

# GEO WEEK & MINISTERIAL SUMMIT 2023

Showcase Session



#TheEarthTalks



science & innovation

Department:  
Science and Innovation  
REPUBLIC OF SOUTH AFRICA



GEO WEEK  
2023 MINISTERIAL  
SUMMIT

GO GROUP ON  
EARTH OBSERVATIONS

# GEOValue: Assessing the Societal Impacts and Use of Earth Observation Data

07.11.2023

09:30 GMT/UTC



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#TheEarthTalks GEO WEEK & Ministerial Summit 2023

# Introduction to GEOValue

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Crista Straub and Shanna McClain

# WHAT IS GEOVALUE?

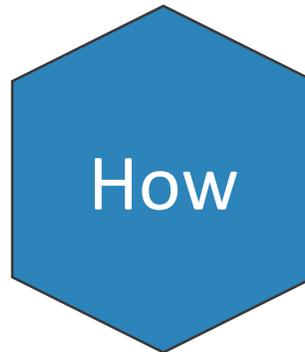


GEOValue is a multi-disciplinary international community pursuing evidence-based methodologies to assess the use and value of Earth Observations (EO).

EO contributes to the evidence-base for decisions by various sectors. Expanding our understanding of the socio-economic benefits of EO will lead to more effective use and promotion of this information.

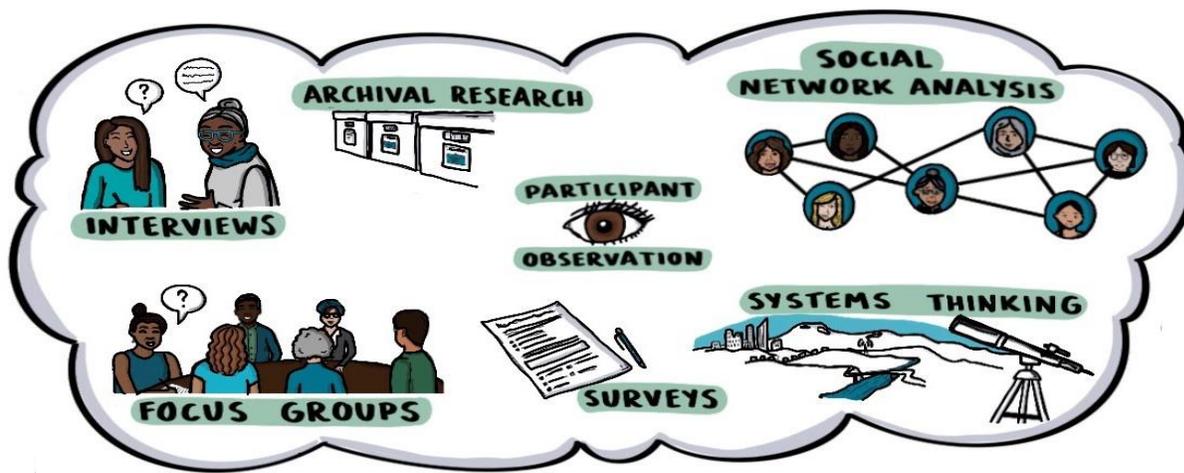


GEOValue furthers the use of socio-economic evidence through working groups, case studies, sharing best practices in methodology, peer-reviewed publications and a structured repository to guide practitioners in the assessment of Earth Observation impacts.



# WHAT WE DO

- Focus on the value and socioeconomic impacts of Earth science information for societal benefit
- Opportunities for collaboration and publication
  - Studies conducted by GEOValue members
  - Shared approaches and opportunities for learning assessments across GEO projects and thematic area
- Transitioning to foundational task of GEO to benefit the broader GEO and CEOS communities



# Value of Landsat Assessment



**Nihimá Nahasdzáán**  
The Art of Mother Earth Gallery Event  
APRIL 4, 2023 - 5 PM to 7 PM MDT

**Navajo Nation Museum**  
FREE FOOD, BINGO, DOOR PRIZES, & FAMILY ACTIVITIES!  
The Navajo Nation has thousands of miles of beautiful landscapes. From the top of the Chuska Mountains to the valleys of Monument Valley, communities are interacting with their environment. We see the landscapes from the ground everyday. Have you ever wondered what the landscapes look like from the sky? Are you curious about the changes the land experiences and how they can impact our lives?

