Infographics in the Classroom: Using Data Visualization to Engage in Scientific Practices

Activity 3: Data Graphic Critique

1. Reflecting on all the graphics seen in Activity 1 and 2, do a quick write about which graphic was their favorite and why? Encourage them to think beyond "I was interested in the subject"
2. In a group, have students share their opinions and create a list of what makes a good graphic.
3. Make master list of the classes ideas.
4. Introduce graphic principles created by Academy experts. How are they similar? How are they different from the class generated list?
5. Using the graphics from Activity 1 and 2, assign each pair of students one of the graphic principles from the Academy list or their own. Give each pair one red post-it and one blue post-it (have them write their principle on each) next have them decide on which graphic successfully uses the principle and which graphic might need some work.
6. Hand out the worksheet and a new graphic. Explain that they will be critiquing this graphic as homework.
7. The next day, have students find 1-2 others who critiqued the same graphic. Have them compare notes on how successfully the graphic met the different principles of what makes a good graphic.
8. Have student pairs/groups put together a small poster (like in Activity 1) to show what the main ideas are and how well they met the graphic principles

Infographics used:

- Nancy Gibbs, Where we Live, Time Magazine, http://www.truthistreason.net/wp-content/uploads/2010/04/infographic_us_population_large.jpg
- David MacCandless, Scale of Devestation, from Visual Miscellanuem http://www.informationisbeautiful.net/visualizations/scale-of-devastation/
- Philippe Rekacewicz, World Resources Institute, http://visual.ly/diversity-species
- National Geographic, Food for Thought, http://visual.ly/food-thought
- Meredith Darlington, Mother Nature Network, http://www.mnn.com/earth-matters/animals/stories/infographic-top-20-countries-with-most-endangered-species
- Stanford Kay, Global Carbon Emissions, http://www.stanfordkaystudio.com/information.html

Activity 3
Data Graphic Critique

CALIFORNIA ACADEMY OF SCIENCES

Name _____

Date _____

Title of Graphic _____

1. What ideas or pieces of information does the author present?

2. Identify the central idea(s) told in the graphic. What story does it tell?

3. Describe how the author represents data in the graphic? (Ex. Using color to differentiate two things.)	4. What questions do you have about the graphic? What confuses you?
» » » »	

5. Critique the graphic using the list of *Graphic Principles for Visualizing Scientific Data*.

» Does this graphic **impart only one to two key messages**? Explain your answer.

» Does **everything on the graphic have a reason for being there**? Explain your answer.

» Does the graphic **keep it accurate**? Explain your answer.

» Does the graphic **represent the numbers fairly**? Explain your answer.

» Does the graphic **blow them away**? Explain your answer.

Graphic Principles of Visualizing Scientific Data

CALIFORNIA ACADEMY OF SCIENCES

Name _____

Date _____

1. Keep it simple.

A. Aim to impart one or two key messages.

» Did you highlight key patterns that seem to have meaning in the real world?
» Can your viewers summarize your message(s) in a single sentence?
» Try to impart something your audience will be drawn to, remember, and share. Know your audience.

B. Everything on your graphic should have a reason for being there.

» Pretend ink is expensive, so use as little as possible to tell your story.
» Use color to reinforce your message, not solely for design.
» Use basic, intuitive representations.
» Don't include unnecessary dimensions of data (time, space, feature, etc.).

