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PROJECTED LAND COVER CHANGE ANALYSIS AND FLOOD EXTENT SENSITIVITY IN THE LOWER MISSISSIPPI RIVER BASIN

ERDC



COASTAL &
HYDRAULICS
LABORATORY



EARTH SYSTEM SCIENCE
INTERDISCIPLINARY CENTER

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PROBLEM & BACKGROUND

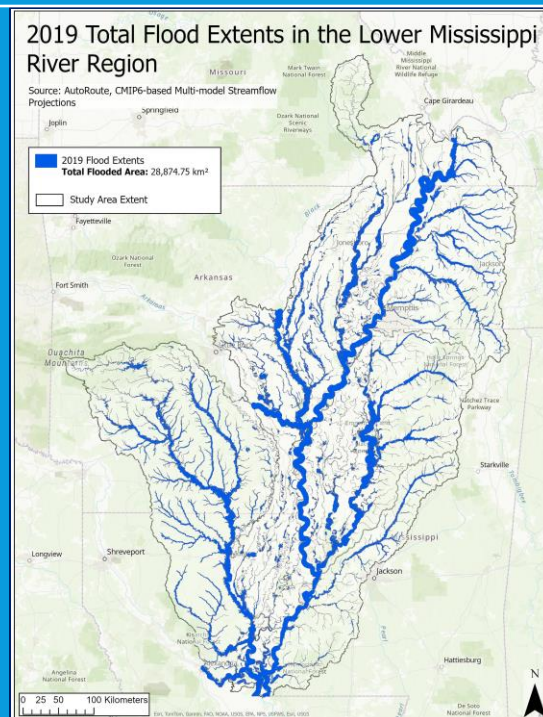
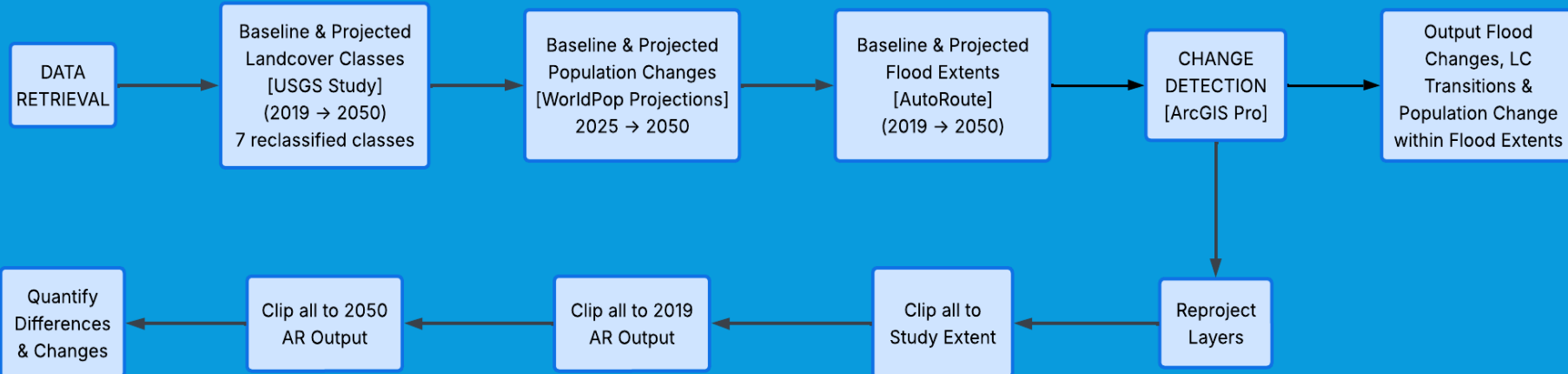
- Future flood risk may be influenced by changes in landcover(LC) and hydrology.
- Broader Mississippi River Geomorphology & Potamology (MRG&P) study evaluates how projected LC and streamflow may affect future flooding, building on Phase 1.
- This sub-study focuses on where projected flood extent changes coincide with LC and population changes using SSP2 projections.

OBJECTIVES

- Quantify & Compare 2019 baseline and 2050 projected flood extents.
- Identify LC transitions from 2019 → 2050.
- Examine population change within flood extents.