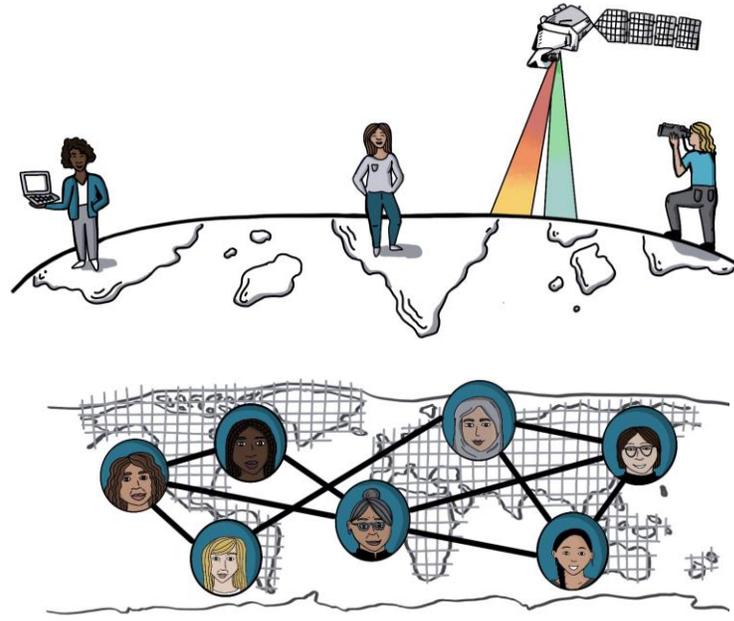
Come and join us to see the views of Nihimá Nahasdzáán that are captured from space. What does the satellite story tell?

USGS NASA AmericaView WWF Google



2006  
2022  
USGS

**Storytelling**



frontiers | Frontiers in Environmental Science

REVIEW  
SUBMITTED: 13 May 2022  
DOI: 10.3389/fenv.2022.832424

**Value of Information: Exploring Behavioral and Social Factors**

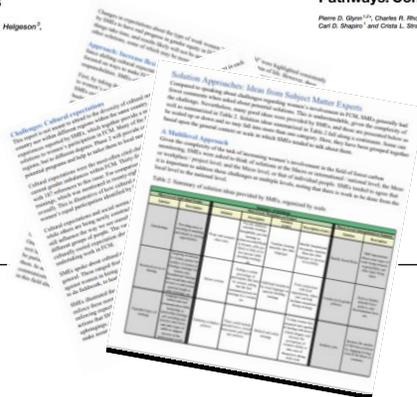
Pierre D. Glaser<sup>1,2\*</sup>, Scott J. Chavers<sup>1</sup>, Charles R. Rhodes<sup>1</sup>, Jennifer F. Helgeson<sup>1</sup>, Carl D. Shapiro<sup>1</sup> and Crista L. Straub<sup>1</sup>

frontiers | Frontiers in Environmental Science

REVIEW  
SUBMITTED: 21 May 2022  
DOI: 10.3389/fenv.2022.832424

**Value of Information and Decision Pathways: Concepts and Case Studies**

Pierre D. Glaser<sup>1,2\*</sup>, Charles R. Rhodes<sup>1</sup>, Scott J. Chavers<sup>1</sup>, Jennifer F. Helgeson<sup>1</sup>, Carl D. Shapiro<sup>1</sup> and Crista L. Straub<sup>1</sup>




**USGS NASA**  
science for a changing world

**Enduring and Increasing Economic Value of Landsat**  
The Landsat series of Earth-observing satellites provides critical information about the Earth's surface.

**GOLD STANDARD**  
Landsat is the worldwide reference for imagery calibration, adding value and reliability to Earth-observing satellite systems.

**UNDERSTANDING CHANGE**  
Landsat's imagery provides a landscape-level view of Earth that enables us to better understand the scope, nature, and speed of change to the natural and built environment.

**WIDE-RANGING USES**  
Business, government, nonprofit, and academic users place a high value on Landsat data for various applications.

**SOCIETAL BENEFIT**  
Landsat data contribute to decisions about land, water, and resource use that protect life, property, and the environment; advance science, technology and education; and grow the U.S. economy.

