

Quality Metadata and The National Climate Assessment

Sarah Champion
Data Architect

Technical Support Unit for the National Climate Assessment

Overview

- Background
- Measuring the Quality of NCA Metadata
 - Compliance w/ Government Mandates
 - User Friendly Tools
 - Actionable Output
 - Next Steps



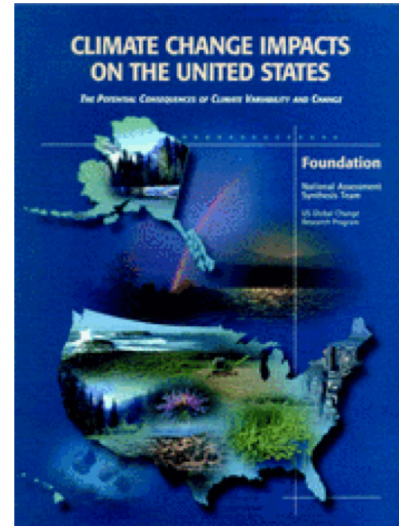
Background: The National Climate Assessment

- Global Change Research Act of 1990
- Requires a state-of-the-science assessment of climate impacts and trends for U.S. regions and sectors every four years
- Aims to inform decision and policy-making stakeholders
- Part of a Sustained Assessment process



Background: The National Climate Assessment

- First National Climate Assessment (2000)
 - Second National Climate Assessment (2009)
-
- Third National Climate Assessment (2014)
 - The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (CHA) (2016)
 - NOAA's State Climate Summaries (2017)
 - Climate Science Special Report (CSSR) (NCA4 Vol. I) (2017)
 - Fourth National Climate Assessment (NCA4 Vol. II) (2018)



