



Environmental Protection Agency

Usability Audit Review
Climate Change

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®

Agenda

- › **Overview of Usability Audit Review**
 - Top Usability Issues
 - Bottom Line

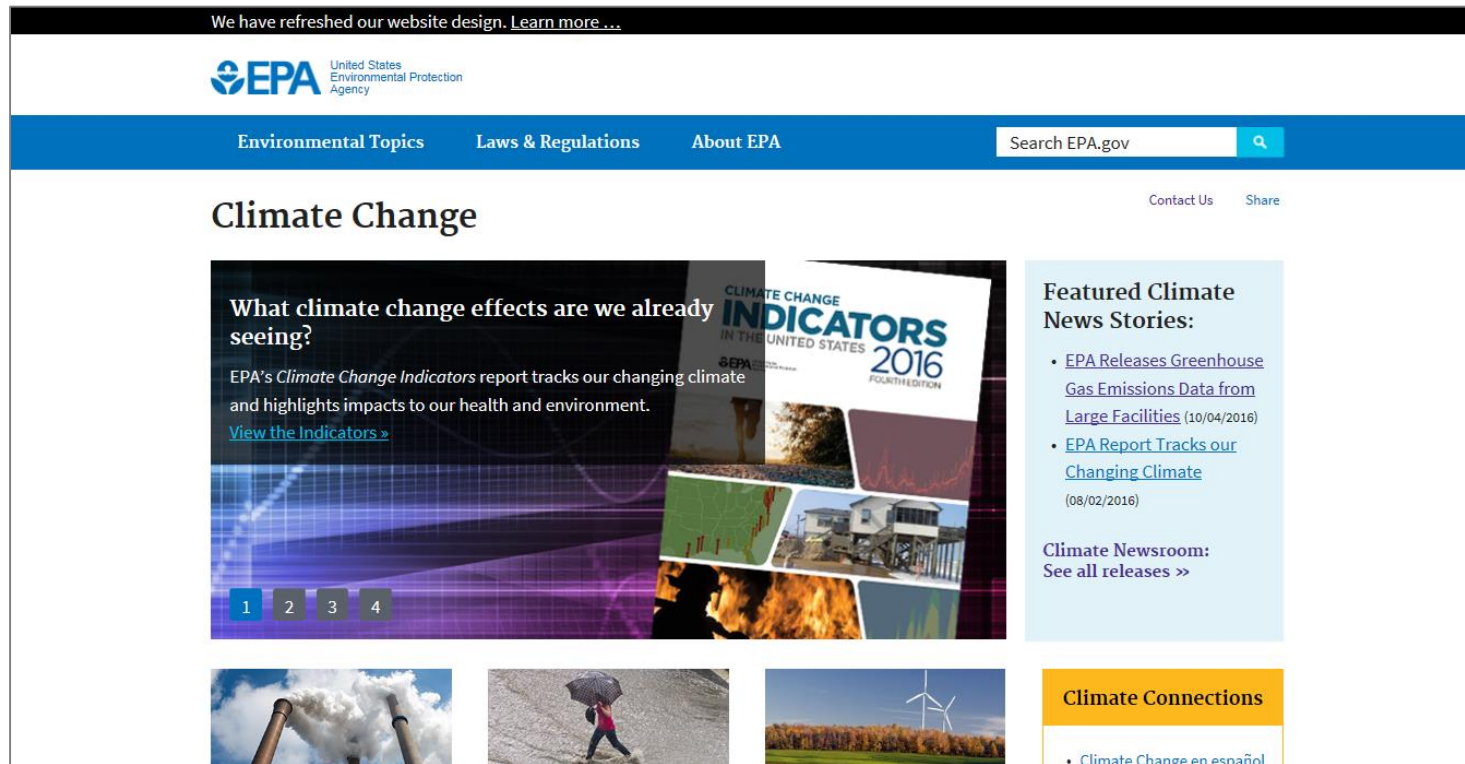
ForeSee Usability Process

- Audit
- Analysis
- Independent Evaluation
- Target Visitor Needs and Expectations

Usability Indicators

- Individual Application
- Pass/Fail Metric
- Measures Specific Aspect of Usability
- Proprietary to ForeSee
- Website Analysis and External Research
- Best Practice

Scope and Specifications



- January 2017
- 1366 x 768
- Iterative Evaluation

This audit examines content and navigation within Climate Change Home, Climate Change Science, Climate Change Impacts, Climate Change Indicators, and Greenhouse Gas (GHG) Emissions to evaluate the organization and categorization of information, the intuitiveness of navigation, and how clearly labeling communicates the nature of content and its structure.

Agenda

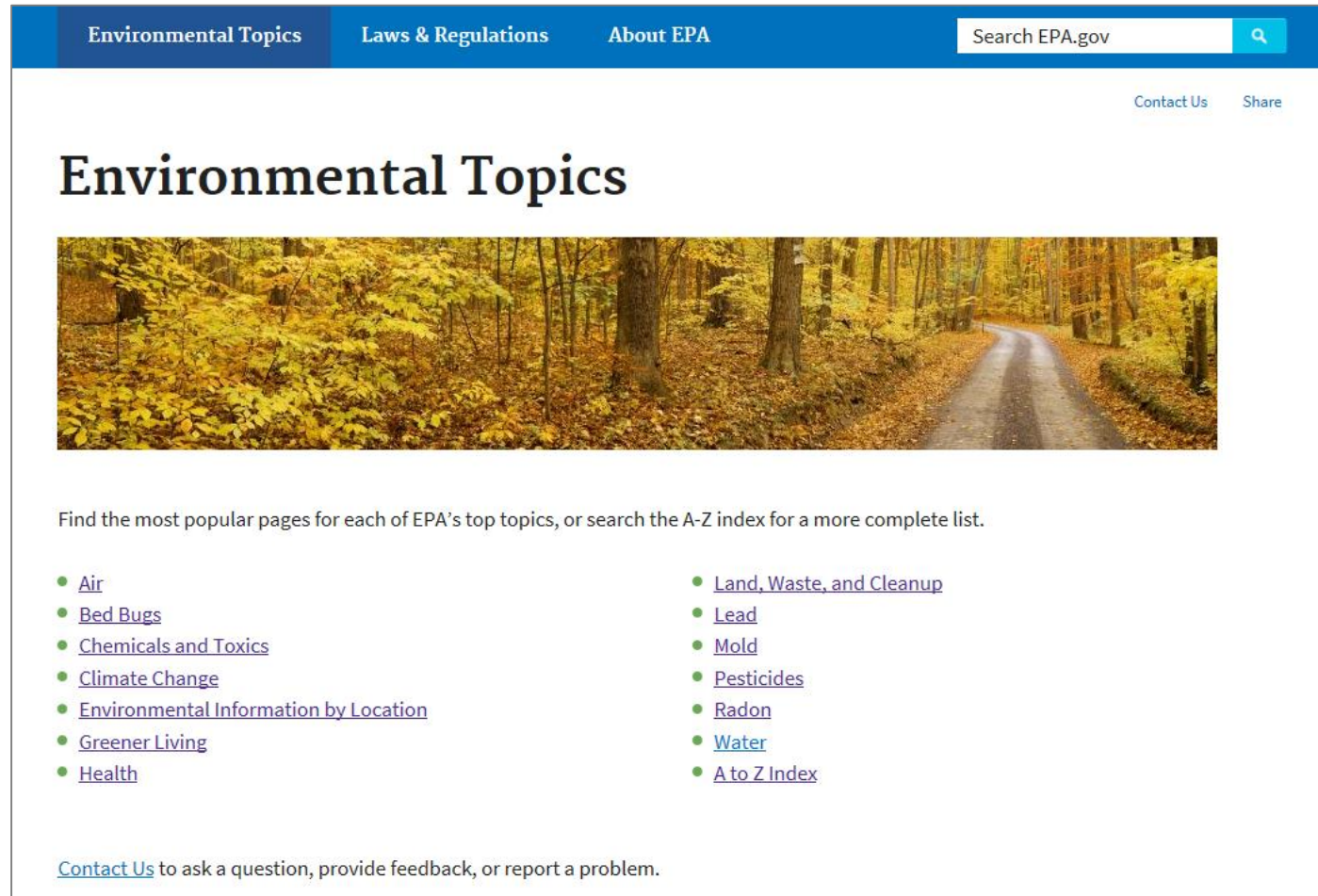
- Overview of Usability Audit Review
- › **Top Usability Issues**
- Bottom Line

Top Usability Issues

- Category Awareness
- Scope Notes
- Presence of Local Navigation
- Execution of Local Navigation
- Orientation
- Hidden Content
- In-Page Navigation
- Expected Location
- Link Execution
- Print and Email

Category Awareness

Category information is missing from Environmental Topics page



EPA.gov does not display subcategories for Climate Change, and other topics, on the Environmental Topics page. As a result, visitors may have difficulty gaining a mental model of the contents and organization of the site and may fail to locate desired content.

The site has an opportunity to provide an overview and convenient navigation for each topical subcategory by listing and linking to subcategories under each topic on this page.

Recommendation: Provide a hierarchical overview of Climate Change and other topics by listing and linking to subcategories on the Environmental Topics page.

Primary page link groups do not reflect the structure of the section

The screenshot shows the EPA Climate Change homepage. Red lines with numbered circles (1-5) point to specific link groups:

- 1** Points to the main navigation bar at the top, which includes links for Science, Indicators, Impacts, and GHG.
- 2** Points to the 'Featured Climate News Stories' section, which lists recent news items.
- 3** Points to the 'Climate Connections' section, which lists links for 'Climate Change en español', 'Frequent Questions', 'Energy and the Environment', 'Climate and Energy', 'Resources for State, Local, and Tribal Governments', 'Facility Greenhouse Gas Emissions Data', 'Climate and Transportation', 'Climate and Water', and 'EPA Climate Change Research'.
- 4** Points to the 'Why is the climate changing?' section, which lists links for 'Basic Information', 'Causes of Climate Change', 'Future of Climate Change', and 'Greenhouse Gas Emissions'.
- 5** Points to the 'How is the climate changing?' section, which lists links for 'Climate Science', 'Climate Indicators', 'Climate Impacts', and 'Extreme Weather'.

Other sections visible on the page include 'How does climate change affect our health?', 'What are the impacts of climate change where I live?', and 'Greenhouse Gas (GHG) Emissions'.

Primary pages serve to introduce a section's content, set visitor expectations about what can be accomplished, and provide efficient pathways for doing so. Typically, visitors look to the centerwell for overview text and linkage to content on deeper pages within the section.

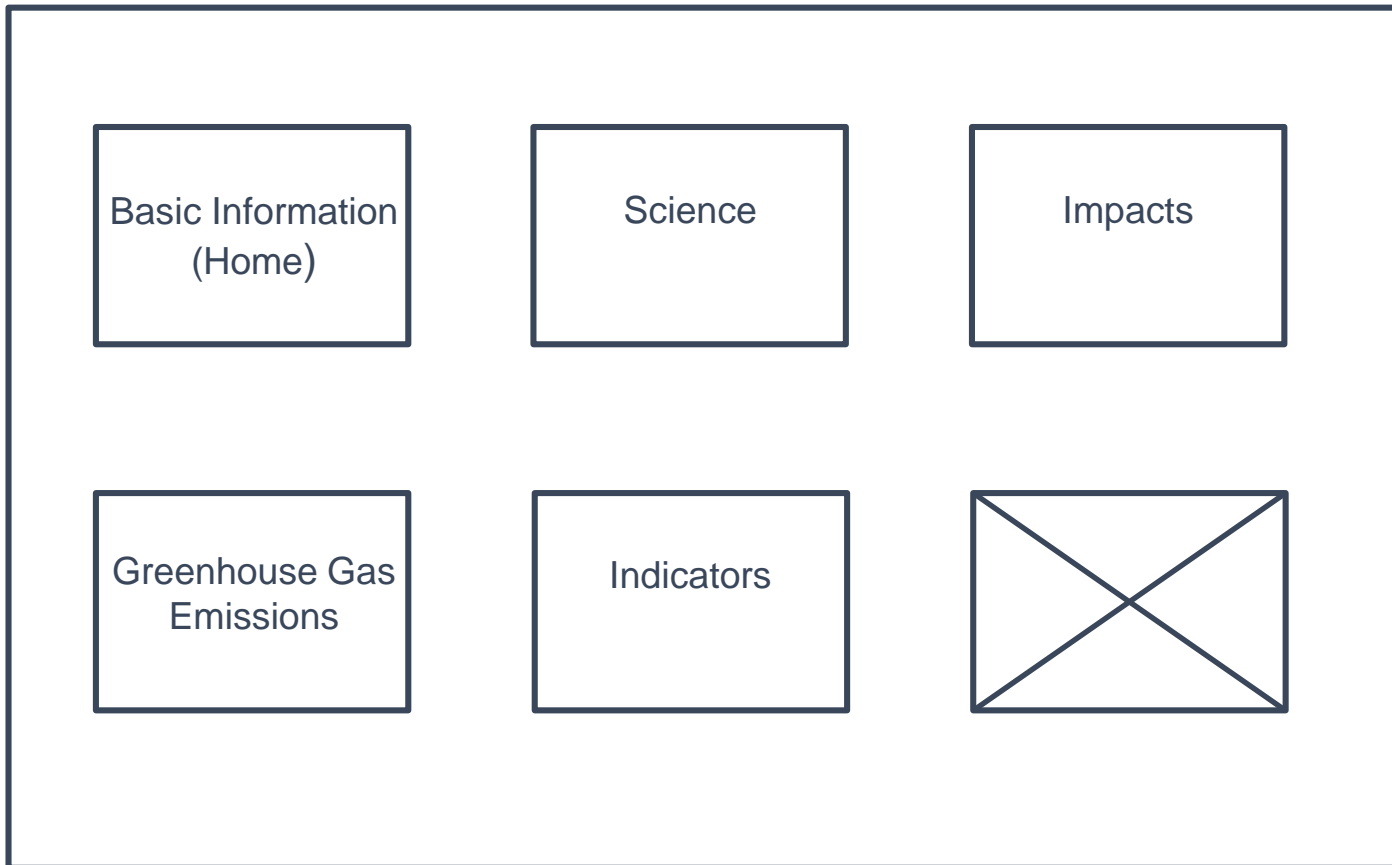
Visitors expect the three headings **1** in the Climate Change Home centerwell to reflect the section's categories. However, links to the actual Climate Change categories **2 3 4 5** are unevenly distributed among these groups, indicating that the groups do not reflect the present organization of the section.

