

**Santa Rosa and Escambia County 2040 Future Development Scenarios and Water  
Quality/Quantity Impact Assessment: Technical Information Source Report**

Michael Volk, Dan Farrah, Tricia Kyzar

University of Florida Center for Landscape Conservation Planning  
University of Florida Center for Coastal Solutions

## Summary of Methods and Results

The following report summarizes methods and results for future 2040 development scenarios developed for Escambia and Santa Rosa Counties, along with an assessment of water quality and quantity impacts resulting from current and future development.

### Future Development Scenario Methods and Results

Two potential future development scenarios were developed, including a “Trend” scenario for 2040 based on current development densities and trends, and an “Alternative” scenario that incorporates a 30% increase in density, additional redevelopment, and avoids development of priority conservation lands. These two scenarios are also compared to current “Baseline” development.

Likelihood for future development is identified based on a set of basic assumptions following the recent Sea Level 2040 and 2070 reports developed by 1000 Friends of Florida and the University of Florida Center for Landscape Conservation Planning <https://1000fof.org/sealevel2040/>, incorporating the best available updated data for Escambia and Santa Rosa Counties. Specific assumptions include the following:

- Population: Future population projections were based on medium population projections for 2040 from the Bureau of Economic and Business Research (BEBR).
- Sea Level Rise: A 0.25m rise in sea levels was also incorporated, based on the 2022 NOAA Intermediate projection, with residents on lands lost to sea level rise relocated to other areas within the county or out of state.
- Redevelopment: In the Alternative scenario, 13% of the population was allocated to redevelopment in Escambia County and 10% in Santa Rosa County
- Priority Conservation: Priority conservation lands were identified in the Alternative Scenario as lands that are either currently protected or are high priorities for protection for Florida’s biodiversity, water, or other ecosystem services. For this project, these included existing conservation lands based on the Florida Managed Areas (FLMA) dataset from Florida Natural Areas Inventory; Florida Forever state land acquisition program projects; and Priorities 1, 2, and 3 in the Florida Ecological Greenways Network (FEGN), otherwise known as the Florida Wildlife Corridor.

Table 1 below identifies the future population projections for 2040 for each county that were used to identify the area needed to accommodate future development. Table 2 provides the same information as table 1 for 2070 population growth. The 2070 population projections were extrapolated from the BEBR 2045 projections. Table 3 includes the same gross development densities (GDD) that were used to allocate population for 2040 throughout the counties based on current (Trend) densities, and with a 30% increase for the Alternative scenario. The table also identifies acres needed to accommodate population through 2070. Figures 1-4 identify potential future development by 2040 (in red) for Escambia and Santa Rosa Counties. Existing acres of grazing land and other agricultural lands are provided in Table 4. Tables 5-7 include statistics comparing current and future development results.

County	2023 Population Baseline	BEBR (2023) Projection for 2040	Total Population Change	Percent Population Change
Escambia	333,452	364,200	30,748	9%
Santa Rosa	202,772	251,500	48,728	24%

Table 1. Future population projections for Escambia and Santa Rosa Counties for 2040

County	2023 Population Baseline	BEBR (2023) Projection for 2070	Total Population Change	Percent Population Change
Escambia	333,452	407,104	73,652	22%
Santa Rosa	202,772	321,858	119,086	59%

Table 2. Future population projections for Escambia and Santa Rosa Counties for 2070.

County	2023 Gross Development Density	Acres needed to accommodate 2070 population	30% Higher Gross Development Density (Alternative)	Acres needed to accommodate projected population
Escambia	2.95	24,967	3.84	19,205
Santa Rosa	2.11	56,439	2.74	43,415

Table 3. Acres needed to accommodate 2070 future development for Escambia and Santa Rosa Counties

County	Grazing Land	Other Agriculture
Escambia	27,256	19,785
Santa Rosa	105,587	46,811

Table 4. Existing acres of grazing and other agricultural land in Escambia and Santa Rosa Counties