Measuring Quality

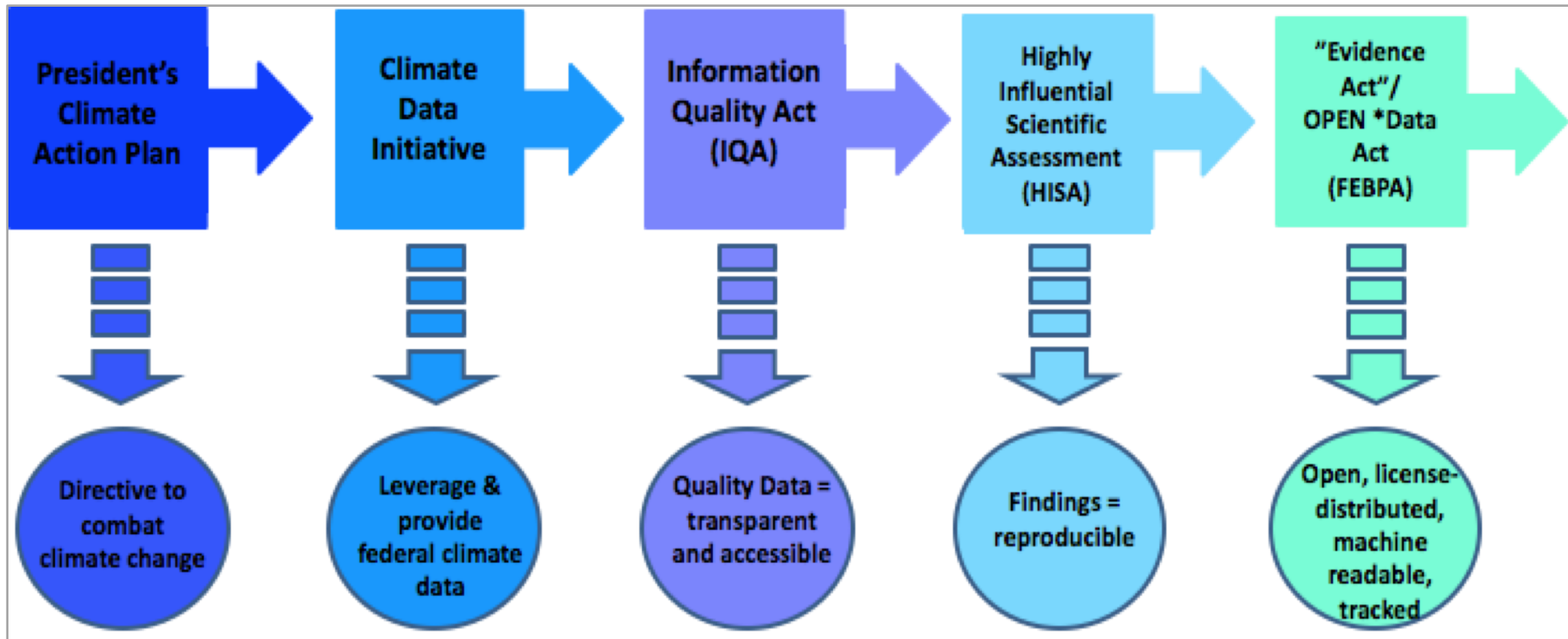


**Compliance w/
Government
Mandates**



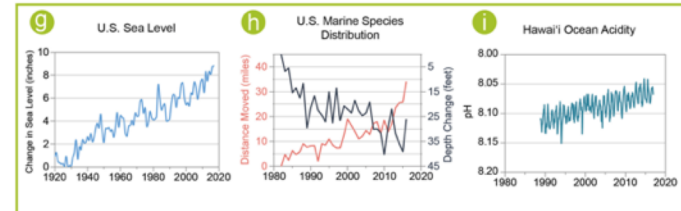
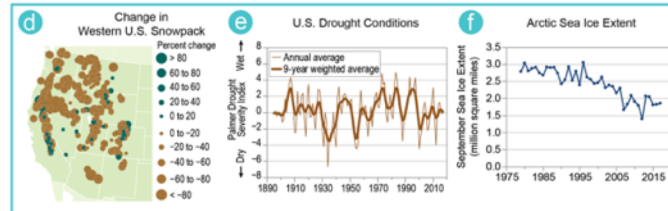
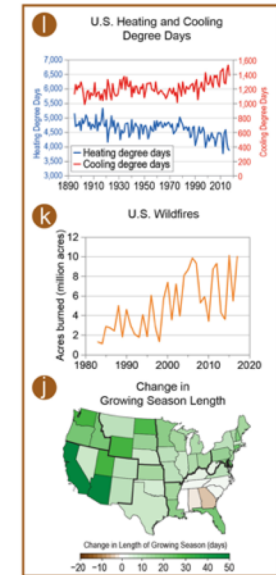
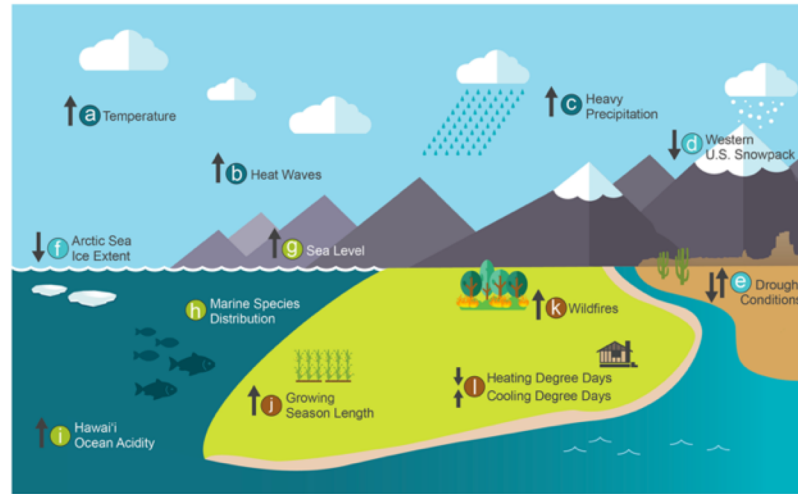
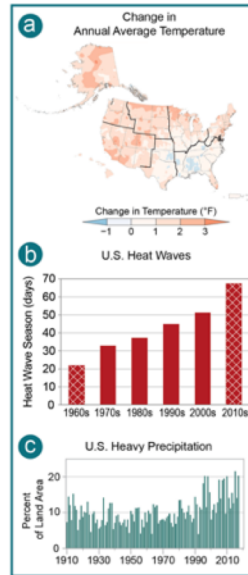
**User
Friendly
Tools**

Measuring Quality: Government Mandates



Measuring Quality: User Friendly Tools

User
Friendly
Tools





Measuring Quality: User Friendly Tools

User Friendly Tools

1.2 Indicators of Change Overview

[Back to Overview/Graphics](#) [Admin](#) [Images](#) [Basic](#) [Additional](#) [Log](#) [GCIS](#)



1 Figure Overview

2 Figure Origin

Figure Overview ?

