IMPROVING SCIENCE COMMUNICATION WITH INFOGRAPHICS
The key to any visual design is the presentation of a cohesive, structured, readable, and understandable composition.
GOOD VISUALIZATIONS…

1. They show good information correctly
2. They attract readers’ attention
3. They don’t frustrate readers
4. They show the right amount of data
THESE ARE NOT INFOGRAPHICS
THE COFFEE FACTS

THE BEAN BELT
All of the world's coffee grows here

COMMONLY USED BEANS
ARABICA vs ROBUSTA

65% OF COFFEE CONSUMPTION TAKES PLACE DURING BREAKFAST HOURS

POPULAR BREWING METHODS

2ND MOST POPULAR DRINK IN THE WORLD AFTER WATER

THE MOST EXPENSIVE COFFEE IN THE WORLD "KOPi LUWAK"

IT SELLs FOR MORE THAN $600 A POUND MAKING IT A CUP OF COFFEE

SEPTEMBER 29TH IS NATIONAL COFFEE DAY IN THE UNITED STATES

THESE ARE DATA DUMPS
THESE ARE INFOGRAPHICS
THESE ARE DATA VISUALIZATIONS
NATIONAL SYMBOLS ENDANGERED

A person’s national identity can be tied to not only the state or nation they belong to, but to a symbol which represents and embodies the nation’s people, values, goals, or history. The national animal or plant is a symbol of that identity, selected for holding cultural, historical, economic, and/or religious significance. However, the threat to a nation’s animal symbol may be under threat due to human population growth.

SYMBOLS PER REGION

There are 258 U.S. federal National Symbols listed in 39 states and territories. Some are flora, such as the Arizona State Tree, the California State Tree, and the Pennsylvania State Tree. However, many states lack a national animal.

SYMBOLS IN DANGER

The data shows that the poorest “heritage” being protected and revered is its symbols (i.e., national symbols) are facing severe threats including habitat loss, climate change, pollution, and nutrient pollution. In fact, over half of the traditional wildlife populations are reported to be at risk of extinction, and almost half of the remaining species are at risk of extinction.

TYPES OF ANIMALS

The most common type of endangered symbols is birds, followed by mammals. These include large, charismatic megafauna such as the grizzly bear and species extinctions.

PRIMARY THREATS

Poverty and habitat loss are the most significant threats to national symbols. The total estimated number of threatened species is 1,500, with over 800 species being critically endangered.

NATIONAL PROTECTION

The Nature Conservancy tracks the status of national symbols and their protection status using a risk-based approach.

HIRAM HENRIQUEZ  UNIVERSITY OF MIAMI
MIAMI HERALD
AUG. 17, 2013

ORIGINAL STORY ONLINE HITS

From August 16 to September 19, 2013

7,058 people viewed the original story online (without a graphic).
Avulnerable 
Lake Okeechobee

How damage occurs
Water moves through cracks and porosity in the dike, creating areas where water can enter, causing the dike to sink. Swell and water pressure from the rise of the water on the lake can potentially generate a breach or hole. A Hurricane's impact on the lake can dramatically increase the flow.

First efforts to repair the dike
In January, the Corps finished the first wave of slope stabilization by building a concrete wall along the eastern and western edges of the lake. The dike is a critical element to protect the lake from overtopping.

Secondary measures to prevent future incidents
The Corps is implementing a comprehensive multi-year plan that includes monitoring, inspection, and repair of the dike to ensure its safety and integrity.
A vulnerable Lake Okeechobee

Florida’s Lake Okeechobee ranks second by the International Hurricane Research Center in a list of U.S. mainland areas most vulnerable to hurricanes. Reports indicate that the lake’s Herbert Hoover Dike is susceptible to failure caused by water seepage and piping at high water levels whether by long-term changes due to rainfall or by hurricane events.

How damage occurs

First efforts to repair the dike

A potential for flooding

Secondary measures: Revamping culverts


Reporting: Curtis Morgan  Graphic: Hiram Henriquez (Special for the Herald)  Interactive: Marco A. Ruiz / Miami Herald Staff


From September 20 to October 31

13,670 people viewed the graphic at the story level

(52 people viewed the standalone PDF)
Visualization can have multiple purposes and use different styles.
SOUTH FLORIDA & PHOSPHORUS
A Catastrophe in the Making

Florida, in 1900

Florida's development began with the state's population growing rapidly due to its warm climate and beautiful beaches. The state's economy was driven by agriculture, particularly citrus and tobacco, and the growth of cities like Miami and St. Petersburg. The state's natural resources, including its beaches and natural beauty, attracted tourists and developers.

Urban Sprawl, Farming

Since the 1960s, much of the Everglades has been channelled for agricultural land development. Economic prosperity and the demand for food has led to the conversion of the wetlands to farmland. The Florida land room of the 1980s brought about the expansion of urban development, placing the landscape under the construction of manmade canals and removal of many natural waterways.

Cleaning the Water

Most of the pollutants are discharged untreated into and out of the lake, eventually rising up into the air and entering the environment. Water in the Everglades is not treated, and can contain pathogenic bacteria, fungi, and other contaminants. The majority of these impurities are discharged directly into the lake, leading to the pollution of the water bodies and the loss of natural habitat.

Development of urban and farming areas has increased movement of water as well as decrease of aquifer recharge.
Affecting Water Quality

**PHOSPHORUS AMOUNTS FROM NATURAL SOURCES**

- Wildlife
- Periphyton
- Phytoplankton
- Neon & Salt Limestone

In normal amounts, phosphorus helps grow periphyton, a complex mixture of algae, cyanobacteria, microbes, and detritus that attaches to submerged surfaces in most aquatic ecosystems.