2. Tell the truth.

A. Keep it accurate.

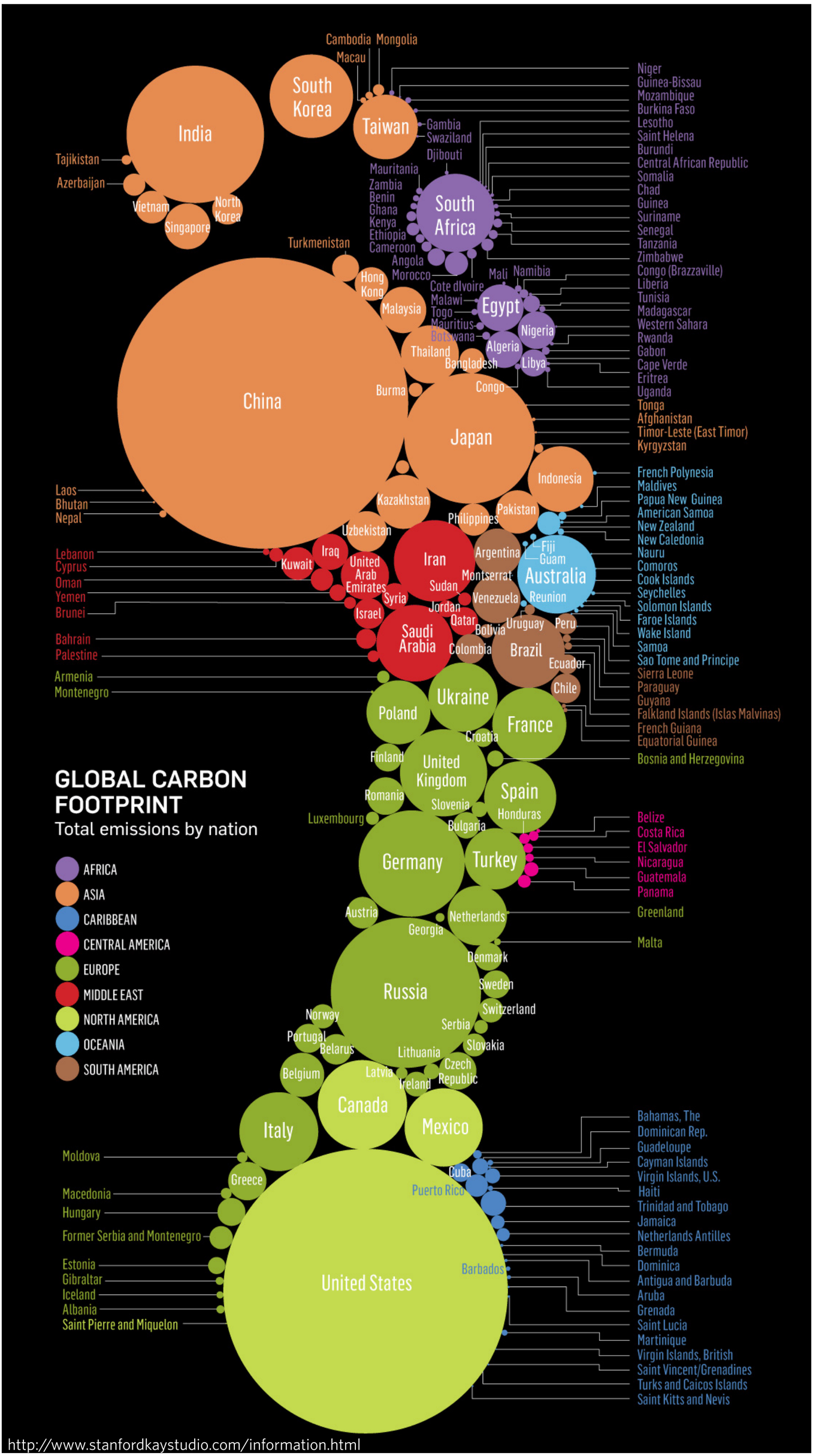
» Did you pull the numbers correctly?
» Keep in mind where your data came from. How was it collected? Context is essential.
» Did you cite your data sources?
» Use labels to eliminate ambiguity.

B. Be fair.

» Choose your statistics wisely. Mean/averages, medians, and percentages tell different stories.
» Did you represent the numbers and scale accurately? Make things proportional and appropriate to the numbers.
» Are you comparing like things (similar attribute, dimension, time scale, etc.)?
» Dots, lines, area, and volume convey different messages. Consider carefully which you will use.
» Be aware of ways your graphic could be misinterpreted. Do your graphs show what you think they show? (Challenge yourself to reinterpret your graphic.)

