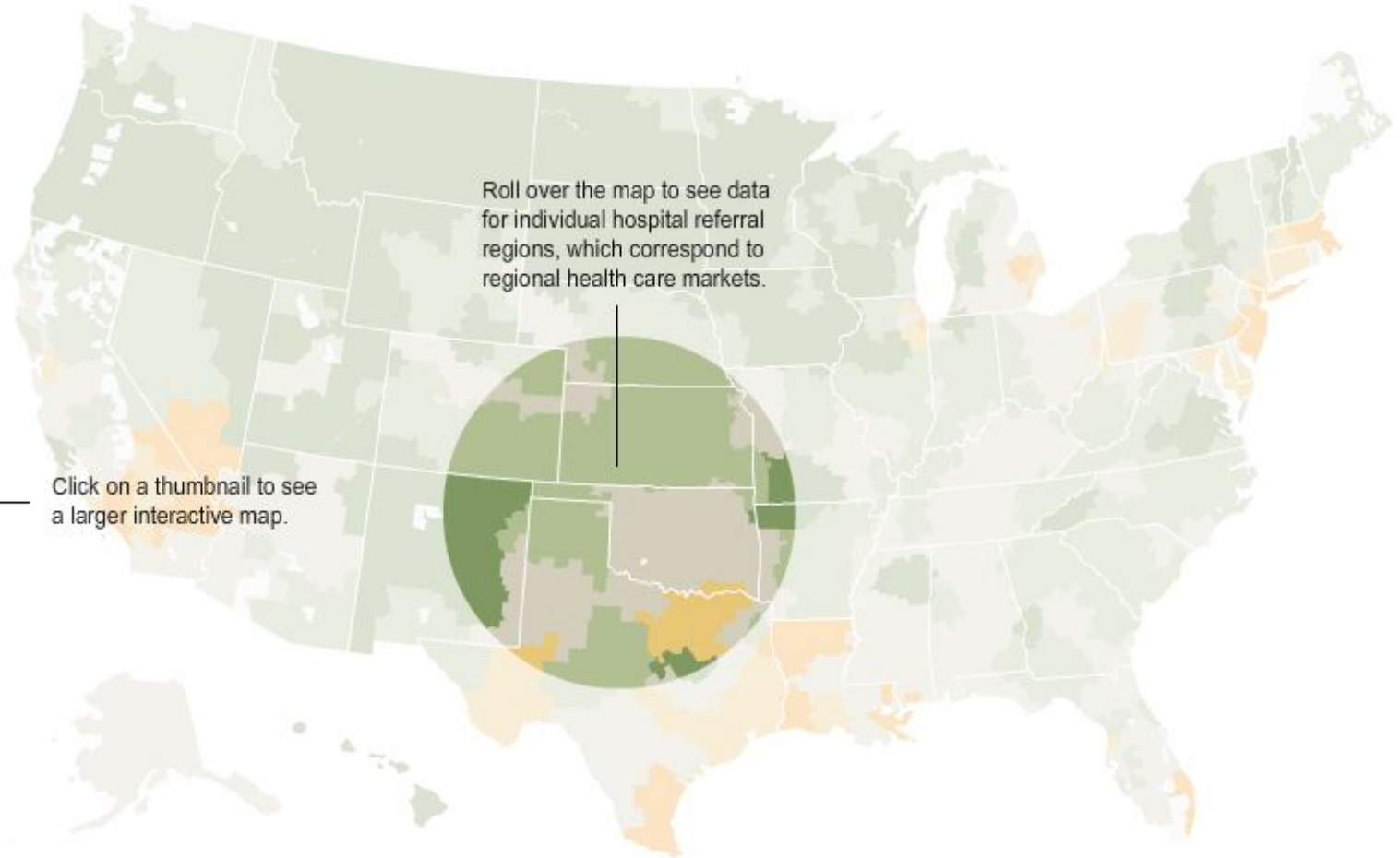
ACUTE CARE \$2,706



OUTPATIENT \$695



SURGICAL \$302



Roll over the map to see data for individual hospital referral regions, which correspond to regional health care markets.

Click on a thumbnail to see a larger interactive map.

Title/Splash Screen

- Short & to the point
- Allow map user to click on screen to skip it
- Should be used as a modern map title – title & graphic(s)
 - ▣ Not as a place to include information about who designed the map, projections, data sources, base map providers, etc.
- Map goal will determine if a splash screen is effective

Mapped areas

- Should be the largest element on the screen – in mobile apps its expected to take up the full screen
- Mapped areas are expected to be interactive – no fixed scale
 - ▣ If it is, there should be data at various scales or what's the point?

