

# Project 1: Albertine Rift Pipeline Analysis

ENVIRON 761

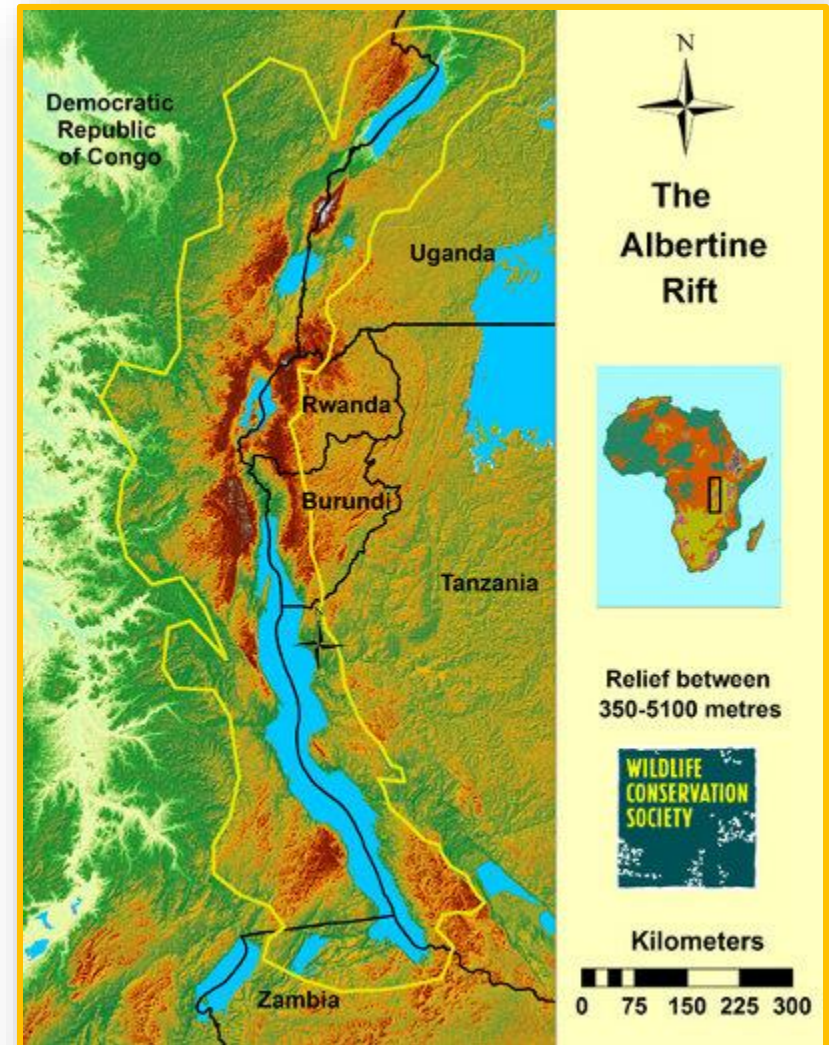
Geospatial Applications for  
Conservation & Land Management