The difference between the organization of content on the primary page and the categories within the section prevents visitors from acquiring a mental model of the section which would allow them to navigate confidently and efficiently to content of interest.

Recommendation: Ensure the organization of links on the home page accurately reflects the structure of the section.

Organization of the centerwell: Wireframe

This wireframe demonstrates a possible layout for the centerwell of the Climate Change Home page. By representing each of the existing categories with explicit labels and linkage, the layout builds awareness of the contents and organization of the section, ensuring that visitors can understand what information is offered, how it is organized, and how to navigate to it.



Categories are misrepresented by linked images

Next, the linked images on Climate Change Home do not set expectations regarding the destination of the links. The proximity of these images to the group headings may lead visitors to assume that the images are linked to category pages for these topics. Instead, each image is linked to the same page as the first hypertext link in the list below the heading.

For instance, visitors may be surprised when clicking on the image above **How is the climate changing?** loads the Climate Change Science landing page. Instead, the images should accompany headings which introduce key content in the section.

Recommendation: Ensure the destination of linked images matches their associated labels or headings.

The diagram illustrates a misrepresentation of categories by linked images. It shows three columns of content under the heading 'How is the climate changing?':


- Why is the climate changing?**
 - Basic Information
 - Causes of Climate Change
 - Future of Climate Change
 - Greenhouse Gas Emissions
- How is the climate changing?**
 - Climate Science
 - Climate Indicators
 - Climate Impacts
 - Extreme Weather
- What can we do about this change?**
 - Reducing Emissions
 - Adapting to Change
 - What EPA is Doing
 - What You Can Do

A red circle highlights an image of a person with an umbrella, which is linked to the 'Climate Change Science' page. A red arrow points from this image to the 'Climate Change Science' page, which is shown below. The 'Climate Change Science' page includes a section titled 'Climate change fundamentals:' with links to 'Overview', 'Causes', and 'Future', and a section titled 'A deeper look:' with links to 'Climate Change Impacts', 'Climate Change Indicators', 'Extreme Weather', and 'Benefits of Global Action'.

Category Awareness: Best practice

Lead

Contact Us Share



EPA has two programs for certifying contractors and accrediting training providers

- [Renovation, Repair and Painting Program](#)
- [Lead Abatement Program](#) for permanent elimination of lead-based paint hazards

1 2 3 4

LEARN ABOUT LEAD

- [What is lead?](#)
- [Where is lead found?](#)
- [Who is at risk?](#)
- [What are the health effects of lead?](#)
- [Get educational material about lead](#)
- [Get certified as a Lead Abatement Worker, or other abatement discipline](#)
- [Lead in drinking water](#)
- [Lead air pollution](#)


PROTECT YOUR FAMILY

- [Test your child](#)
- [Check and maintain your home](#)
- [Find a Lead-Safe Certified firm](#)
- [Before you renovate](#)
- [Before you buy or rent a home built before 1978](#)
- [Test your home's drinking water](#)
- [Test for lead in paint, dust or soil](#)

RENOVATE RIGHT FOR CONTRACTORS AND TRAINERS

- [EPA Lead Renovation, Repair and Painting \(RRP\) Program](#)
- [Become a Lead-Safe Certified firm or renew your certification](#)
- [Locate an RRP training class or provider](#)
- [Become an accredited training provider](#)

Look for the Logo



Highlights

- January 10, 2017 -- EPA published a science-based public health approach and a coordinated strategy for continuing our progress to reduce lead exposures and protect public health.

Popular Topics and Resources

- [Newsroom](#)
- [Real Estate Disclosure Information](#)
- [Lead Evaluation and Removal \(Abatement\)](#)

Make sure lead safety is a part of your renovation

- Consumers: [Find a Lead-Safe Certified firm](#)
- Renovation firms: [Apply for lead safe certification/recertification](#)
- Property managers: [Know your responsibilities](#)

Lead

Lead Home

[Learn About Lead](#)

[Protect Your Family](#)

[Renovation, Repair and Painting Program](#)

[Evaluating and Eliminating Lead-Based Paint Hazards](#)

[Real Estate Disclosure](#)

[Science and Technology](#)

[Lead Laws and Regulations](#)

[Outreach and Grants](#)

[En Español: Plomo](#)

This other primary page on EPA.gov provides groups of links which reflect the key categories within the topic. Additionally, text labels on the linked images accurately indicate the destination of the links.

Category Awareness

Recommendations

- Provide a hierarchical overview of Climate Change and other topics by listing and linking to subcategories on the Environmental Topics page.
- Ensure the organization of links on the home page accurately reflects the structure of the section.
- Ensure the destination of linked images matches their associated labels or headings.

Scope Notes

Categories are not explained

Climate Change does not provide scope notes, or introductory text, on the primary and category pages. The inclusion of scope notes helps to explain the nature of content and categories and entice visitors to learn more.

In addition to clarifying the type of content visitors will encounter by clicking on navigation choices, these notes help to guide visitors down the correct path and assure them that the first click they make from the primary page is the correct one.

Scope notes can range in length from a short phrase to a few sentences, depending on the link or links they are describing.

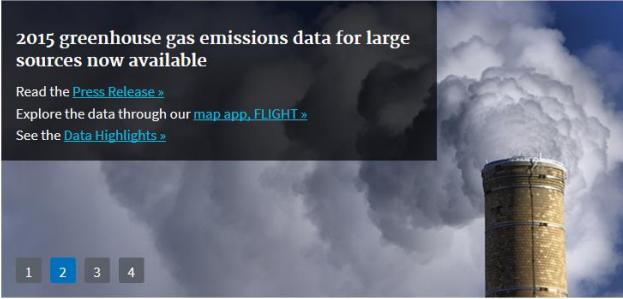
Recommendation: Supplement links with succinct scope notes that set initial expectations and help visitors select the best one.

Climate Change

Contact Us Share

2015 greenhouse gas emissions data for large sources now available

Read the [Press Release](#) »
Explore the data through our [map app, FLIGHT](#) »
See the [Data Highlights](#) »



1 2 3 4


Featured Climate News Stories:

- [EPA Releases Greenhouse Gas Emissions Data from Large Facilities](#) (10/04/2016)
- [EPA Report Tracks our Changing Climate](#) (08/02/2016)

Climate Newsroom:
[See all releases »](#)


Climate Connections

- [Climate Change en español](#)
- [Frequent Questions](#)
- [Energy and the Environment](#)
- [Climate and Energy Resources for State, Local, and Tribal Governments](#)
- [Facility Greenhouse Gas Emissions Data](#)
- [Climate and Transportation](#)
- [Climate and Water](#)
- [EPA Climate Change Research](#)




Why is the climate changing?

- [Basic Information](#)
- [Causes of Climate Change](#)
- [Future of Climate Change](#)
- [Greenhouse Gas Emissions](#)



How is the climate changing?


- [Climate Science](#)
- [Climate Indicators](#)
- [Climate Impacts](#)
- [Extreme Weather](#)



What can we do about this change?


- [Reducing Emissions](#)
- [Adapting to Change](#)
- [What EPA is Doing](#)
- [What You Can Do](#)

What are the impacts of climate change where I live?




Select a region to view impacts affecting that location.

[Alaska](#) | [Great Plains](#) | [Midwest](#) | [Northeast](#) | [Northwest](#) | [Southeast](#) | [Southwest](#) | [Hawaii and U.S. Tropical Islands](#) | [International](#) | [State Fact Sheets](#)



a student's guide to
GLOBAL CLIMATE CHANGE



Climate Change Basics

16

Issue 2: Scope Notes

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Scope notes: Best practice

This site provides scope notes to inform visitors upfront about the type of content associated with each link. This facilitates browsing by allowing them to make an informed decision about which links they wish to follow.

The screenshot displays the NOAA Climate.gov website. The header includes the NOAA logo, the site name "Climate.gov", and the tagline "science & information for a climate-smart nation". A navigation bar contains links for "News & Features", "Maps & Data", "Teaching Climate" (which is highlighted), "About", "Contact", "FAQs", "Site Map", and "What's New?". Below the navigation bar, there are tabs for "Reviewed resources for teaching about climate and energy", "Climate Systems", "Causes of Climate Change", "Measuring & Modeling Climate", "Climate Impacts", "Human Responses to Climate", and "Nature of Climate Science".

The main content area features a "Featured Resources" section with a large image of Earth from space. To the right of the image is a featured resource titled "The United States and Climate Change: Mitigation and Adaptation through Existing Federal Environmental and Natural Resources Laws". Below the title, it mentions "NOAA Climate Stewards Education Project Webinar" and "January 9, 2017". A brief description follows: "NOAA's Climate Stewards Education Project is pleased to welcome Robin Craig, William H. Leary Professor of Law, and Acting Director of the Wallace Stegner Center for Land,".

Below the featured resource, there are several other sections:

- Teaching Climate Literacy:** Includes a small image of a book cover and text stating "Climate and energy are complex topics. There are many ways to approach climate and energy depending on the grade level, course topics and instructional method." with a "Read more" link.
- Professional Development:** Features a "view all" link and a specific event titled "The United States and Climate Change: Mitigation and Adaptation through Existing Federal Environmental and Natural Resources Laws" scheduled for "Monday, January 9 at 7:30 pm Eastern Time". It includes a "View event" link.
- National Climate Assessment Teaching Resources:** Includes a small image of a book cover and text stating "Explore a series of guides for educators that focus on the regional chapters of the Assessment Report, helping to unpack the key messages of each region and point to related, high-quality online resources." with a "Read more" link.
- Climate Youth Engagement:** Includes a "Learn More" link and two sub-sections:
 - Case Studies:** Text describes "Unique and diverse youth programming models and student-driven initiatives that are advancing place-based climate solutions." with a "See case studies >>" link.
 - Events:** Lists "Our Time to Lead: Youth Engagement on Climate Change" and "Nuorten Ilmastohuippukokous (Youth Climate Summit)" with a "View event map >>" link.
- Blog:** Features a post titled "Get Involved: Climate Choices Issue Guide" dated "April 18, 2016" with a "Read more >>" link.

On the right side of the page, there is a search bar and a "Grade Level" dropdown menu set to "- Any -", with a "Find Resources" button below it. A note at the bottom of the search section says "Reviewed learning activities from cleanet.org".

Scope Notes

Recommendations

- Supplement links with succinct scope notes that set initial expectations and help visitors select the best one.