Regional Differences in Costs and Care

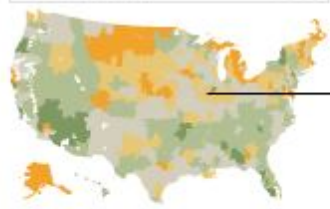
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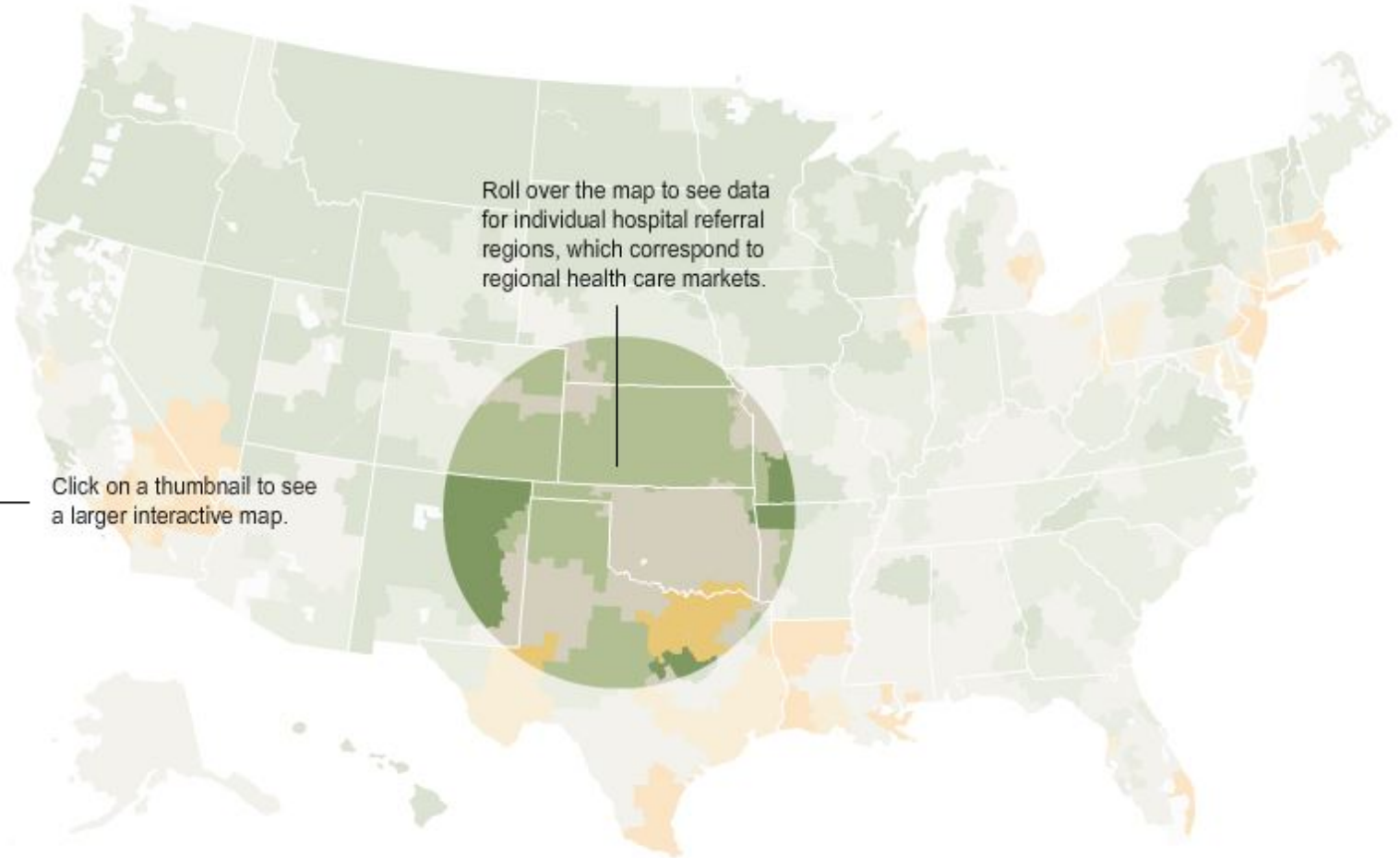
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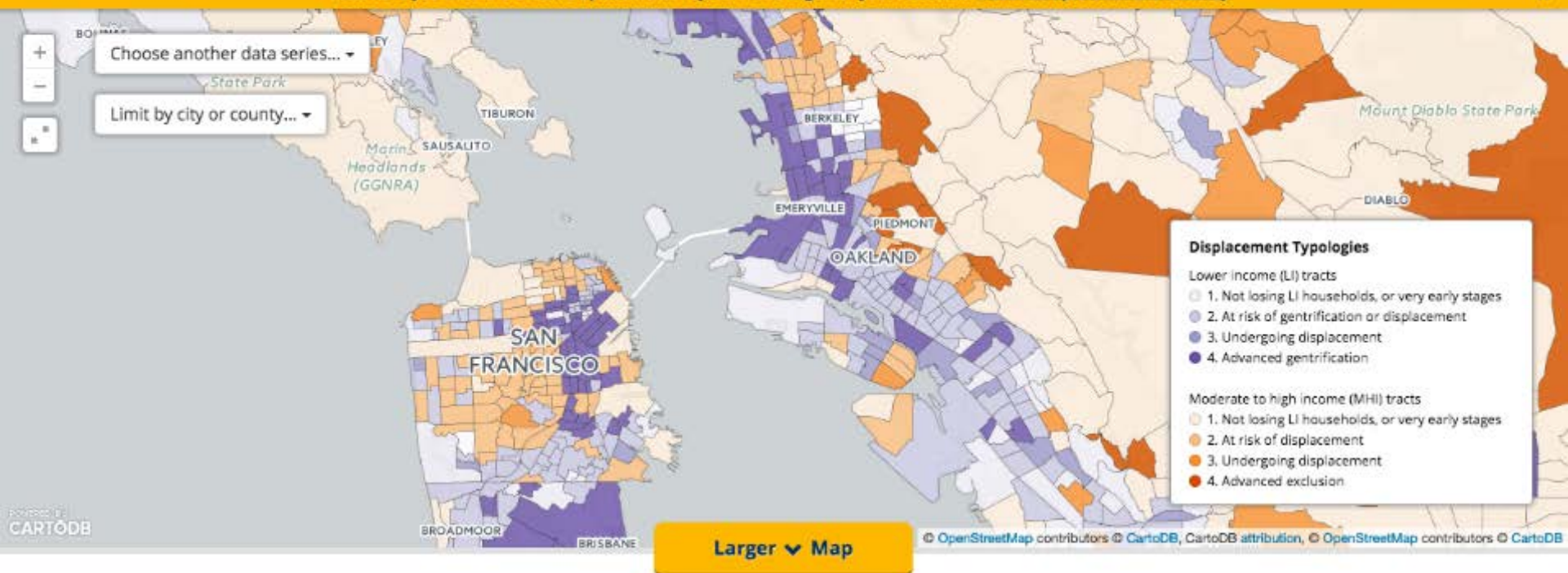
OUTPATIENT \$695