# Section 1: Project-based GIS

## Impact analysis of two proposed oil pipelines in the Albertine rift



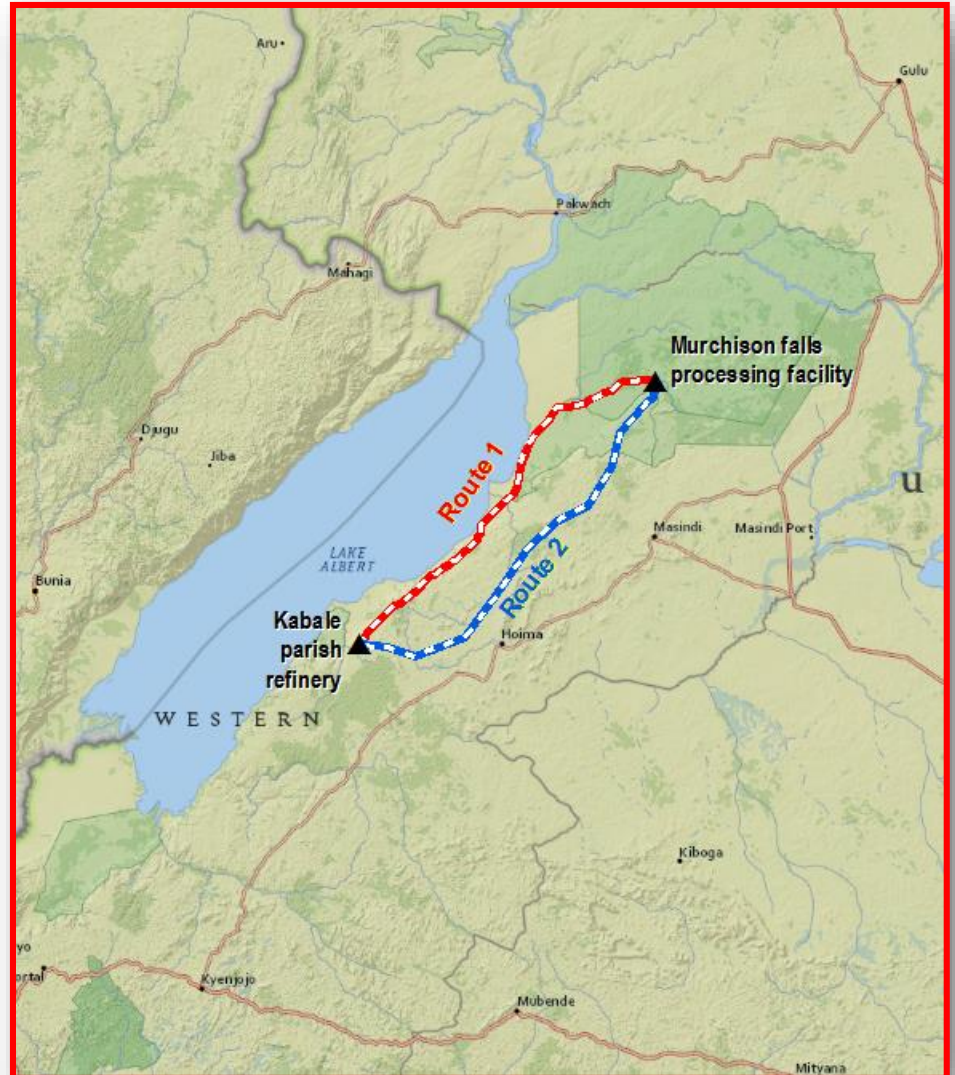
<http://www.albertinerift.org>



# Albertine Rift Pipeline Project

## ***Objective:***

Evaluate the potential impacts of two proposed oil pipelines on people, wetlands, and ecologically sensitive areas...



# Albertine Rift Pipeline Project

## **Clarified objectives:**

For each route, estimate:

1. The number of people with 2.5km of the pipeline
2. The area of wetlands within 2.5km of the pipeline
3. The length of pipeline falling within a protected area

# Albertine Rift Pipeline Project

## Data needs:

- Proposed pipeline routes (provided, but poorly documented).
  - Population data
  - Wetland areas
  - Protected areas
- } *Need to find...*

# Albertine Rift Pipeline Project


## **Analysis:**




- Create a 2.5km buffer around each proposed route.
- Tabulate total number of people within buffer
- Tabulate total area of wetlands within buffer
  
- Clip route segments found within protected area
- Calculate total length of these segments