What is the title for this figure?*

Indicators of Change

Keywords ?

Click to select keywords.

Tree Search Clear Select

Science Keywords

EARTH SCIENCE SERVICES

+ DATA ANALYSIS AND VISUALIZATION

+ DATA MANAGEMENT/DATA HANDLING

+ EDUCATION/OUTREACH

+ ENVIRONMENTAL ADVISORIES

HAZARDS MANAGEMENT

DISASTER RECOVERY/RELIEF

DISASTER RESPONSE

EARTH HAZAR

EARTH TEMPE

EARTH DROUK

EARTH WAVE

EARTH

EARTH SCIENCE > CLIMATE INDICATORS > ATMOSPHERIC/OCEAN INDICATORS > EXTREME WEAT

EXTREME PRECIPITATION

EARTH SCIENCE > CLIMATE INDICATORS > ATMOSPHERIC/OCEAN INDICATORS > SEA LEVEL RISE

EARTH SCIENCE > CLIMATE INDICATORS > ATMOSPHERIC/OCEAN INDICATORS > TEMPERATURE

> COOLING DEGREE DAYS

EARTH SCIENCE > CLIMATE INDICATORS > ATMOSPHERIC/OCEAN INDICATORS > TEMPERATURE

> HEATING DEGREE DAYS

EARTH SCIENCE > CLIMATE INDICATORS > BIOSPHERI

INDICATORS > SPECIES MIGRATION

EARTH SCIENCE > CLIMATE INDICATORS > LAND

SURFACE/AGRICULTURE INDICATORS > LENGTH OF G

SEASON

EARTH SCIENCE > HUMAN DIMENSIONS > NATURAL F

> WILDFIRES

EARTH SCIENCE > OCEANS > OCEAN CHEMISTRY > PH

EARTH SCIENCE > OCEANS > SEA ICE

EARTH SCIENCE > TERRESTRIAL HYDROSPHERE > SNO

SNOW WATER EQUIVALENT

What is the creation date and

Click...

How many panels are associa

13 panels

Points of Contact ?

Name*

Michael Kolian

Email*

Kolian.Michael@epa.gov

+ Add Another Person

* Denotes required field

Panel 2 : U.S. Heat Waves

Swap panel Use Panel

Panel Title

Copy metadata to another panel Copy metadata from another panel

Enter a title for this panel:*

U.S. Heat Waves

Origination ?

Origination*

Original Creation for this Report

- Directly Cited: This figure appears exactly as it is published in another source. No changes or edits will be made in any way.
- Adapted: This figure appears in a previously published source, and the edits will change the overall message: e.g., changing the period of record, the type of display, removing or adding content.
- Redrawn: This figure appears in a previously published source, and the edits will not change the overall message, e.g., changing font appearance (size, color), changing colors, adding display features (borders, titles).
- Original Creation for this Report: This figure does not appear in any other previously published source, and was created explicitly for this report.

Have you ever published any version of this figure?*

No

Contributors ?

What are the names and agency affiliations for the authors of this graphic?

Name*

Michael Kolian

Organization*

U.S. Environmental Protection Agency

Email*

kolian.michael@epa.gov

+ Add Another Person

Datasets ?

Is there a particular dataset associated with this figure?*

Yes

Datasets

Full, formal name of the dataset:*

Apparent Temperature Thresholds

What is the URL for this dataset?

https://www.ncdc.noaa.gov/monitoring-content/societal-impacts/heat-stress/app_temp_thr.dat



Measuring Quality: User Friendly Tools

User Friendly Tools

Analysis and Methods

This section will collect details on how you analyzed and visualized the datasets, resulting in this panel in th in a succinct (e.g., bullet-style) format, at a level of detail that would allow a future user to reproduce your s

Was the dataset modified to create the figure?*

Yes

How was the dataset adapted from the original?

The panel only presents heat wave season length, which is one of four heat wave metrics available for the

Is the modified dataset archived?

Yes

Location (agency, city and state) and authoritative source (name, agency)

Michael Kolian,
U.S. EPA, Washington, DC

Please list, in bullet format, the methods used to analyze the data*

* Heat wave season length is defined as: the number of days from the first day of the first heat wave of th last heat wave, inclusive.