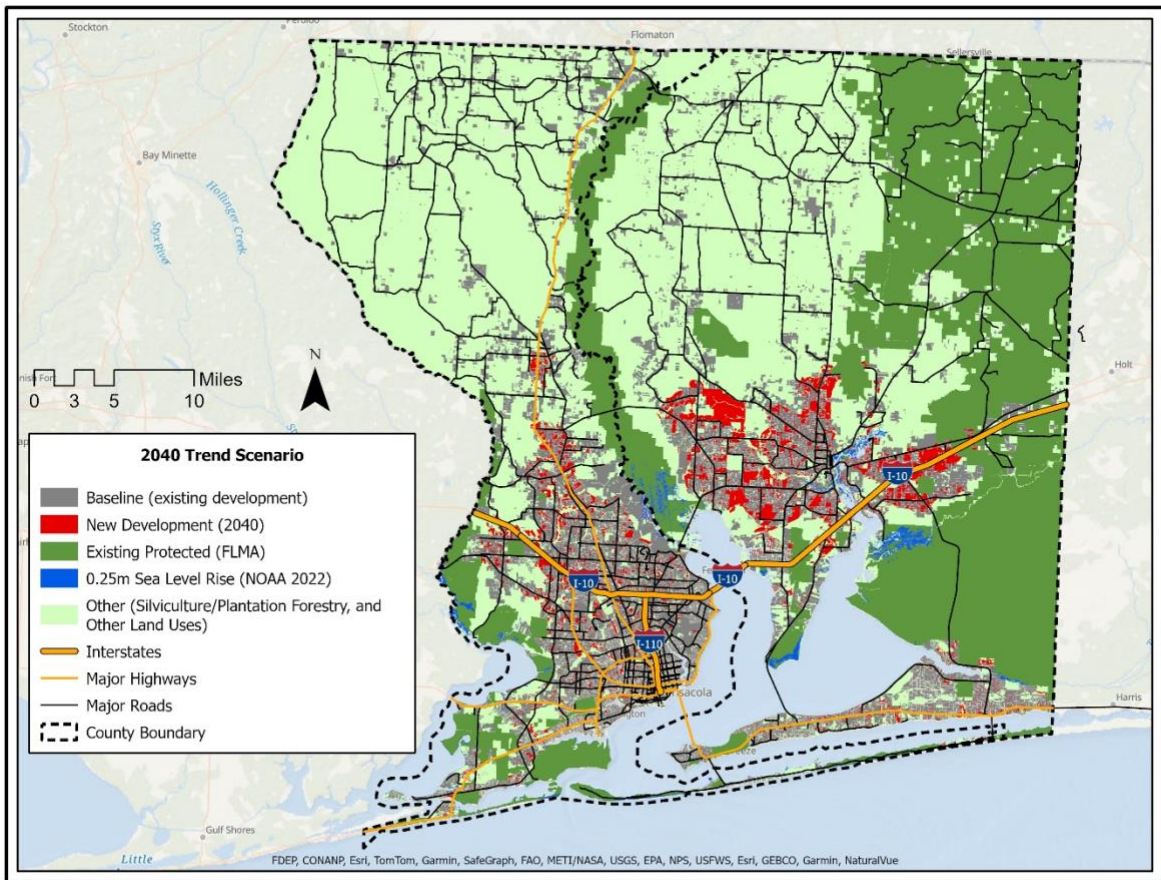


Figure 1. 2040 Trend Development Scenario Results

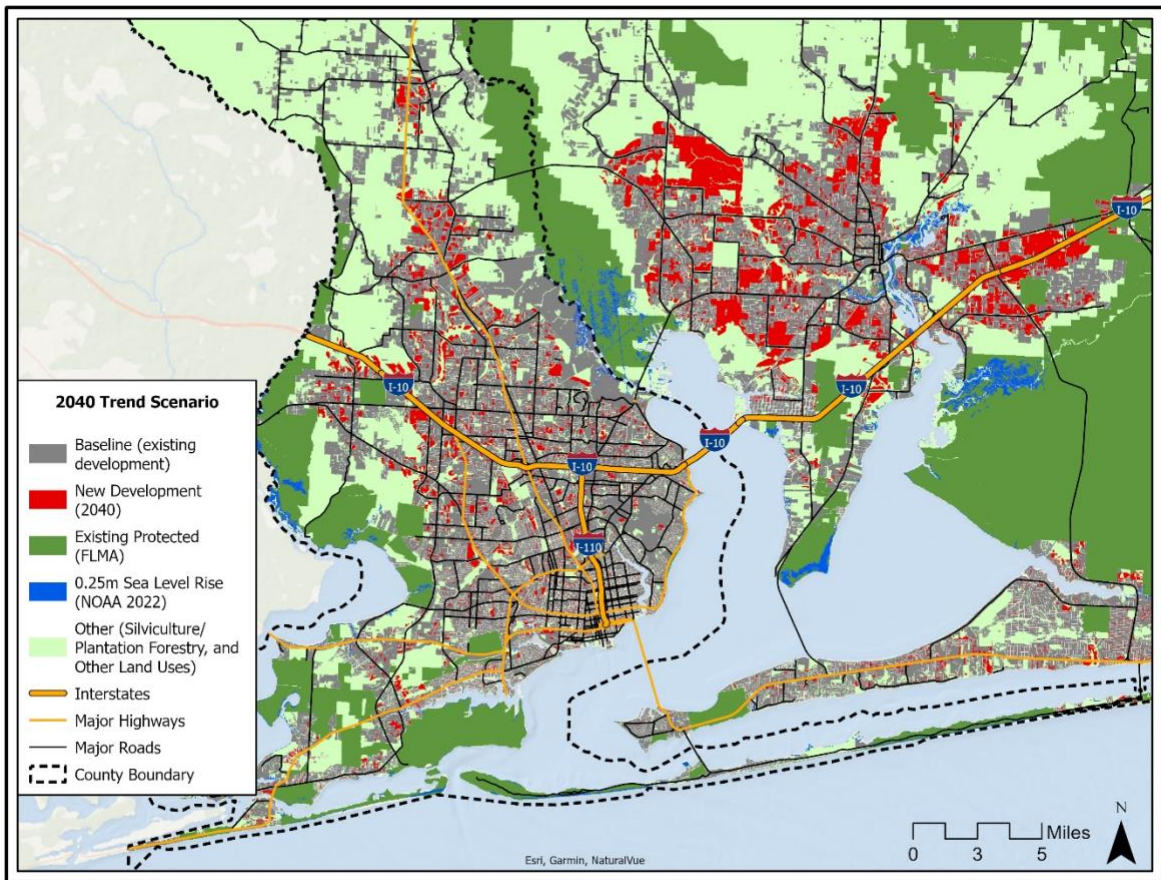


Figure 2. 2040 Trend Development Scenario Results (Milton and Pensacola region)



