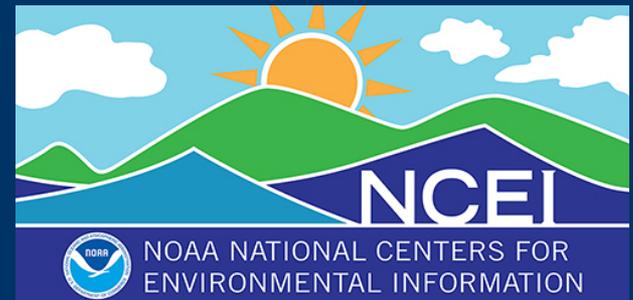


# Data Management: If it's good enough for the government, it's good enough for you

Brian Beck



NOAA  
**CORAL REEF**  
CONSERVATION PROGRAM

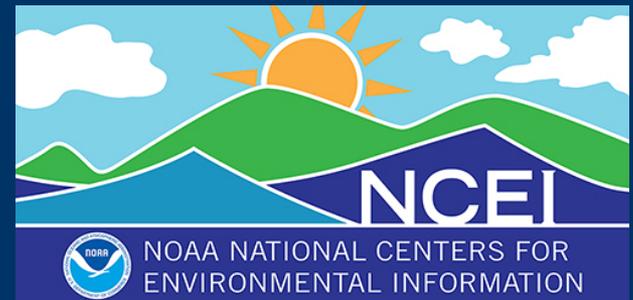


# Will your data be useful after you are dead?

Brian Beck



NOAA  
**CORAL REEF**  
CONSERVATION PROGRAM



# Take Home Message

- **Manage your data**
  - Make sure that someone can use your data without your involvement
- **Make your data accessible**
  - After a period of time (to be discussed later) make your data available to anyone who wants it

# CRCP Mission and Focus

- **Mission: To support effective**
- **management and sound science**
- **to preserve, sustain, and restore**
- **valuable coral reef ecosystems**
- **for future generations**



**We focus on the three biggest global threats:**

- **CRCP Goals and Objectives**
- **Grants and Cooperative Agreement Programs**

# Where We Work



## NOS

### NCCOS

- Atlantic Reef Monitoring
- Atlantic Mapping
- Water quality
- Coral Physiology

### OCM

- Grants Management
- Management Liaisons
- Socio-Economic Program Coordination
- NCRMP Coordination
- LBSP Coordination
- Climate Coordination
- International Program
- NOAA/USAID IAA

### ONMS

- Florida Keys NMS
- Flower Garden Banks NMS
- Fagatele Bay NMS
- Papahānaumokuākea MNM
- MPA Center

## NMFS

### PIFSC

- Pacific Reef Monitoring
- Pacific Reef Climate
- Pacific Mapping
- Socioeconomic Studies

### SEFSC

- Atlantic Reef Monitoring
- Coral Biology
- Fisheries Science
- Socioeconomic Studies

### PIRO

- Pacific Fishery Liaisons
- Watershed Restoration
- Local Capacity Building

### SERO

- Atlantic Fishery Liaisons
- ESA species recovery
- Education & Outreach
- Local Capacity Building

### OHC

- Program Coordination
- Coral & Watershed Restoration

## OAR

### AOML

- Atlantic Reef Climate
- Water Quality
- Coral Ecology and Fisheries Research

### OAP

- Climate and Reef Monitoring

### OER

- CRCP HQ Support

### PMEL

- Ocean Monitoring

## NESDIS

### NCEI

- CRCP Data Management
- CRCP HQ Support
- Coral Reef Information System (CoRIS)

### STAR

- Coral Reef Watch

# Federal Data Policy

- **Public Access to Research Results (PARR)**



The Obama Administration is committed to the proposition that citizens deserve easy access to the results of research their tax dollars have paid for. That's why, in a policy memorandum released today, OSTP Director John Holdren has directed Federal agencies with more than \$100M in R&D expenditures to develop plans to make the results of federally funded research freely available to the public—generally within one year of publication.