Presence of Local Navigation

Local navigation is missing on category pages

Climate Change Science

- Climate Change Home
- Climate Science Home
- Science Overview
- Climate Change Causes**
- Future Climate Change
- Climate Change Impacts
- Climate Change Indicators**
- Extreme Weather
- Impacts and Risk Analysis

Causes of Climate Change

On This Page:

- [Earth's temperature is a balancing act](#)
- [The greenhouse effect causes the atmosphere to warm](#)
- [Changes in the sun's energy affect how much energy is absorbed by Earth](#)
- [Changes in reflectivity affect how much energy is reflected back into space](#)

Earth's temperature

Earth's temperature depends on the balance between energy entering and leaving the planet. When incoming energy from the sun is absorbed by the Earth system, Earth warms. When the sun's energy is reflected back into space, Earth avoids warming. When absorbed energy is released back into space, Earth cools. Many factors, both natural and human, can cause changes in Earth's energy balance, including:

- Variations in [the sun's energy](#) reaching Earth
- Changes in the [reflectivity](#) of Earth's atmosphere and surface
- Changes in the [greenhouse effect](#), which affects the amount of heat retained by Earth's atmosphere

Climate Change Indicators in the United States

New Indicators Report Released

EPA has released the 2016 edition of *Climate Change Indicators in the United States*, which includes seven new indicators and a feature on climate and health.

About the Report

- Download PDF of full report
- Technical documentation
- Indicators fact sheet
- Frequent questions
- Order print copies or send inquiries: climateindicators@epa.gov
- Subscribe to indicator updates

Key Findings

The Earth's climate is changing. Temperatures are rising, snow and rainfall patterns are shifting, and more extreme climate events - like heavy rainstorms and record high temperatures - are already happening. Many of these observed changes are linked to the rising levels of carbon dioxide and other greenhouse gases in our atmosphere, caused by human activities.

EPA partners with more than 40 data contributors from various government agencies, academic institutions, and other organizations to compile a key set of indicators related to the causes and effects of climate change. The indicators are published in EPA's report, *Climate Change Indicators in the United States*, available on this website and in print. Explore the indicators below.

Explore Climate Change Indicators

Greenhouse Gases <ul style="list-style-type: none">• Greenhouse Gases Summary• U.S. Greenhouse Gas Emissions• Global Greenhouse Gas Emissions• Atmospheric Concentrations of Greenhouse Gases• Climate Forcing	Weather and Climate <ul style="list-style-type: none">• Weather and Climate Summary• U.S. and Global Temperature• High and Low Temperatures• U.S. and Global Precipitation• Heavy Precipitation• Tropical Cyclone Activity• River Flooding*• Drought	Oceans <ul style="list-style-type: none">• Oceans Summary• Ocean Heat• Sea Surface Temperature• Sea Level• Coastal Flooding*• Ocean Acidity	Climate Connections <ul style="list-style-type: none">• Climate Change and Human Health• Temperature and Drought in the Southwest• Land Loss Along the Atlantic Coast• Ice Breakup in Two Alaskan Rivers• Cherry Blossom Bloom Dates in Washington, D.C.• Trends in Stream Temperature in the Snake River*
Snow and Ice <ul style="list-style-type: none">• Snow and Ice Summary• Arctic Sea Ice• Antarctic Sea Ice*	Health and Society <ul style="list-style-type: none">• Health and Society Summary• Heat-Related Deaths	Ecosystems <ul style="list-style-type: none">• Ecosystems Summary• Wildfires• Streamflow	Related Topics <ul style="list-style-type: none">• Climate Change Home• Climate Science• Climate Change Impacts• Greenhouse Gas Emissions

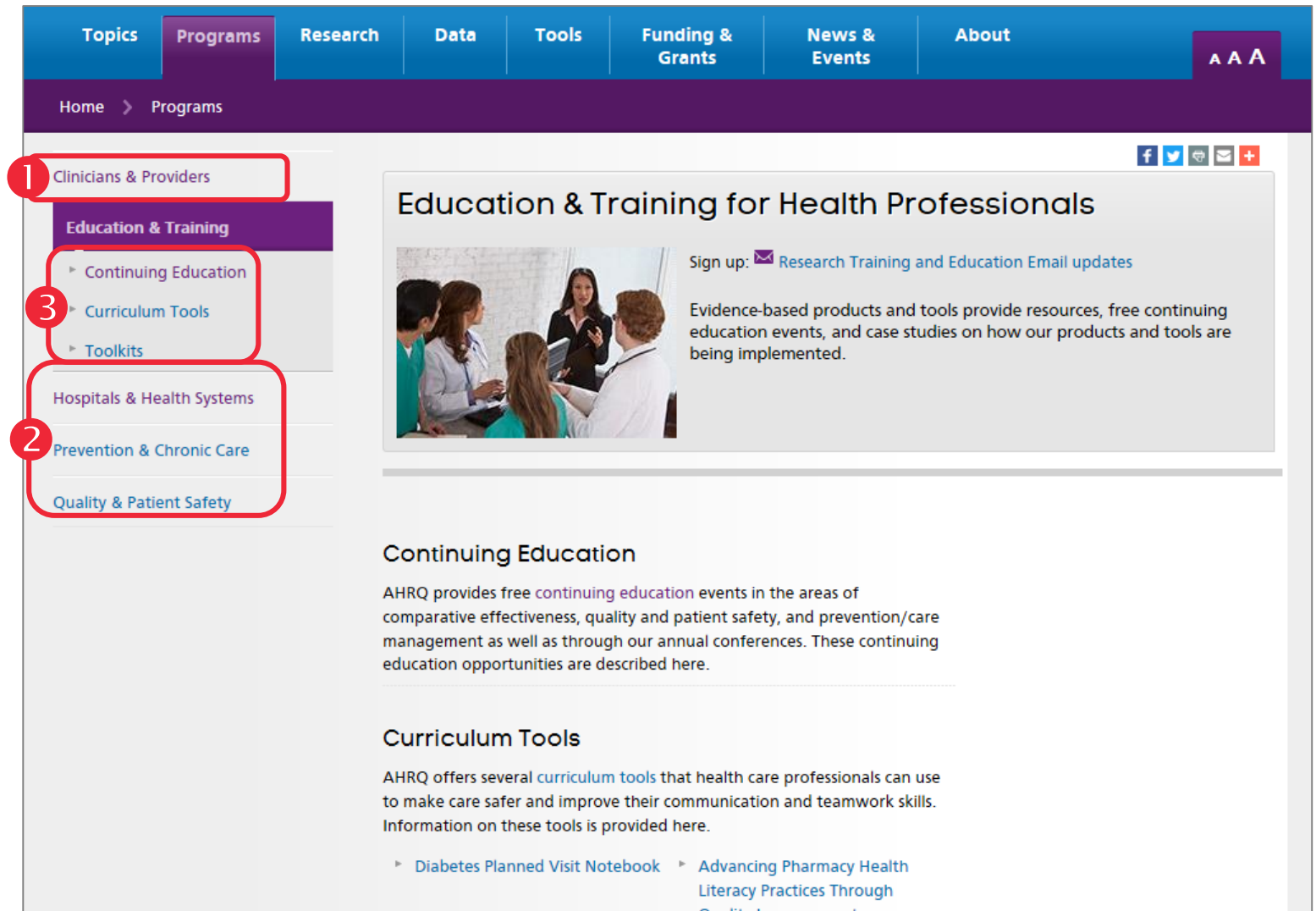
* = new in 2016

Although the site provides local navigation menus on content pages, navigation between categories is hindered by the absence of these menus on category pages. Thus, as visitors move from content pages to category pages **1**, the loss of the menu requires them to scan the category page to determine their options. When present, hub and spokes navigation increases orientation, as visitors can understand the relationship of the current page to the rest of those in this section, simply by noting which navigation options are highlighted and the how subsequent menus are nested.

Recommendation: Provide local navigation menus on category pages.

Local navigation: Best practice

This site effectively implements a local navigation area on introductory category pages that provides cross linkage to pages at the same level ❶ ❷ and also to subsequent pages within the current topical area ❸.



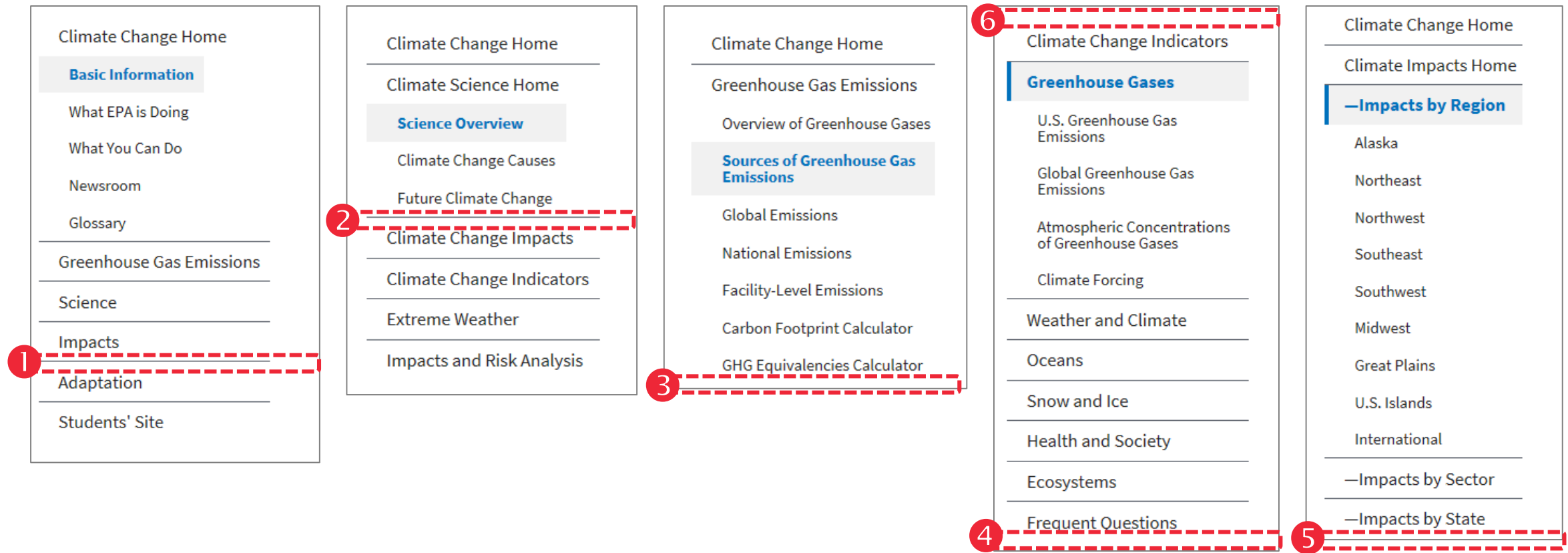
Presence of Local Navigation

Recommendations

- Provide local navigation menus on category pages.

Execution of Local Navigation

Menus do not consistently include top-level categories

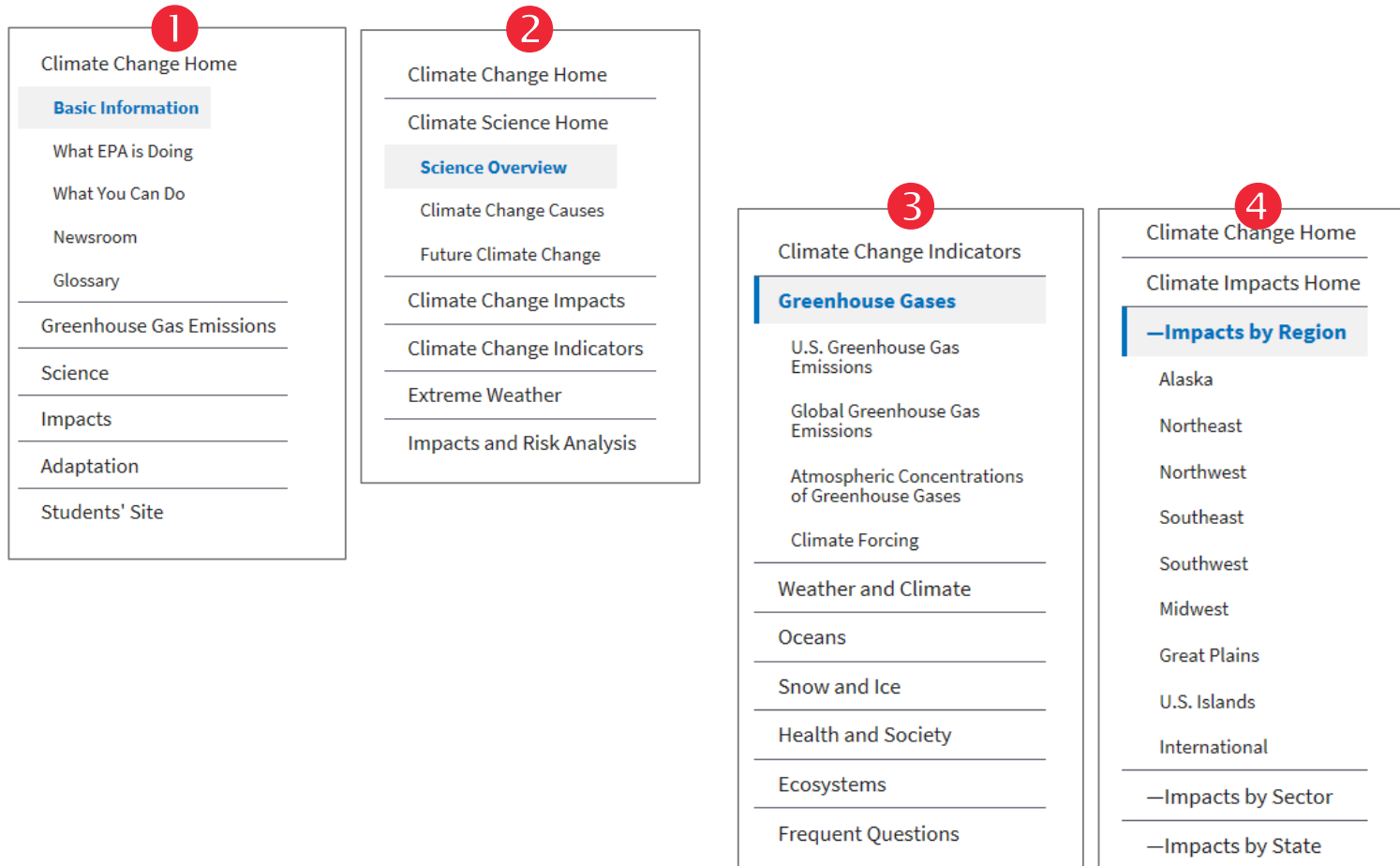


Local navigation menus within the Climate Change sections are inconsistent in the inclusion of linkage to other top-level categories within the section. For example, the menu in the Home category does not include a link to the Indicators category page ❶. In the Science category, no link is provided for Greenhouse Gas Emissions ❷, and the Greenhouse Gas Emissions, Indicators, and Impacts pages are lacking cross-linkage to all other Climate Change categories ❸ ❹ ❺. Furthermore, the Indicators menu omits linkage to the Climate Change Home page ❻.