Landcover Classes:
[Used: USGS, B2 SRES/ SSP2-equivalent]:
Water • Developed • Agriculture • Herbaceous
• Forest • Wetlands • Barren

DATA & METHODS





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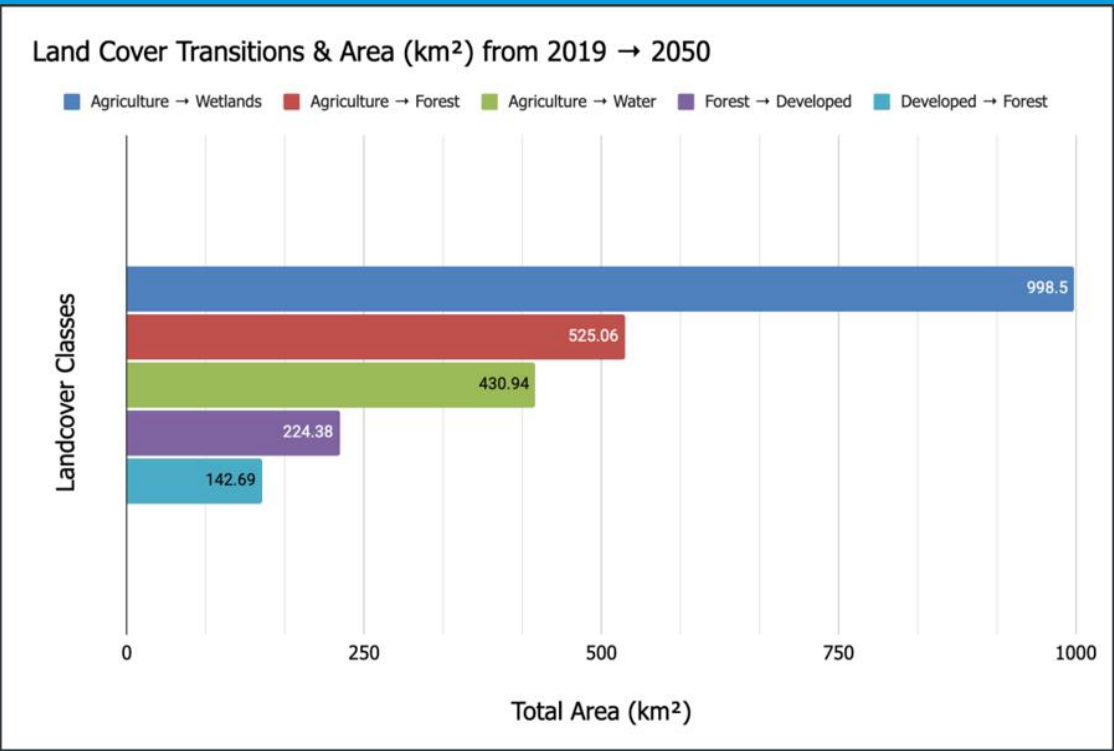


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RESULTS



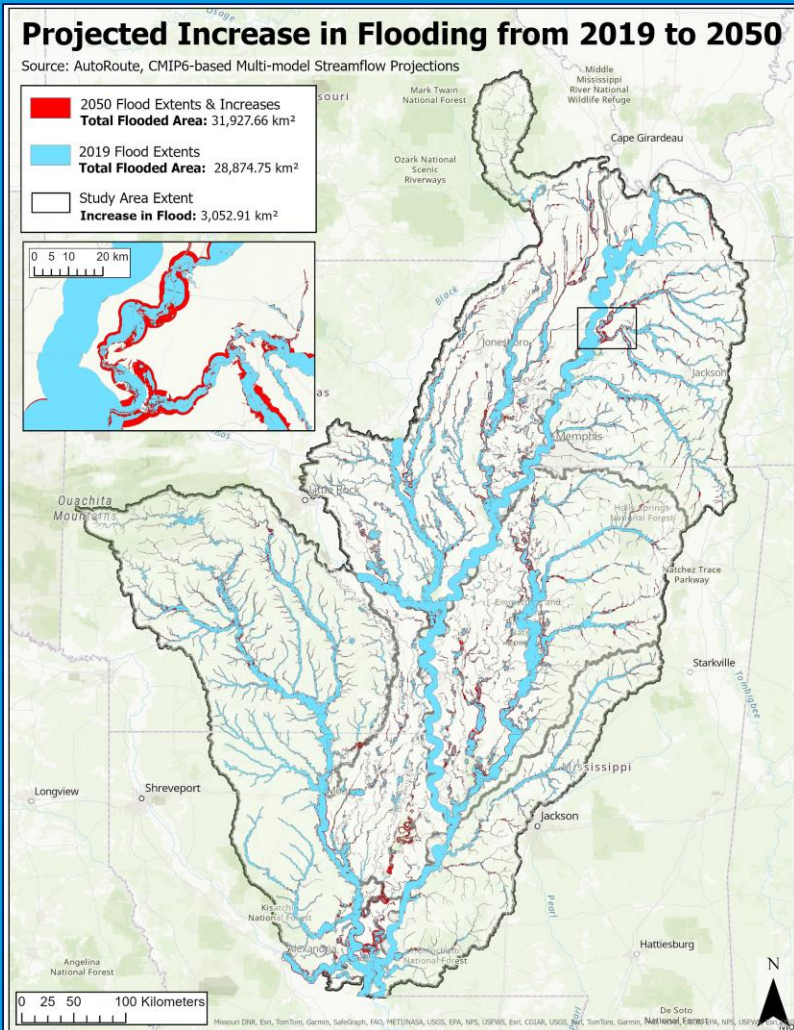
2019	2050	Projected Increase in Flood Extent
28,874.75 km ²	31,927.66 km ²	+3,052.91 km ²