## Public Access to Results of Federally Funded Research at the U.S. Geological Survey



### National Institutes of Health Plan for Increasing Access to Scientific Publications and Digital Scientific Data from NIH Funded Scientific Research

February 2015

### Increasing Access to the Results of Research Funded by the National Science Foundation

National Science Foundation

March 18, 2015

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Home » U.S. Department of Energy Increases Access to Results of DOE-funded Scientific Research

## U.S. Department of Energy Increases Access to Results of DOE-funded Scientific Research

August 4, 2014 - 10:49am

### Public Access to Results of FDA-Funded Scientific Research

f SHARE t TWEET in LINKEDIN p PIN IT e EMAIL p PRINT





# NOAA PARR Requirements

- **Data access**
  - All data must be made available one year after the time of collection and made accessible until deemed unuseful
- **Data documentation**
  - Metadata and associated documentation
- **Data management plan**
  - All data should be covered by a data management plan
- **Publication policy**
  - All federally funded research publication will be made publicly available one year after publication

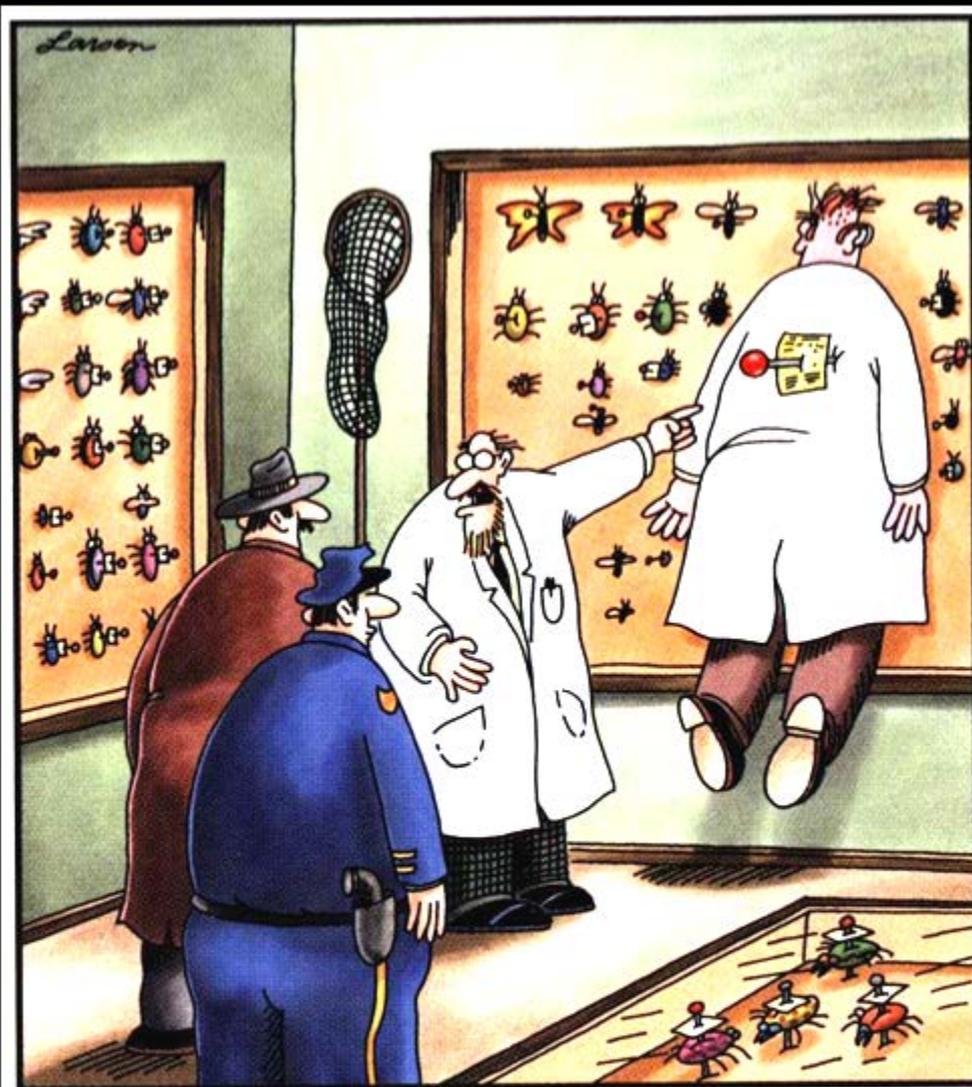


# What this all means

- Data must be archived and made accessible in a timely manner



- Proper metadata and documentation is needed to make the data understandable.