SURGICAL \$302



How have you used the Urban Displacement Project? We're eager for your feedback! [Please complete our short survey.](#)



Mapping Displacement and Gentrification in the San Francisco Bay Area

The Bay Area's booming jobs and housing market necessitates a

Census Tract Typology Classification

Lower Income Tracts (> 39% of HH are considered Low Income)

Moderate to High Income Tracts (<39% of HH are considered Low Income)

Not losing low income households or very early stages

Not losing low income households or very early stages

<http://www.urbandisplacement.org/map/sf>

Panning

- “The ability to move a portion of visible content out of the mapped area to be replaced by adjacent, but currently unseen, content” (*Muehlenhaus, 2014*)
- Required if:
 - ▣ Map users can zoom in on your map
 - ▣ Your map is preset to a scale that does not show the entire mapped area

Panning – a few best practices

- Do not let users pan beyond the scope of your mapped area
 - ▣ Example: Showing Oregon wine regions, only allow map to be zoomed out to show the state (not NY)
- If panning does not add anything to the map – don't include it

Election 2015: most-searched UK leaders on Google

David Cameron, Con

Ed Miliband, Lab

Nick Clegg, Lib

Nigel Farage, UKIP

Nicola Sturgeon, SNP

Natalie Bennett, Green

Leanne Wood, PC

Others

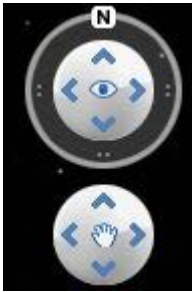


Google Trends

https://srogers.cartodb.com/viz/9176a532-ed10-11e4-80ea-0e018d66dc29/embed_map

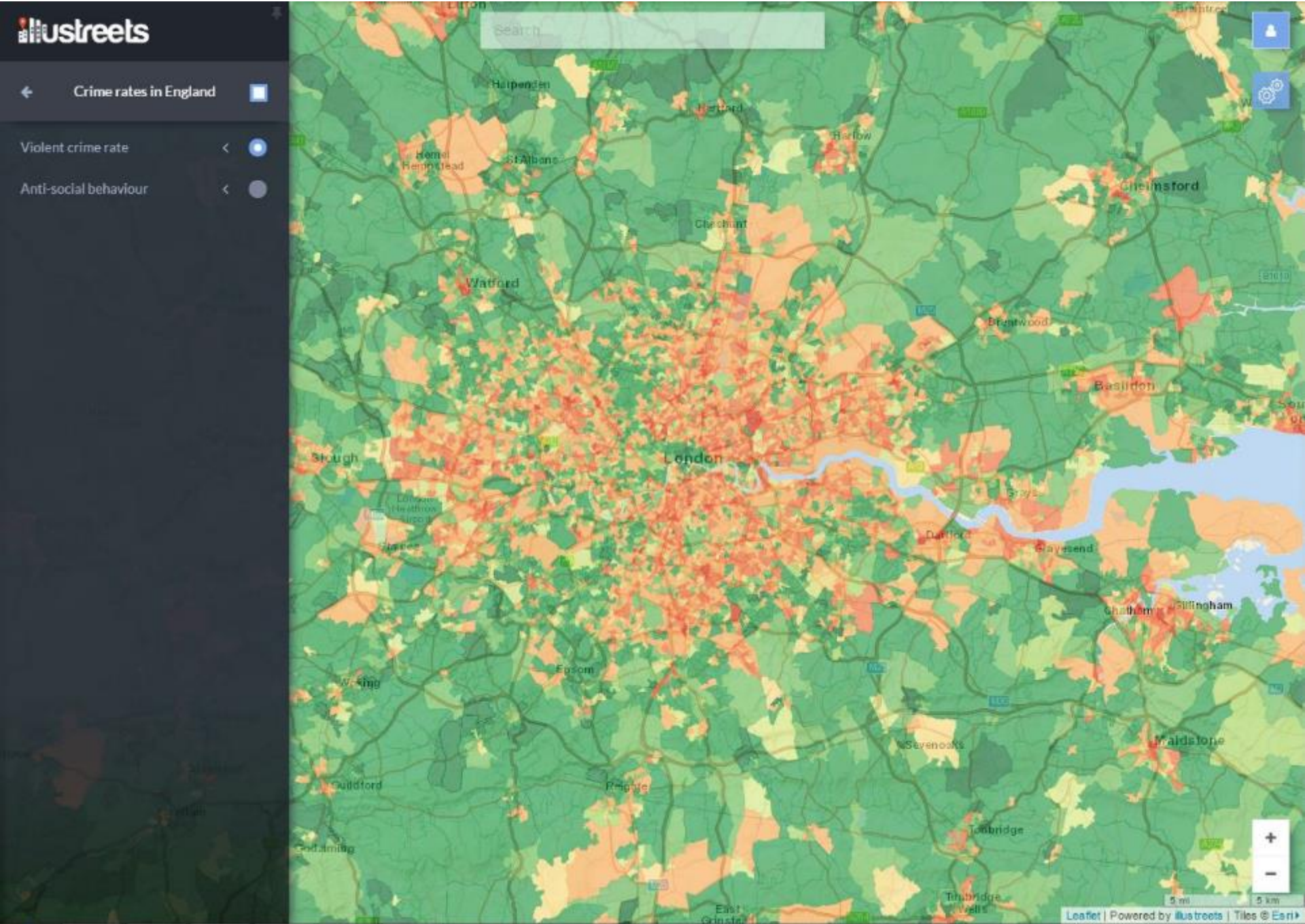
Panning – common methods

- Panning arrows. Remnants of pre-slippy maps
- Arrow keys. Limited to maps being viewed on a device with a keyboard
 - ▣ Incorporating arrow keys allows for 2 tools to be used for interactivity
 - ▣ Do not take up any screen real-estate
- Click(touch) and drag. Intuitive method for moving the map around the screen
 - ▣ Works with both WIMP & touch screen devices
 - ▣ Make it multi-touch so that touching the screen doesn't accidentally do something else on the map