**VISIT USGS**  
<https://landsat.usgs.gov>

**Users VALUE Landsat more each year**

**\$3.45 BILLION 2017** economic benefit in 2017  
**\$2.19 BILLION 2011** economic benefit in 2011

INTERNATIONAL: \$399 million (2011), \$1.39 billion (2017)  
UNITED STATES: \$1.79 billion (2011), \$2.08 billion (2017)

**95+ MILLION DOWNLOADS**

2008: +1, 2009: +3, 2010: +2, 2011: +2, 2012: +3, 2013: +2, 2014: +2, 2015: +10, 2016: +20, 2017: +20, 2018: +10, 2019: +16

\*Free data policy started 2008; downloads jumped from 12,000 in 2008 to 1+ million in 2009.

Landsat is a joint program of the U.S. Geological Survey (USGS) and the National Aeronautics and Space Administration (NASA). NASA oversees satellite construction and launch. The USGS directs Landsat flight operations; coordinates the ground receiving station network; and manages the acquisition, production, calibration, validation, and distribution of Landsat data and derived products for users worldwide.

U.S. Department of the Interior  
U.S. Geological Survey

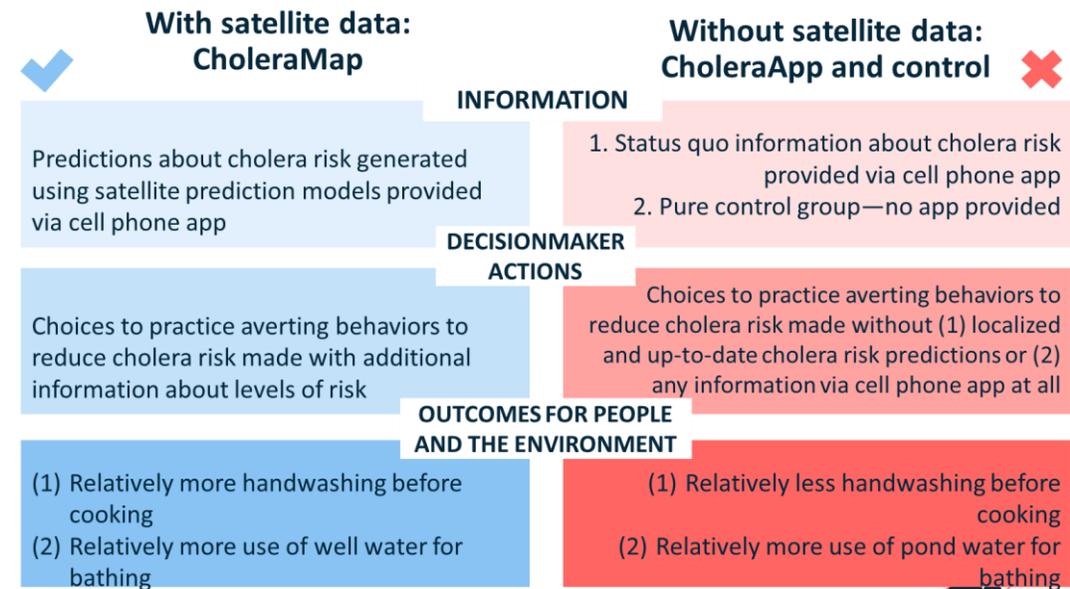
# The VALUABLES Consortium

A cooperative agreement between RFF and NASA to measure and communicate how satellite information benefits people and the environment when we use it to make decisions

- **Satellite data:** Cholera risk predictions use
  - IMERG rainfall observations
  - TRMM/GPM rainfall anomaly
  - SERVIR NMME rainfall forecast
  - MODIS land surface temp.
  - SRTM land surface elev.
  - SEDAC population density



- **Method:** Field experiment with control & treatment communities
- **PI Sonia Aziz, Moravian College;** Emily Pakhtigian, Penn State University; Ali Akanda, University of Rhode Island; Kevin Boyle, Virginia Tech