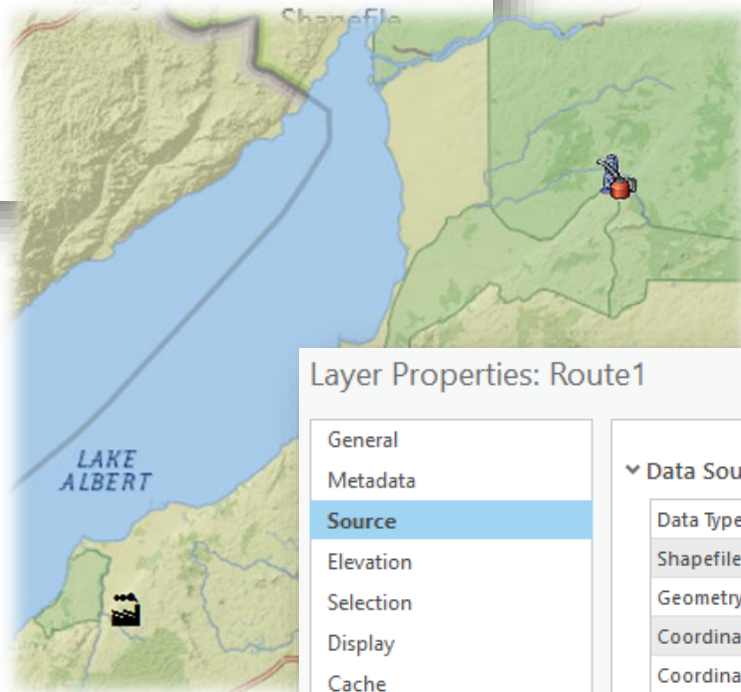
# Plan of attack


- Create a project workspace
- Prep the pipeline data
- Locate and prepare data:
  - Population
  - Wetlands
  - Protected areas
- Execute analysis
- Have draft results prior to class on Tue, Jan 24<sup>th</sup>

# Prepare pipeline data (provided)

MurchisonPipeline  Search Project

Name	Type
 EndPoints.shp	
 Route1.shp	
 Route2.shp	



Layer Properties: Route1 

General  
Metadata  
**Source**  
Elevation  
Selection  
Display  
Cache  
Definition Query  
Time  
Range

**Data Source**

Data Type	Shapefile Feature Class
Shapefile	V:\Lab1\data\MurchisonPipeline\Route1.shp
Geometry Type	Line
Coordinates have Z value	No
Coordinates have M value	No