These omissions prevent visitors from gaining a clear mental model of the organization and contents of the site, and risks that they will not find desired content. Additionally, visitors must work harder to find information residing on the pages which are not included and may be unable to complete their tasks if they conclude the information is not available.

Recommendation: Provide linkage to all Climate Change category pages in local navigation menus.

Menus display inconsistent visual hierarchy



Visitors should be able to understand the relationship of the current page to the rest of the section, simply by noting which navigation option is highlighted and how the subsequent menus are nested. However, the use of visual elements varies across the section.

For instance, in the Home and Science sections **1** **2**, horizontal rules are used to separate the top-level categories, but the Indicators and Impacts categories **3** **4** employ these elements to separate subcategories.

Inconsistency in the implementation of the menus impairs visitors' ability to acquire an accurate mental model of the structure of the section and requires them to relearn the organization of the menu as they move between categories.

Recommendation: Ensure visual elements in the navigation menus are consistently employed throughout the section.

Presentation of top-level categories is inconsistent

As a further example, two links in the Climate Change Science menu appear to represent top-level categories, but do not. Links to Extreme Weather and Impacts and Risk Analysis are presented at the same list level as top-level categories. However, Extreme Weather ¹ leads to a content page in the current section ² and Impacts and Risk Analysis ³ leads outside of the Climate Change section, as demonstrated by the url ⁴.

Recommendations:

- Ensure links are placed at the correct level of the menu.
- Do not include links to related content (outside the Climate Change section) in the local navigation menu.

The image shows a screenshot of the EPA website's navigation and content area. On the left, a sidebar menu titled "Climate Change Science" (annotated with a red box and '2') contains a list of links: "Climate Change Home", "Climate Science Home", "Science Overview", "Climate Change Causes", "Future Climate Change", "Climate Change Impacts", "Climate Change Indicators", "Extreme Weather" (highlighted with a blue bar), and "Impacts and Risk Analysis". To the right of the sidebar, a main content area displays the title "Understanding the Climate Change and Weather" and a section "On This Page:" with three links: "Changes in Extreme Weather and Climate Events", "Trends in Specific Extreme Weather Events", and "Adaptation: Reducing the Threat of Climate Change and Impacts". A red arrow points from the "Extreme Weather" link in the sidebar to the first link in the "On This Page:" section. Another red arrow points from the "Impacts and Risk Analysis" link in the sidebar to a URL in a browser window shown on the right. The browser window displays the URL "https://www.epa.gov/cira" (annotated with a red box and '4') and the page title "Climate Change in the United States: Benefits and Risks". The page content includes the EPA logo, navigation tabs for "Environmental Topics", "Laws & Regulations", and "About EPA", and a large heading "Climate Change in the United States: Benefits and Risks". A red arrow points from the "Impacts and Risk Analysis" link in the sidebar to the "Climate Change Indicators" link in the main content area.



Execution of Local Navigation

Recommendations

- Provide linkage to all Climate Change category pages in local navigation menus.
- Ensure visual elements in the navigation menus are consistently employed throughout the section.
- Ensure links are placed at the correct level of the menu.
- Do not include links to related content (outside the Climate Change section) in the local navigation menu.

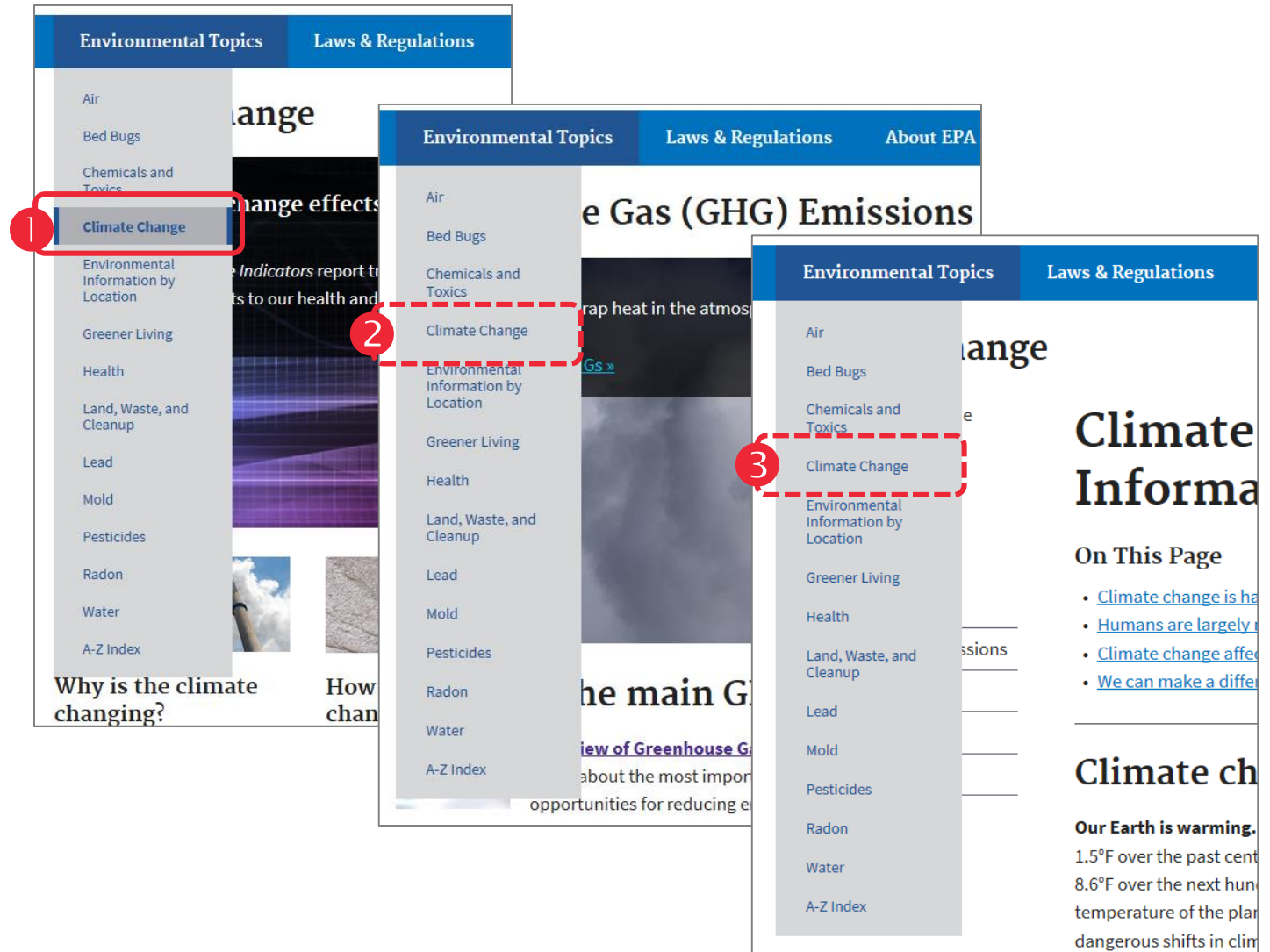
Orientation

Menu does not consistently indicate the current location

While the site visually differentiates the current category on the top-level category page **1**, the site does not continue to highlight the category on deeper pages **2** **3**.

Without this important visual cue, visitors are unaware of which section corresponds to the current page and are unable to navigate intuitively to desired content.

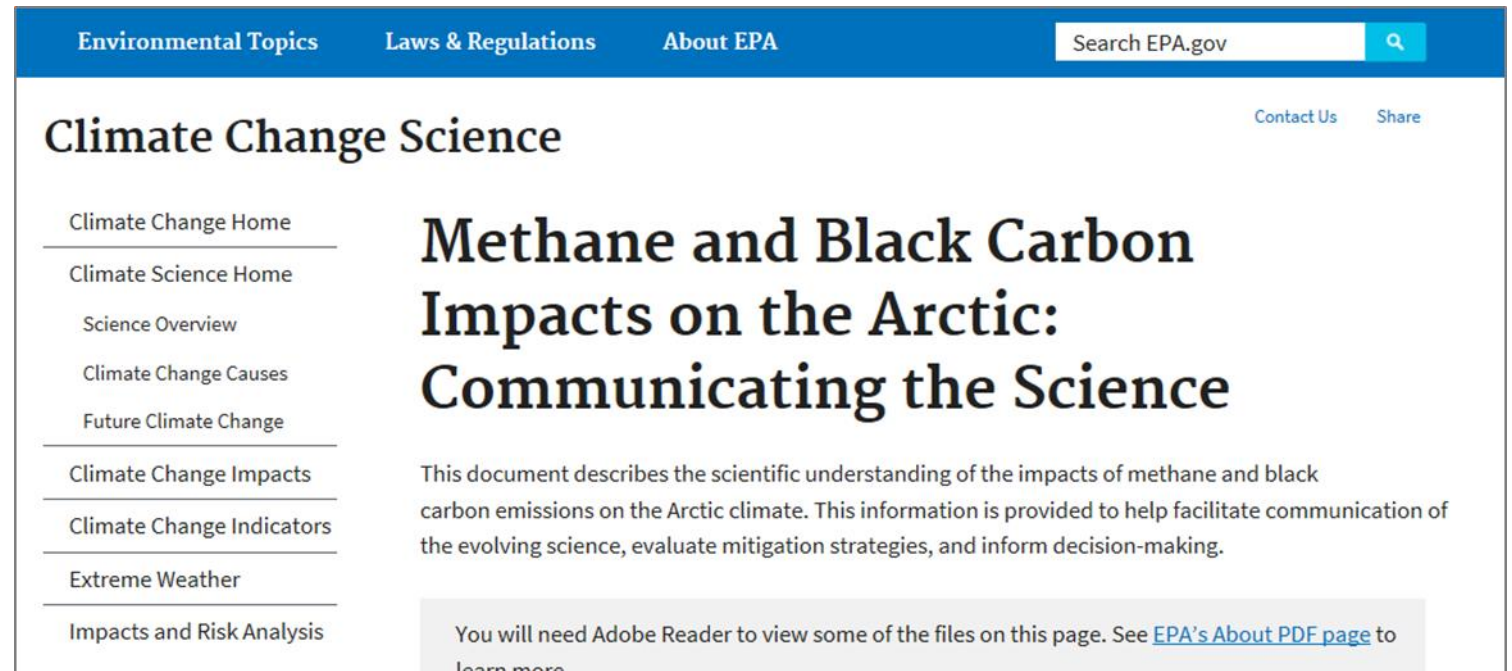
Recommendation: Ensure the global link corresponding to the current category is visually differentiated at all levels within the category.



Breadcrumb trails are not provided

Without breadcrumb trails, visitors must use other page elements to determine where the current page resides within the site. Breadcrumb trails are navigation and orientation tools that list the pages which are directly parent to the present page in the site hierarchy. Breadcrumb trails also provide one-click navigational access to these pages.

Recommendation: Add breadcrumb trails to all pages on EPA.gov.