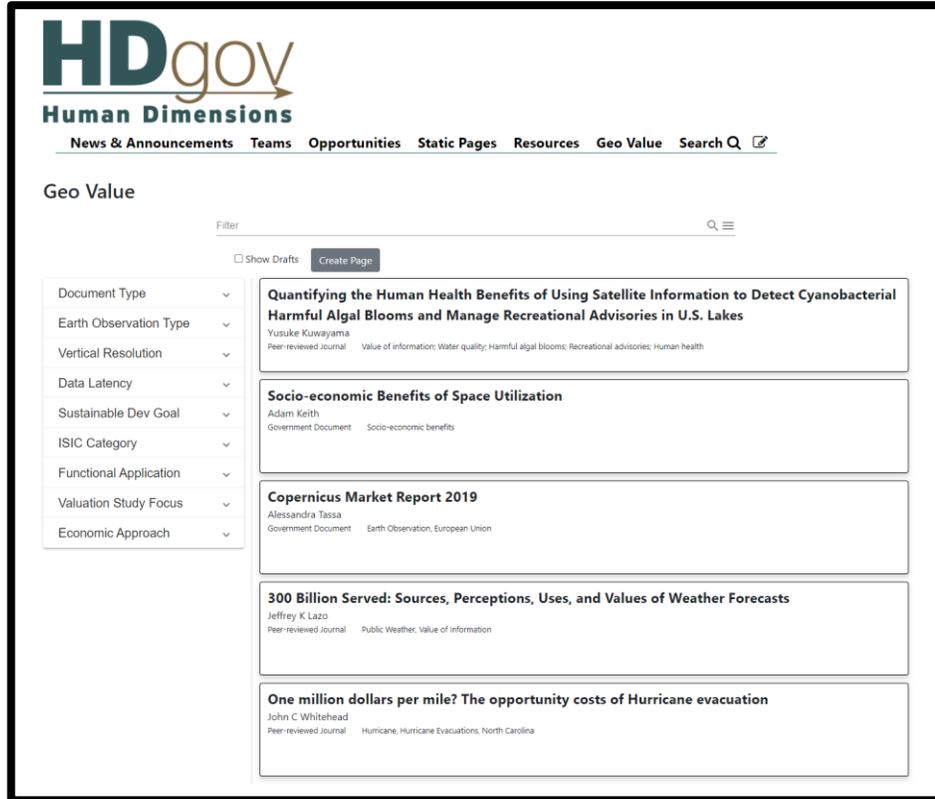
## Collaborative Network for Valuing Earth Information

- A network dedicated to understanding how the use of Earth observations can help protect our planet and promote social justice
- This five-year consortium will:
  - Create diverse teams to advance the methods for valuing the benefit of Earth science information to society;
  - Build a community of practice for the exchange of ideas and approaches toward shared learning; and
  - Enable technical and capacity exchanges across Earth science, social science, and practitioner communities to create the future generations of transdisciplinary approaches to valuing Earth science information.

[Join the Network!](#)

\*or reach out to  
[shanna.n.mcclain@nasa.gov](mailto:shanna.n.mcclain@nasa.gov) for  
more information





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Geo Value

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- Document Type
- Earth Observation Type
- Vertical Resolution
- Data Latency
- Sustainable Dev Goal
- ISIC Category
- Functional Application
- Valuation Study Focus
- Economic Approach

