

Adopted TMDLs and Allocation Strategies

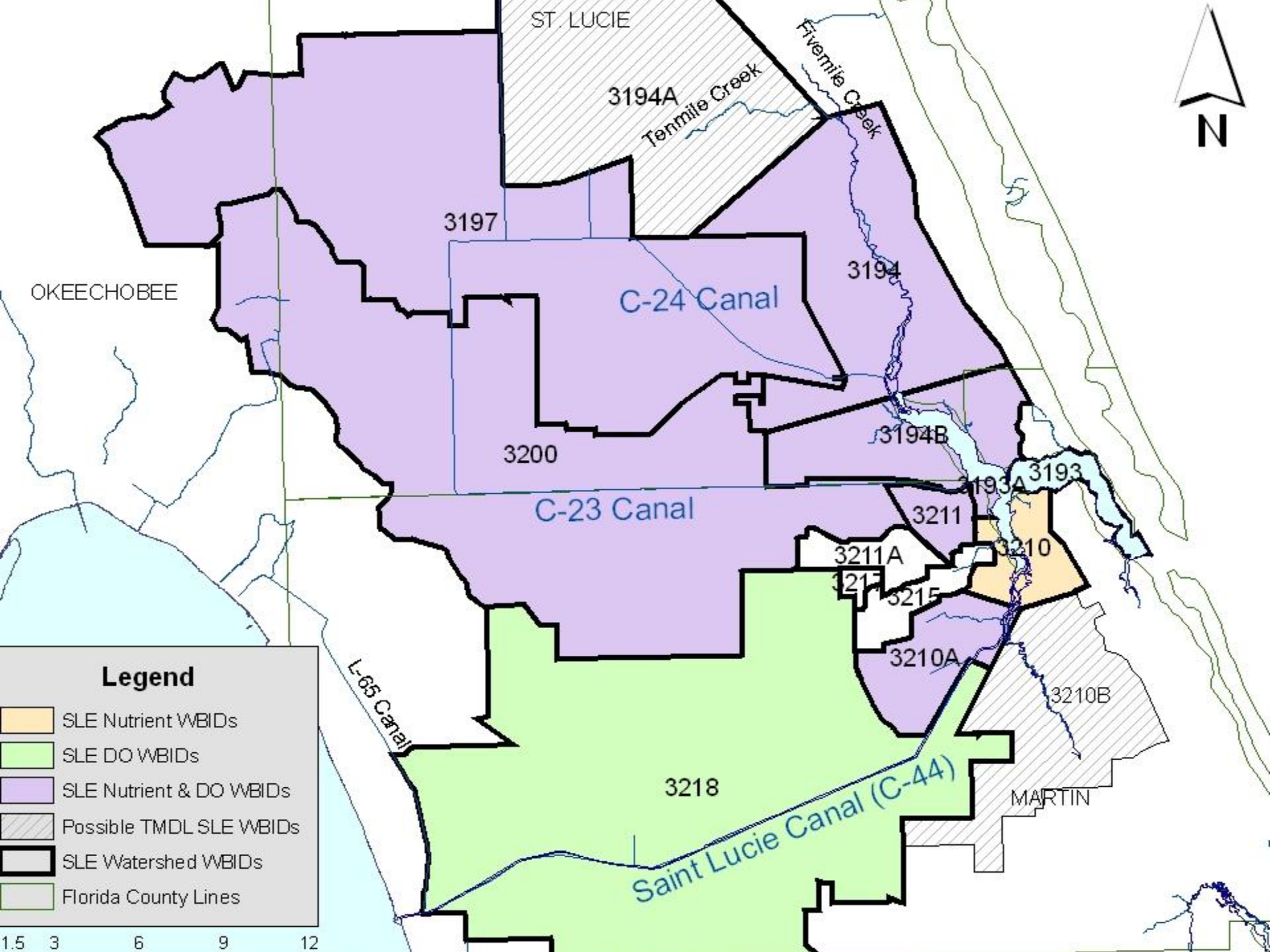
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March 25, 2010 Stuart, Florida

Nutrient and Dissolved Oxygen TMDL for the St. Lucie Basin

- Adopted by rule (62-304.705(1)-(9), FAC) in March 2009
- Total Nitrogen and Total Phosphorus reductions in 9 WBIDs
 - St. Lucie Estuary (WBID 3193)
 - North Fork St. Lucie River (WBID 3194)
 - North Fork St. Lucie Estuary (WBID 3194B)
 - C-24 Canal (WBID 3197)
 - C-23 Canal (WBID 3200)
 - South Fork St. Lucie Estuary (WBID 3210)
 - South Fork St. Lucie River (WBID 3210A)
 - Bessey Creek (WBID 3211)
 - C-44 Canal (WBID 3218)
- -BOD reductions in 3 WBIDs
 - North Fork St. Lucie River (WBID 3194)
 - C-24 Canal (WBID 3197)
 - C-44 Canal (WBID 3218)