3. Blow them away.

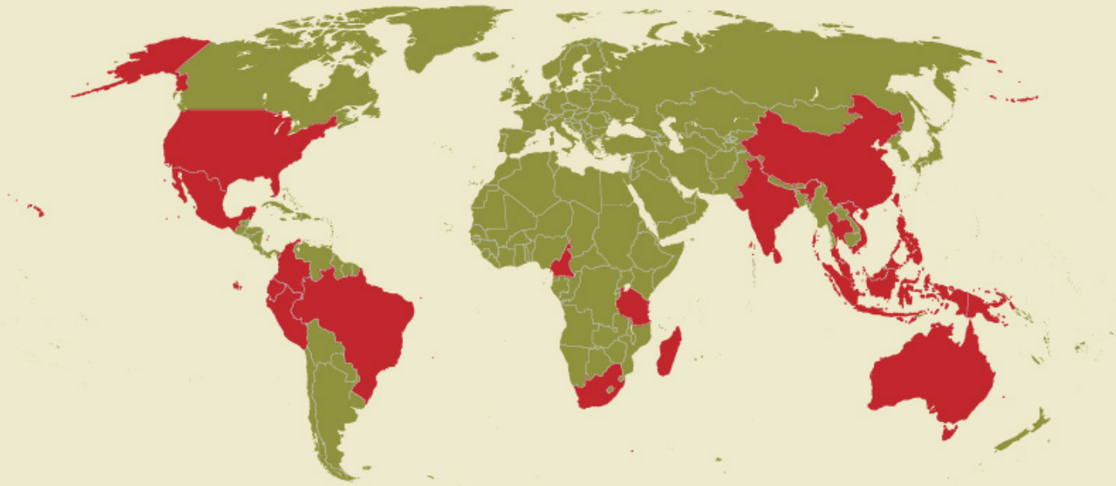
» Draw them in with interesting, innovative design.
» Shake up traditional charts, graphs, maps, etc.
» Draw viewers' attention to the substance of the graphic.
» Show data variation, not design variation.



http://www.stanfordkaystudio.com/information.html

ENDANGERED SPECIES

About 900 species of plants and animals have gone extinct in the last five centuries, and more than 10,000 others are now on the verge of joining them. Here's a look at some of the countries with the greatest potential for both disaster and improvement.



