

## Scene 1

- . Image containing, NASA, DEVELOP National Program, Langley Research Center
  - Created clip for the very beginning, called Beginning\_Clip
- . Next image should contain, NASA, Applied Science
  - Is combined in Beginning Clip
- . Image of the entrance of the NASA facility
  - Shown in Beginning\_Clip
  - Combine outside image of Langley with the words NASA, Earth Science
  - Close in on the image and fade into the next
  - Introductory music, something with a bit of energy
  - Run time approximately 10 seconds

## Scene 2; Welcome

. “Hello and welcome, (pan out here) we are the North Carolina Agriculture team here at Langley Research Center in Hampton, Virginia. We’re working on utilizing NASA Earth Observing Systems to better access crop damage due to natural disasters such as hurricanes and droughts in Northern Carolina.

- Start with clip of team member speaking, then pan out and see the rest of the team behind Conor , have names appear below each team member

- Music should be light and happy

- Suggested speaker: Conor

- Run time should be approximately 10-15 seconds

### Scene 3; Events of interest

. “Agriculture in North Carolina is a \$70 billion annual industry, making it the seventh highest agricultural producing state in the country. The agriculture industry in North Carolina is often threatened by extreme weather events such as hurricanes and droughts. We specifically looked at imaging concerning pre and post hurricane Floyd, hurricane Isabel and hurricane Irene as well as the droughts during 2007 and 2011. Using NASA satellites to look at before and after images we were able to see the effects of each disaster on North Carolina’s agriculture.

- Start by having speaker walking along the water followed by clips/ pictures of hurricanes, floods and the effects of hurricanes, flooding, and droughts and effects on agriculture. Image of an agronomist and maybe the outside of FEMA or NCDA&CS.

- Or, just have the speaker in the background and simply have clips and pictures of the hurricanes and crop damage

- Background music, something sad and daunting

- Suggested Speaker: Jeremy

- time for audio: 83 seconds

## Scene 4; Study Area

. “We have narrowed down our area of interest to the Inner Banks region of Northern Carolina due to its low elevation and high levels of agricultural productivity. importance to North Carolina’s agricultural industry.” quantity

- Image of the counties with names, scan across a map of the counties, have the speaker in the background.
- Regular music for the scene
- Suggested Speaker: Courtney
- time for audio = 18 seconds

## Scene 5; Partners

. “We have been working with Daniel Madding, Information Services director for the NCDA&CS. We also interviewed Mr. Malcolm Gibbs Jr. with the North Carolina State University Cooperative Extension in Hyde County in solving the problems currently had with assessing crop damage.”

- Clip of one of us talking either following the pictures or after the pictures are shown
- Picture with NCDA&CS name on it, picture of Daniel Madding and Malcolm Gibbs
- Suggested Speaker: Emily or continue with Courtney as the speaker
- Time to record audio = 14.5 seconds

## Scene 6; What's not being done/ used

“

NCDA&CS have yet to employ NASA's satellite imagery to assess crop health. But, this data could be invaluable to the NCDA&CS in pinpointing areas most affected by natural disasters. We worked on a way to assess crop damage after the 24 hour limit enforced by FEMA because as Mr. Gibbs points out.

- Images of disorder, and clip of Gibbs talking about 24 hour rule. Then going into images of people helping others and healthy crops

. Suggest start with picture of agronomist in the field with a description of what is being seen in the image, then followed by speaker talking, walking down the hallway here at Langley, then on to more images

- Music, going from daunting to invigorating (bad to good)

- Suggested Speaker: Jacob or Madison or James

- audio time = 61 seconds

## Scene 7; Satellites

. “Using Landsat 5 and MODIS on Terra imagery, found the Normalized Difference Vegetation Index, the Normalized Difference Moisture Index, the Normalized Differential Water Index and the Normalized Multi-Band Drought Index or the NDVI, NDMI, NDWI, and NMDI to collect our data. Combined this data with the USDA’s CropScape program, which showed which crops were or are grown within a certain study area during a specific study time.

