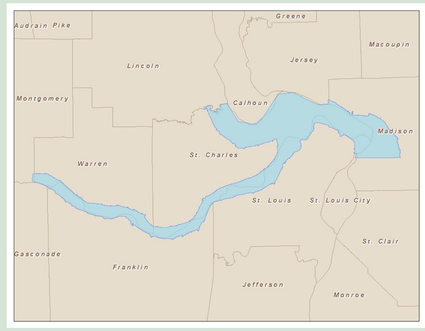
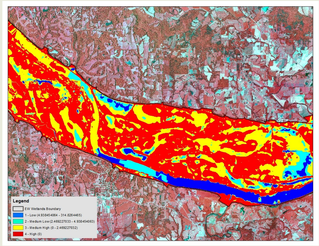
WETLANDS MAPPING IN EAST-WEST GATEWAY USING LIDAR

C. DIANE TRUE AND THE STAFF OF MORAP

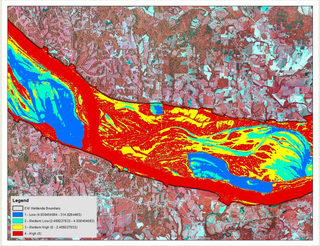
Abstract: Our goal was to create a revised and improved wetland mitigation and restoration data layer for parts of the Missouri and Mississippi River floodplains for the East-West Gateway Council of Governments using LiDAR data to enhance our previous work.



1. Build Sinks from LiDAR



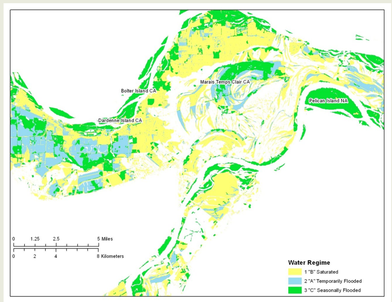
Sinks from 2006 COE 5 meter DEM



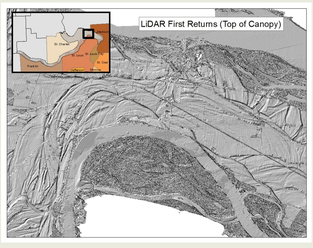
Sinks from 2008-2010 LiDAR 5 meter DEM

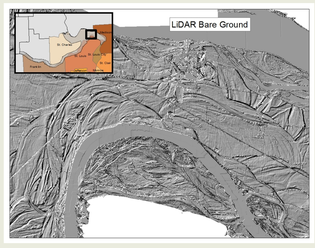
2. Water regime based on relative elevation (sinks) and soil drainage class (from SSURGO)

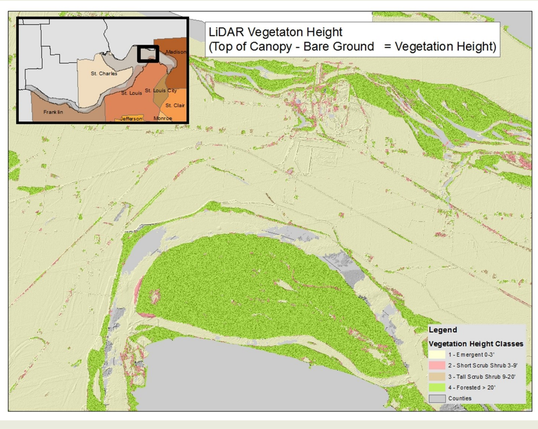
Water Regime	Cowardin Code	Area (Hectares)	% of Study Area
Upland	U	28084.7	28.81%
Permanently Flooded	H	16968.2	17.41%
Saturated	B	27345.0	28.05%
Seasonally Flooded	C	16023.1	16.44%
Temporarily Flooded	A	9065.4	9.30%



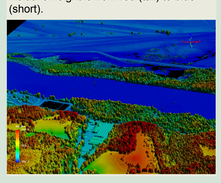
3. Vegetation height is First Return - Last Return