TOP 10 COUNTRIES

each icon = 10 species

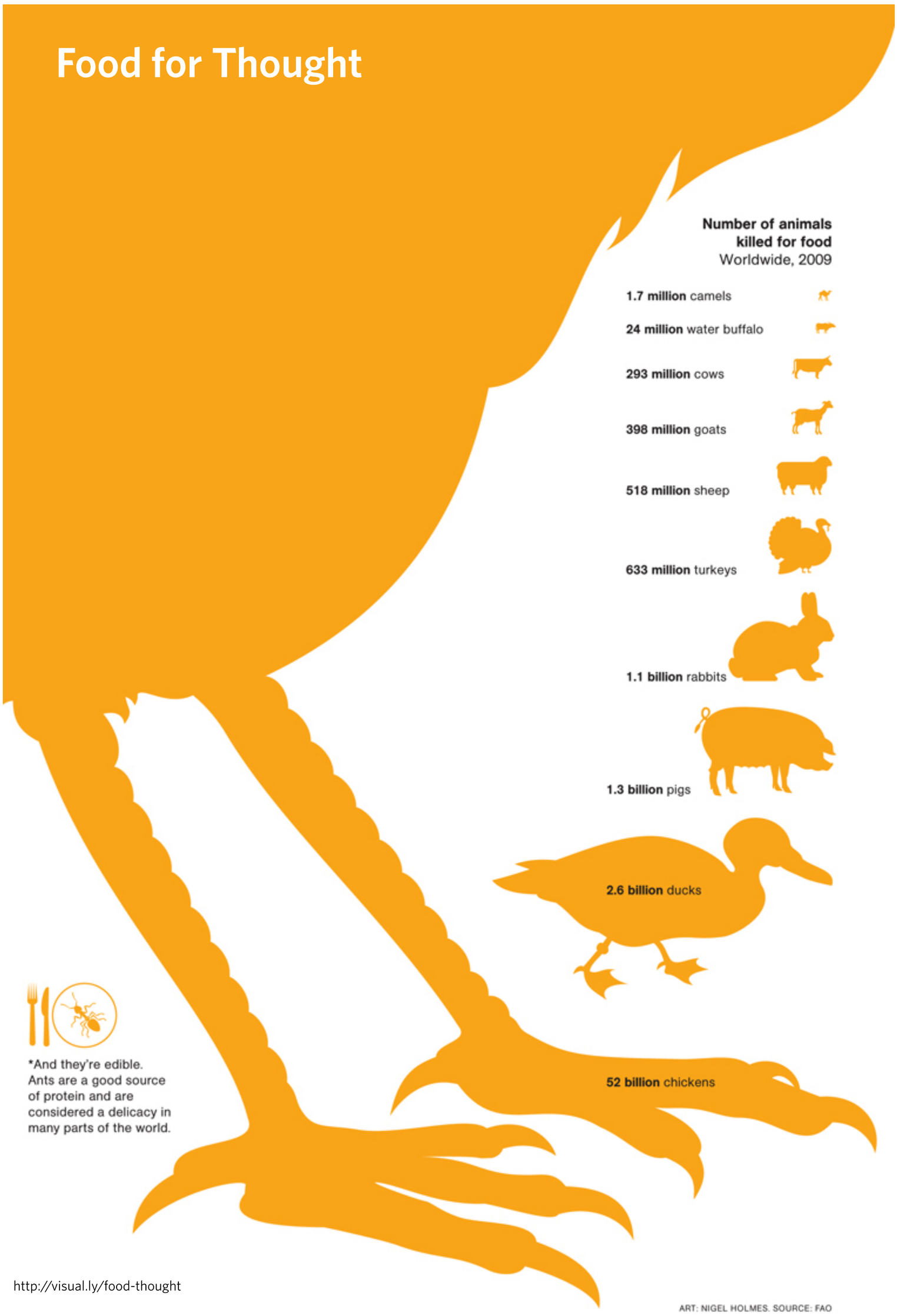
country	mammals	birds	reptiles	amphibians	fish	mollusks
Ecuador 2,211 total species	10	10	1	20	1	4
United States 1,203 total species	10	10	3	10	20	20
Malaysia 1,166 total species	10	5	2	10	4	3
Indonesia 1,126 total species	20	10	3	5	10	1
Mexico 900 total species	10	5	10	20	10	1
China 841 total species	10	10	3	10	5	1
Australia 804 total species	10	5	4	5	5	15
Brazil 769 total species	10	10	2	5	5	2
India 687 total species	10	5	2	10	3	1
Philippines 682 total species	4	5	4	10	4	1

Sources: IUCN Red List of Threatened Species 2009, 2009 State of Birds report, WWF, Bloomberg, PBS