Zoom

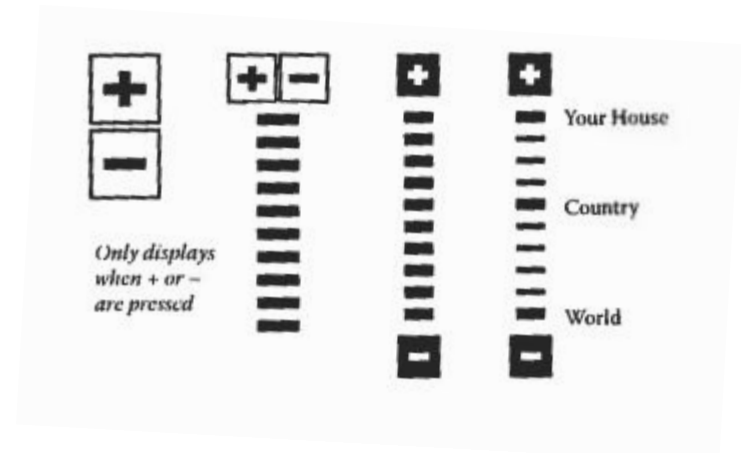
- Zooming is fun – we all love it!
- Zooming is only necessary when there is data to zoom in or out to that is part of the maps purpose
- Limit the zoom so that user cannot zoom too far or too close in
- Only allow for user to zoom in if there is data (what's the point of zooming into a county if all you are going to see is a solid color?)



https://explore-uk.illustreets.com/apps?map=-0.1133*51.5105*10

Zoom bars

- Work with most user-computer interactive tool (WIMP & touchscreen)
- Typically found:
 - ▣ Vertical, with the top being the max zoom and bottom being the min
 - ▣ Placed on the right or left side of the map (available but not competing for space)
- Keep it simple



Zoom – other options

- Double-click or tap
- Scroll wheel
- Pinch to zoom
- Keyboard shortcuts
- Rectangle zoom

Zoom - comparisons

Tools	Benefits	Drawbacks
Standard zoom bar	<ul style="list-style-type: none">- Easy to use- Can see which zoom level you are on	<ul style="list-style-type: none">-Takes up space-rarely used with mouse scroll and pinch-to-zoom-low accuracy zooming
+/- buttons	<ul style="list-style-type: none">-Easy to use-use minimal screen space	<ul style="list-style-type: none">-cannot see which zoom level you are on-rarely used with mouse scroll & pinch-to-zoom-low accuracy zooming
Mouse scroll wheel	<ul style="list-style-type: none">-Easy to use-No screen space taken-High accuracy zooming over features	<ul style="list-style-type: none">-cannot see which zoom level you are on-can easily zoom in or out too far and get confused
Pinch-to-zoom	<ul style="list-style-type: none">-Easy to use-No screen space taken-Some accuracy zooming over features	<ul style="list-style-type: none">-can easily zoom in or out too far and get confused-can vary in accuracy depending on screen and finger sizes-cannot see which zoom level you are on
+/- keys	<ul style="list-style-type: none">-Easy to use-No screen space taken	<ul style="list-style-type: none">-Few people realize these work-cannot see which zoom level you are on-can easily zoom in or out too far and get confused



Map rotation

- Automated
 - ▣ Map user has no control, happens no matter what
 - ▣ Narrative maps, animated maps, flybys
- User controlled
 - ▣ Powered by GUI
 - ▣ Flip map horizontally or vertically

Map rotation – best practices

- ❑ Always start with north at the top
- ❑ Make rotations smooth
- ❑ Text should never be upside down
- ❑ On mobile apps, map should rotate to mimic the direction the person is facing

Information windows, aka pop-ups

- Callout labels, on steroids
- Can include text, hyperlinks, images, videos, music, etc.
- Fine balance between too much & too little info
 - ▣ Info should be directly related to goals of map
 - ▣ Should be more than just a place name (that can be done with a label)
- Great tools for connecting more information about the map & data
- Drawback: they have the ability to cover up surrounding map area

Info window – tool tip

URBAN REVIEWER

Mapping master plans for New York City

Search by plan or address

ABOUT
REFERENCES
ESSAYS
ARCHIVE
PRESS
CONTACT

Plans **Filters**

Welcome to Urban Reviewer!

Reviewing Past Urban Plans. Discovering Present Impact. Supporting Future Action.

The City of New York has adopted over 150 master plans for our neighborhoods. You can see which areas have been affected and what those grand plans were here.

Awesome!

PLAN STATUS

☒ Active ?
☐ Expired ?