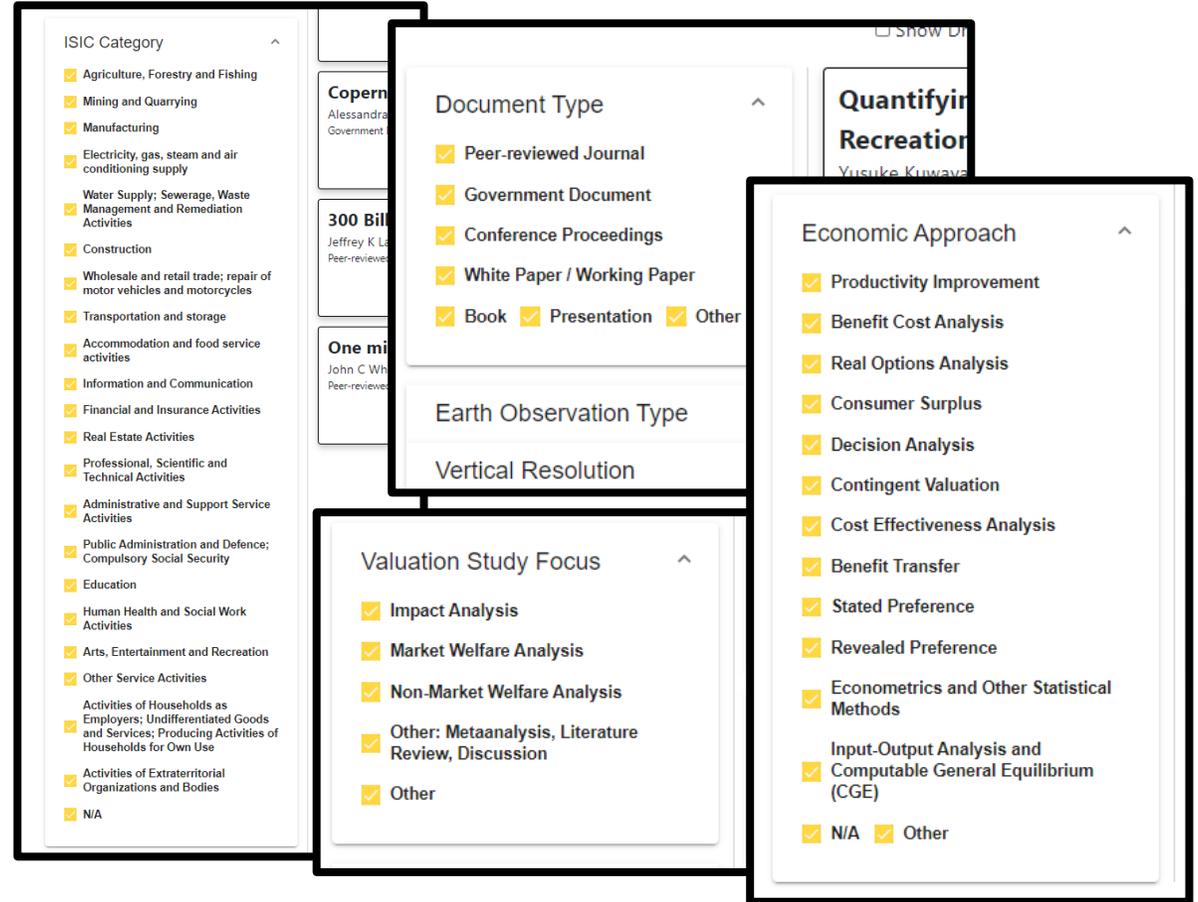
**Quantifying the Human Health Benefits of Using Satellite Information to Detect Cyanobacterial Harmful Algal Blooms and Manage Recreational Advisories in U.S. Lakes**  
Yusuke Kuwayama  
Peer-reviewed Journal Value of information; Water quality; Harmful algal blooms; Recreational advisories; Human health

**Socio-economic Benefits of Space Utilization**  
Adam Keith  
Government Document Socio-economic benefits

**Copernicus Market Report 2019**  
Alessandra Tassa  
Government Document Earth Observation, European Union

**300 Billion Served: Sources, Perceptions, Uses, and Values of Weather Forecasts**  
Jeffrey K Lazo  
Peer-reviewed Journal Public Weather, Value of information

**One million dollars per mile? The opportunity costs of Hurricane evacuation**  
John C Whitehead  
Peer-reviewed Journal Hurricane, Hurricane Evacuations, North Carolina



**ISIC Category**

- Agriculture, Forestry and Fishing
- Mining and Quarrying
- Manufacturing
- Electricity, gas, steam and air conditioning supply
- Water Supply; Sewerage, Waste Management and Remediation Activities
- Construction
- Wholesale and retail trade; repair of motor vehicles and motorcycles
- Transportation and storage
- Accommodation and food service activities
- Information and Communication
- Financial and Insurance Activities
- Real Estate Activities
- Professional, Scientific and Technical Activities
- Administrative and Support Service Activities
- Public Administration and Defence; Compulsory Social Security
- Education
- Human Health and Social Work Activities
- Arts, Entertainment and Recreation
- Other Service Activities
- Activities of Households as Employers; Undifferentiated Goods and Services; Producing Activities of Households for Own Use
- Activities of Extraterritorial Organizations and Bodies
- N/A

**Document Type**

- Peer-reviewed Journal
- Government Document
- Conference Proceedings
- White Paper / Working Paper
- Book  Presentation  Other

**Earth Observation Type**

**Vertical Resolution**

**Valuation Study Focus**

- Impact Analysis
- Market Welfare Analysis
- Non-Market Welfare Analysis
- Other: Metaanalysis, Literature Review, Discussion
- Other

**Economic Approach**

- Productivity Improvement
- Benefit Cost Analysis
- Real Options Analysis
- Consumer Surplus
- Decision Analysis
- Contingent Valuation
- Cost Effectiveness Analysis
- Benefit Transfer
- Stated Preference
- Revealed Preference
- Econometrics and Other Statistical Methods
- Input-Output Analysis and Computable General Equilibrium (CGE)
- N/A  Other



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# Examples from Digital Earth Africa

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Fairah Naidoo

Digital Earth Africa (DE Africa) is the only Earth observation platform offering free, open-source data and products for the entire African continent and is now the world's largest Open Data Cube implementation.