* For consistency across the country, this indicator defines a heat wave as a period of two or more consec minimum apparent temperature in a particular city is higher than the 85th percentile of historical July and that city.

Bulleted lists of your methods are best here. Think of providing an uninformed user a recipe to reproduce y

Please describe, in bullet format, how the data were visualized*

The data are presented as bar chart. Hatching is applied to denote decades in which there are fewer than

Again, think of providing a recipe of steps to a future user to reproduce your same results.

Are these methods published?*

Yes

Citation for Published Methods

Habeeb, D., J. Vargo, and B. Stone, Jr. 2015. Rising heat wave trends in large U.S. cities. Nat. Hazards 76(3): doi:10.1007/s11069-014-1563-z

[Click here](#) to view the style guide for examples of citation styles.

Please list an authoritative source for these methods (Name, agency)*

Michael Kolian, U.S. EPA

* Denotes required field

Tools and Applications

[Copy from another panel](#)

What software was/were used to analyze the data? (Name and version)

Python

R

+

To add additional software entries, please click the blue "plus" button.

What software was/were used to visualize the data? (Name and version)*

MatLab

Microsoft Excel

Microsoft Excel for Mac Version 16.14.1

Adobe Illustrator CC2017

+

To add additional software entries, please click the blue "plus" button.

What operating system(s) were used?*

Windows 10, macOS 10.13.6

How much time was invested in creating the figure?*

003:30

Format: HHH:MM

What is the name and location of the output file for the final figure?*

Overview_indicators_print_v15.png; on TSU Resources site

Please list all of the files (names and extensions) used in the creation of this figure*

Heat Waves - all figures - 05-07-18.xlsx

HeatWaves_OverviewIndicatorsFig_v2.xlsx

+

To add additional file entries, please click the blue "plus" button.

* Denotes required field

[Back](#)

[Submit](#)



Measuring Quality: User Friendly Tools

User
Friendly
Tools

Panel: U.S. Heat Waves Figure 1.2: Indicators of Change

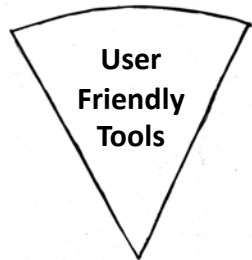
« Back to Overview/Graphics Admin Images Basic Additional Log GCIS

GCIS Instances		
Local		
http://localhost/ Whatever you've got running on localhost. Good luck getting GCIS running.	Not Reachable - unable to connect to http://localhost/ Unable to log in	
Last modified (locally)	Last synced to GCIS	Action
Tue Dec 10 2019 10:54:48 GMT-0500 (Eastern Standard Time)	Never	Not Ready
Review		
https://data-review.globalchange.gov/ This was traditionally used as a stage system for messing around since Stage automatically deploys to Prod.	Not Reachable - unable to connect to https://data-review.globalchange.gov/ Unable to log in	
Last modified (locally)	Last synced to GCIS	Action
Tue Dec 10 2019 10:54:48 GMT-0500 (Eastern Standard Time)	Never	Not Ready
Stage		
https://data-stage.globalchange.gov/ The final handoff. Automatically deployed to production on a regular basis.	Not Reachable - unable to connect to https://data-stage.globalchange.gov/ Unable to log in	
Last modified (locally)	Last synced to GCIS	Action
Tue Dec 10 2019 10:54:48 GMT-0500 (Eastern Standard Time)	Never	Not Ready
Data TSU		
https://data-tsu.globalchange.gov/	Not Reachable - unable to connect to https://data-tsu.globalchange.gov/ Unable to log in	
Last modified (locally)	Last synced to GCIS	Action
Tue Dec 10 2019 10:54:48 GMT-0500 (Eastern Standard Time)	Never	Not Ready

API

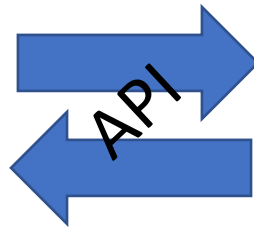


Measuring Quality: User Friendly Tools



Global Change Information System

Connecting global change resources.



Indicators of Change

Overview Panel Details Full Record Figure Downloads Additional Details



Zoom

Caption: Long-term observations demonstrate the warming trend in the climate system and the effects of increasing atmospheric greenhouse gas concentrations (Ch. 2: Climate, Box 2.2). This figure shows climate-relevant indicators of change based on data collected across the United States. Upward-pointing arrows indicate an increasing trend; downward-pointing arrows indicate a decreasing trend. Bidirectional arrows (e.g., for drought conditions) indicate a lack of a definitive national trend.