"Professor LaVonne had many enemies in the entomological world, detective, but if you examine that data label, you'll find exactly when and where he was—shall we say—'collected.'"

# Metadata

## Well Written Metadata is Required:

- **Think of metadata as legacy information. Your data is meaningless without it.**
- **You need metadata:**
  - So you won't forget how you collected and processed your own data
  - So information won't be lost when an employee/student leaves
  - So the data can be used again in the future
- **When done properly metadata answers a wide range of questions about a dataset ensuring it's reliable and continued use over a span of years.**

# Digital Object Identifiers (DOIs)

**Create the ability to not only cite specific data sets, but also track the citations the same way you would a journal article**

**Example Citation:**

**Ignatov, Alexander; Stroup, John D.; Kihai, Yury; Petrenko, Boris; Dash, Prasanjit; Sapper, John F. (2015). GHRSSST v2 Level 3U Global Skin Sea Surface Temperature from the Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi NPP satellite created by the NOAA Advanced Clear-Sky Processor for Ocean (ACSP0) (GDS version 2). NOAA National Centers for Environmental Information. Dataset. doi:10.7289/V5KK98S8 [access date]**



# National Centers for Environmental Information (NCEI)

NOAA's National Centers for Environmental Information (NCEI) are responsible for hosting and providing public access to one of the most significant archives for environmental data on Earth with over 20 petabytes of comprehensive atmospheric, coastal, oceanic, and geophysical data. [Read more about NCEI »](#)



## Center for Weather and Climate

NCEI's Center for Weather and Climate acquires, preserves, monitors, and assesses the Nation's treasure of climate and historical weather data and information.

[Weather and Climate](#)

## Center for Coasts, Oceans, and Geophysics

NCEI's Center for Coasts, Oceans, and Geophysics acquires, preserves, monitors, and assesses the Nation's treasure of coastal, oceanographic, and geophysical data and information.

[Coasts](#)

[Oceans](#)

[Geophysics](#)

## Find Data by Category

Access various data holdings from the Center for Weather and Climate and the Center for Coasts, Oceans, and Geophysics within NCEI.





## NOAA/NOS National Centers for Coastal Ocean Science (NCCOS) /Center for Coastal Ocean Science (CCMA) benthic habitat and fish community assessment, U.S. Virgin Islands, 2011-2012 (NODC Accession 0088018)



Preview graphic

These data were collected 2011-2012 from select locations on St. Thomas, St. Croix, and St. John (U.S. VI) in order to 1) to spatially characterize and monitor the distribution, abundance, and size of both reef fishes and macro-invertebrates (conch, lobster, Diadema); 2) to relate this information to in situ data collected on water quality and associated habitat parameters; 3) to use this information to establish the knowledge base necessary for enacting management decisions in a spatial setting; 4) to establish the efficacy of those management decisions; 5) to work with the National Coral Reef Monitoring Program to develop data collection standards and easily implemented methodologies for transference to other agencies and to work toward standardizing data collection throughout the U.S. states and territories; and to 6) conduct a baseline characterization of fish and benthic communities.

This work was variously conducted in collaboration with the Virgin Islands Department of Planning and Natural Resources, the Nature Conservancy, the University of Miami, the U.S. Department of Interior National Park Service and the University of the Virgin Islands.