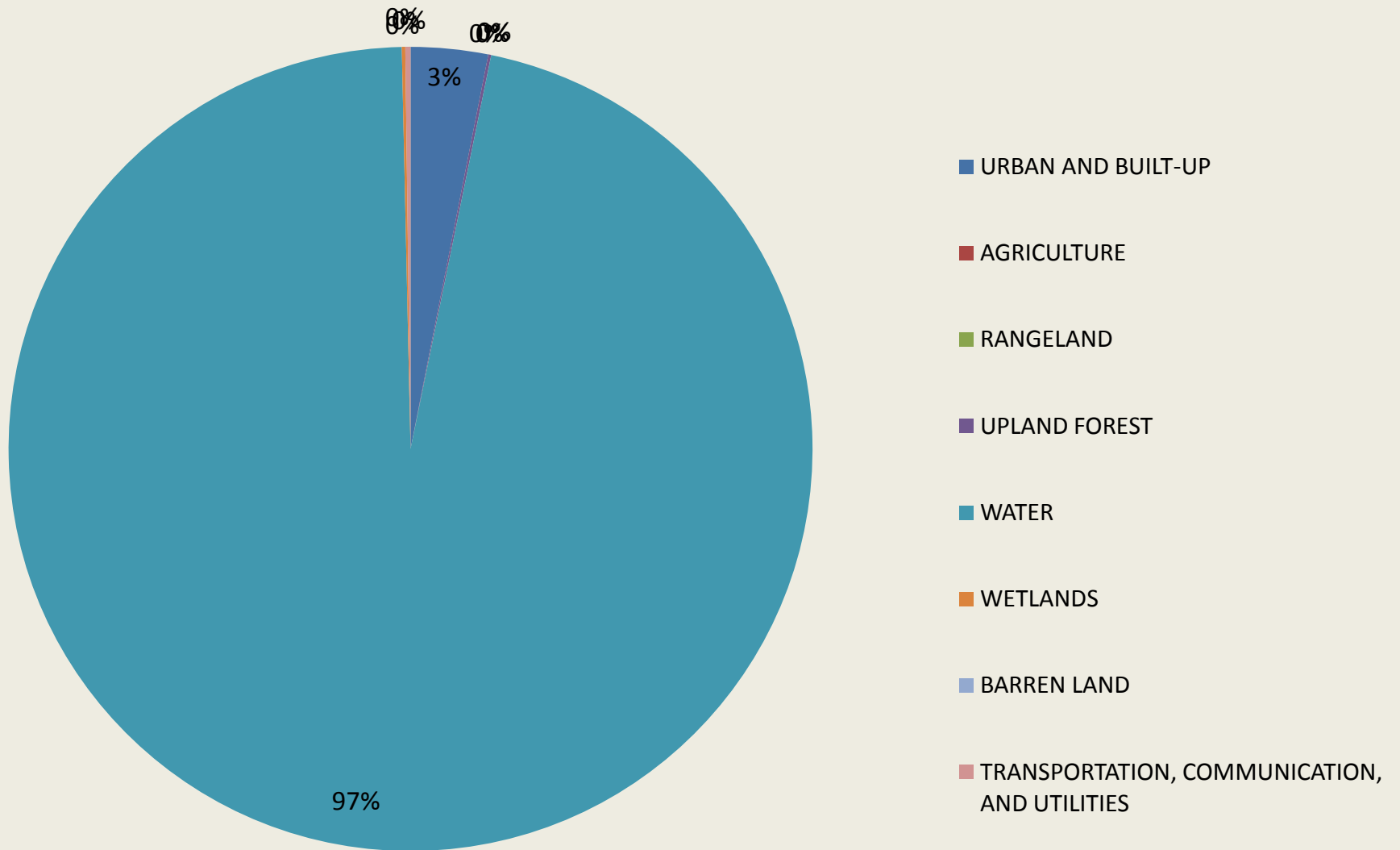


Waterbody	TN TMDL		TP TMDL	
	Annual TN load reduction (lbs) or TN [mg/L]	Percent TN Reduction	Annual TP load reduction (lbs) or TP [mg/L]	Percent TP Reduction
St. Lucie Estuary (3193)	[0.196]	21.4	[0.057]	41.3
North Fork St. Lucie River (3194)	46,828	25.0	11,500	42.2
North Fork St. Lucie Estuary (3194B)	41,878	28.8	16,156	58.1
C-24 Canal (3197)	374,612	51.8	101,867	72.2
C-23 Canal (3200)	258,999	51.7	100,325	78.6
South Fork St. Lucie Estuary (3210)	15,246	38.4	3,673	57.2
South Fork St. Lucie River (3210A)	80,400	47.1	16,477	61.8
Bessey Creek (3211)	9,394	23.9	3,544	51.2
C-44 Canal (3218)	254,374	51.2	33,441	55.0