Atmosphere (a-c): (a) Annual average temperatures have increased by 1.8°F across the contiguous United States since the beginning of the 20th century; this figure shows observed change for 1986–2016 (relative to 1901–1960 for the contiguous United States and 1925–1960 for Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands). Alaska is warming faster than any other state and has warmed twice as fast as the global average since the mid-20th century (Ch. 2: Climate, KM 5; Ch. 26: Alaska, Background). (b) The season length of heat waves in many U.S. cities has increased by over 40 days since the 1960s. Hatched bars indicate partially complete decadal data. (c) The relative amount of annual rainfall that comes from large, single-day precipitation events has changed over the past century; since 1910, a larger percentage of land area in the contiguous United States receives precipitation in the form of these intense single-day events.

Ice, snow, and water (d-f): (d) Large declines in snowpack in the western United States occurred from 1955 to 2016. (e) While there are a number of ways to measure drought, there is currently no detectable change in long-term U.S. drought statistics using the Palmer Drought Severity Index. (f) Since the early 1980s, the annual minimum sea ice extent (observed in September each year) in the Arctic Ocean has decreased at a rate of 11%–16% per decade (Ch. 2: Climate, KM 7).

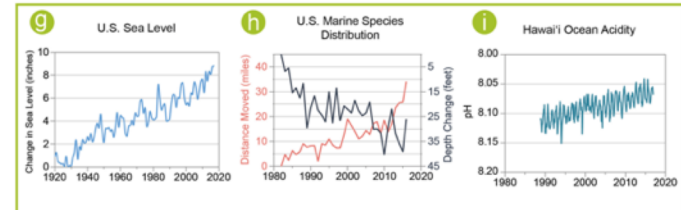
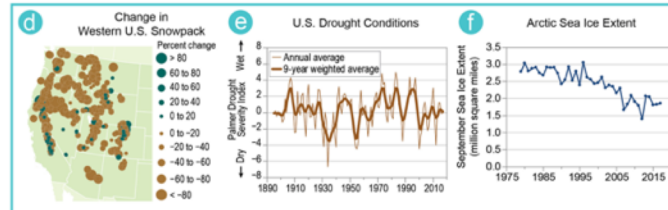
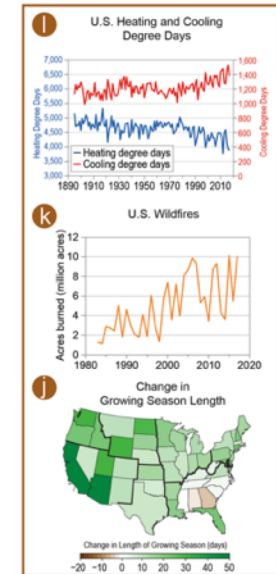
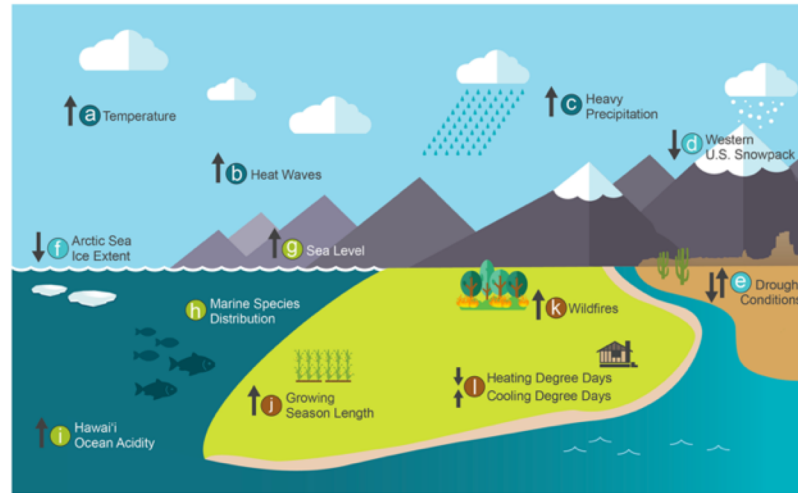
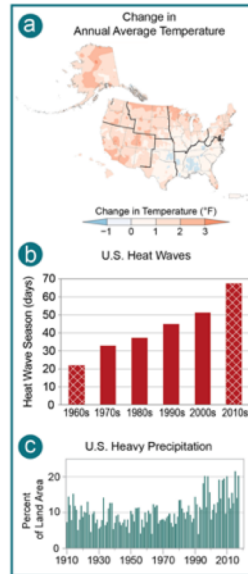
Oceans and coasts (g-i): (g) Annual median sea level along the U.S. coast (with land motion removed) has increased by about 9 inches since the early 20th century as oceans have warmed and land ice has melted (Ch. 2: Climate, KM 4). (h) Fish, shellfish, and other marine species along the Northeast coast and in the eastern Bering Sea have, on average, moved northward and to greater depths toward cooler waters since the early 1980s (records start in 1982). (i) Oceans are also currently absorbing more than a quarter of the carbon dioxide emitted to the atmosphere annually by human activities, increasing their acidity (measured by lower pH values; Ch. 2: Climate, KM 3).