LAST UPDATED YEAR

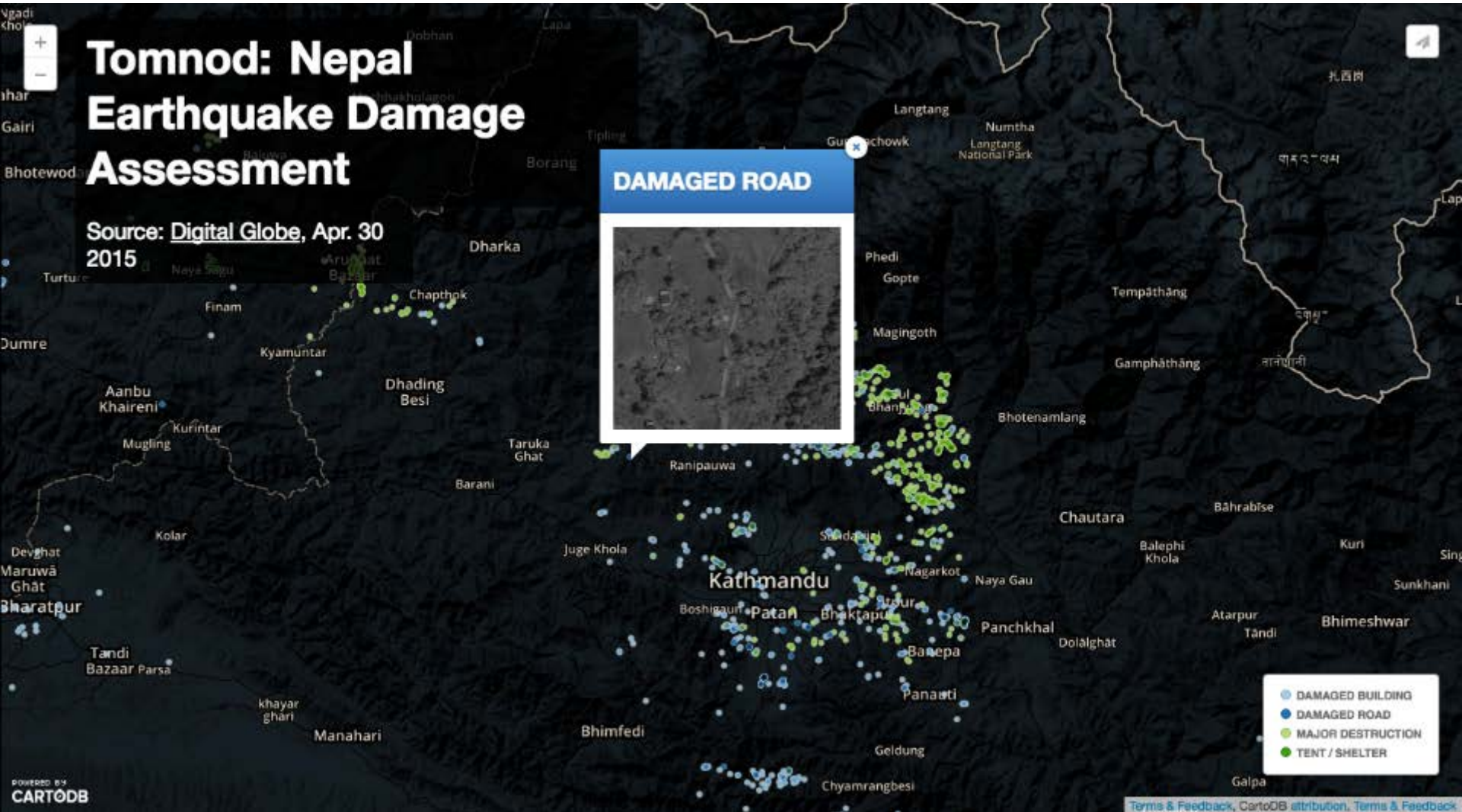
any year ?

PLAN	ADOPTED
49th Street-1st Avenue	1972
Arverne	1968
Atlantic Terminal	1968
Baltic Street	1982
Bathgate	1975

1952 **2014**

YEAR ADOPTED

<http://www.urbanreviewer.org/#map=14/40.7400/-74.0018>



https://geosprocket.cartodb.com/viz/bb5ed630-ee1e-11e4-8dca-0e018d66dc29/embed_map

Locator Maps

- Allow users to reference the location being viewed
- Especially useful at fine scale
- Can function as an alternative zoom
 - ▣ Allow user to to drag the rectangle over them or pan the area in the locator map



Islamic State presence

○ Islamic State controlled city

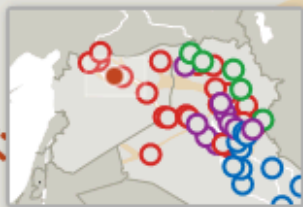
○ Kurd controlled city

○ Contested city

○ Iraqi controlled city

Map Overview

Back To Beginning ↶



الخير دولة الإسلام

@greyadnaq

Follow

ولاية حلب مسكنة اقامة حد السرقة على الاخ زكريا
بعد ان اقر على نفسه بالسرقة وهو ايضا طلب ان
تقطع يده تطهيرا لذنبه

pic.twitter.com/Alvs3MrkQV

View transition

Reply Retweet Favorite Quote Share



RETWEETS
197

FAVORITES
49



Twitter screengrab

AMPUTATION IN MASHKANAH

The extremist group live-tweeted an amputation of a hand from the Twitter account of an Islamic State supporter. The account has since been suspended, but it had 96,000 followers at the time.

Menu design

- So many styles of menus: drop-down, horizontal, vertical, icon-based, text-based, interactive
- Map users should instinctively know where to go to look for information

Menu design in 4 easy steps!

- Step 1. Organize your menus
 - ▣ Take all functionality of your map (not addressed by elements) and organize into groups
- Step 2. Design your menus
 - ▣ Readily accessible, intuitive, don't take away from map
- Step 3. Conduct user tests
- Step 4. Reorganize your menus

Smart legends

- Purpose of the legend remains unchanged
- Design your legend with a purpose
 - ▣ What does it NEED to show?
 - ▣ How can this data be displayed clearly?
 - ▣ Is the effectiveness of your map communication enhanced or diminished by allowing the map user to interact with the legend?

