# Nutrient Decision Support System (NDSS)

## eRAMS

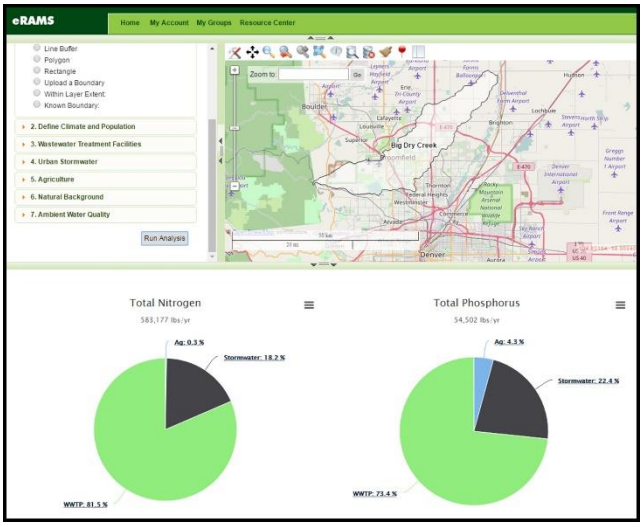
The **Environmental Resource Assessment and Management System (eRAMS)** is an open source technology that provides cloud-based software solutions as online services and a platform for development and deployment of online tools.

Version control and platform requirements are often barriers to widespread adoption of new technologies.

We develop platform independent software to access analytical and "big" data management systems. eRAMS streamlines access to publicly available databases and simplifies workflows.

Our software holistically integrates data and models to comprehensively assess water, land, energy and other linked systems.

Our services are used to assist with strategic and tactical decision making for sustainable management of land, water, energy and other connected resources.




- Assess nutrient contributions from various sources
- Identify optimal nutrient control strategies
- Explore potential effects of incentives, trading and policy alternatives

The eRAMS nutrient management portfolio was created to assist watershed managers in determining the most effective ways to reduce harmful nutrient loadings from a watershed. Currently, the portfolio evaluates management options for wastewater, stormwater and agricultural operations in Colorado.

The Nutrient Decision Support System (NDSS) was developed by the One Water Solutions Insitute's CLEAN Water Pollution Control Center in partnership with the U.S. EPA and Colorado Department of Public Health and Environment (CDPHE) to help watershed managers analyze scenarios to implement nutrient abatement requirements from Colorado Nutrients Management Control Regulation 85.

The NDSS web-tool enables assessment of nutrient contributions from various sources, identification of optimal nutrient control strategies, and potential effects of incentives, trading, and policy alternatives.

A user can analyze nutrient management scenarios in a specified area ranging in size from a HUC-12 watershed up to a regional-scale analysis. Users can also input their own data and upload various land use configurations to analyze future growth scenarios.

ONE WATER SOLUTIONS INSTITUTE

CATENA ANALYTICS

## CATENA ANALYTICS

Catena Analytics provides powerful platforms for building accessible and scalable analytical tools and simulation models that can be accessed via desktop or mobile devices.

Our **Environmental Resource Assessment and Management System (eRAMS)** and **Cloud Services Integration Platform (CSIP)** present several options for developing collaborative projects and integrating geospatial data, analytics, and modeling engines.

### ACCESSIBLE

Your documents, data and tools can be accessed from commonly used web-browsers on mobile or desktop devices.

### SCALABLE

Our sophisticated distributed storage and computing techniques provide the scalability and availability necessary to serve a broad range of needs.

### SECURE

We provide state-of-the-art data protection solutions and instant access to digital resources using a secure user account.

# Key Features

The Nutrient Decision Suport System (NDSS) summarizes contributions from urban stormwater, wastewater treatment facilities, irrigated agriculture, and background and compares them against instream nutrient loads for available stream monitoring stations. The dashboard is currently on version 1.1 with irrigated agriculture data available for the South Platte, Republican, and Arkansas River basins in Colorado. The remaining data is available state wide. The dashboard is used by the Colorado Department of Public Health and Environment and other stakeholders for nutrient control in watersheds across the State. More information is available at: https://erams.com/catena/tools/nutrient-control/

## DATA

The Nutrient Decision Support System fetches live data from several publicly available datasets as well as regulatory data provided by the CDPHE through Regulations 85 and 31. Data sets utilized in analysis include:

- EPA's Water Quality Exchange (WQX)
- Parameter-elevation Regressions on Independent Slopes Model (PRISM)
- USGS National Land Cover Dataset (NLCD)
- Land-use and Agricultural Management Practices web-Service (LAMPS)
- USGS National Water Information System (NWIS)
- Colorado Decision Support System
- Colorado Dept. of Public Health and Environment – Regulatory Data (user supplied)

## RESULTS

The NDSS web-tool estimates total nitrogen and phosphorus (nutrient load) by source on an average annual basis. The following sources are included in the analysis:

- Urban stormwater
- Wastewater treatment facilities
- Agriculture
- Background

Graphical plots can be customized to examine and visualize:

- Management strategy scenario comparison
- Nutrient load sources

### TECHNICAL SUPPORT

Should you need additional assistance we are here to help! Contact an eRAMS expert to help guide you through any hurdles at:
eramsinfo@gmail.com

# System Requirements

A modern web-browser is required to connect and run the web-tool. Browser options include: Google Chrome v.69, Mozilla Firefox v.62, Safari v.11.1, and Microsoft Edge v.17.

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