Land and ecosystems (j-k): (j) The average length of the growing season has increased across the contiguous United States since the early 20th century, meaning that, on average, the last spring frost occurs earlier and the first fall frost arrives later; this map shows changes in growing season length at the state level from 1895 to 2016. (k) Warmer and drier conditions have contributed to an increase in large forest fires in the western United States and Interior



Measuring Quality: User Friendly Tools

User
Friendly
Tools



Measuring Quality: Actionable Output

“We’re building an interactive map of the U.S. that helps people see the observed and projected increases in heavy downpours for their region as a result of climate change. We’ve found that our audience is almost completely unaware of the relationship between global climate change and precipitation/non-Hurricane flooding.”



Measuring Quality: Actionable Output



“You can have data without information, but you cannot have information without data.” – Daniel Keys Moran

Measuring Quality: Actionable Output

“The administration wants to tackle environmental crises like unsafe drinking water and extreme wildfire.”



THE
HUFFINGTON
POST

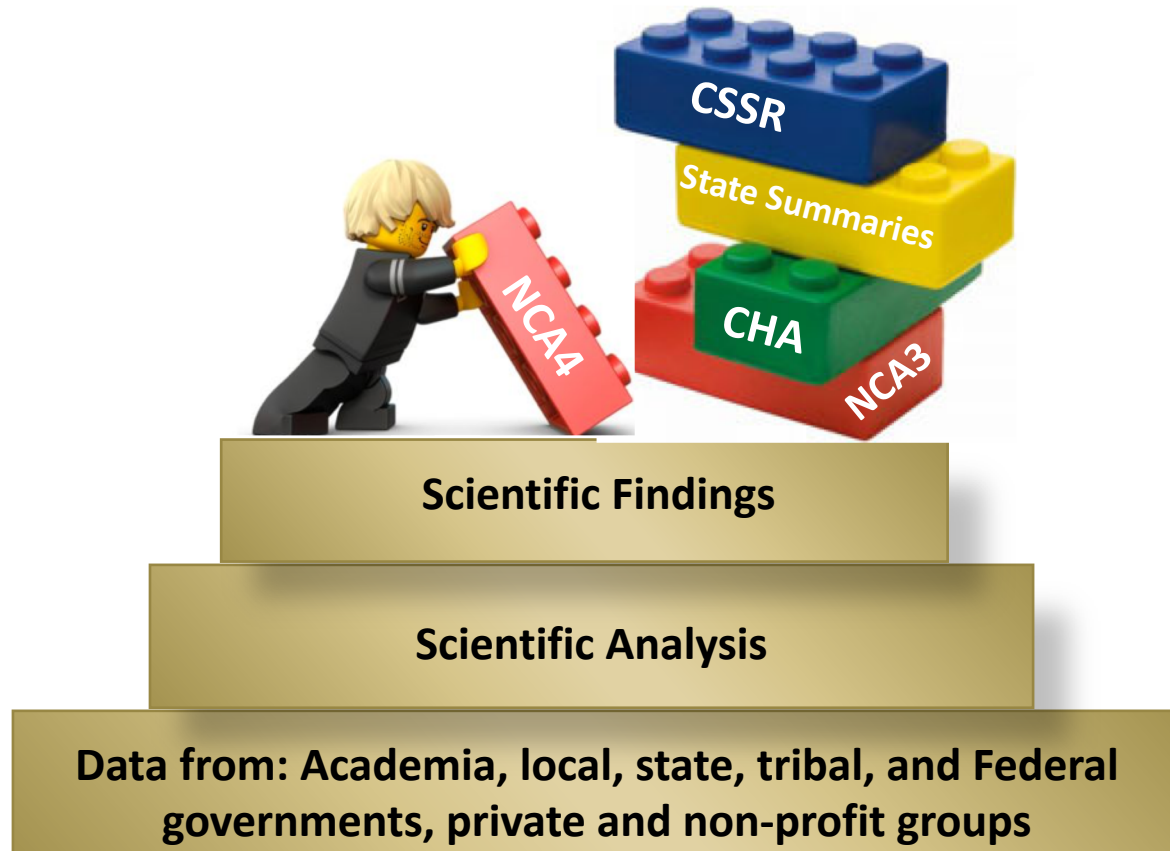
“Last year’s Fourth National Climate Assessment,...documents significant changes in water quality and quantity across the country...”