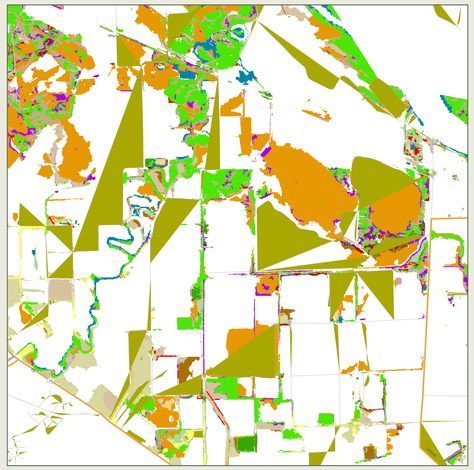




LiDAR vegetation height visualization for a section of the Missouri River floodplain. Relative height is from red (tall) to blue (short).



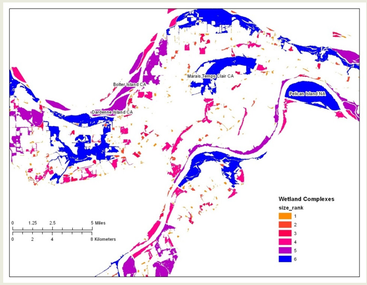
4. Combine water regime and vegetation height to classify wetland types

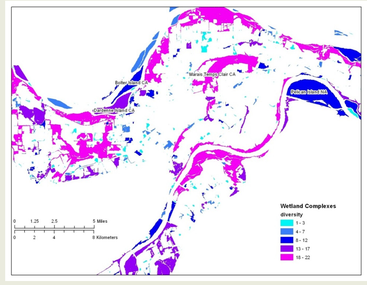


- Emergent Marsh, Permanently Flooded
- Emergent Marsh, Saturated
- Emergent Marsh, Seasonally Flooded
- Emergent Marsh, Temporarily Flooded
- Forested Wetland, Permanently Flooded
- Forested Wetland, Saturated
- Forested Wetland, Seasonally Flooded
- Forested Wetland, Temporarily Flooded
- Short Shrub/Scrub Wetland, Permanently Flooded
- Short Shrub/Scrub Wetland, Saturated
- Short Shrub/Scrub Wetland, Seasonally Flooded
- Short Shrub/Scrub Wetland, Temporarily Flooded
- Tall Shrub/Scrub Wetland, Permanently Flooded
- Tall Shrub/Scrub Wetland, Seasonally Flooded
- Tall Shrub/Scrub, Saturated
- Tall Shrub/Scrub, Temporarily Flooded
- Upland Forested Vegetation
- Upland Herbaceous Vegetation
- Upland Short Shrub/Scrub Vegetation
- Upland Tall Shrub/Scrub Vegetation
- Water

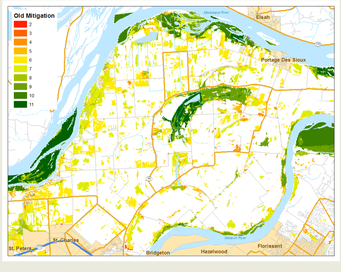
Wetland Type and Water Regime	Area (Hectares)	% of Complexes
Emergent (EM; marsh <1 m)		
Permanently Flooded "H"	397.63	1.79%
Seasonally Flooded "C"	4,803.20	21.68%
Temporarily Flooded "A"	498.30	2.25%
Saturated "B"	1,637.12	7.39%
Subtotal	**7,336.25**	33.11%
Short Shrub/Scrub (SSS; ≤3 m)		
Permanently Flooded "H"	9.32	0.04%
Seasonally Flooded "C"	510.40	2.30%
Temporarily Flooded "A"	51.28	0.23%
Saturated "B"	127.27	0.57%
Subtotal	**698.27**	3.15%
Tall Shrub/Scrub (TSS: 3 m to <6 m)		
Permanently Flooded "H"	9.44	0.04%
Seasonally Flooded "C"	947.80	4.28%
Temporarily Flooded "A"	51.41	0.23%
Saturated "B"	186.11	0.84%
Subtotal	**1,194.76**	5.39%
Forested (FO; >6 m)		
Permanently Flooded "H"	12.15	0.05%
Seasonally Flooded "C"	12,015.40	54.22%
Temporarily Flooded "A"	185.66	0.84%
Saturated "B"	716.63	3.23%
Subtotal	**12,929.83**	58.35%
Grand Total (All Wetlands)	**22,159.11**	