These data include benthic habitat data (benthic coverage type, species, percent cover), reef fish survey data (habitat and species), and macroinvertebrate counts

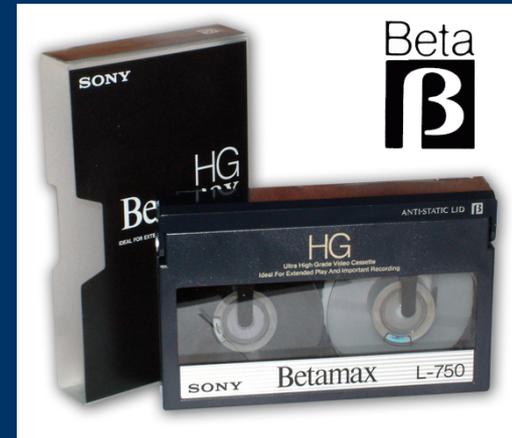
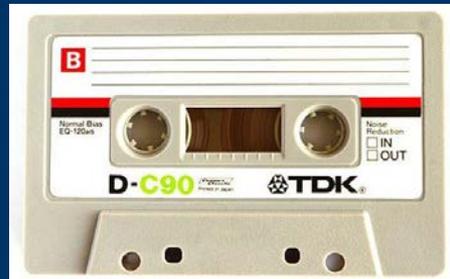
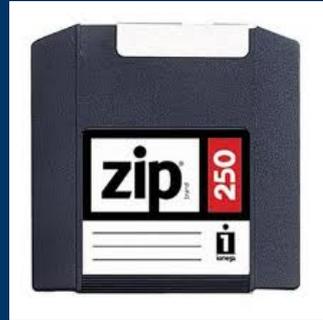
### Dataset Citation

Cite as: Hile, S. and US DOC; NOAA; NOS; National Centers for Coastal Ocean Science; Center for Coastal Monitoring and Assessment (2013). NOAA/NOS National Centers for Coastal Ocean Science (NCCOS) /Center for Coastal Ocean Science (CCMA) benthic habitat and fish community assessment, U.S. Virgin Islands, 2011-2012 (NODC Accession 0088018). Version 1.1. National Oceanographic Data Center, NOAA. Dataset. [access date]

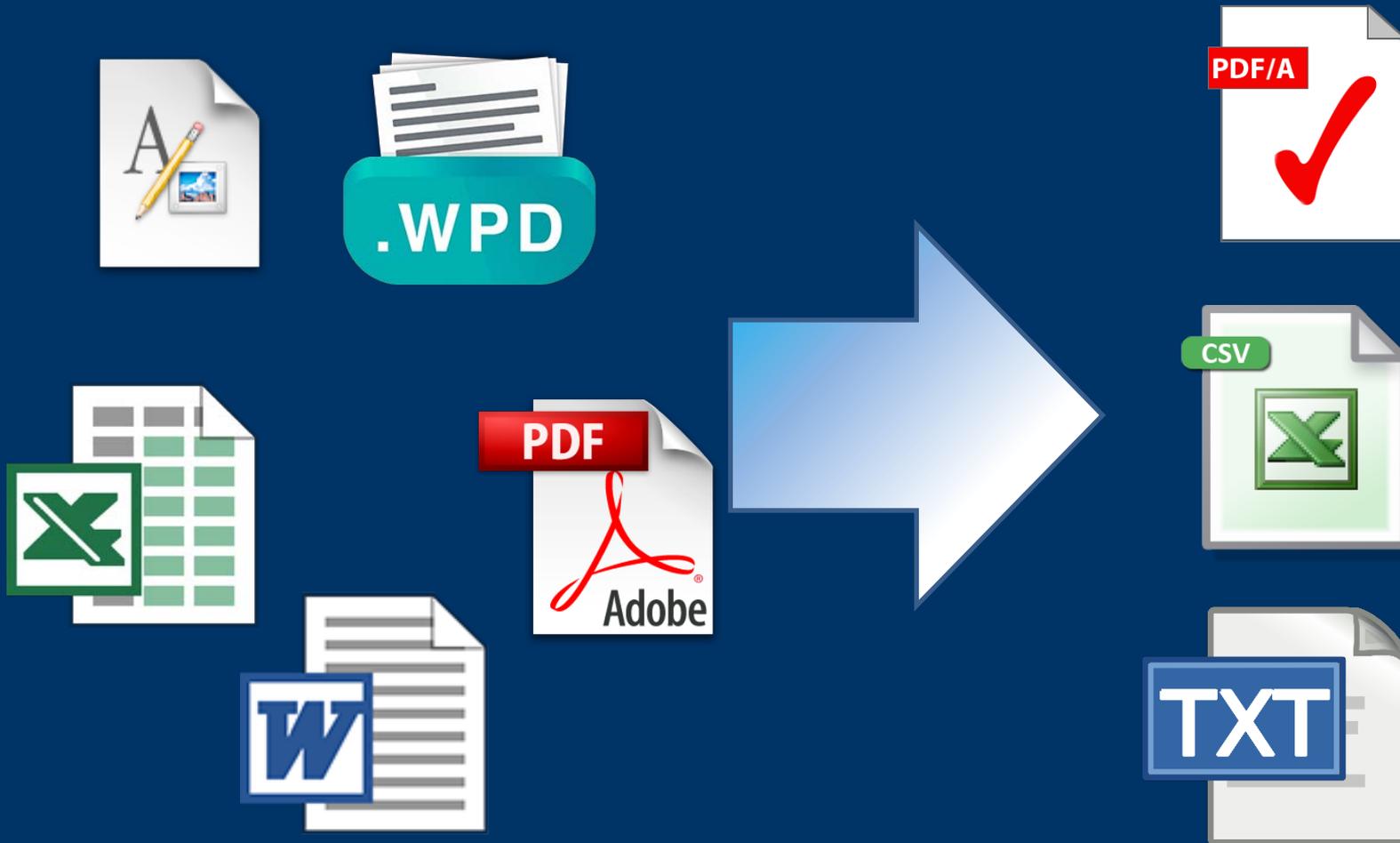
### Dataset Identifier(s)