**Spatial Reference**  
Unknown Coordinate System

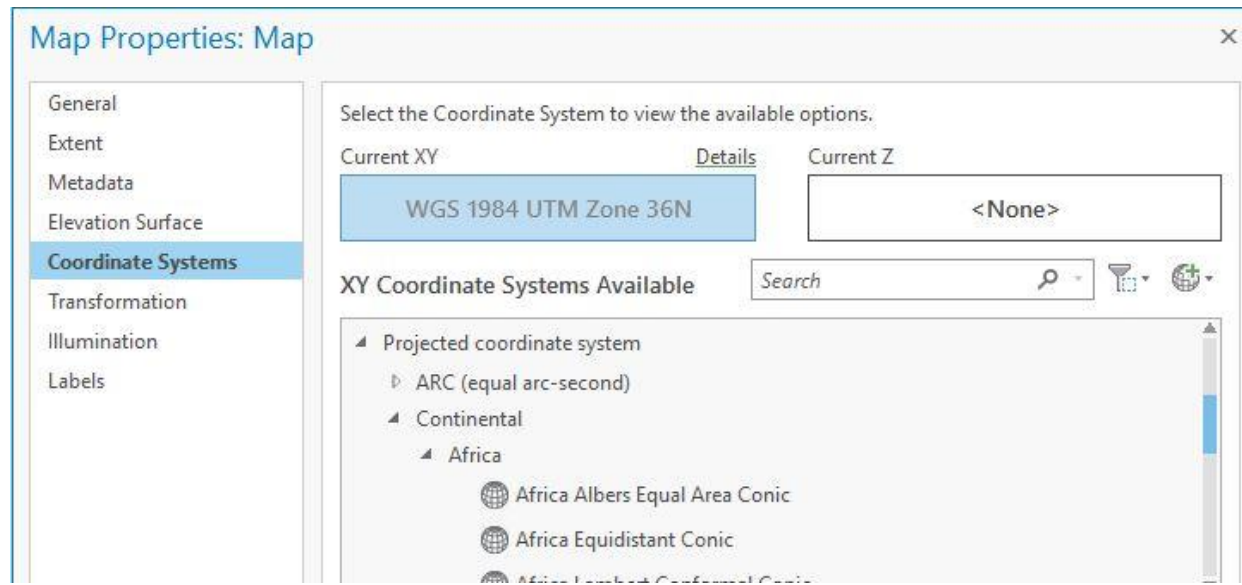




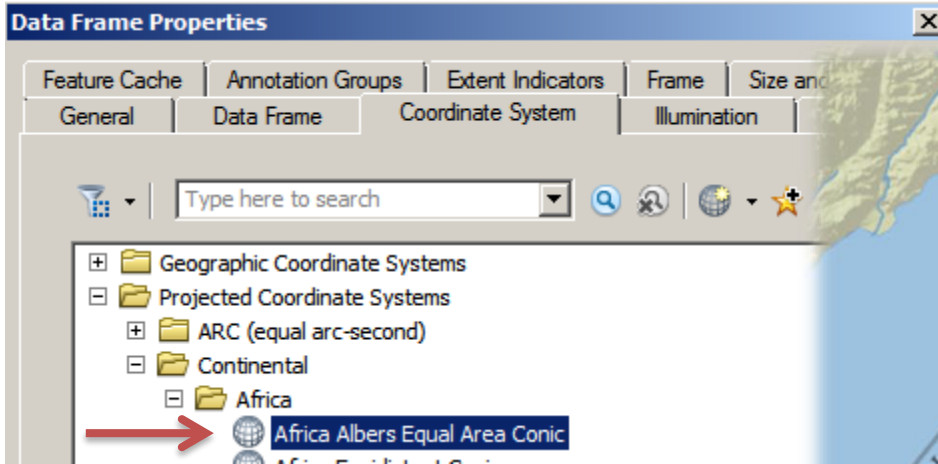
# Guessing at projections

- Check metadata/documentation
- Geographic or projected?
  - zoom to layer & look at the coordinates
- Which projection?
  - Anything to narrow guess? (location? feature?)
  - Change coord. system of data view to find match.

5.6660282°E 1.4684205°N

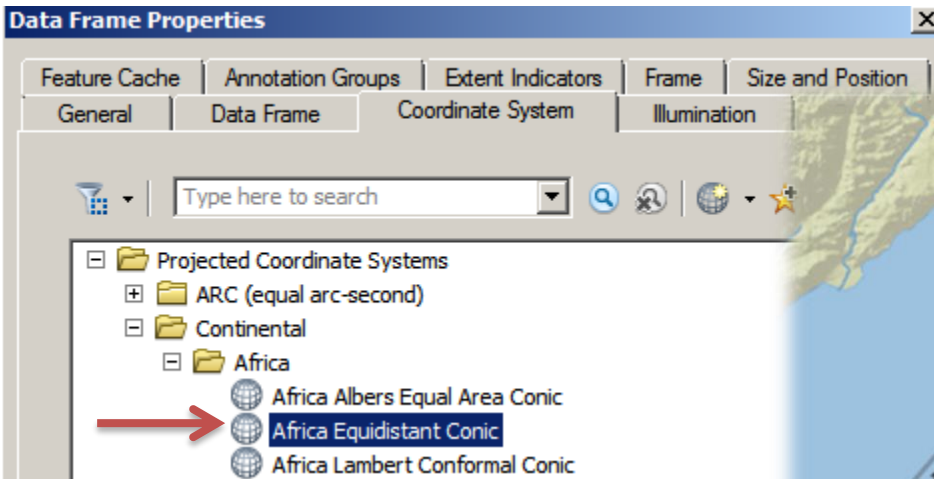


# Guessing at projections...



Close, but not quite...

# Guessing at projections...



Bingo!

Next:

- *Define projection and/or project data*

# Searching for Data

- *Public domain data* → Population



- *On-line geospatial data platforms:*

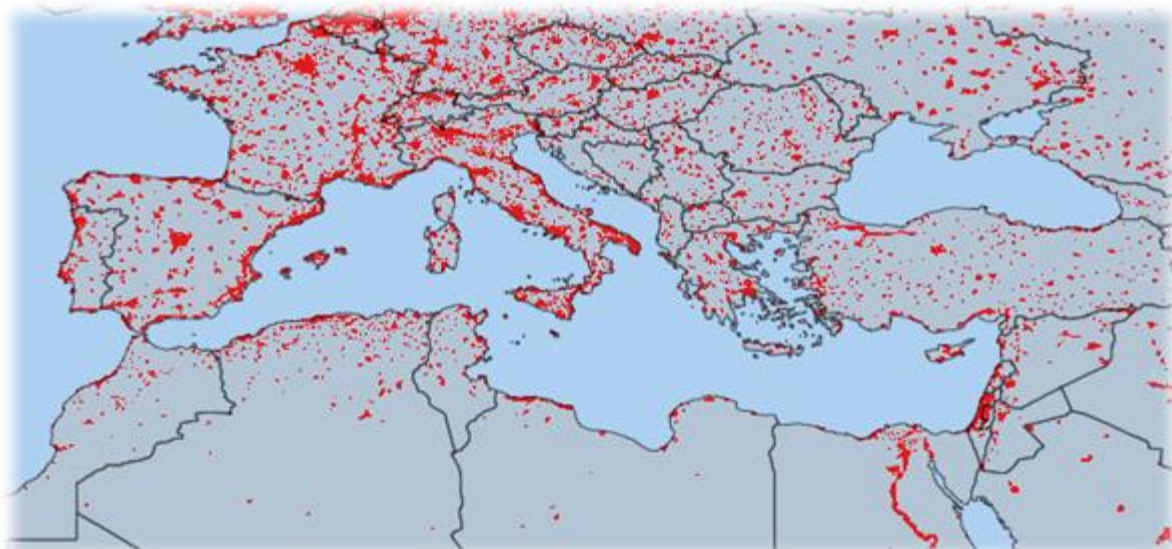
- [ArcGIS Online](#) → Wetlands

- [DATA BASIN](#) → Protected areas

# Population Data

## Demographics: GRUMP

- Global Rural-Urban Mapping Project, V.1 (GRUMPv1)  
<http://sedac.ciesin.columbia.edu/maps/gallery/collection/grump-v1>
  - Dates: 1990, 1995, 2000
  - 30 arc-second (~1 km) resolution
  - Modeled from night-time lights and buffered settlement points




# Population Data


- Locate\download population data for Uganda
- Add to map & symbolize
- Is the dataset properly georeferenced?
- Should you [re]project the data?

# Population - Landscan




Sakai...

 [Up one level](#)

## Data Sources and leads


-  [Conservation-GeoPortal-Intro-demo.ppt](#)
-  [Data 101: Fundamentals of data in GIS \(USAID\)](#)
-  [Duke Library: Data and GIS Services](#)
-  <http://spatialreserves.wordpress.com/>
-  [Kerski\\_PublicDomainData\\_Chaper1.pdf](#)
-  [Link to Decker \(2001\) - Conservation Data Sources](#)
-  [The GIS Guide to Public Domain Data \(Kerski 2012\)](#)
-  [LandScan population data accessible via Duke Libraries](#)

## East View Geospatial LandScan Global Archive.

Format:  Database;  Internet resource;  Serial

Published: [Minneapolis] : East View Geospatial

Language: English

Online Access: 

Summary: The LandScan Global Population Database provides global population distribution in a gridded GIS format at 30 arc-second resolution (approximately 1x1 km cells). Oak Ridge National Laboratory developed modeling techniques to disaggregate and interpolate census data within administrative boundaries to create a GIS layer showing population distribution as accurately and as timely as possible. EastVi... ([see more](#))

# ArcGIS Online

Contents

- Project
  - Maps
  - Toolboxes
  - Databases
  - Styles
  - Folders
  - Locators
- Portal
  - My Content
  - Groups
  - All Portal
  - Living Atlas
- Favorites

ArcGIS Online

www.arcgis.com/home/index.html

ArcGIS FEATURES PLANS GALLERY MAP GROUPS MY CONTENT

# ArcGIS

**Kentucky's Physiographic Regions**

**City of Encinitas CA Parks**

**For the Love of The Land**

- Sign-up now**  
Get a free ArcGIS Online account and start making web maps today.
- Make a Map**  
Create a map that can be viewed in a browser, desktop or mobile device. Share it on a blog, via email, or embed it in a website.
- ArcGIS for Developers**  
Build custom web and mobile applications that incorporate your maps and data.



# ArcGIS Online

- Search by theme: wetlands

The screenshot shows the ArcGIS Online interface. The search bar at the top right contains the text 'Wetlands', which is highlighted with a red box. Below the search bar, a table lists search results. The first result, 'National Wetlands Inventory - Wetlands', is selected and highlighted in blue. To the right of the table, a metadata panel is visible, showing the title 'National Wetlands Inventory - Wetlands Web Services (REST, KML, WMS)' and a thumbnail image of a map with wetland areas. Below the thumbnail, there is a 'Tags' section with a list of related terms.