Link labels do not consistently match page headings

The screenshot shows the 'Climate Change Indicators' page. The main heading is 'Climate Change Indicators: Greenhouse Gases'. A sidebar on the left lists several links, with 'Greenhouse Gases Summary' circled in red and labeled with a red '1'. A red arrow points from this link to the main heading. Below the main heading, there is a section titled 'View Indicators:' with a sub-heading 'Impacts and Risk Analysis' circled in red and labeled with a red '2'. A red arrow points from this link to the 'Climate Change in the United States: Benefits of Global Action' page.

Climate Change Indicators

Climate Change Indicators

Greenhouse Gases

Greenhouse Gases

Greenhouse gases from human activities are the most significant driver of observed climate change since the mid-20th century.¹ The indicators in this

View Indicators:

- [Greenhouse Gases Summary](#)
- [U.S. Greenhouse Gas Emissions](#)
- [Global Greenhouse Gas Emissions](#)
- [Atmospheric Concentrations of Greenhouse Gases](#)
- [Climate Forcing](#)

Climate Change Home

Climate Science Home

Science Overview

Climate Change Causes

Future Climate Change

Climate Change Impacts

Climate Change Indicators

Extreme Weather

Impacts and Risk Analysis

The Climate Change section does not ensure link labels and corresponding page headings have a one-to-one match to orient visitors and reassure them they have accessed the correct page.

For example, when visitors click Greenhouse Gases Summary, on the Climate Change Indicators page, they are taken to a page with the heading of Climate Change Indicators: Greenhouse Gases **1**. Likewise, clicking on Impacts and Risk Analysis leads to Climate Change in the United States: Benefits of Global Action **2**.

Visitors can be momentarily confused by the difference in labeling. Unless there is a compelling reason, the site should ensure page headings exactly match the labels of links visitors clicked.

Recommendation: Ensure link labels and corresponding page headings have a one-to-one match.

The screenshot shows the 'Climate Change in the United States: Benefits of Global Action' page. The main heading is 'Climate Change in the United States: Benefits of Global Action'. Below the heading, there is a section titled 'The Importance of Taking Action Now'. To the right, there is a 'Useful Links' section with two links: 'Download the report' and 'Frequently asked'.

Climate Change in the United States: Benefits of Global Action

The Importance of Taking Action Now

Useful Links

- [Download the report](#)
- [Frequently asked](#)

Orientation

Recommendations

- Ensure the global link corresponding to the current section is visually differentiated.
- Add breadcrumb trails to all pages on EPA.gov.
- Ensure link labels and corresponding page headings have a one-to-one match.

Hidden Content

Some pages cannot be found in the category structure

The section fails to provide access to some pages via the category structure and navigation. For example, visitors looking for an FAQ page may find a link in the Climate Connections group on the Primary Page or in Additional climate change resources on Climate Change Science page, but the page is not represented in the local navigation. This increases the likelihood that visitors will overlook relevant content or assume the site does not provide this information. Instead, all pages should be accessible through the existing category structure.

Recommendation: Provide access to all pages through the existing category structure.

Additional climate change resources:

- [EPA: Climate Change Home](#)
- [EPA: Climate Change Research](#)
- [Frequent Questions on Climate Change](#)
- [Extreme Heat: What You Can Do to Prepare](#)
- [Arctic Methane and Black Carbon](#)
- [National Climate Assessment](#)
- [U.S. Global Change Research Program](#)
- [NOAA Climate.gov](#)
- [NASA Climate Change](#)
- [Climate Change at the National Academies](#)
- [Intergovernmental Panel on Climate Change](#)

The screenshot shows the EPA Climate Change website. On the left, a sidebar titled "Climate Connections" lists several links, with "Frequent Questions" circled in red. A red arrow points from this link to the "Frequent Questions on Climate Change" link in the "Additional climate change resources" list above. Another red arrow points from the "Frequent Questions" link in the sidebar to the "Climate Change Facts: Answers to Common Questions" section on the right. The "Climate Change" header includes links for "Climate Change Home", "Basic Information", "What EPA is Doing", "What You Can Do", "Newsroom", "Glossary", "Greenhouse Gas Emissions", "Science", "Impacts", "Adaptation", and "Students' Site". The "Climate Change Facts: Answers to Common Questions" section contains three expandable questions, each with a plus sign icon.

Climate Connections

- [Climate Change en español](#)
- [Frequent Questions](#)
- [Energy and the Environment](#)
- [Climate and Energy Resources for State, Local, and Tribal Governments](#)
- [Facility Greenhouse Gas Emissions Data](#)
- [Climate and Transportation](#)
- [Climate and Water](#)
- [EPA Climate Change Research](#)

Climate Change

Climate Change Home
Basic Information
What EPA is Doing
What You Can Do
Newsroom
Glossary
Greenhouse Gas Emissions
Science
Impacts
Adaptation
Students' Site

Climate Change Facts: Answers to Common Questions

This page answers some of the most commonly asked questions about climate change and its impacts. Click on the questions below to view the answers.

- Is there a scientific consensus on climate change? +
- What is the evidence that proves the climate is changing? +
- Are human activities or natural variations in climate responsible for the climate change being observed today? +

Access to glossary content is limited

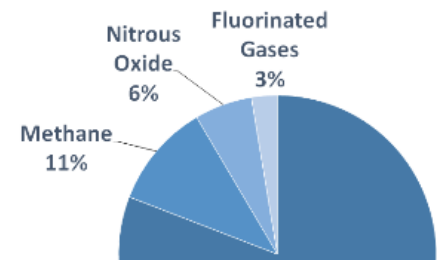
[Climate Change Home](#)
[Greenhouse Gas Emissions](#)
[Overview of Greenhouse Gases](#)
[Sources of Greenhouse Gas Emissions](#)
[Global Emissions](#)
[National Emissions](#)
[Facility-Level Emissions](#)
[Carbon Footprint Calculator](#)
[GHG Equivalencies Calculator](#)

Overview of Greenhouse Gases

[Overview](#)[Carbon Dioxide](#)[Methane](#)[Nitrous Oxide](#)[Fluorinated Gases](#)

Gases that trap heat in the atmosphere are called greenhouse gases. This section provides information on emissions and removals of the main greenhouse gases to and from the atmosphere. For more information on the science of climate change and other climate forcers, such as black carbon, please visit [Climate Change Science](#).

U.S. Greenhouse Gas Emissions in 2014



Gas	Percentage
Carbon Dioxide	80%
Methane	11%
Nitrous Oxide	6%
Fluorinated Gases	3%

Black Carbon Aerosol

Black carbon (BC) is the most strongly light-absorbing component of particulate matter (PM), and is formed by the incomplete combustion of fossil fuels, biofuels, and biomass. It is emitted directly into the atmosphere in the form of fine particles (PM_{2.5}).

Borehole

Any exploratory hole drilled into the Earth or ice to gather geophysical data. Climate researchers often take ice core samples, a type of borehole, to predict atmospheric composition in earlier years. See [ice core](#).

[A](#) - [B](#) - [C](#) - [D](#) - [E](#) - [F](#) - [G](#) - [H](#) - [I](#) - [J](#) - [K](#) - [L](#) - [M](#) - [N](#) - [O](#) - [P](#) - [Q](#) - [R](#) - [S](#) - [T](#) - [U](#) - [V](#) - [W](#) - [X](#) - [Y](#) - [Z](#) - <#>

The site misses an opportunity to assist visitors by providing easy access to relevant glossaries. Glossaries are a conventional Help feature that many visitors look for in order to answer their questions about how specific terms are defined within the site.

While the site does offer definitions within a glossary, visitors are forced to view that information on a new page, taking them outside the context in which the word is being used.

Without access to contextual glossary content, visitors must rely on their memory or open new windows, which increases the complexity of their task.

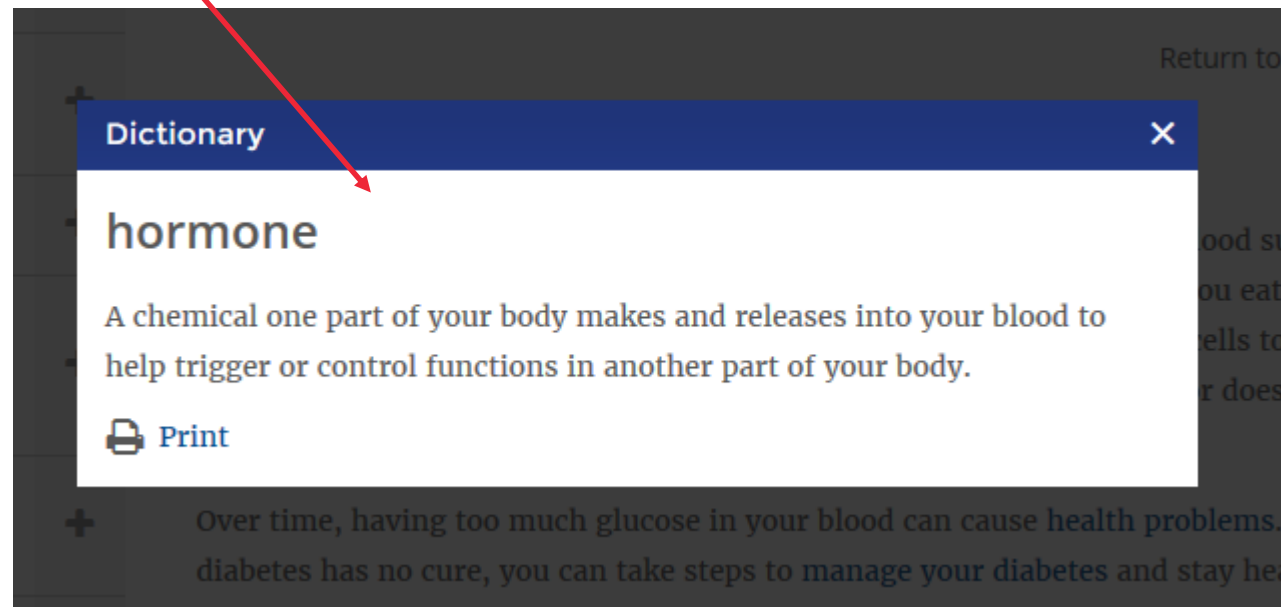
Contextual glossary layers: Best practice

Instead, the site should offer glossary information on the page itself through tool tip text or an overlay, as shown in this example from another site. This allows visitors to understand how the site is using particular words without taking them away from the context of the page it is being used on.

Recommendation: Present glossary definitions on the page where the terms occur.

What is Diabetes?

Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Blood glucose is your main source of energy and comes from the food you eat. [Insulin](#), a [hormone](#) made by the [pancreas](#), helps glucose from food get into your cells to be used for energy. Sometimes your body doesn't make enough—or any—insulin or doesn't use insulin well. Glucose then stays in your blood and doesn't reach your cells.



Hidden Content

Recommendations

- Provide access to all pages through the existing category structure.
- Present glossary definitions on the page where the terms occur.

In-Page Navigation

Glossary lacks an explicit link to Top of Page

Environmental Topics

Laws & Regulations

About EPA

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Share

Climate Change

Climate Change Home

Basic Information

What EPA is Doing

What You Can Do

Newsroom

Glossary

Greenhouse Gas Emissions

Science

Impacts

Adaptation

Students' Site

1

Glossary of Climate Change Terms

A - B - C - D - E - F - G - H - I - J - K - L - M - N - O - P - Q - R - S - T - U - V - W - X - Y - Z - #

A

Related Links

Abrupt Climate Change

Sudden (on the order of decades or less) change in the climate system.

Adaptation

Adjustment or process to change environmental conditions to reduce vulnerability.

Adaptive Capacity

The ability of a system to adjust to change to take advantage of opportunities or to reduce vulnerability.

Aerosols

Small particles or droplets that may be suspended in the atmosphere and reflect or absorb sunlight.

Afforestation

Planting of new forests on land that was not forested.

Albedo

The amount of solar radiation reflected by a surface, often expressed as a percentage.

Alternative Energy

Energy derived from nontraditional sources (e.g., compressed natural gas, solar, hydroelectric, wind).

The Convention entered into force on 21 March 1994.

A - B - C - D - E - F - G - H - I - J - K - L - M - N - O - P - Q - R - S - T - U - V - W - X - Y - Z - #

V

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

W

Wastewater

Water that has been used and contains dissolved or suspended waste materials.

Water Vapor

The most abundant greenhouse gas, it is the water present in the atmosphere in gaseous form. Water vapor is the primary driver of the greenhouse effect.