ISO 19115-2 Metadata

# Avoiding Obsolescence



# Avoiding Digital Obsolescence



# File format recommendations

archives.gov/records-mgmt/policy/transfer-guidance-tables.html

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## Records Managers

Home > Records Management > Policy > Appendix A: Tables of File Formats

### Records Management Resources

- E-mail Management
- Records Management FAQs
- Memorandums to Agency Records Officers
- Federal Records Centers (FRC)
- Guidance and Policy for Accessioning
- Electronic Records Management (ERM)
- Toolkit for Managing Electronic Records
- Records Management Handbook
- Records Management Policy and Guidance
- Records Management Initiatives (RMI)
- Records Management Self Assessment (RMSA)
- Records Management Training
- Electronic Records Archives (ERA)
- Electronic Records Guidance
- Basic Laws & Authorities
- Meetings & Activities

## NARA 2014-04: Appendix A, Revised Format Guidance for the Transfer of Permanent Electronic Records – Tables of File Formats

**Quick Links**

1. Computer Aided Design	2. Digital Audio	3. Digital Moving Images
3.1 Digital Cinema	3.2 Digital Video	4. Digital Still Images
4.1 Digital Photographs	4.2 Scanned Text	4.3 Digital Posters
5. Geospatial Formats	6. Presentation Formats	7. Textual Data
8. Structured Data Formats	9. Email	10. Web Records

**Symbol Key**

- Preferred Formats (3 blue circles)
- Acceptable Formats (3 blue circles)
- Acceptable for Imminent Transfer Formats (1 blue circle)

### 1. Computer Aided Design (CAD)

www.digitalpreservation.gov/formats/fdd/descriptions.shtml

## Sustainability of Digital Formats Planning for Library of Congress Collections

Introduction | Sustainability Factors | Content Categories | Format Descriptions | Contact

Format Descriptions >> Format Description Categories >> [Browse Alphabetical List](#) >> [Format Descriptions as XML](#)