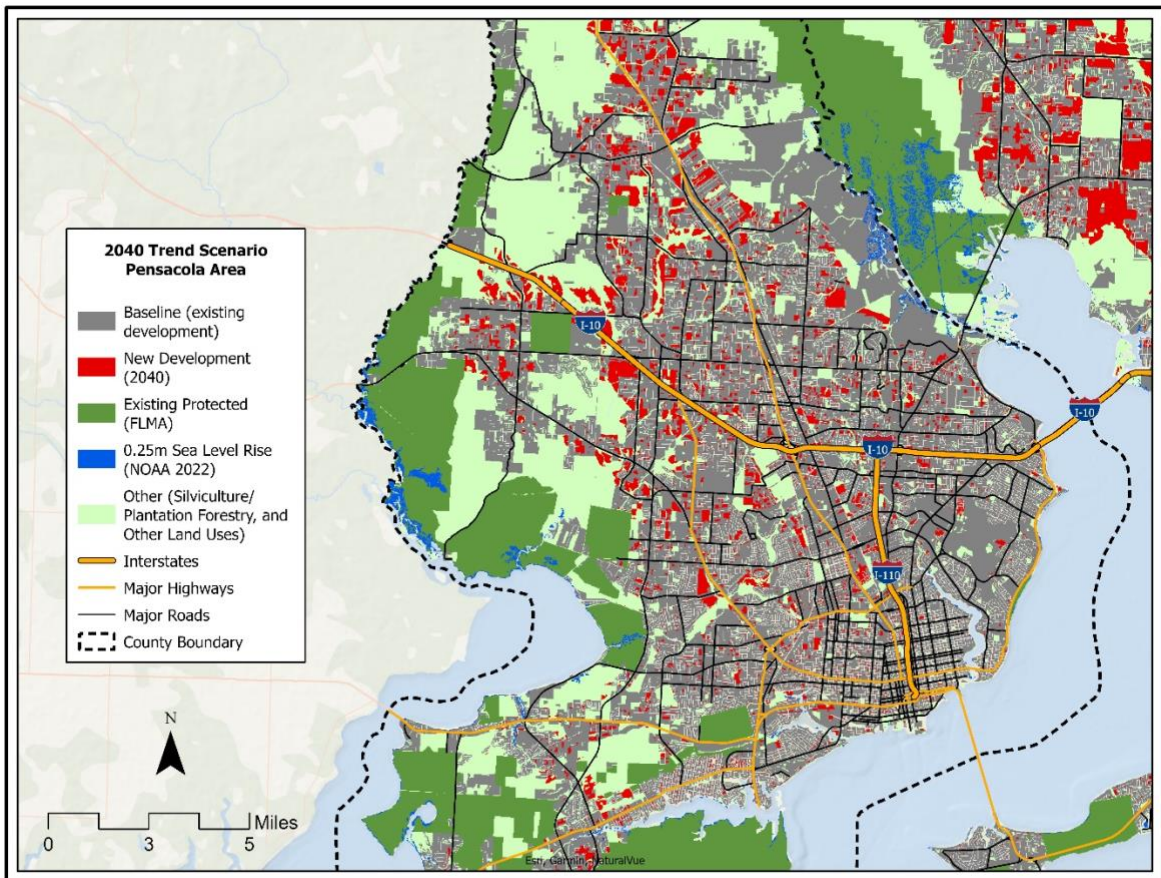


Figure 3. 2040 Trend Development Scenario Results (Pensacola region)

