### Hinkson Creek Physical Habitat GIS Data Development



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# Mission

 Use GIS and Remote Sensing techniques to create basic information on the geomorphology of Hinkson Creek and the distribution of land cover within the valley and watershed.

# Data Development

#### **Study Area**

- 57,338 acres in central Boone County, Missouri
- Includes County House Branch, Flat Branch, Grindstone Creek, Hinkson Creek, Hominy Branch, Mill Creek, Nelson Creek, and Varnon Branch watersheds



# Data Development

• Data Sharing

Data Name	Source	Description	Use
			stream centerline undate hankfull valley
		Digital elevation raster model	delineation sand and gravel bar
	De sus Countra	Digital elevation faster model	delineation, sand and graver bar
2009 1° DEIVI	Boone County	derived from 2009 LIDAR data	delineation, and % slope
			stream centerline update, bankfull, valley
		Hill Shade raster derived from	delineation, sand and gravel bar
2009 1' Hill Shade	Boone County	2009 1' DEM	delineation, and % slope
		Hydrography lines based on	Source for Hinkson Creek centerline.
Hydro_lines	Boone County	2007 Ortho-imagery	though centerline was updated by MoRAP.
			Stream Centerline update, Sand and
2011 6 inch Leaf-off		6 inch leaf-off true color aerial	Gravel Bar Delineation, MoRAP LULC,
Aerial Photography	Boone County	photography	Hinkson Road Crossings
			Used to determine LULC and impervious
			surface composition throughout study
		6 class vector Land Use/Land	area. Used as training data source for
2007 Natural Resources		Cover data set for City of	MoRAP LULC of study area not covered by
Inventory (NRI)	City of Columbia	Columbia	NRI.
		Watershed vector layer used to	
Watersheds	City of Columbia	define study area	Study area delineation and LULC statistics

# Data Development

- Subject Matter Expert Collaboration
  - Paul Blanchard MDC
  - Jason Hubbard University of Missouri
  - Robb Jacobson USGS
  - Series of meetings to discuss and review through development phase improved final products

Stream Centerline Update





Stream Centerline Update – Bank Erosion





#### Stream Centerline Update – Bank Erosion

2011 Aerial Photography n feer Legend 2011 6 inch leaf-off RGB Red: Band\_1 Green: Band 2 Blue: Band\_3 Centerline Hinkson Creek Bankfull Hinkson

#### Stream Centerline Update – Bank Erosion



#### Top of Bank/Bankfull

•Manually selected polygons that delineated top of bank at scale of 1:1,000





#### Top of Bank/Bankfull



### Data Development - Methodology Top of Bank/Bankfull



#### **Morphologic Valley Delineation**

- •Bottomland between bluffs
- •Historical bottomland/floodplain
- •2009 1 ft LiDAR DEM hillshade and slope



#### **Constricted Valley Delineation**

- •Modern floodplain constricted by roads, bridges, trails, levees, neighborhoods, etc.
- •Reflects areas affected by modern high flow events
- •2009 1 ft LiDAR DEM hillshade and slope



Morphologic Valley vs. Constricted Valley



#### Sand/Gravel Bar Delineation

•Objects delineating sand/gravel bars based on imagery were manually selected and modified @ 1:1000 scale



#### Sand/Gravel Bar Delineation

•2011, 6-inch, true color, leaf-off Imagery



#### Sand/Gravel Bar Delineation

•2012, 1 meter, true color, leaf-on Imagery



#### **Hinkson Road Crossings**

•Point file created where roads, bridges, trails, cart paths, etc. cross creek and placed on stream centerline

•Based on visual inspection of 2011, 6-inch, leaf-off, true color imagery @ 1:1000 scale



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Point file created where roads, bridges, trails, cart paths, etc. cross creek and placed on stream centerline
Based on visual inspection of 2011, 6-inch, leaf-off, true color imagery @ 1:1000 scale



#### **Stream Points**



• Stream Points - % Slope



• Stream Points – Sinuosity @ 250 meters



• Stream Points – Sinuosity @ 4000 meters





• Stream Points – Sinuosity





Stream Point ID - 500 m

Legend

• Stream Points – Bankfull/Top of Bank Width



• Stream Points – Bankfull/Top of Bank Width

Hinkson Creek Bankfull Width @ 500 meter Intervals



Stream Point ID - 500 m

Legend

Major Tribe

• Stream Points – Morphologic Valley Width



• Stream Points – Constricted Valley Width



Stream Points – Constricted Valley Width



Stream Point ID - 500 m

#### Land Use/Landcover – (LULC)

•75% of study area contained in City of Columbia 6 class 2007 Natural Resource Inventory (NRI)

•LULC Classes: forest, grass, impervious, sparsely vegetated, crop, and water

•Based on objects generated from 2007, 6-inch, leaf-on, 4-band aerial photography

•MoRAP created LULC for remaining 25% of study area using NRI for training







LULC - Watershed



LULC - Watershed

#### LULC Area by Watershed



LULC Class by Watershed

- **Results Data Analysis**
- LULC Watershed



% LULC by Watershed

### LULC – Catchment

- Modified watersheds by subdividing at confluence of major tributaries based on hydrologic catchments generated from 30 meter DEM
- Calculate cumulative upstream LULC at major tributaries



LULC – Catchment

#### % LULC Composition by Catchment



■ Forest ■ Crop ■ Impervious Surface ■ Water ■ Sparse Veg ■ Grass

#### LULC – Catchment

#### % Cumulative Upstream LULC by Catchment



### LULC – Catchment

% LULC Type Within Catchment



**Catchment Number** 

#### MoRAP Staff Contributors

- Ronnie Lea GIS/RS Specialist
- David Diamond, Ph.D. Director
- Clayton Blodgett, Ph.D. Remote Sensing Coordinator
- Dyan Pursell GIS Technician
- Kim Mabry GIS Technician
- Hinkson CAM Science Team Collaborators
  - Paul Blanchard, Ph.D. Missouri Department of Conservation
  - Joe Engeln, Ph.D. Missouri Department of Natural Resources
  - Robb Jacobson, Ph.D. United States Geological Survey
  - Jason Hubbard, Ph.D. University of Missouri

**Questions or Comments:** 

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• Stream Points – Distance to Morphologic Valley Wall