The Climate Change section demonstrates good usability in providing a glossary with A to Z index links ❶ to facilitate navigation within the long list of terms and definitions. However, explicit linkage to the top of the page is missing ❷ ❸. Although visitors can access the top of the page, and the navigational options there, by clicking on the **A** link, some visitors are likely to overlook this option and waste time scrolling. The site can assist intuitive navigation to the top of the page by including an explicit link in the A to Z index positioned between each content section.

Recommendation: Provide an explicit Top of Page link between each content section in the Glossary.

39

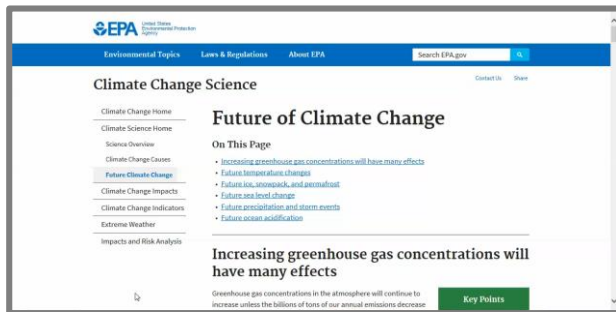
Issue 7: In-Page Navigation

FORESEE

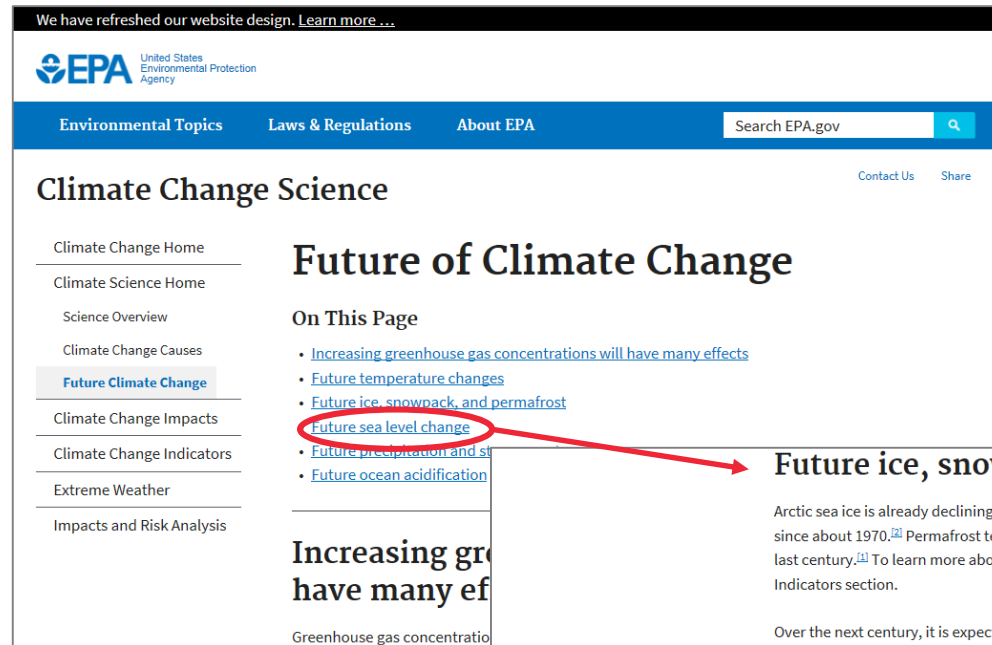
Topical links transition too quickly

When visitors click a topical link they are transported to the related section in the page so swiftly they may fail to understand what has occurred, this risks that visitors may mistakenly conclude they have navigated to a different page. To avoid confusion and disruption, the site should ensure this movement is noticeable.

Recommendation: Ensure the movement up or down the page that occurs after clicking a topical link is gradual enough to be observed and understood, yet rapid enough to be preferable to scrolling manually.



Video runtime: 3 seconds



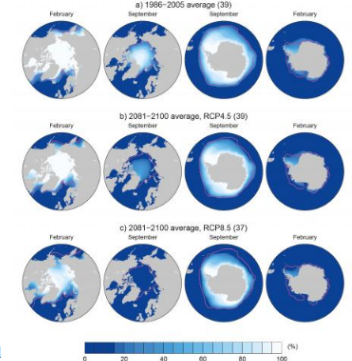
Future ice, snowpack, and permafrost

Arctic sea ice is already declining.^[2] The area of snow cover in the Northern Hemisphere has decreased since about 1970.^[2] Permafrost temperatures in Alaska and much of the Arctic^[2] have increased over the last century.^[2] To learn more about recent changes in snow and ice, visit the [Snow and Ice page](#) of the Indicators section.

Over the next century, it is expected that sea ice will continue to decline, glaciers will continue to shrink, snow cover will continue to decrease, and permafrost will continue to thaw. Potential changes to ice, snow, and permafrost are described below.

Key global projections

- For every 2°F of warming, models project about a 15% decrease in the extent of annually averaged Arctic sea ice and a 25% decrease in the area covered by Arctic sea ice at the end of summer (September).^[3] Note that this decrease does not contribute to sea level rise.
- The coastal sections of the Greenland and Antarctic ice sheets are expected to continue to melt or slide into the ocean. If the rate of this ice melting increases in the 21st century, the ice sheets could add significantly to global sea level rise.^[3]
- Glaciers are expected to continue to

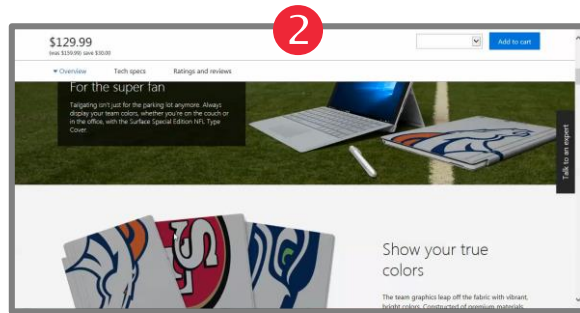


These maps show projected losses of sea ice in the Arctic and Antarctica. The maps in a) show the average ice concentration (the

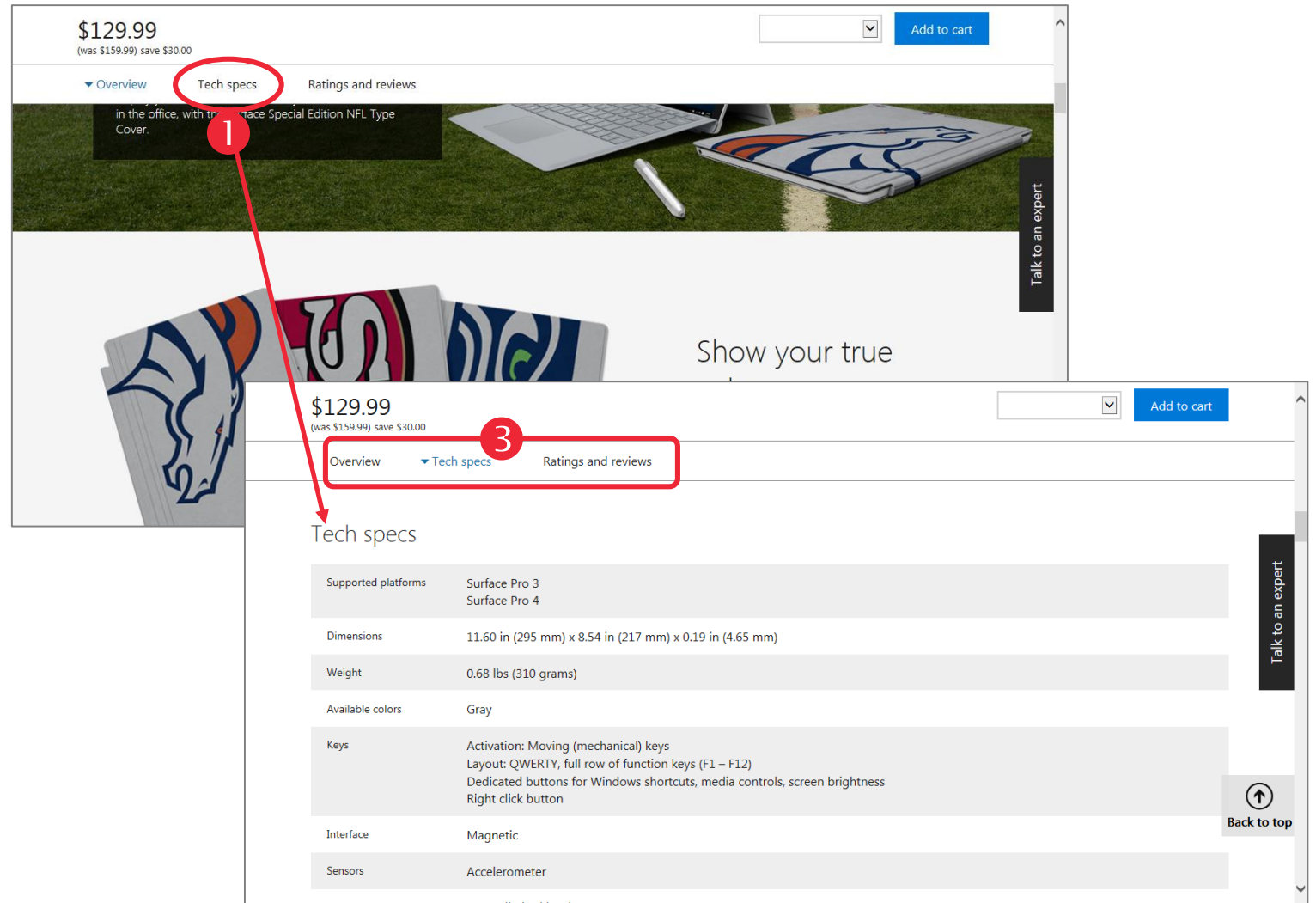
Topical links: Best practice

Observable movement between page sections ① ② on this site promotes orientation since visitors are aware that they are still viewing the same page. Additionally, the fixed-position (sticky) element ③ which contains topical links facilitates both orientation and in-page navigation.

Recommendation: Consider placing topical links in a fixed-position element.



Video runtime: 9 seconds



Tab interface hinders efficient access to information

On some pages, a considerable amount of information is located in tabs. This risks that visitors may not find content of interest if they overlook the tabs and scroll past them. Additionally, the tab interface prevents visitors from viewing or printing all content on the page.

To improve the findability of the content and ensure that visitors are able to print it as needed, the site should provide this content directly on the page. Efficient navigation to sections of content can be provided through topical links at the top of the page. In cases where the amount of information in each tab is extensive, the site should consider creating a subsequent category of pages which can be accessed through the local navigation menus.

Recommendations:

- Place content directly on the page instead of within tabs.
- Provide topical navigation links to related sections of content on the page.
- Consider placing content on separate pages with appropriate linkage in the local navigation.

Greenhouse Gas Emissions

Climate Change Home
Greenhouse Gas Emissions
Overview of Greenhouse Gases
Sources of Greenhouse Gas Emissions

Overview of Greenhouse Gases

Overview **Carbon Dioxide** Methane Nitrous Oxide Fluorinated Gases

Carbon Dioxide Emissions

Carbon dioxide (CO₂) is the primary greenhouse gas emitted through human activities. In 2014, CO₂ accounted for about 80.9% of all U.S. greenhouse gas emissions from human activities. Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). Human activities are altering the carbon cycle—both by adding more CO₂ to the atmosphere and by influencing the ability of natural sinks, like forests, to remove CO₂ from the atmosphere. While CO₂ emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution.¹

Properties of Carbon Dioxide

Chemical Formula: CO₂
Lifetime in Atmosphere: See below.
Global Warming Potential (100-year): 1

U.S. Greenhouse Gas Emissions in 2014

Total Emissions in 2014 = 6,870 Million Metric Tons of CO₂ equivalent.

Larger image to save or print.

U.S. Carbon Dioxide Emissions, By Source

The main human activity that emits CO₂ is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation, although certain industrial processes and land-use changes also emit CO₂. The main sources of CO₂ emissions in the United States are described below.

Electricity. Electricity is a significant source of energy in the United States and is used to power homes, business, and industry. The combustion of fossil fuels to generate electricity is the largest single source of CO₂ emissions in the nation, accounting for about 37 percent of total U.S. greenhouse gas emissions in 2014. The type of fossil fuel used to generate electricity will emit different amounts of CO₂. To produce a given amount of electricity, burning coal will produce more CO₂ than oil or natural gas.

Transportation. The combustion of fossil fuels such as gasoline and diesel to transport people and goods is the second largest source of CO₂ emissions, accounting for about 31 percent of total U.S. CO₂ emissions and 25 percent of total U.S. greenhouse gas emissions in 2014. This category includes transportation sources such as highway vehicles, air travel, marine transportation, and rail.

Many industrial processes use fossil fuel combustion in their processes.

Each gas's effect on climate change depends on three main factors:

How much of these gases are in the atmosphere?