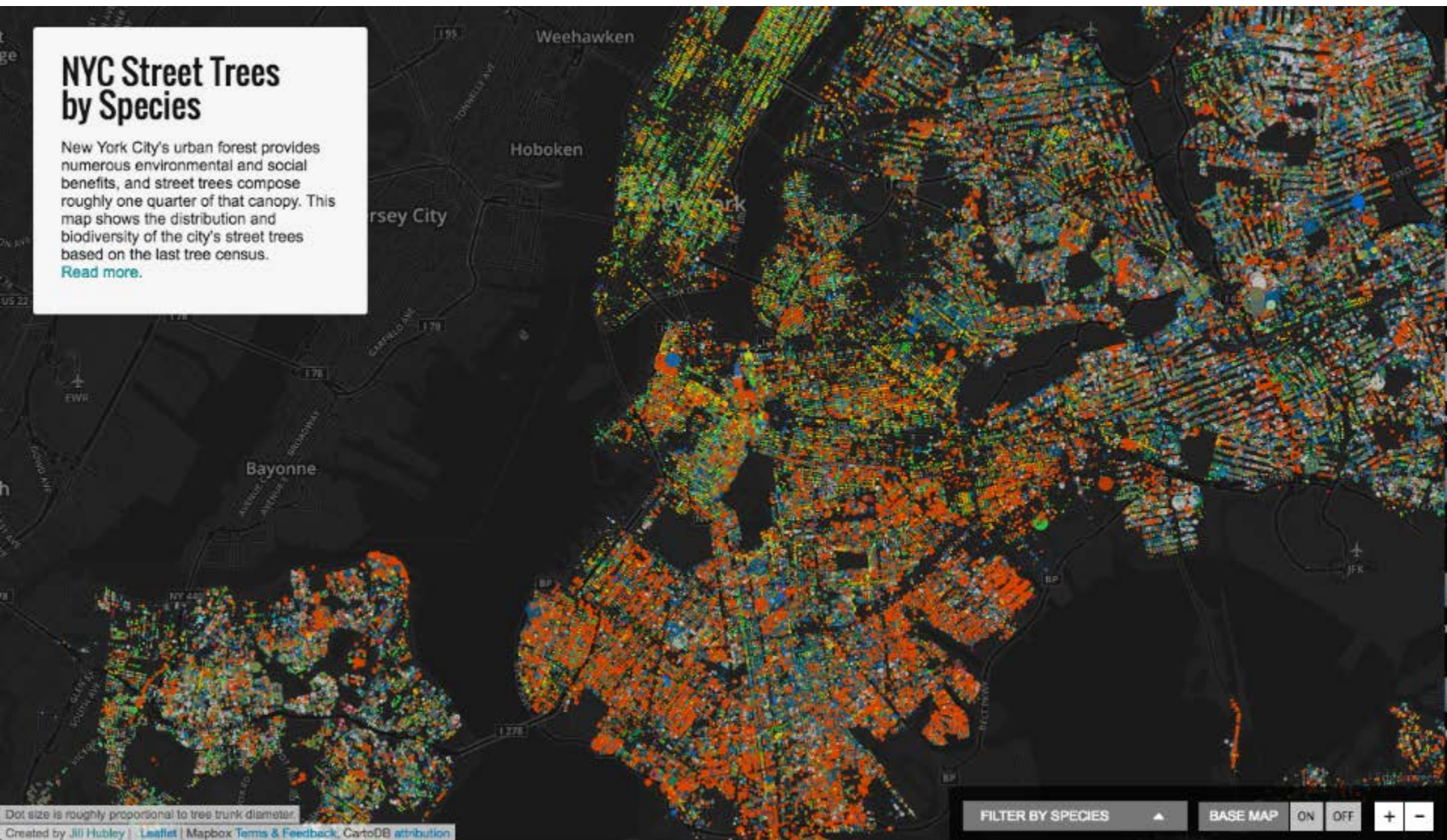
Smart legends

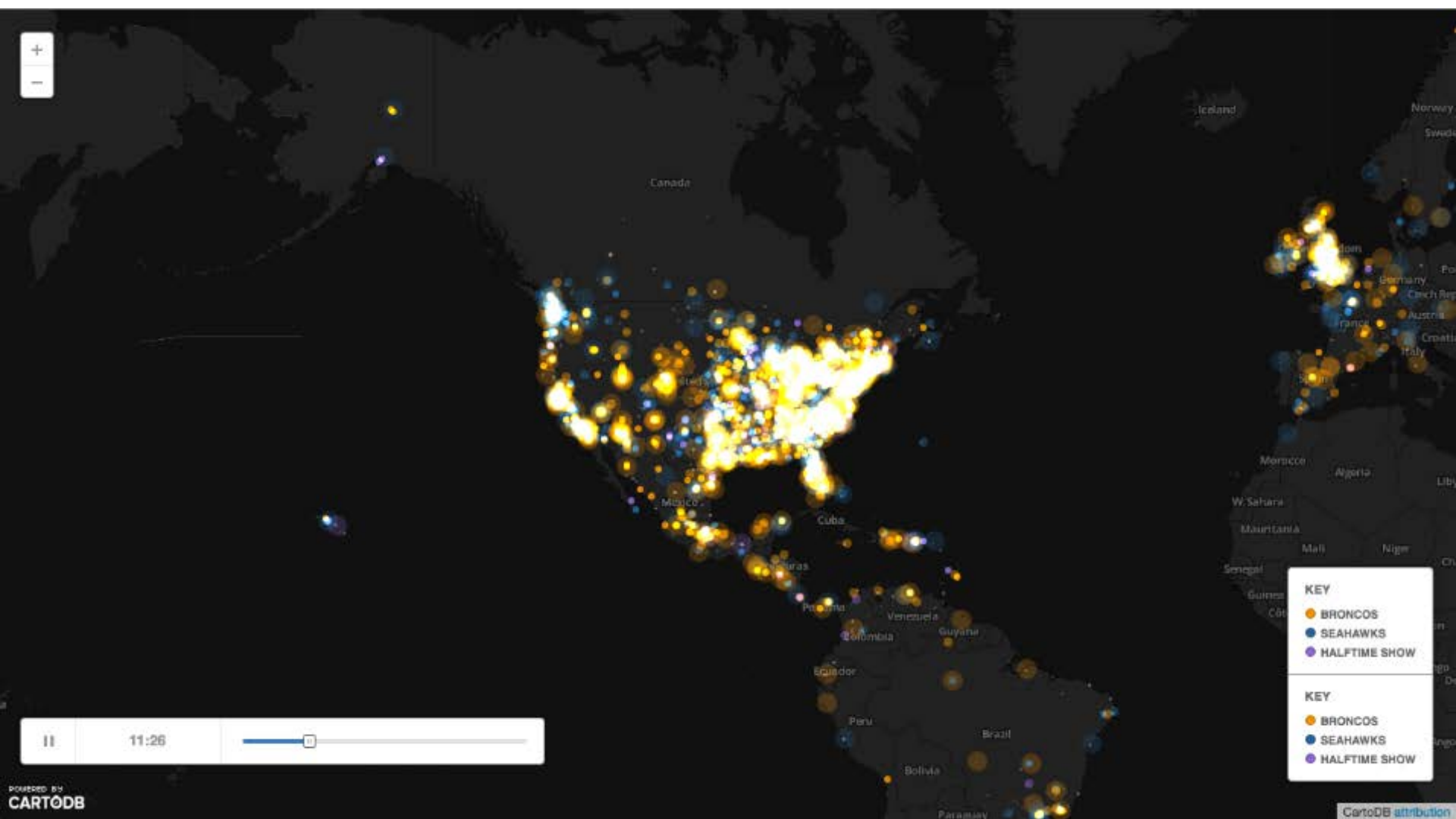
- Having options makes users feel in control
- Highlight or add more data in form of layers
- Less can be more – some people prefer less information
- Can provide a place for users to select what type of visualization they prefer
- Temporal legends are necessary with animations