### Format Descriptions

<b>Still Image</b> <ul style="list-style-type: none"> <li>• <a href="#">SVG_1_1</a></li> <li>• <a href="#">TIFF_6</a></li> <li>• <a href="#">All still image format descriptions</a></li> </ul>	<b>Sound</b> <ul style="list-style-type: none"> <li>• <a href="#">WAVE</a></li> <li>• <a href="#">MP3_FF</a></li> <li>• <a href="#">All sound format descriptions</a></li> </ul>	<b>Moving Image</b> <ul style="list-style-type: none"> <li>• <a href="#">MPEG-4_FF_2</a></li> <li>• <a href="#">AVI</a></li> <li>• <a href="#">All moving image format descriptions</a></li> </ul>
<b>Textual</b> <ul style="list-style-type: none"> <li>• <a href="#">PDF/A</a></li> <li>• <a href="#">DOCX/OOXML_2012</a></li> <li>• <a href="#">All text format descriptions</a></li> </ul>	<b>Web Archive</b> <ul style="list-style-type: none"> <li>• <a href="#">ARC_IA</a></li> <li>• <a href="#">WARC</a></li> <li>• <a href="#">All Web archive format descriptions</a></li> </ul>	<b>Datasets</b> <ul style="list-style-type: none"> <li>• <a href="#">DBF</a></li> <li>• <a href="#">HDF5</a></li> <li>• <a href="#">All dataset format descriptions</a></li> </ul>
<b>Geospatial</b> <ul style="list-style-type: none"> <li>• <a href="#">ESRI_shape</a></li> <li>• <a href="#">GeoPDF_2_2</a></li> <li>• <a href="#">All geospatial format descriptions</a></li> </ul>	<b>Generic</b> <ul style="list-style-type: none"> <li>• <a href="#">ASF</a></li> <li>• <a href="#">RIFF</a></li> <li>• <a href="#">All generic format descriptions</a></li> </ul>	

**About the format descriptions**

The digital content format descriptions accessible here provide specific information about individual formats and their characteristics. Each description provides inclusion are a wide variety of formats: file formats, file-format classes, bitstream structures and encodings, and the mechanisms used to compress files or bitstreams. The format is preferred or acceptable for Library of Congress collections. Although presented here in HTML format, the descriptions are created in XML, and info [here](#).

Descriptions are drafted and added to the site individually rather than on a scheduled basis. The compilers encourage persons with specialized knowledge to [refer to the format to provide comments](#).

These descriptions will not only serve as a resource for selection and acquisition at the Library but will also support the preservation of digital content as a resource element of the [Open Archival Information System \(OAIS\)](#) reference model.

National Archives

Library of Congress



# Send 2 NCEI (S2N)

NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

formerly the National Oceanographic Data Center (NODC)... [more on NCEI](#)

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You are here: [Home](#) > [Submit Data](#) > New Submission Package

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## New Submission Package

Reference ID: GDUB1Y [Review](#)

People & Projects Dates & Locations Data Types Package Description Upload & Submit

**Responsible Persons:**

*principal investigator: Doe, John* [edit](#) | [remove](#)

\* **First Name:**

Middle Name:

\* **Last Name:**

\* **Role:**

E-mail:

Institution:

[Discard this entry](#)

**Related Funding Agencies:**

*US DOC; NOAA; NOS; Coral Reef Conservation Program (Coral Reef Conservation Program - CRCP)* [edit](#) | [remove](#)

\* Required fields are in red

Please click "Save Person" to add a person to your Submission Package. You can add multiple persons who should be recognized for their contribution to this data collection.



# Coral Reef Conservation Program (CRCP) Data

The **Coral Reef Conservation Program** is a partnership between the NOAA Line Offices that work on coral reef issues. We bring together expertise from across NOAA for a multidisciplinary approach to understanding and conserving coral reef ecosystems.

**Bridging Science to Policy: 13<sup>th</sup> International Coral Reef Symposium**

- Funding Opportunities
- Coral Reef Information System
- Coral Threats
- Corals in the News
- Coral FAQs
- Deep Sea Corals

**Featured Data**  
Reef Manager's Guide to Fostering Community Stewardship

**Spotlight on Coral Reefs**  
Podcast: Connecting the Dots Between Corals and Humans (Episode 135)

**Other Highlights**  
Earth Is Blue—What is coral bleaching and what can you do to help?

# Coral Reef Information Systems (CoRIS)

www.coris.noaa.gov

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION UNITED STATES DEPARTMENT OF COMMERCE

NOAA CORAL REEF

Coral Reef Information System

Home ▾ Data & Publications ▾ Regional Portals ▾ CRCP Activities ▾ Glossary ▾ Search

## CoRIS: Coral Reef Information System

CoRIS is the Coral Reef Conservation Program's (CRCP) information portal that provides access to NOAA coral reef information and data products with emphasis on the U.S. states, territories and remote island areas. NOAA Coral Reef activities include coral reef mapping, monitoring and assessment; natural and socioeconomic research and modeling; outreach and education; and management and stewardship.