**TWO MUCH PHOSPHORUS FROM UNNATURAL SOURCES**

- Sunlight diminished
- Oxygen depleted
- Green algae
- Dead fish
- Peat Degradation
- Limestone

With too much phosphorus, green algae covers the water table, blocking important sunlight and oxygen for sustaining life under water.

**3D ILLUSTRATIONS**

- Cattail
- Green Algae
- Small fish and invertebrates
- Peat Degradation
- Limestone

The Everglades food cycle is broken as large fish are unavailable as a food source for the birds that are attracted by them, altering the landscape forever.
MORE EXAMPLES
THE NORTH AMERICAN BISON
A New National Symbol

The National Bison Legacy Act, passed in late April by the U.S. House of Representatives, aims to honor the North American bison as the national mammal of the United States. It must now get Senate approval before heading to the President’s desk for his signature, bringing the iconic animal one step closer to receiving the recognition many groups have pushed for.

FAST FACTS
- Population: Estimated 545,000
- Height: 6.6-8.5 feet at the shoulder
- Length: 10-12.5 feet
- Weight: 900–2,000 lbs.
- Vertical jump: 6 feet
- Running speed: 25–40 mph
- Lifespan: 18–22 years (wild); over 30 years (captivity)
- Mating Season: June–September
- Gestation: 270–285 days
- Calves born April–May
- litter size: 1 calf

HISTORY & RANGE
Though it once grazed the plains of most of the U.S., in the millions, the population dwindled to a little over a thousand at the turn of the 20th century. Its decline coincided in large part with its mass slaughter during the years of the nation’s westward expansion.

- Pre-1800s range (100 million)
- 1840 (3.6 million)
- 1870 (2.5 million)
- 1890 (750,000)
- 2003 (est. 545,000)

A SLOW RETURN
Through preservation efforts, the bison was slowly reintroduced to the wild. An estimated 545,000 bison now exist across all 50 states and contribute to a multi-million dollar sector of American agriculture.

TWO TYPES
- Largest pop of wild bison: 4,000
  Wood Bison National Park
  In Public Lands 30,000
  Free-Ranging 15,000
  In Private Lands 465,000

- Largest pop of plains bison: 10,000
  Yellowstone National Park
  In Public Lands 15,000
  In Private Lands 10,000

Although ecologically extinct throughout most of their historic range, the remaining two roam private lands, national parks and small wildlife areas.
The fact that we’re willing to move four tons of earth for a single barrel really shows that the world is running out of easy oil.

—Banner Oiler, Pembina Institute

The Alberta government estimates that the province’s three main oil sands deposits, of which the Athabasca one is the largest, contain 173 billion barrels of oil that are economically recoverable today. “The size of that, on the world stage—it’s massive,” says Rick George, CEO of Suncor, which opened the first mine on the Athabasca River in 1967. In 2003, when the Oil & Gas Journal added the Alberta oil sands to its list of proven reserves, it immediately propelled Canada to second place, behind Saudi Arabia, among oil-producing nations. The proven reserves in the oil sands are eight times those of the entire U.S. “And that number will do nothing but go up,” says George. The Alberta Energy Resources and Conservation Board estimates that more than 300 billion barrels may one day be recoverable from the oil sands; it puts the total size of the deposit at 1.7 trillion barrels.

Getting oil from oil sands is simple but not easy. The giant electric shovels that rule the...

Black Gold Too Deep to Mine

About 80 percent of the bitumen potentially recoverable from Canada’s oil sands is in deposits deeper than 200 feet, requiring more energy to extract than bitumen from surface mines. Injecting steam into wells and upgrading the bitumen consumes vast amounts of water and natural gas.

Oil sands production uses enough natural gas daily to heat more than 3 million homes.

To extract oil in situ, pipelines take core samples of oil deposits as deep as 1,500 feet from the ground and place them into oil sands. One well (1) injecting steam melts the bitumen. Steam crosses the front (2) from toward the bottom recover’s well (2), which central booster station (3) to the surface (3).
A push to drill

Unless Congress acts, the Bush administration will allow oil and gas exploration as close as 100 miles to Florida's coast in July 2007.
CONSERVING THE SOUTHERN RESIDENT KILLER WHALES

NOAA Fisheries will soon include Lolita, Miami Seaquarium’s killer whale, in the endangered species listing for Southern Resident Killer Whales that spend much of the year in the inland waters of Washington and British Columbia. Their population was depleted between 1965 and 1974 because of captures conducted for marine parks, and their numbers remain low due to environmental factors such as pollution, oil spills and noise from passing vessels.

**ORCA ORCA**
- Length: Up to 32 feet
- Weight: Up to 10 tons
- Speed: 35 mph
- Lifespan: 29 yrs (male), 50 yrs (female)

**APEX PREDATORS**
Killer whales feed on other whales, seals and sea lions, salmon, and seabirds. They are the only large marine mammals that can hunt in a coordinated way to catch their prey.

**SOUTHERN RESIDENT KILLER WHALE POPULATION IN THE WILD**

**KILLER WHALES IN CAPTIVITY: 2010**
- USA: 25 (71% died)
- Japan: 4
- Spain: 2
- Canada: 4

**CRITICAL HABITAT**
Blue whales, humpbacks, and fin whales, the Southern Resident population can be found in the inland waters off Puget Sound and nearby rivers, in the winter, they travel along the entire coast of the southern Puget Sound, California.