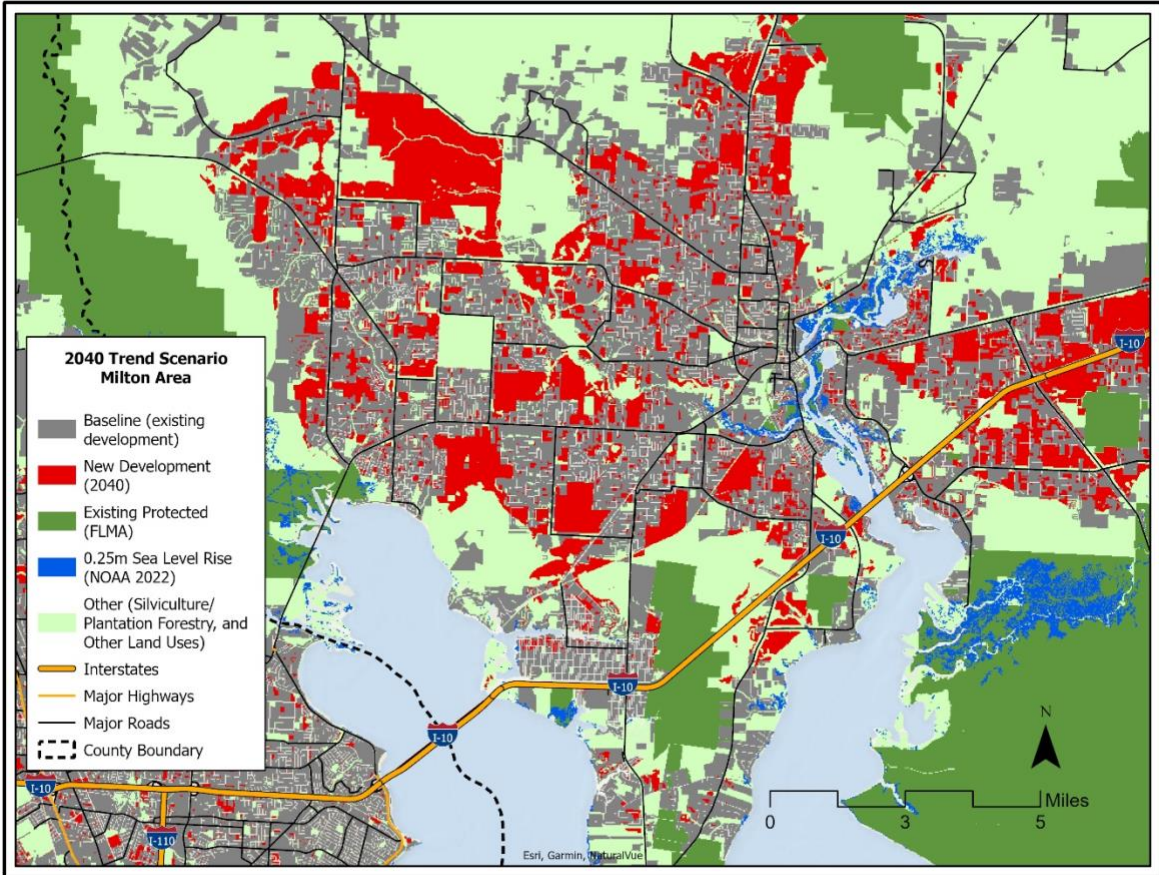


Figure 4. 2040 Trend Development Scenario Results (Milton region)