Chris D’Angelo
The Huffington Post
March 22, 2019



NC STATE
UNIVERSITY

Measuring Quality: Next Steps



Measuring Quality: Next Steps

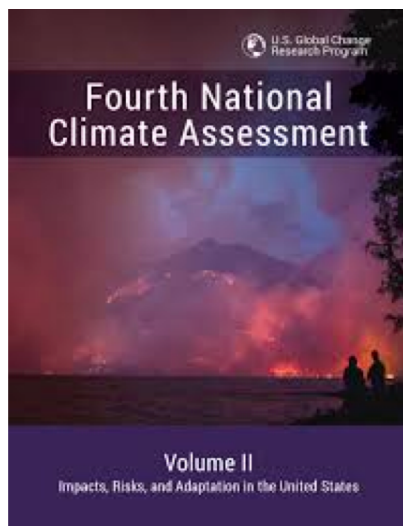
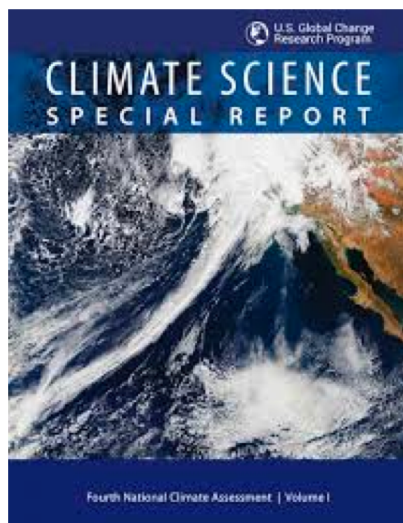
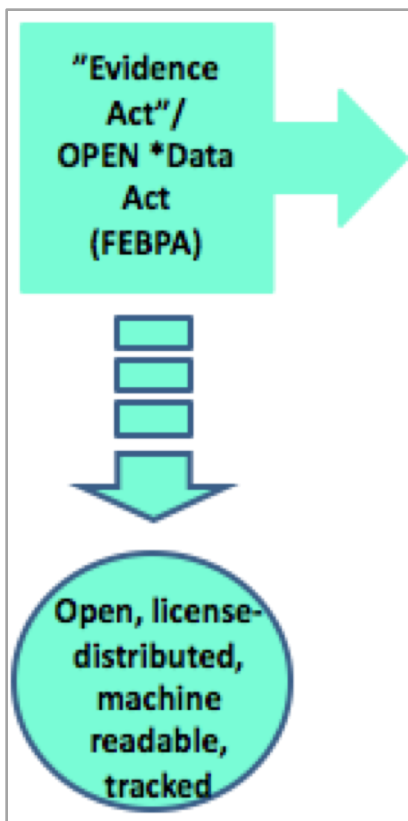


[Figure Source](#)