NYC Street Trees by Species

New York City's urban forest provides numerous environmental and social benefits, and street trees compose roughly one quarter of that canopy. This map shows the distribution and biodiversity of the city's street trees based on the last tree census.

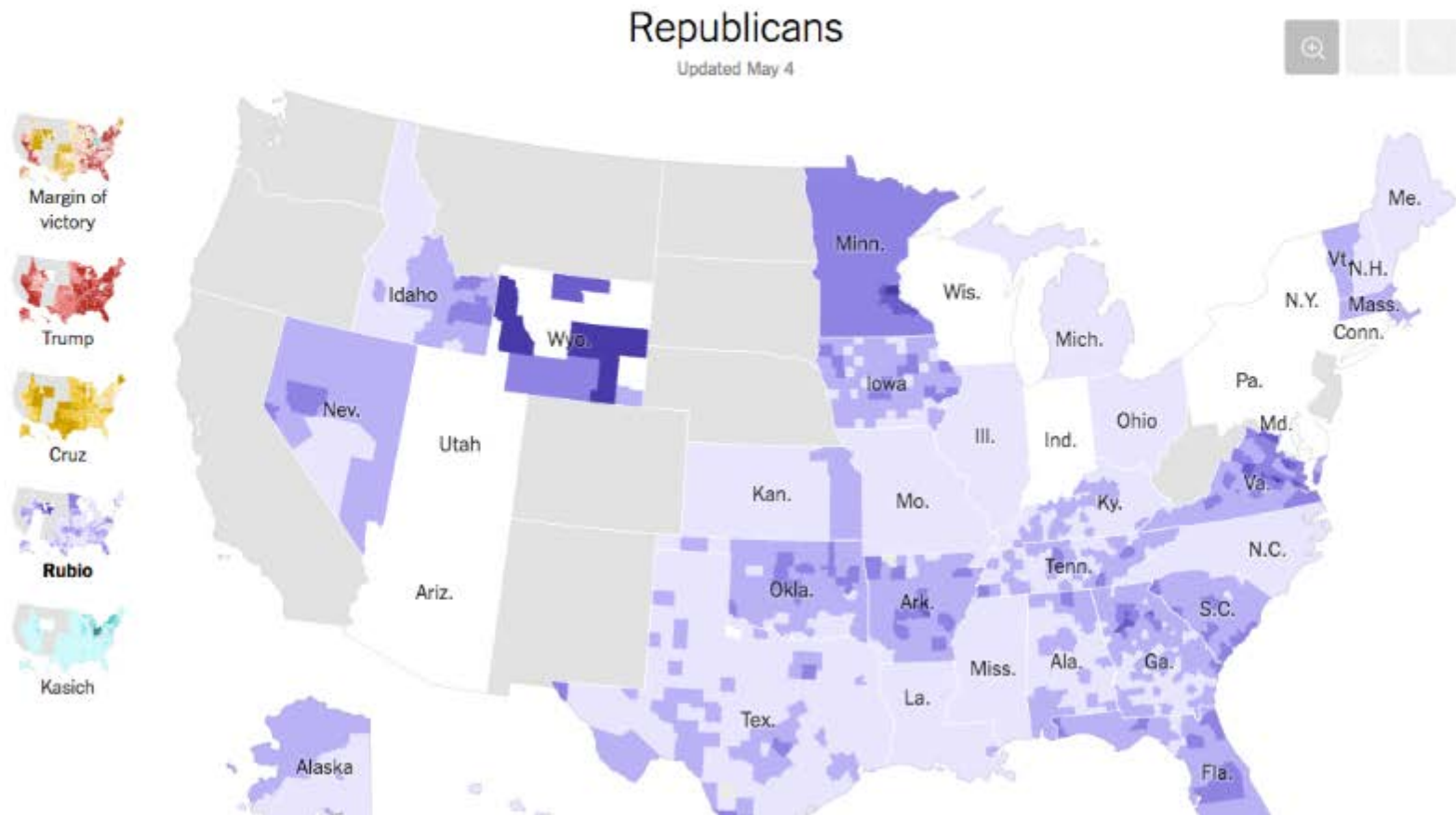
[Read more.](#)