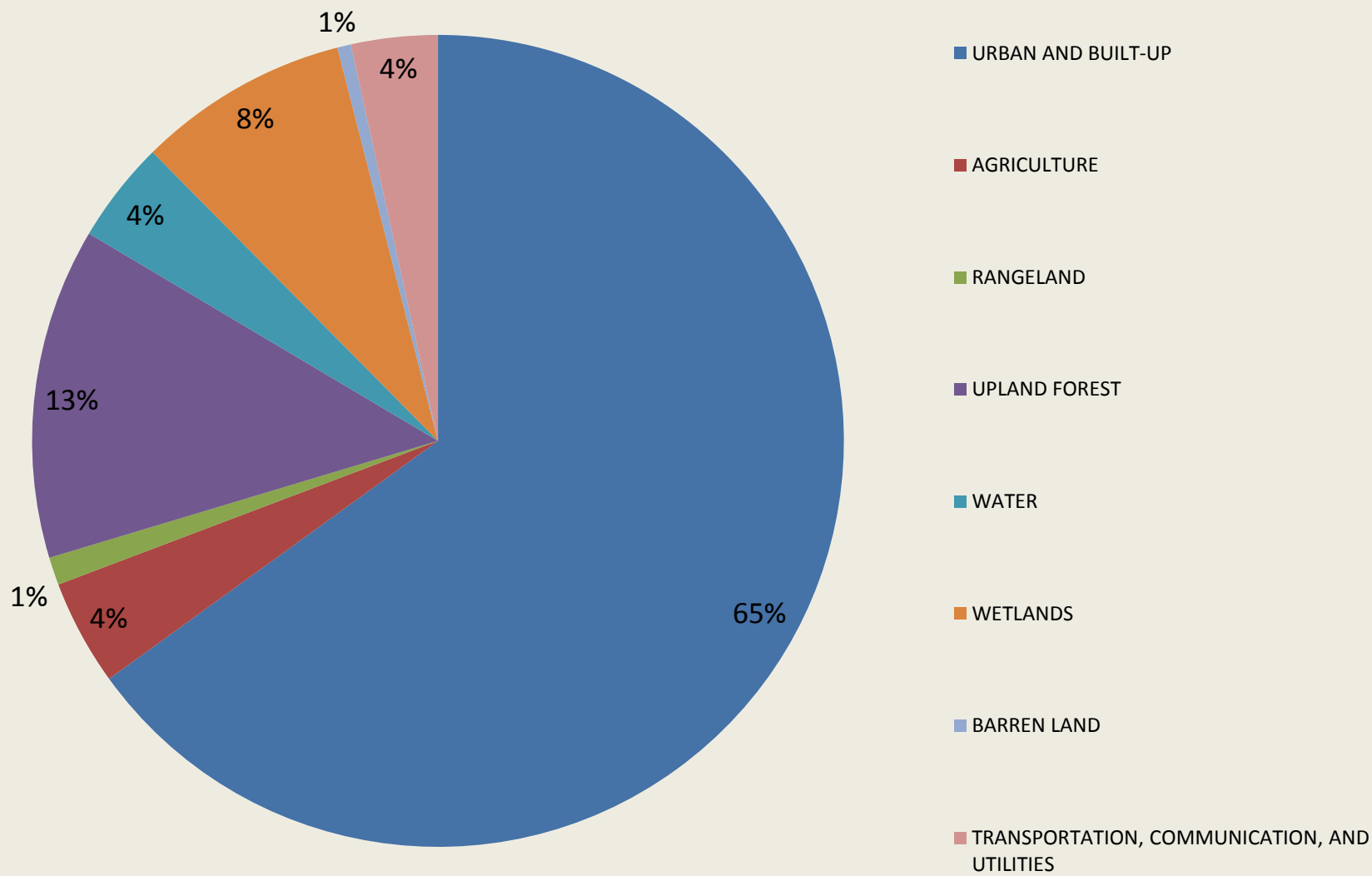
Waterbody	BOD TMDL	
	Annual BOD Reduction [mg/L]	Percent BOD Reduction
North Fork St. Lucie River (3194)	[5.70]	74.0
C-24 Canal (3197)	[1.00]	33.3
C-44 Canal (3218)	[4.6]	69.7