Concentration, or abundance, is the amount of a particular gas in the air. Larger emissions of greenhouse gases lead to higher concentrations in the atmosphere. Greenhouse

Topical links: Best practice



Global Greenhouse Gas Emissions Data

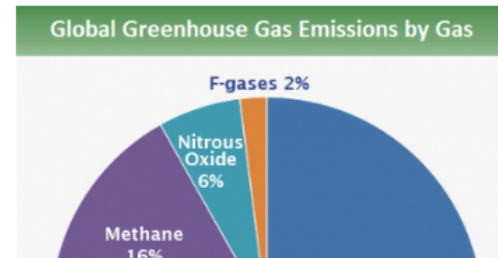
On This Page:

- [Global Emissions by Gas](#)
- [Trends in Global Emissions](#)
- [Global Emissions by Economic Sector](#)
- [Emissions by Country](#)

Global Emissions by Gas

At the global scale, the key greenhouse gases emitted by human activities are:

- **Carbon dioxide (CO₂):** Fossil fuel use is the primary source of CO₂. The way in which people use land is also an important source of CO₂, especially when it involves deforestation. CO₂ can also be emitted from direct human-induced impacts on forestry and other land use, such as through



On this page, convenient access to sections of related content is provided through topical links at the top of the page. If visitors overlook these links, they can still locate the content by scrolling. Additionally, the entire page is printable.

In-Page Navigation

Recommendations

- Provide an explicit Top of Page link between each letter section in the Glossary.
- Ensure the movement up or down the page that occurs after clicking a topical link is gradual enough to be observed and understood, yet rapid enough to be preferable to scrolling manually.
- Consider placing topical links in a fixed-position element.
- Place content directly on the page instead of within tabs.
- Provide topical navigation links to related sections of content on the page.
- Consider placing content on separate pages with appropriate linkage in the local navigation.

Expected Location

Offsite Links are not consistently indicated (1 of 2)

When hypertext links do anything other than transport visitors to another page of the site—including taking visitors to a new site—they should be forewarned via messaging or an icon so that this information can be taken into account prior to clicking the link.

Introductory category pages, such as those for Science ❶ and Impacts ❷, contain groups of links to external sites which are not adequately labeled ❸ ❹. Since these pages primarily introduce subsequent content, visitors may be caught off guard when some links lead offsite placing them in completely different contexts with altered navigational options ❺ ❻.

❶ Climate Change Science

Are extreme weather events becoming more frequent, and is it related to climate change?

Understand the link between [climate change & extreme weather](#)

❷ Climate Change Impacts

Climate change affects every state differently.

See [climate change impacts in your state](#)

Climate Change

Explore all things climate—including:

- [Climate Change Home](#)
- [Climate Science](#)
- [Climate Change Indicators](#)
- [Greenhouse Gas Emissions](#)

❸ Additional climate change resources:

- [EPA: Climate Change Home](#)
- [EPA: Climate Change Research](#)
- [Frequent Questions on Climate Change](#)
- [Extreme Heat: What You Can Do to Prepare](#)
- [Arctic Methane and Black Carbon](#)
- [National Climate Assessment](#)
- [U.S. Global Change Research Program](#)
- [NOAA Climate.gov](#)
- [NASA Climate Change](#)
- [Climate Change at the National Academies](#)

❹ Additional Climate Change Resources:

- [National Climate Assessment](#)
- [U.S. Global Research Program](#)
- [National Institute of Environmental Health Sciences](#)

❺ GlobalClimate.gov

Understand Climate Change

Explore Regions & Topics

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Follow News & Updates

Engage Connect & Participate

BROWSE & FIND > REPORTS LIBRARY

Global Climate Change Impacts in the United States

VIEW ADD TO CART

OTHER REPORTS

SAP 3.3. Weather and Climate Extremes in a Changing Climate

Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change. Overview.

SAP 5.1. Uses and Limitations of Observations, Data, Forecasts, and Other Projections in Decision Support for Selected Sectors and Regions.

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CLIMATE CHANGE AT THE NATIONAL ACADEMIES

Home Reports Studies in Progress Resources News Archive Past Events About

The Power of Change: Innovation for Development and Deployment of Increasingly Clean Electric Power Technologies (2016)

A new report from the National Academies' Board on Science, Technology, and Economic Policy asks an important question: rather than trade affordability and reliability for low emissions, is there a way to balance all three?

View full post

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Upcoming Events

Anthropogenic Methane Emissions in the United States—First Meeting

January 25–26, 2017

National Academy of Sciences Building

2100 C St. NW

Washington D.C.

Call for Nominations: Review of SOCCR-2

The Carbon Cycle Interagency Working Group, via the U.S. Carbon Cycle Science Program, under the auspices of the U.S. Global Change Research Program, is leading the development of the 2nd State of the Carbon Cycle Report (SOCCR-2) as a product of the Sustained National Climate Assessment. A new ad hoc committee of the Academies will conduct an independent review of the SOCCR-2 draft report, which will be available in early 2017. The committee will conduct this review concurrent with the public review period and will produce a report.

The focus of SOCCR-2 is on the scientific understanding of U.S. and North American carbon cycle stocks and

Tweets by @NASEM_Climate

Offsite Links are not consistently indicated (2 of 2)

Earth's climate is changing

The global average temperature has increased by more than 1.5°F since the late 1800s.^[2] Some regions of the world have warmed by more than twice this amount. The buildup of greenhouse gases in our atmosphere and the warming of the planet are responsible for other changes, such as:

- Changing [temperature and precipitation patterns](#) ^{[1][2]}
- Increases in [ocean temperatures, sea level, and acidity](#)
- Melting of [glaciers and sea ice](#) ^[1]
- Changes in the frequency, intensity, and duration of [extreme weather events](#)
- Shifts in [ecosystem characteristics](#), like the length of the growing season, timing of flower blooms, and migration of birds
- Increasing effects on [human health and well-being](#)

Learn more about the [indicators of climate change](#).

Related Links

- USGCRP: [National Climate Assessment, 2014](#)
- USGCRP: [Global Climate Change Impacts in the United States](#)
- NRC: [America's Climate Choices Reports](#) EXIT
- IPCC: [Fifth Assessment Report](#) EXIT
- IPCC: [Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation](#) EXIT

On other pages, explicit labels are provided for some ❶, but not all ❷, links to external sites. Visitors may assume that the unlabeled links lead to pages within EPA.gov.

Recommendation: Ensure visitors are consistently forewarned of external links via explicit textual messaging adjacent to the link.

Expected Location

Recommendations

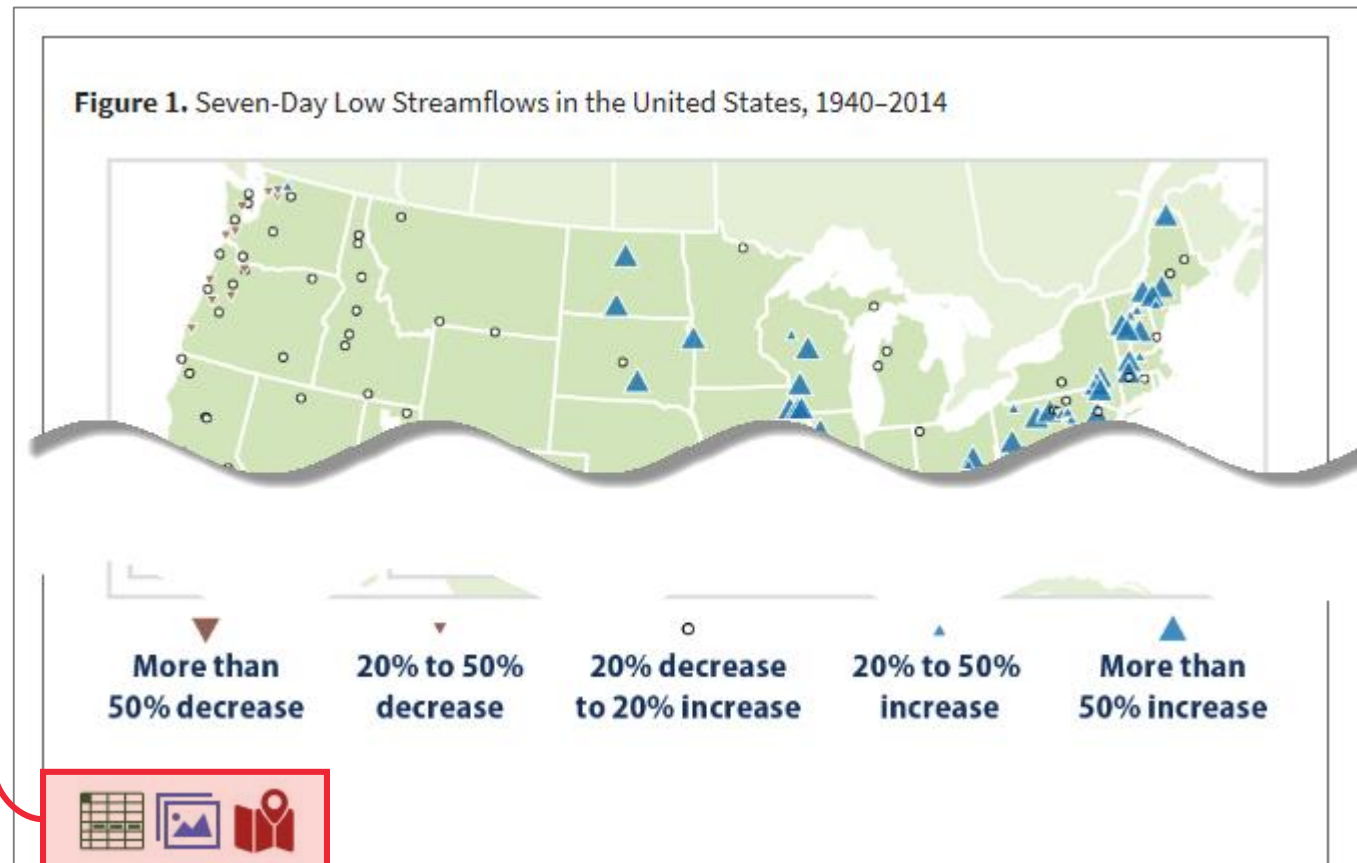
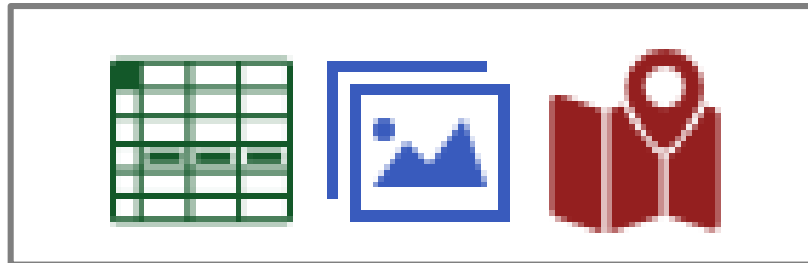
- Ensure visitors are consistently forewarned of external links via explicit textual messaging adjacent to the link.

Link Execution

Linked icons require text labels

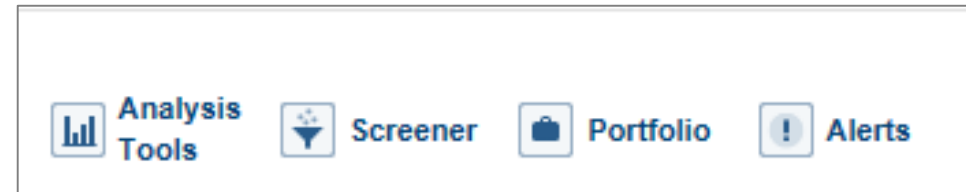
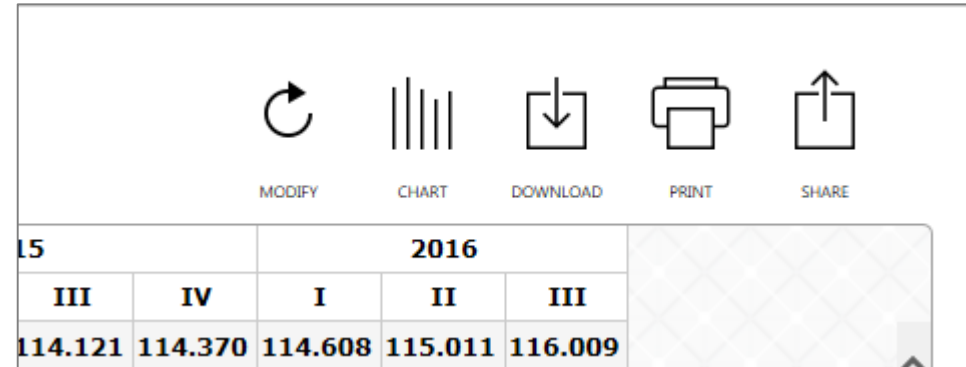
The data graphs in the Indicators section provide a group of linked icons which allow visitors to download the data or image, or to interact with the map. However, these icons lack text labels. As a result, visitors must experiment with clicking on the links simply based upon their interpretation of each icon's meaning. This places an undue cognitive burden on visitors, and needlessly risks misinterpretations which result time-wasting trial and error. While icons can help visitors identify the best link, they must not replace text labels.