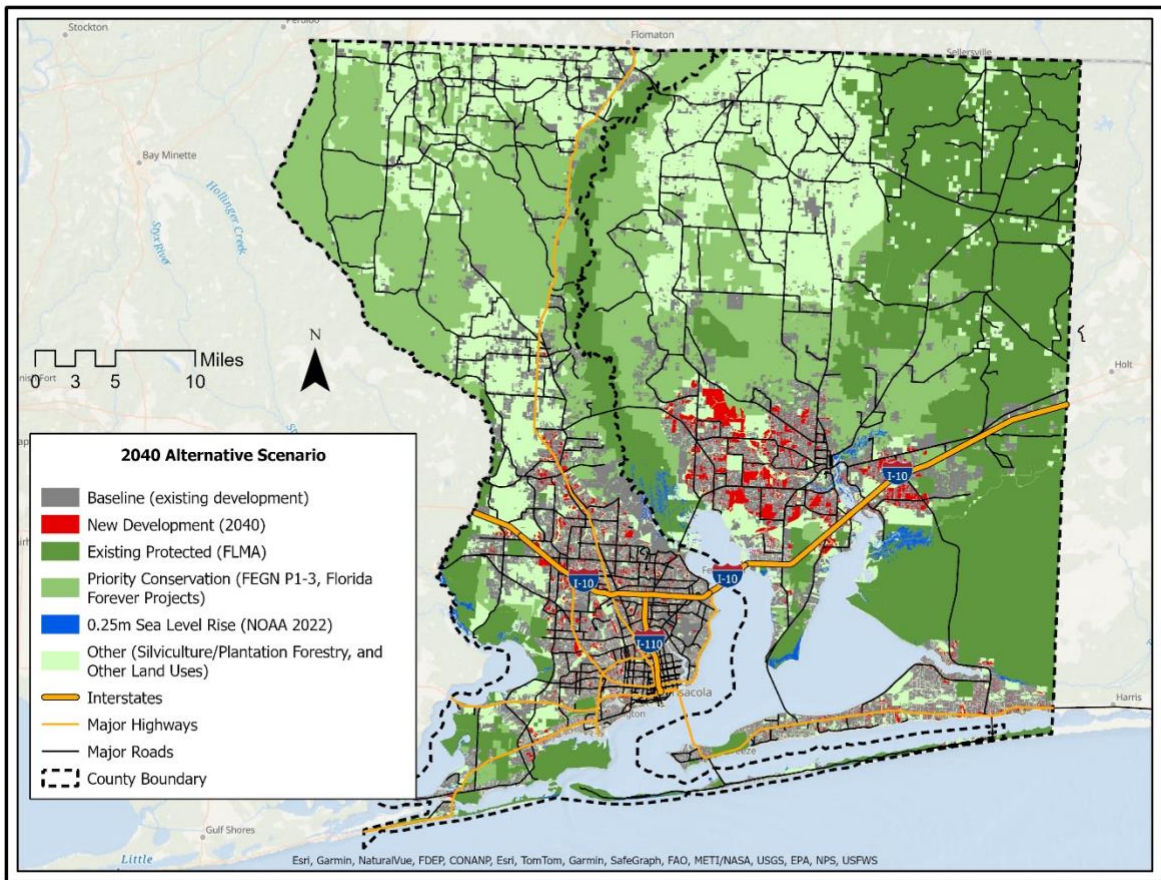


Figure 5. 2040 Alternative Development Scenario Results



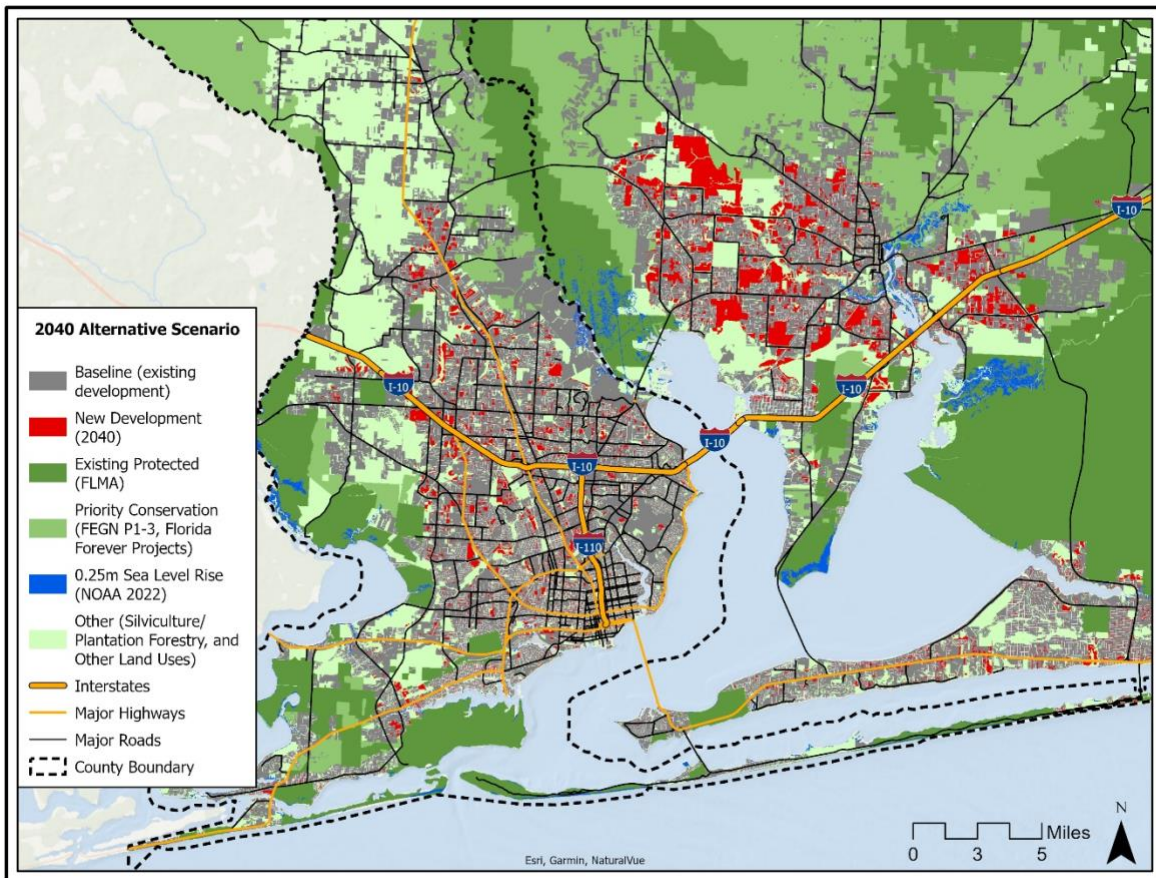


Figure 6. 2040 Alternative Development Scenario Results (Milton and Pensacola region)