5. Create Wetland Complexes by dissolving wetlands into large polygons

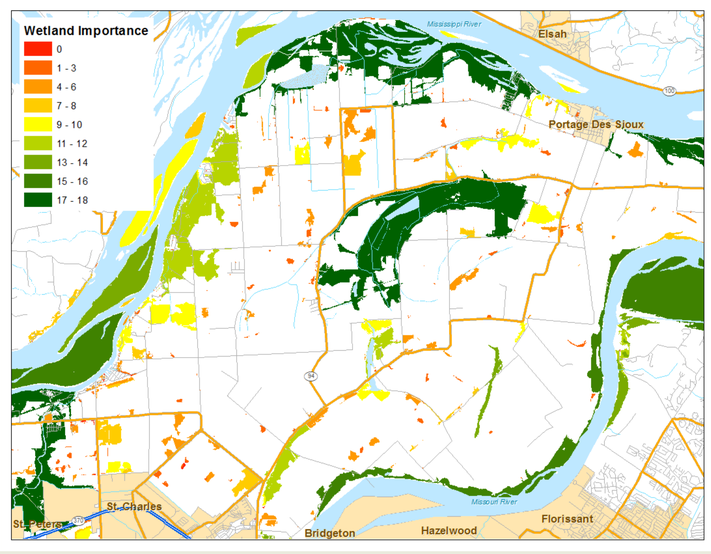




6. Rank Wetland Complexes based on patch size, patch diversity, distance to public lands, and distance to urban lands

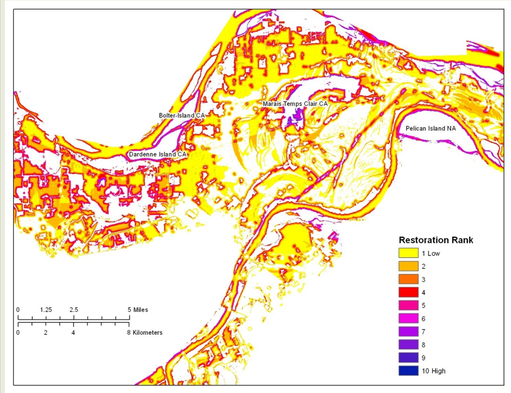


Wetland mitigation importance ranks from older versus improved data on the upstream side of the confluence. Darker greens are more important. Note the false positives for wetlands (yellows on the left image).



- We ranked all areas over bottomland soils as having either potential wetland mitigation value or potential wetland restoration value.
- Cropland, barren or sparsely vegetated land, and open water were ranked in terms of potential for restoration, and all other extant vegetation types were ranked in terms of potential for mitigation.
- In this regard, the terminology may not correspond with definitions used within regulatory contexts.

Restoration ranks were based on water regime and landscape context (distance to extant wetlands, public lands, urban lands, and water) and were applied to cropland and barren land.



Wetland significance and mitigation scores are useful in directing pro-active conservation and mitigation actions toward the most worthy areas. We found that only 7.9% of all wetlands received the highest significance rank. Less than 5% of croplands received the highest restoration rank. A focus on a small fraction of the total area would ensure the most positive outcomes for expenditure of time and money.

EAST-WEST GATEWAY Council of Governments

MoRAP