We continue to demonstrate the impact and benefits of Earth observation data for Africa with exceptional examples from the user community showcasing data-driven decision making and changes.

We have a range of collaborative projects focused on food security and landcover mapping. Our partners included the UN Food and Agricultural Organisation, the Australian Centre for International Agricultural Research. We have strong continued collaboration with many partners, including the UN Economic Commission for Africa and the GEO

## **Impact stories from our user community**

- EO for Coastline Erosion Monitoring in Saly-Portudal/Senegal
  - Identifying and analysing irrigated agriculture in Mozambique
-

## Impact stories from our user community

- Digital Earth Africa helps to remotely assess the productivity of mango farms in Ghana
- Creating an open-source framework for crop-type mapping in Zambia
- Planned grazing management in Northern Kenya
- DE Africa won the GEO Week 2022 Sustainable Development Goal Award for Climate Action for the project “How data and community can save Zanzibar’s Mangroves”



# Opportunities for GEOValue in the GEO Community

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Marié Smith

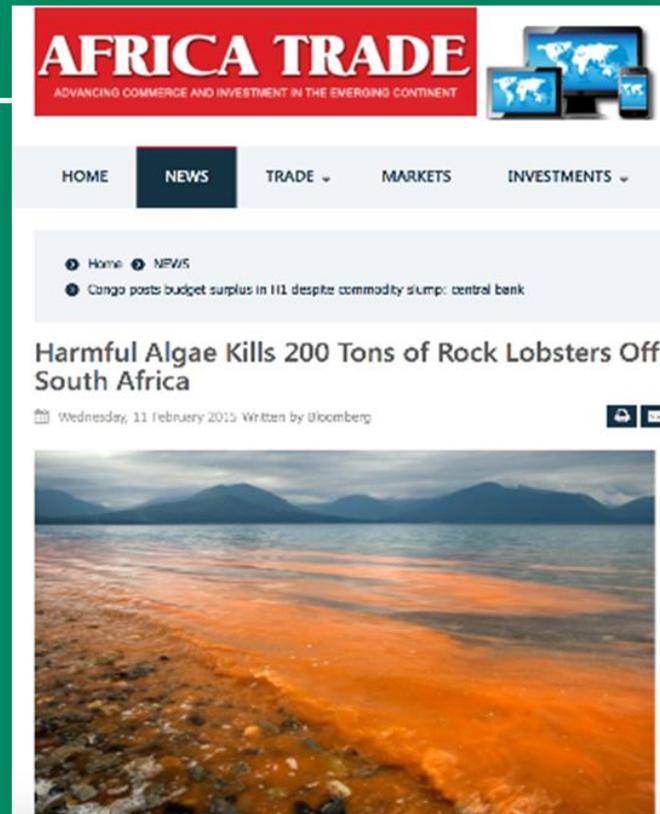


# RED TIDE

## DEVASTATES SOUTH AFRICAN ABALONE FARMS

*Dr. Anna Mouton, BVSc, MSc*

South African abalone farms suffered devastating losses due to a harmful algal bloom earlier this year. Three farms situated in Hermanus, on the South coast, lost up to 50 percent of their stock. These farms held an estimated 24 million abalone, or a third of the total South African farmed abalone population.

**AFRICA TRADE**  
ADVANCING COMMERCE AND INVESTMENT IN THE EMERGING CONTINENT

HOME NEWS TRADE MARKETS INVESTMENTS

Home NEWS  
Congo posts budget surplus in H1 despite commodity slump: central bank

**Harmful Algae Kills 200 Tons of Rock Lobsters Off South Africa**  
Wednesday, 11 February 2015 Written by Bloomberg



News > South Africa > Wcape

### Red Tide outbreak on Garden Route

WESTERN CAPE / 15 December 2015, 8:22pm

Jabulile S. Ngwenya

Cape Town - An outbreak of Harmful Algal Bloom (HAB), also known as Red Tide, has been confirmed along the Garden Route coastal area, the Department of Environmental Affairs (DEA) announced on Tuesday.

DEA spokesperson Zolile Nqayi said some of the HAB-affected areas along the coastal route included popular tourist spots Plettenberg Bay, Knysna and Wilderness.



A policeman watches crayfish walk out of the sea at Elands Bay due to a Red Tide. File

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6-10 NOVEMBER

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