Search CoRIS Data & Publications

### Highlights

**New!**

- Top 10 Things You Can Do Before, During, and After a Bleaching Event
- NOAA's National Coral Reef Monitoring Program
- Improvements to NOAA Coral Reef Watch's near-real-time satellite monitoring and modeled predictions of coral bleaching thermal stress globally and regionally
- The Coral Program's Watershed Management Activities
- NOAA Coral Reef Conservation Grant Program

[Glossary of Terminology Search](#)

[Acronyms and Abbreviation List](#)

### Featured Publications

Reef Manager's Guide to Fostering Community Stewardship

### Featured Data

- [NOAA Deep-Sea Coral Data Portal](#)
- [Tracking the Marine Aquarium Trade](#)
- [American Samoa Watershed and Coastal Mapping Project](#)
- [Seafloor Characterization of the U.S. Caribbean](#)
- [Coral Health and Monitoring Program \(CHAMP\) - Oceanographic & Meteorological Data](#)
- [Coral Reef Temperature Anomaly Database \(CoRTAD\)](#)

# Old Ways vs New Ways

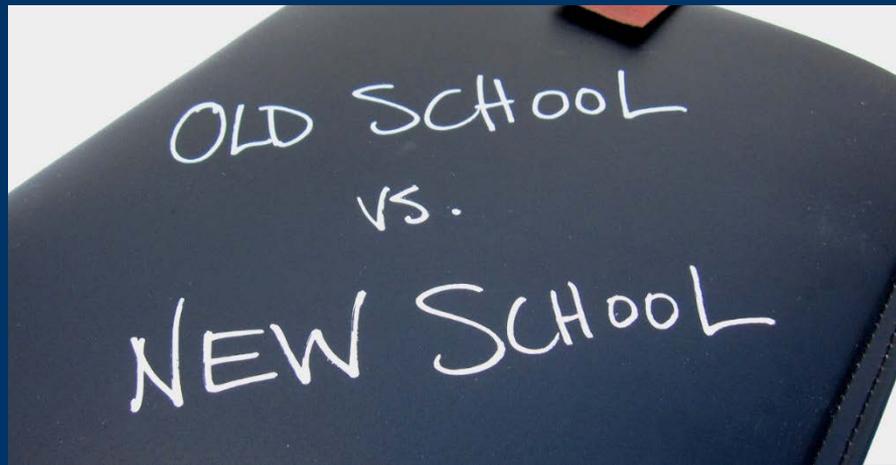
Come gather 'round people  
Wherever you roam  
And admit that the waters  
Around you have grown  
And accept it that soon  
You'll be drenched to the bone  
If your time to you is worth savin'  
Then you better start swimmin' or you'll  
sink like a stone  
For the times they are a-changin'

-Bob Dylan



# Publish vs Perish

- Hold onto your data and publish papers or your career will perish



- Publish your data or your paper will perish.

# Open Access in the News

“Biden unveiling public database for clinical data on cancer”

*Washington Post - June 6, 2016*



“Increasing the pool of researchers who can access data and decreasing the time it takes for them to review and find new patterns in that data is critical to speeding up development of lifesaving treatments for patients,”

-Joe Biden

The New York Times

AUSTRALIA

## Great Barrier Reef Hit by Worst Coral Die-Off on Record, Scientists Say

By MICHELLE INNIS NOV. 29, 2016



The Washington Post

Energy and Environment

# Why the death of coral reefs could be devastating for millions of humans



ALJAZEERA

SCIENCE & TECHNOLOGY

## Coral catastrophe: The fight to save our dying reefs



# Ideal World

- **All students should be taught basic data management before starting any graduate degree**
- **Researchers make data available within a reasonable amount of time after collection (no more than 2 years)**
- **Open Access long term storage of coral reef monitoring data with stable funding and simplified submission guidelines.**



# More Palatable Recommendations

- **Manage your data!**
  - Metadata
  - File names that make sense
  - What is needed to use the data in the future
- **Make all of your data available with as few hoops to jump through as possible.**

# Thank You