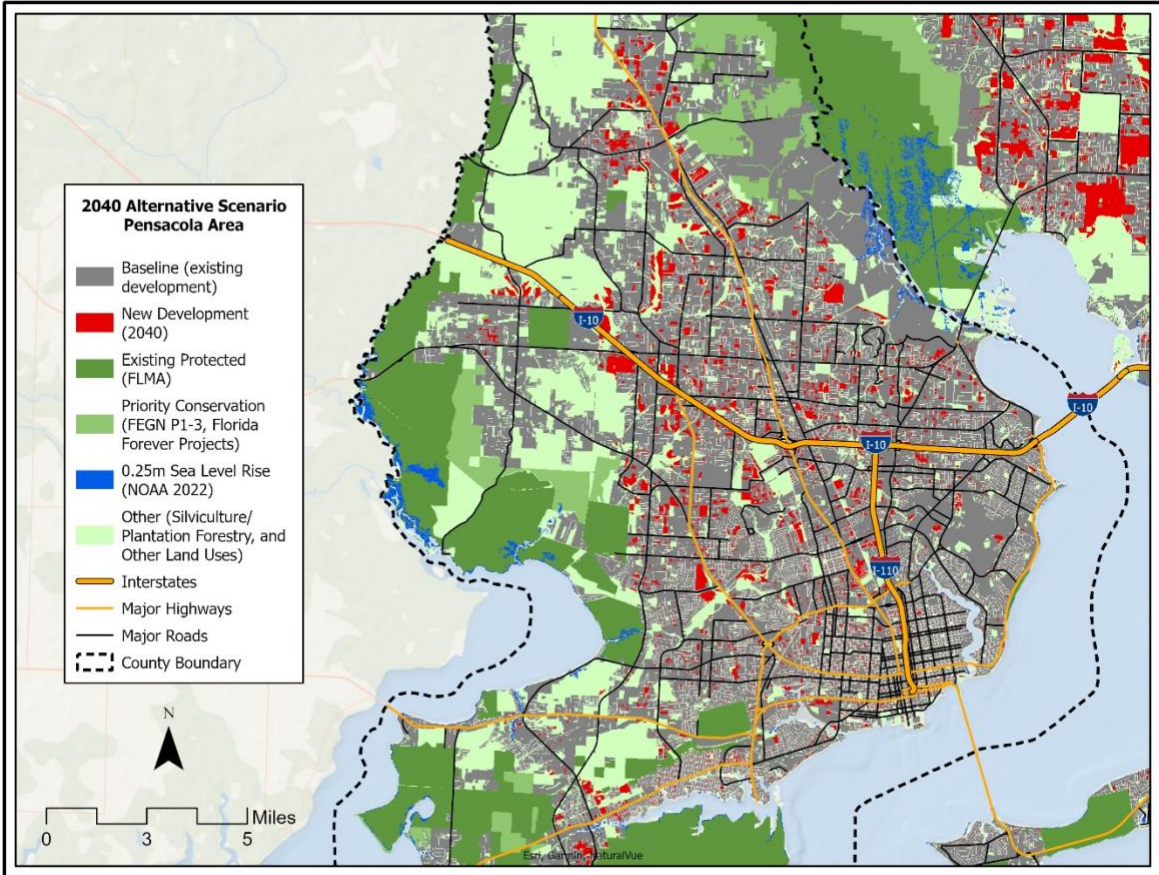


Figure 7. 2040 Alternative Development Scenario Results (Pensacola region)

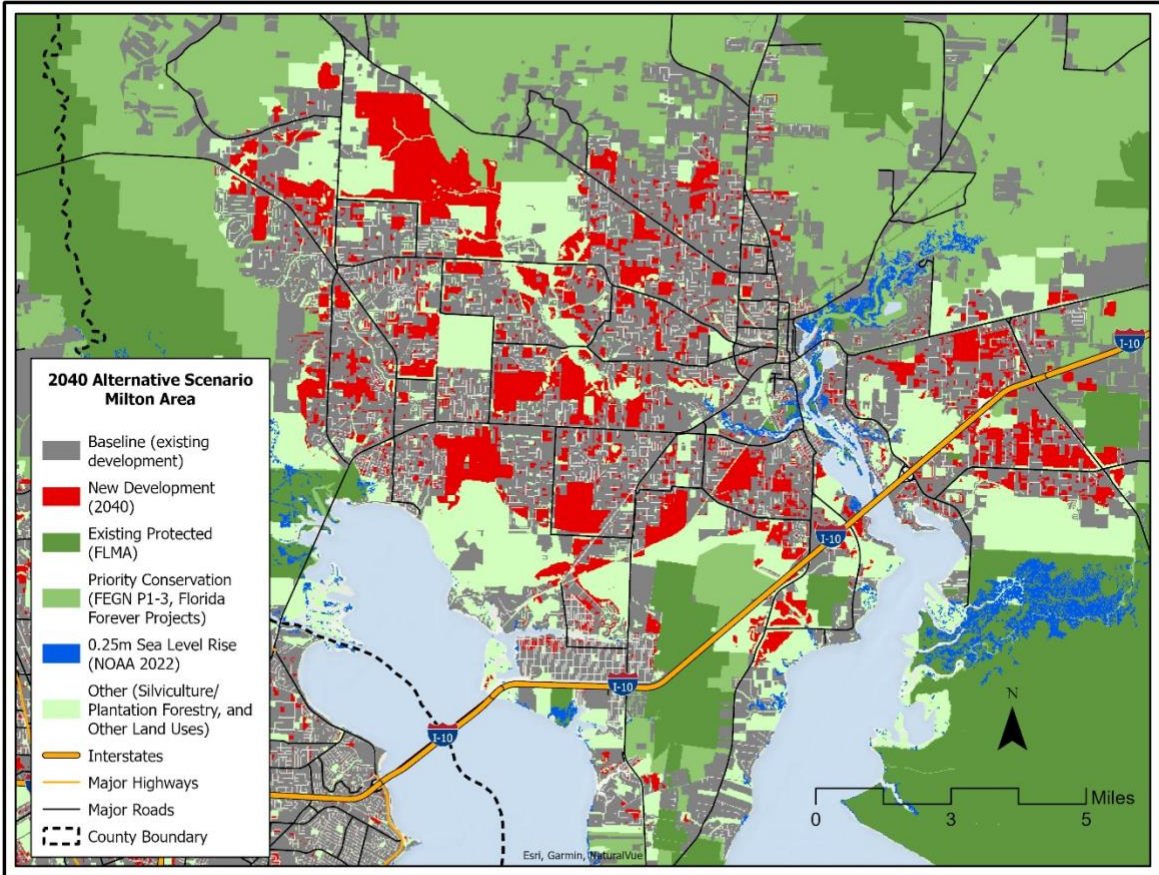


Figure 8. 2040 Alternative Development Scenario Results (Milton region)



	2023	% of Total Acreage	Trend 2040	% of Total Acreage	Alternative 2040	% of Total Acreage
Developed	109,006	25.47%	113,960	26.63%	111,279	26.00%
Protected Natural Forest & Silviculture	31,082	7.26%	30,666	7.17%	153,975	35.98%
Protected Other	12,521	2.93%	12,211	2.85%	30,380	7.10%
Natural Forest / Silviculture (Unprotected)	174,922	40.88%	172,129	40.22%	50,149	11.72%
Other (Unprotected)	88,993	20.80%	86,118	20.12%	69,301	16.19%
2019 Open Water	11,408	2.67%	11,408	2.67%	11,408	2.67%
Sea Level Inundation: Protected Lands	0	0.00%	726	0.17%	775	0.18%
Sea Level Inundation: All Other Land Uses	0	0.00%	714	0.17%	665	0.16%
<b>Total Acreage in Escambia County</b>	<b>427,932</b>	<b>100.00%</b>	<b>427,932</b>	<b>100.00%</b>	<b>427,932</b>	<b>100.00%</b>
Total Land Acreage	416,524	97.33%	415,084	97.00%	415,084	97.00%
Total Sea Level Inundation	0	0.00%	1,440	0.34%	1,440	0.34%
Total Open Water including SLR	11,408	2.67%	12,848	3.00%	12,848	3.00%

Table 5. Acreage and land use comparisons between current (baseline) development and the Trend and Alternative future development scenarios for Escambia County.