NC STATE
UNIVERSITY

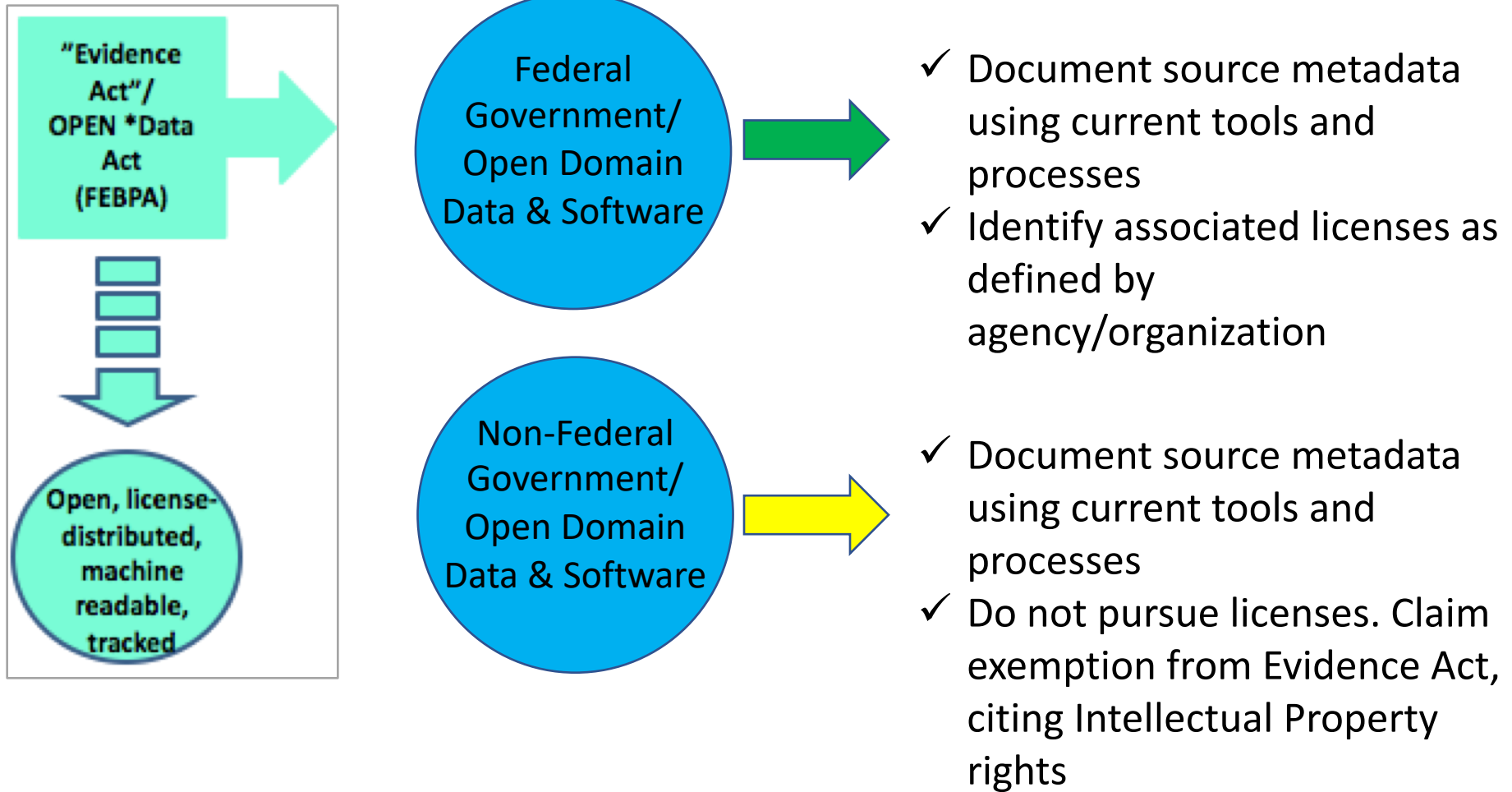
Measuring Quality: Next Steps



- 1970 pages
- 975 figure panels
 - 152 datasets
- 350+ authors
 - 15 federal departments
 - 5 national laboratories
 - 20 research institutions and non-profits
 - 3 government contract companies
 - 28 local (city, state, and tribal) government organizations
 - 65 universities

*Note that several non-federal organizations were not U.S. institutions.

Measuring Quality: Next Steps



Measuring Quality: Next Steps



- Working in partnership with the Department of Commerce and NOAA Chief Data Officer on agency guidelines
- Working with NOAA Legal to create legally sound forms for documenting compliance and exemptions
- NCA metadata documentation surveys will be updated to accommodate these forms/documentation
 - NCA authors will be required to declare federal or non-federal affiliation status
 - Documented authorization or exemption will be provided as part of the full metadata record
- Repository will likely be a combined effort between the NCA and GCIS systems
- Version Release date targeted for Spring 2020



Thank You!



United States
Global Change
Research Program



NC STATE
UNIVERSITY