Recommendation: Provide text labels that accurately describe the destination page for all linked icons.

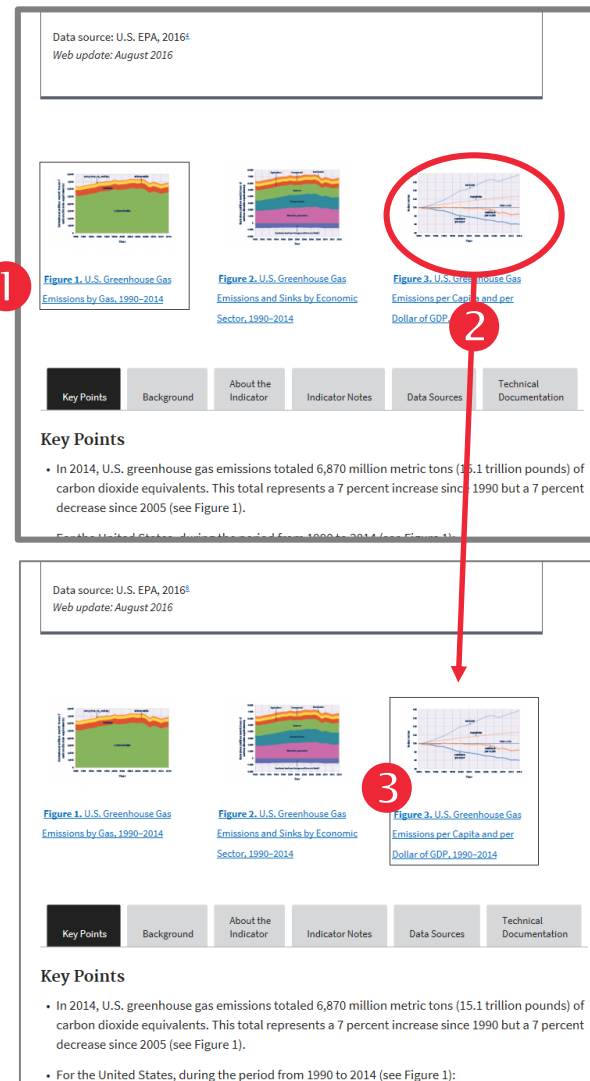
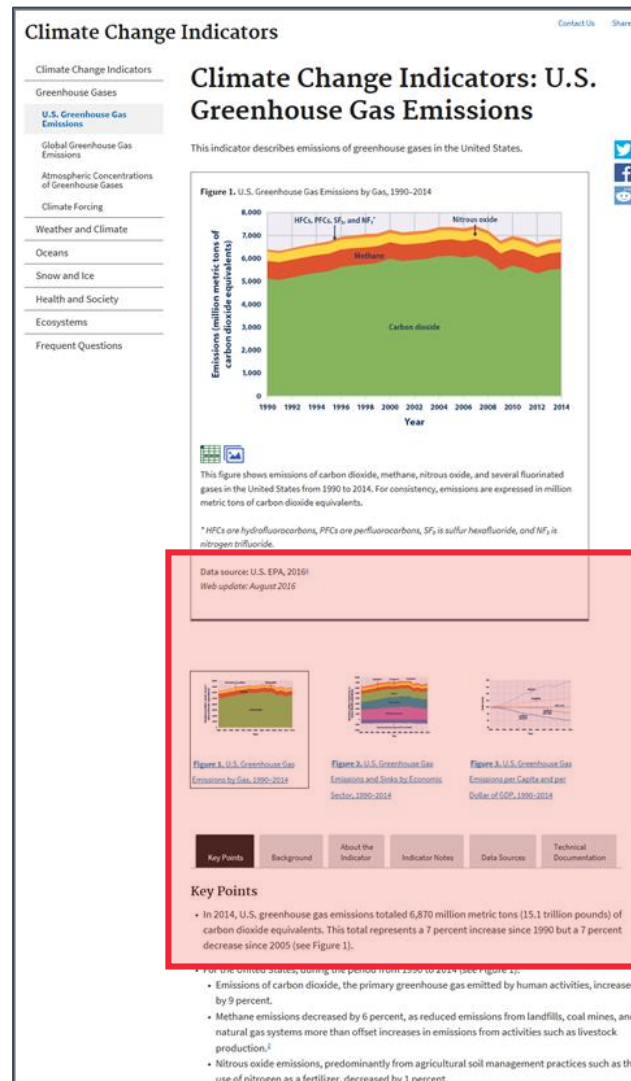


Icon labels: Best practice

These sites combine icons and text to create labels that are informative and memorable.



Purpose of linked thumbnails is unclear



Also on the Indicators pages, thumbnails of alternate data figures are provided ❶. Although clicking on a thumbnail ❷ loads the associated figure, visitors may miss this interaction, since the focus of the page does not change. In some instances, the only perceptible change is the altered highlight ❸. Visitors may assume that the functionality does not work, and miss useful content.

Instead, the link should also return the focus to the top of the graph to orient visitors to the new content and allow them to begin consuming the information.

Recommendation: Ensure newly loaded content is visible by moving the focus to the top of the data figure on the Indicators pages.

Link Execution

Recommendations

- Provide text labels that accurately describe the destination page for all linked icons.
- Ensure newly loaded content is visible by moving the focus to the top of the data figure on the Indicators pages.

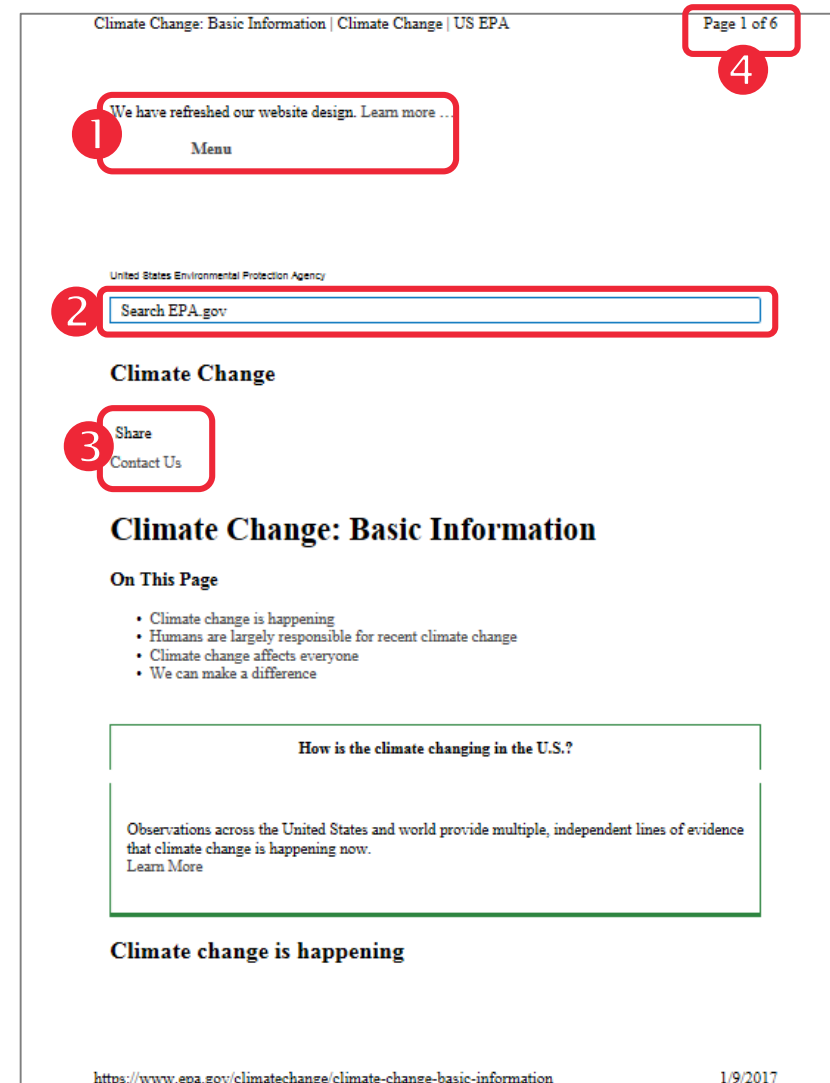
Print and Email

Pages lack explicit Print functionality

Visitors often want to print content pages for review offline, for their own personal use, or for the use of others. However, the site does not provide explicit Print functionality on content pages. When visitors use the browser's Print functionality, the result is a printout that fails to format the content correctly. As shown, navigational elements ❶ ❷ ❸ are included, resulting in a six-page document ❹. Instead, the printout should include properly formatted text for only the main body content, and be free of navigation and other page elements.

Recommendations:

- Provide explicit print functionality on all pages.
- Ensure printed pages are properly formatted and free of extraneous page elements.



Email functionality is missing

Michigan Food Assistance Program

Managing Agency
Michigan

Program Description

The goal of the Food Assistance Program (FAP) is to contribute to hunger and malnutrition. FAP administrative costs are shared equally between the state and local agencies.

FAP benefits are not considered income or assets for other assistance for which a FAP household is eligible. FAP benefits can be used to buy eligible food items at any Food Assistance Program (FAP) approved retailer. FAP benefits include: 1) Any food or beverage product intended for immediate consumption, and 2) Special Milk Program.

General Program Requirements

In order to qualify, you must have an annual household income at or below the following levels:

Household Size*	Maximum Income Level (Per Year)
1	\$15,444

Email to a Friend

Page to be sent: Michigan Food Assistance Program

Your Name *

Email to: *

Add a personal message: *

(5,000 character limit)

Reset **Submit**

Print **Email**

1 **2**

Visitors often want to share content via email, yet the site does not provide access to Email functionality. This limits their ability to share information once they have found it. Without Email functionality, visitors must resort to copying the page's URL, shown in the browser, opening their email program, and pasting the address into new email message. In contrast, best practice is to provide an explicit link or icon that opens pop-up window or layer offering a form which visitors may complete to easily share the page they are viewing.

This site provides persistent and prominent access to email and print functionality on content pages **1**. The Email link causes a pop-up window to appear **2**, containing a form that allows visitors to easily share the link with others and then return to browsing the site.

Recommendation: Provide an explicit link or icon that opens a pop-up window offering a form visitors may fill in to easily email the page they are viewing.

Print and Email

Recommendations

- Provide explicit print functionality on all pages.
- Ensure printed pages are properly formatted and free of extraneous page elements.
- Provide an explicit link or icon that opens a pop-up window offering a form visitors may fill in to easily email the page they are viewing.

Agenda

- Overview of Usability Audit Review
- Top Usability Issues
- › **Bottom Line**

Bottom Line

The Climate Change section can facilitate visitor tasks by strengthening awareness and understanding of the categories through providing clear descriptions and linkage to them on the Climate Change Home page.

Additionally, implementing consistent and complete local navigation menus throughout the section will further support this effort.



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Appendix

Substitute navigation lists are inadequate

It appears that the Climate Change section attempts to compensate for the absence of local navigation by providing linkage to top-level categories in the right sidebar of most category pages. However, these lists are inadequate stand-ins for local navigation because: they do not appear on all category pages, they do not consistently list all categories, and they do not include linkage to subsequent pages in the current category. Furthermore, the heading is too general.

If this feature is to be maintained as a substitute for local navigation, it must:

- Include links to all top-level categories, as well as all subsequent pages of the current category
- Indicate through indentation or grouping the hierarchy of linked pages
- Be present on all category pages
- Include a descriptive heading, such as Climate Change Contents

Greenhouse Gas (GHG) Emissions

GHGs are gases that trap heat in the atmosphere.

[Learn more about GHGs »](#)

1 2 3 4

Contact Us Share

Climate Change

Explore all things climate—including:

- [Climate Change Home](#)
- [Climate Science](#)
- [Climate Change Impacts](#)
- [Climate Change Indicators](#)
- [What You Can Do](#)

Climate Change Science

What is the difference between climate change and global warming?
And between climate and weather?

[Find the answers »](#)

1 2 3 4

Contact Us Share

Climate Change

Explore all things climate—including:

- [Climate Change Home](#)
- [Greenhouse Gas Emissions](#)
- [What You Can Do](#)
- [What EPA Is Doing](#)

Where do you come from?

[Learn more »](#)

What do you want to add GHGs to our cut emissions.





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