	2023	% of Total Acreage	Trend 2040	% of Total Acreage	Alternative 2040	% of Total Acreage
Developed	93,061	14.19%	108,430	16.53%	103,398	15.76%
Protected Natural Forest & Silviculture	240,133	36.61%	238,144	36.31%	337,492	51.45%
Protected Other	31,296	4.77%	30,092	4.59%	53,757	8.20%
Natural Forest / Silviculture (Unprotected)	167,512	25.54%	156,568	23.87%	61,257	9.34%
Other (Unprotected)	113,908	17.37%	108,116	16.48%	85,446	13.03%
2019 Open Water	9,995	1.52%	9,995	1.52%	9,995	1.52%
Sea Level Inundation: Protected Lands	0	0.00%	3,193	0.49%	3,587	0.55%
Sea Level Inundation: All Other Land Uses	0	0.00%	1,368	0.21%	973	0.15%
<b>Total Acreage in Santa Rosa County</b>	<b>655,905</b>	<b>100.00%</b>	<b>655,905</b>	<b>100.00%</b>	<b>655,905</b>	<b>100.00%</b>
Total Land Acreage	645,910	98.48%	641,350	97.78%	641,350	97.78%
Total Sea Level Inundation	0	0.00%	4,560	0.70%	4,560	0.70%
Total Open Water including SLR	9,995	1.52%	14,555	2.22%	14,555	2.22%

Table 6. Acreage and land use comparisons between current (baseline) development and the Trend and Alternative future development scenarios for Santa Rosa County.

	<b>2023</b>	<b>% of Total Acreage</b>	<b>Trend 2040</b>	<b>% of Total Acreage</b>	<b>Alternative 2040</b>	<b>% of Total Acreage</b>
Developed	202,067	18.64%	222,390	20.52%	214,677	19.81%
Protected Natural Forest & Silviculture	271,215	25.02%	268,810	24.80%	491,467	45.35%
Protected Other	43,817	4.04%	42,303	3.90%	84,137	7.76%
Natural Forest / Silviculture (Unprotected)	342,434	31.59%	328,697	30.33%	111,406	10.28%
Other (Unprotected)	202,901	18.72%	194,234	17.92%	154,747	14.28%
2019 Open Water	21,403	1.97%	21,403	1.97%	21,403	1.97%
Sea Level Inundation: Protected Lands	0	0.00%	3,919	0.36%	4,362	0.40%
Sea Level Inundation: All Other Land Uses	0	0.00%	2,082	0.19%	1,638	0.15%
<b>Total Acreage</b>	<b>1,083,837</b>	<b>100.00%</b>	<b>1,083,837</b>	<b>100.00%</b>	<b>1,083,837</b>	<b>100.00%</b>
Total Land Acreage	1,062,434	98.03%	1,056,434	97.47%	1,056,434	97.47%
Total Sea Level Inundation	0	0.00%	6,000	0.55%	6,000	0.55%
Total Open Water including SLR	21,403	1.97%	27,403	2.53%	27,403	2.53%

Table 7. Acreage and land use comparisons between current (baseline) development and the Trend and Alternative future development scenarios for Santa Rosa and Escambia Counties combined.

Because of the significance of timberlands as a land use type within the two-county study area, a basic overlay was developed between existing working and natural timberlands and the priority conservation lands layer used in this Alternative scenario to underscore the idea that avoiding development impacts in priority conservation areas is important for maintaining silvicultural and natural forest land uses and the economic, conservation, and water resource values that these areas provide (Figure 9).

Figure 10 shows a similar overlay between areas that are priorities for water quality and storage, and priority conservation lands – to make a similar point that avoiding development impacts in areas important for conservation will also support protection of water quality and provide water storage services within the two-county region.

Areas important for water quality were selected by identifying undeveloped/minimally developed parcels within 200m of known impaired waterbodies. Areas important for water storage were selected by identifying undeveloped or agricultural parcels that were within existing FEMA flood hazard areas or were classified as wetlands or floodplains.