- Clip going from crops to satellites then to our satellites (Landsat and then MODIS clip)
- Music; kind of like, the hero has arrived
- Suggested Speaker: Emily or Barbara
- audio time 29 seconds

## Scene 8; Methodology

. “To collect our data we uploaded images from USGS Glovis and ECHO Reverb into ArcGis . Using ArcGis, the images were corrected for atmospheric interference and then turned into NDVI, NDMI, NDWI and NMDI images.

Using NDWI we mapped the flooding caused by each hurricane in combination with NDVI, which displayed the health of all the vegetation after each hurricane we were able to map all of the damage caused by each hurricane.

Using NMDI to calculate the values for our drought levels, we then used NDMI to create polygons of all the drought areas to create maps of the areas affected by droughts during our drought periods.

Overlaying this data with crop data from CropScape we were then able to calculate the total acreage of damage caused by each hurricane and drought. Calculating bushels or pounds per acreage we were able to calculate the monetary value of each acre damaged.

(Switch Speakers here) Using the data we collected from all of our images we then created a risk map for our study area, in which we displayed which areas we had found hurricanes and, or droughts had the greatest affect. With our risk map we hope that the NCDA&CS will be able to use this map to better prepare before or after a natural disaster.

- Image of a flow chart that describes the process as speak about each one
  - . Flowchart for hurricanes (throw images of different images into flowchart)
  - . Followed by the flow chart for the drought maps
  - . Followed by clip of speaker talking, hopefully at a field somewhere (field should be corn or cotton, easily

recognizable crop)

- Pictures of different images, NDVI, NDMI, NMDI, just to show what color we have each one as
- Music; kind of pump up music, getting the viewer excited about what we’re doing
- Suggested Speakers: Jeremy to Madison or Conor
- audio time 83 seconds

## Scene 10; Extra Work

. “ Using crop data acquired from the USDA NASS site, Crop Scape, in combination with soil information from the USDA /natural Resources Conservation Service our team used ArcGis to create a map of all crop-soil combinations in our study area during the year of 2011. Then, overlaid this data with our final output of the areas damaged by Hurricane Irene as well as the drought during 2011 to correlate flooding and drought levels to the soil composition beneath each type of crop.

- Footage of Madison talking at desk about crops, pan into his computer screen, then into an image of a crop-soil combination map, proceeded then by images of methodology and/or someone working on the computer, (most likely James working at computer) then by the results

- Music; pumped up again, inspired

- Suggested Speaker: Madison,

- audio time 88 seconds

## **Scene 11; Results of Extra Work**

- . Talk about the results found after looking at damage after Irene and due to the drought in correlation to the crop-soil combinations
  - Images of maps being overlaid, any images of graphs or data of results
  - Music; still excited but coming to an end
  - Suggested Speaker: Madison or James

## Scene 12; Future Work

In the future we are going to work with farmers on the ground suggested to us by Malcolm Gibbs. This will help us increase the accuracy of our overall methodology.

- Suggested Speaker: Courtney or Barbara

- Image of someone shaking the hand of a farmer and then with the farmer looking at the soil or doing some test or looking at a computer to show the joint partnership between North Carolina Farmers and DEVELOP

- 23 seconds

## Scene 13; End

“We were excited to find that utilizing Landsat 5 TM to assess crop damage due to flooding is indeed possible with our methodology and that the NMDI from Terra’s MODIS can be successfully utilized to assess soil and crop damage during drought periods. We would like to thank Mr. Daniel Madding and the NCDA&CS along with Mr. Malcolm Gibbs Jr. for all of their help and guidance. We would also like to thank DEVELOP, if you would like to watch more videos on the many different projects done through develop you can go to <http://www.earthzine.org>”

- End credits, with team first and then listing our partners (all text in white with a black background)
- Followed by an image containing NASA , DEVELOP National Program and the website at the bottom
- Finish with NASA clip
- Music; something that reminds the viewer of NASA, but is still rather plain
- Suggested Speaker: Conor
- 21 seconds