Infographic: Meredith Darlington/MNN

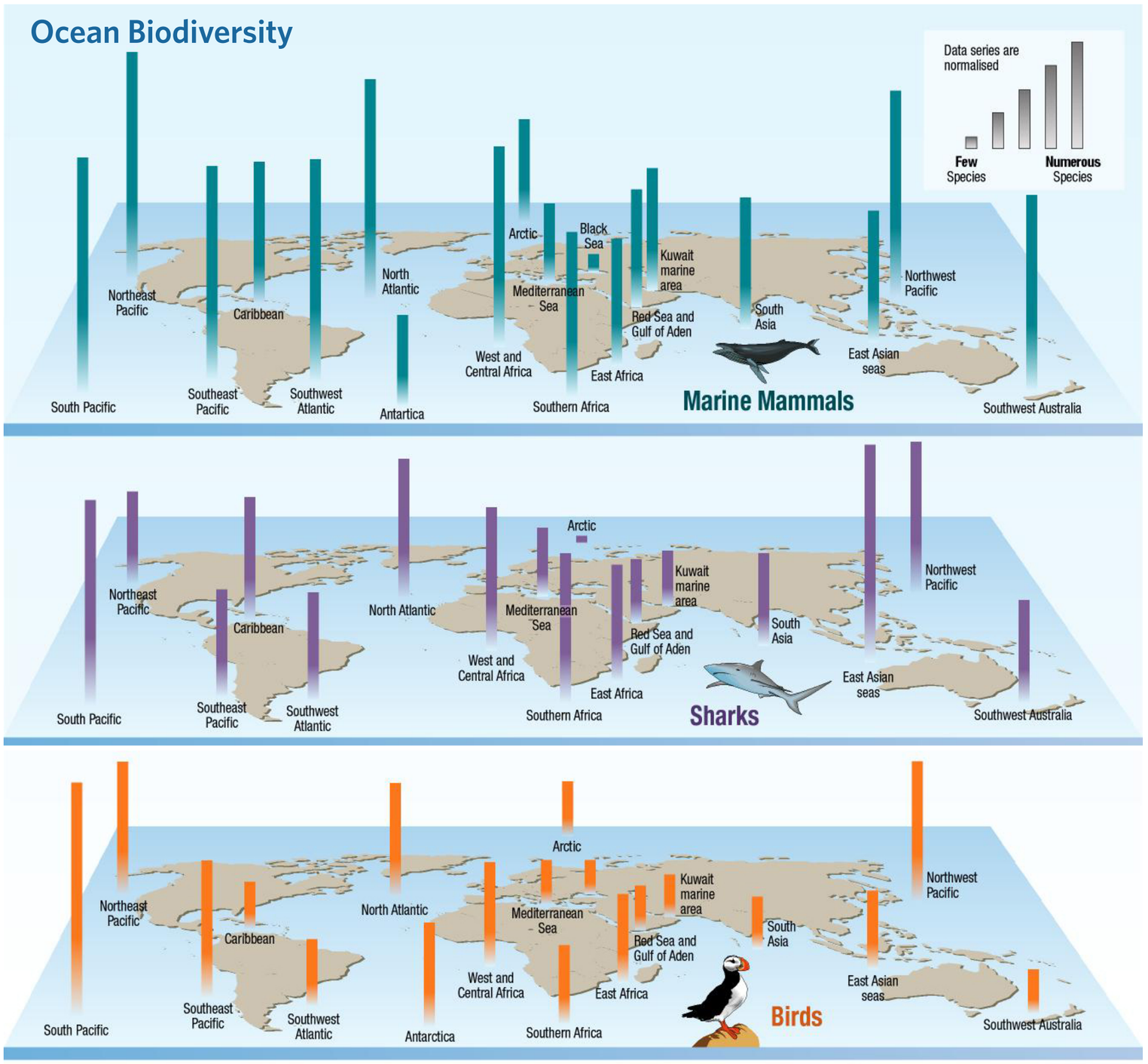
http://www.mnn.com/earth-matters/animals/stories/infographic-top-20-countries-with-most-endangered-species

Food for Thought



http://visual.ly/food-thought

ART: NIGEL HOLMES. SOURCE: FAO



Note: Data have been modified to show the species diversity of each region as a fraction of the most species rich region. The maximum number of marine mammals species in a region is 52, sharks 140, molluscs 1114, birds 115, and shrimps and lobsters: 210.
Source: World Resources Institute (WRI), Washington DC, 1998, based on data from UNEP-WCMC.