Name	Type	Date	Owner
National Wetlands Inventory - Wetlands	Map Image Layer	7/1/2019 2:02 PM	mitch_bergeson@fws.
National Wetlands Inventory - Wetlands	Map Image Layer	11/28/2018 10:22 AM	FDEPOpenDataPortal
National Wetlands Inventory - Wetlands	Map Image Layer	7/1/2019 2:02 PM	mitch_bergeson@fws.
Maryland Wetlands - Wetlands (Nationa	Feature Layer	8/2/2019 12:02 PM	mdimapdatacatalog
Maryland Wetlands - Wetlands, Polygor	Feature Layer	8/27/2019 3:34 PM	mdimapdatacatalog
Maryland Wetlands - Wetlands, Polygor	Feature Layer	8/27/2019 3:34 PM	mdimapdatacatalog
USA Wetlands	Feature Layer	1/6/2020 11:22 AM	esri
Wetlands	Map Image Layer	1/6/2020 3:36 PM	MichaelSemenek
Maryland Wetlands - Wetlands, Linear (l	Feature Layer	8/27/2019 3:34 PM	mdimapdatacatalog
FWS HQ ES NWI Wetlands	Map Image Layer	11/4/2019 12:25 PM	richard_easterbrook@f
DEC Freshwater Wetlands	Feature Layer (Hos	2/3/2016 11:03 AM	David.Ettere_NYPA1
Great Lakes Protected, Restored and Ent	Feature Layer (Hos	12/4/2019 4:12 PM	stephanie.hickel@tnc.
2010 DNR Wetland	Map Image Layer	1/4/2017 12:53 PM	kim7785
National Wetlands Inventory - ArcGIS M	Web Map	7/1/2019 2:02 PM	mitch_bergeson@fws.
NWI Wetlands (5 Mile)	Feature Layer (Hos	5/13/2019 12:22 PM	David.Ettere_NYPA1
Maryland Wetlands - Wetlands, Linear (l	Feature Layer	8/27/2019 3:34 PM	mdimapdatacatalog

**National Wetlands Inventory - Wetlands Web Services (REST, KML, WMS)**

**Tags** Wetlands, Bogs, Fens, Fish and Wildlife Service, FWS, Hydrography, Marshes, National, Surface Water, Swamps, Wildlife, Federal, NWI, National Wetlands Inventory

# ArcGIS Online

- Search by location: ~~Albertine Rift Uganda~~

The screenshot shows the ArcGIS Online interface. The search bar contains the text 'Uganda Wetlands type:package', which is highlighted with a red rectangle. Below the search bar is a table of search results. The first result is selected and highlighted in blue. To the right of the table, the details for the selected item are displayed, including a thumbnail map and tags. A red arrow points to the title of the selected item in the details panel.

Name	Type	Date	Owner
Wetlands extent and types for Uganda -	Layer Package	5/12/2011 11:06 PM	consbio
Wetland area per capita for Uganda (Dat	Layer Package	1/14/2011 3:40 PM	consbio

Uganda Wetlands type:package

Metadata Geography Table

Wetlands extent and types for Uganda - 1996 (Data Basin Dataset)

Tags Data Basin Dataset, Wetlands, permanent wetlands


# Data Basin

Sign Up

Sign In ▾

Support ▾



Search by keyword or location 

Get Started

Explore

Create

Community

My Workspace

What is Data Basin?

What can I do?

Who is using Data Basin?

How do I start exploring?

Data Basin is a science-based mapping and analysis platform that supports learning, research, and sustainable environmental stewardship.



- Search by theme, location, or both...

# Data Basin

Search:   [more options](#)

Sort by:  Display:  

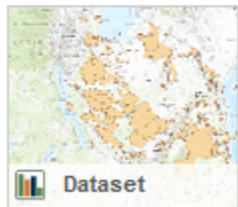
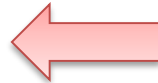


## Uganda protected areas

National Forest Authority

Gazetted areas of Uganda as of 2007.