• 10.57% increase in flooding.

2019	2050	Projected Population Changes
143,027	134,644	-8383 loss

• 5.86% decrease in population.

- Out of 3052.91 km² of Total flood increase in 2050, 2534.625 km² accounted for LC change.
- (83% LC change)





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RESULTS (*continued*)

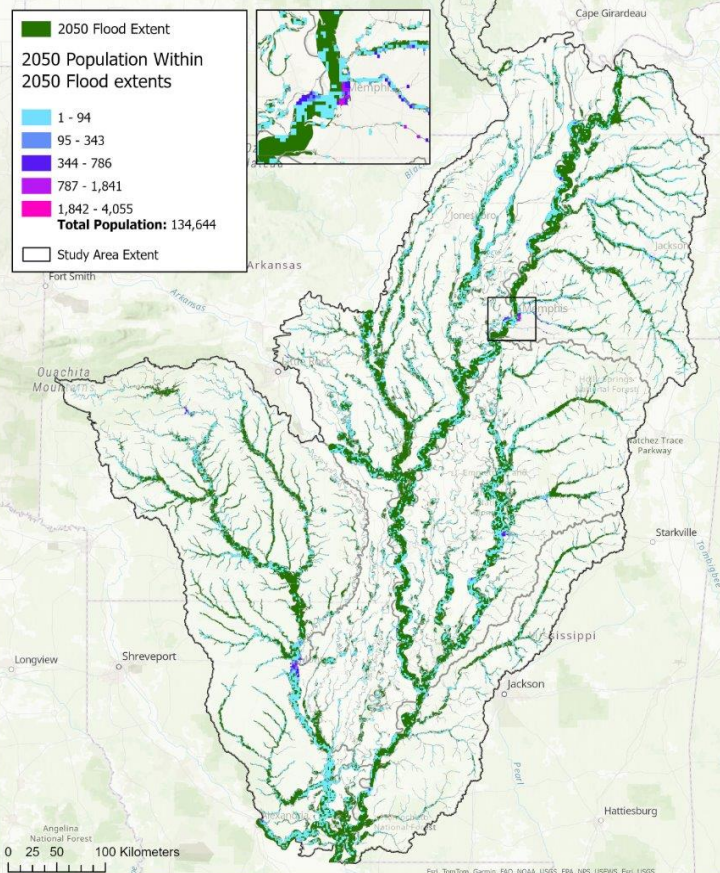
- Finding 1: Flooding Expands by +3,052.91 km²
- Finding 2: LC Changes by 2,534.63 km² within flood expansion (83%)
- Finding 3: Flood, LC & Population changes should be evaluated together.

CONCLUSIONS & NEXT STEPS

- Increase in flood extent does not correspond to population risk.
- Results can help identify areas where flood mitigation and land-use planning may be important for residents and policymakers in the LMR.
- Spatial relationships can be quantified further via spatial/statistical analysis.

SSP2 2050 Population Within 2050 Flood Extents in LMR Region

Sources: AutoRoute, CMIP6-based Multi-model Streamflow Projections | WorldPop Research Group



Landcover Changes from 2019 to 2050

Sources: AutoRoute, CMIP6-based Multi-model Streamflow Projections | USGS, FORE-SCE model Model Projections