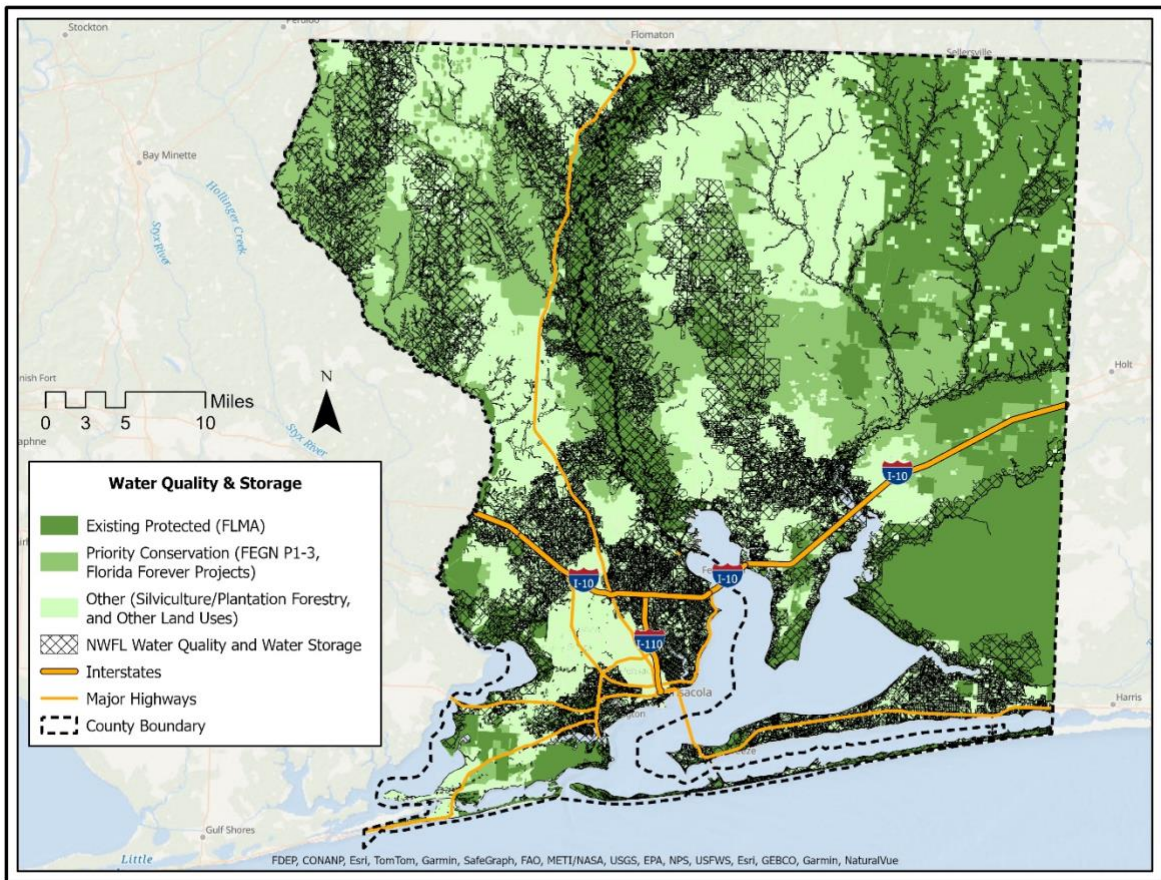


Figure 10. Priority areas for water quality protection and water storage compared with priority conservation lands.



Water Quality and Quantity Impact Assessment Methods and Results

The following section includes a summary of water quality (nitrogen and phosphorus) and quantity (volume) assessment results for current and future development, using the Event Mean Concentration (EMC) method for estimating pollutant discharge, with results shown in Table 8.

To obtain these results, USDA Hydrologic Soil Group classifications and existing Department of Revenue (DORUC) parcel data land use codes were identified within the development footprint for each county. This resulted in a table of values that indicated how many acres were currently in the each of the possible combinations for land use and hydrologic soil group, the variables necessary for using the Event Mean Concentration (EMC) method. Curve numbers were obtained from the Florida Department of Transportation Drainage Design Guide Appendix B (FDOT, 2024), and runoff coefficients and concentration values were obtained from the Escambia County LID Manual (Wanielista & Livingston, 2016).

Because the development forecasts for the Trend and Alternate scenarios cannot predict what land use will occur where, the percentage acres in each of the land use / hydrologic soil group combinations in the current development footprint was calculated. These percentages were then applied to the total acreage in the Trend and Alternative scenarios to estimate how many acres were in each land use / hydrologic soil group combination for both of the future development scenarios. Those values were then used in the EMC calculations for the future development scenarios. The results include stormwater runoff volume (in acre-feet), and Total Nitrogen (TN) and Total Phosphorus (TP) pollution loading (Annual Mass Loading in lb/yr) for both scenarios.

	Developed Acres		Acre-Feet of Runoff		# Olympic Swimming Pools*	Annual Mass Loading (lb/yr)			
	Total	%↑	Total	%↑		TN		TP	
						Total	%↑	Total	%↑
<b>Baseline</b>	202,170		477,885		317,794	2,368,393		417,033	
Escambia	108,848		280,640			1,365,786		242,819	
Santa Rosa	93,321		197,244			1,002,607		174,213	
<b>Trend</b>	211,553	4%	500,065	4%	332,544	2,478,321	4%	436,389	4%
Escambia	113,900		293,666			1,429,179		254,090	
Santa Rosa	97,653		206,399			1,049,142		182,299	
<b>Alternate</b>	204,074	1%	482,387	1%	320,788	2,390,706	1%	420,961	1%
Escambia	109,874		283,284			1,378,653		245,107	
Santa Rosa	94,201		199,102			1,012,053		175,855	

Table 8. Water quality and runoff (volume) comparisons between the current (baseline) development and the Trend and Alternative future development scenarios for Santa Rosa and Escambia Counties combined. \*An Olympic Swimming Pool is equal to 490,000 gallons. This column shows how many Olympic Swimming Pools would be filled by the amount of Acre-Feet Runoff.

### Literature Cited

Florida Department of Transportation (FDOT). (2024). *FDOT Drainage Design Guide*.  
<https://www.fdot.gov/roadway/drainage/design-guide>

Wanielista, M., & Livingston, E. (2016). *Escambia County Low Impact Design BMP Manual*.  
<http://www.myescambia/LID>