 Dataset



## Protected Areas

WDPA with minor editing by Lindsay Spurrier 2012

Protected areas of Tanzania

 Dataset

Conservation Biolog

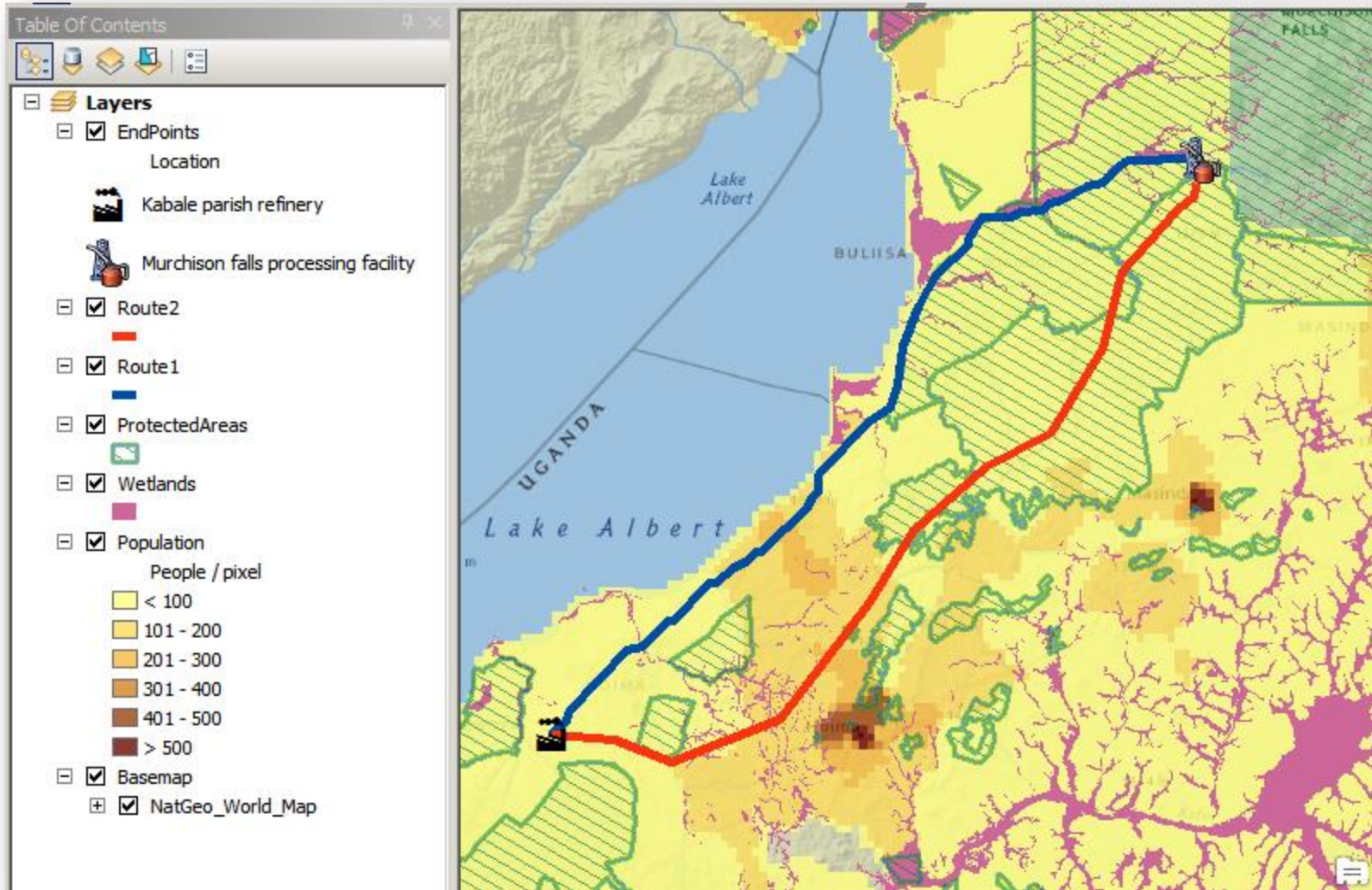
- Open in Map
- Add to My Workspace
- Download ArcGIS Layer Package
- Download Zip Archive



Lindsay Spurrier (Apr 15, 2013)

- Download, extract, add to map. [Reproject]

# All data prepped...



# Analysis

- Population
  - Buffer pipeline route 2.5km
  - Zonal Stats as Table (Buffer on Population) *~36 k people*
- Wetlands
  - Clip wetlands feature class with buffered route
  - Calculate total area (km<sup>2</sup>) *~56.2 km<sup>2</sup>*  
*~~~52.4 km<sup>2</sup>~~*
- Pipeline in protected area
  - Clip route using protected area feature class
  - Determine total length (km) *~45.3 km*  
*~~~43.4 km~~*

# Report results

*Compile results concisely and effectively...*

- For each proposed route:
  - Number of people affected?
  - Area of wetland affected?
  - Length within protected area?