http://srogers.cartodb.com/viz/1b9b0670-8d15-11e3-8ddf-0edd25b1ac90/embed_map

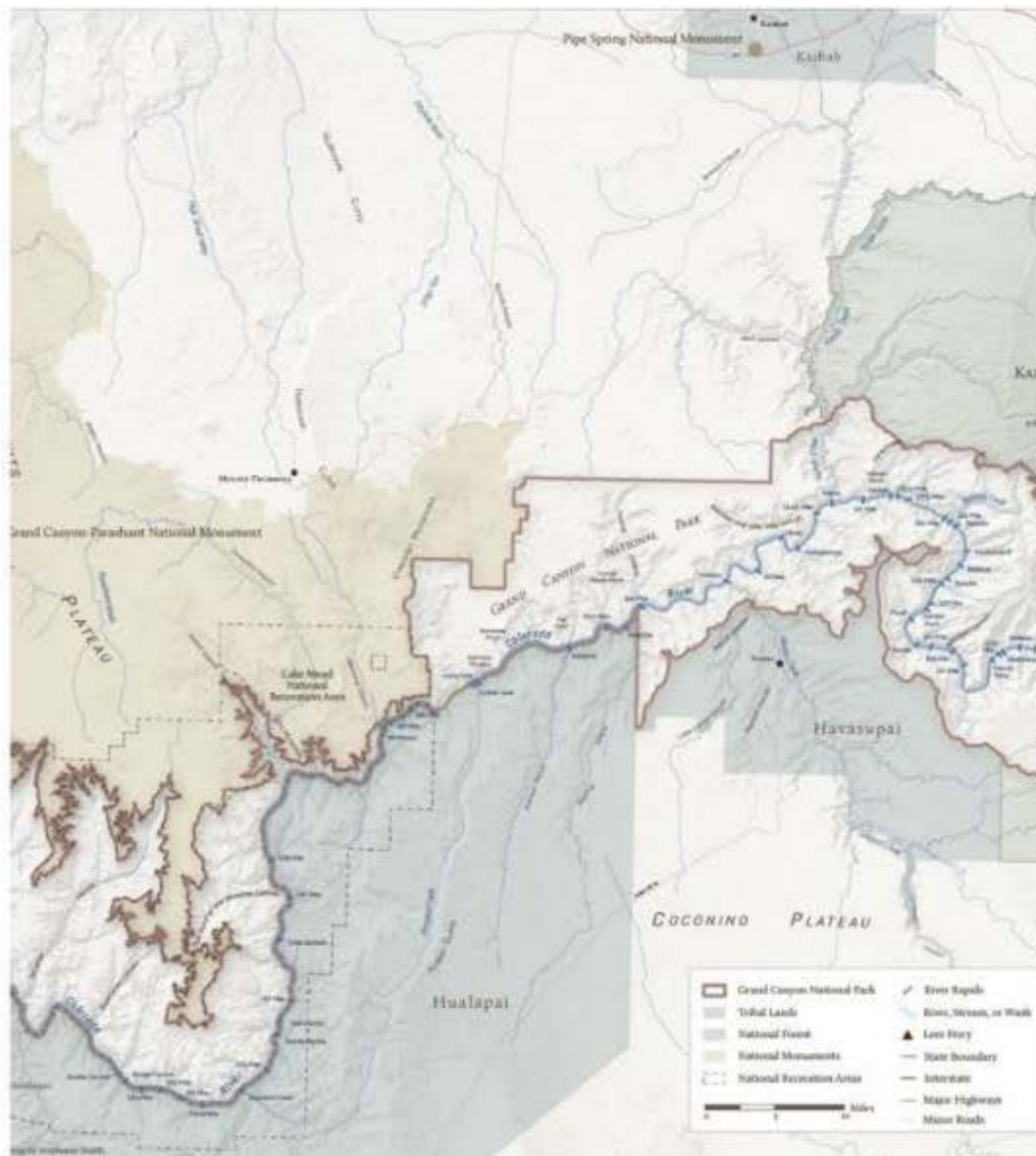
Detailed Maps of Where Trump, Cruz, Clinton and Sanders Have Won



<http://www.nytimes.com/elections/2016/national-results-map>

Other elements

- Multimedia graphics
 - ▣ A web map is multimedia
- Images
- Videos
- Graphs / charts



GRAND CANYON
TRUST

Keep the Canyon Grand

A Canyon Home

“Grand Canyon is my home, the home of my mother and father, my grandparents. We share this powerful place, this river and canyon, with all the world, but we understand how it was, before the scientists. It was our home before it was a national park.”
— Dianna Sue, Havasupai Tribe

Hopi guides first led Spanish conquistadors to the edge of the Grand Canyon in 1540. These conquistadors found it worthless for colonial purposes and promptly left. But indifference toward the canyon soon morphed into a national obsession, attracting dreamers, schemers, and adventurers of all stripes, along with visitors and pilgrims from around the world. Over five million tourists now visit the Grand Canyon each year.

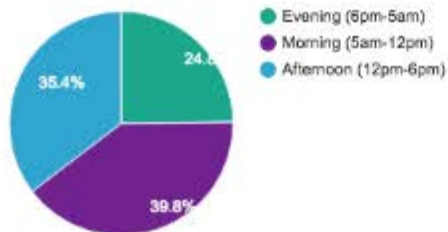




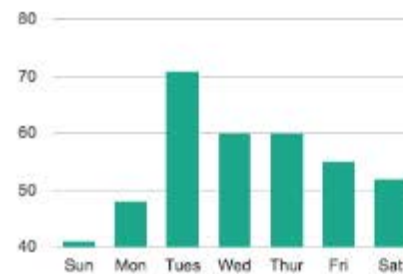
Enter Start Address Enter End Address

Crashes Speed Zone **387 crashes** Charts About

Crashes by Time Of Day



Crashes by Day of Week



Interactive map design elements

- Layout & map composition
- Color
- Typography
- Core visual variables
- Symbolization
- Thematic visualization
- Animation
- Sounds & touch