http://www.grida.no/graphic.aspx?f=series/vg-water2/0301-diversity-EN.jpg

Exxon Valdez oil spill
28,000 km²

Deep Water Horizon oil spill
5,750 km²

Amazon rainforest depletion yearly
6,400 km²

Forest loss Indonesia yearly
5,900 km²

Arable land destroyed by 2010 Russian heatwave
114,500 km²

Wildfires during 2010 Russian heatwave
8,800 km²

Chernobyl exclusion zone
1,300 km²

United Kingdom surface area
242,000 km²

Haiti earthquake 2010
13,000 km²

Chile earthquake 2010
300,000 km²

New Zealand earthquake 2011
5,800 km²

Japanese earthquake 2011
140,000 km²

earthquake areas experiencing at least 'strong' shaking

Thailand floods 2011
60,000 km²

Pakistan floods 2010
114,500 km²

Australian floods 2010
850,000 km²

Scale of Devastation

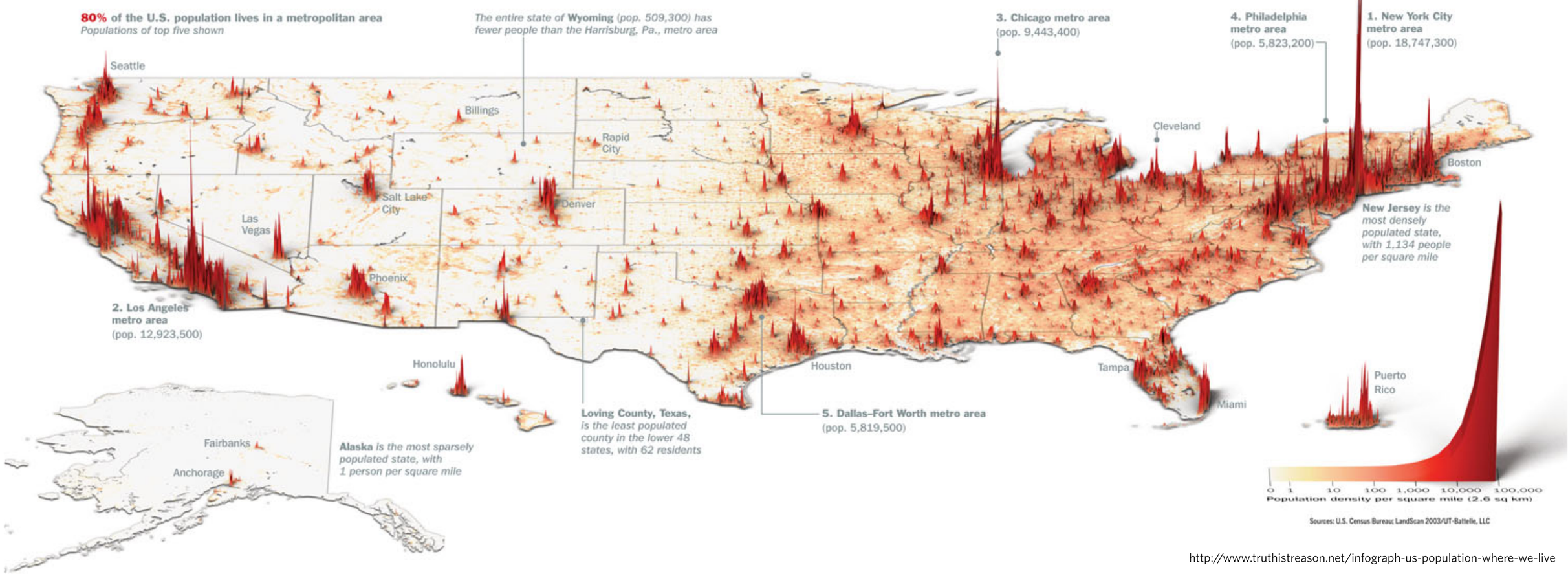
square kilometers

David McCandless & Miriam Quick // InformationIsBeautiful.net

sources: USGS, ScienceDirect, Wikipedia //data: bit.ly/scalesdev

Where We Live…

Unlike many developed countries, the U.S. keeps growing. We are also moving south and west. But compared with China or India, the nation is a vast prairie



http://www.truthistreason.net/infograph-us-population-where-we-live