WBID	WLA COMPONENTS	LA COMPONENTS	
	MS4	COUNTIES	298 DISTRICTS
St. Lucie Estuary (3193)	Martin County, City of Stuart, Town of Sewall's Point	Martin	None
North Fork St. Lucie River (3194)	Martin County, St. Lucie County, City of Port St. Lucie	Martin	North St. Lucie River Water Control District
North Fork St. Lucie Estuary (3194B)	Martin County, City of Stuart, St. Lucie County, City of Port St. Lucie	Martin , St. Lucie	None
C-24 Canal (3197)	St. Lucie County, City of Port St. Lucie	St. Lucie, Okeechobee	North St. Lucie River Water Control District
C-23 Canal (3200)	Martin County, St. Lucie County, City of Port St. Lucie	Martin, Okeechobee	None
South Fork St. Lucie Estuary (3210)	Martin County, City of Stuart	Martin	None
South Fork St. Lucie River (3210A)	Martin County	Martin	None
Bessey Creek (3211)	Martin County	Martin	None
C-44 Canal (3218)	Martin County, Turnpike District/District 4	Martin	Troup-Indiantown Drainage District, Pal Mar Water Control District

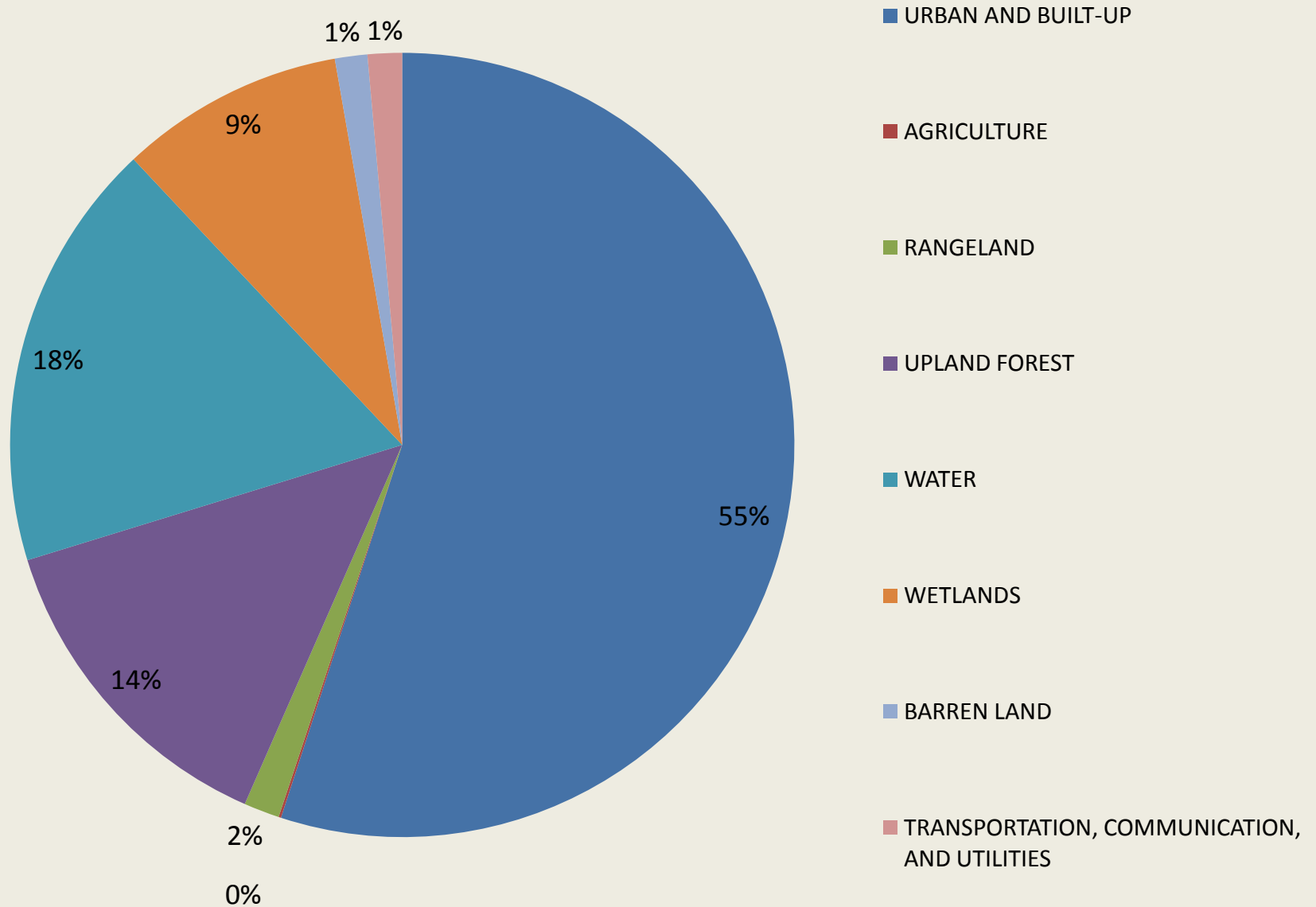
ST. LUCIE ESTUARY (WBID 3193) LEVEL 1 LAND USE (1999)



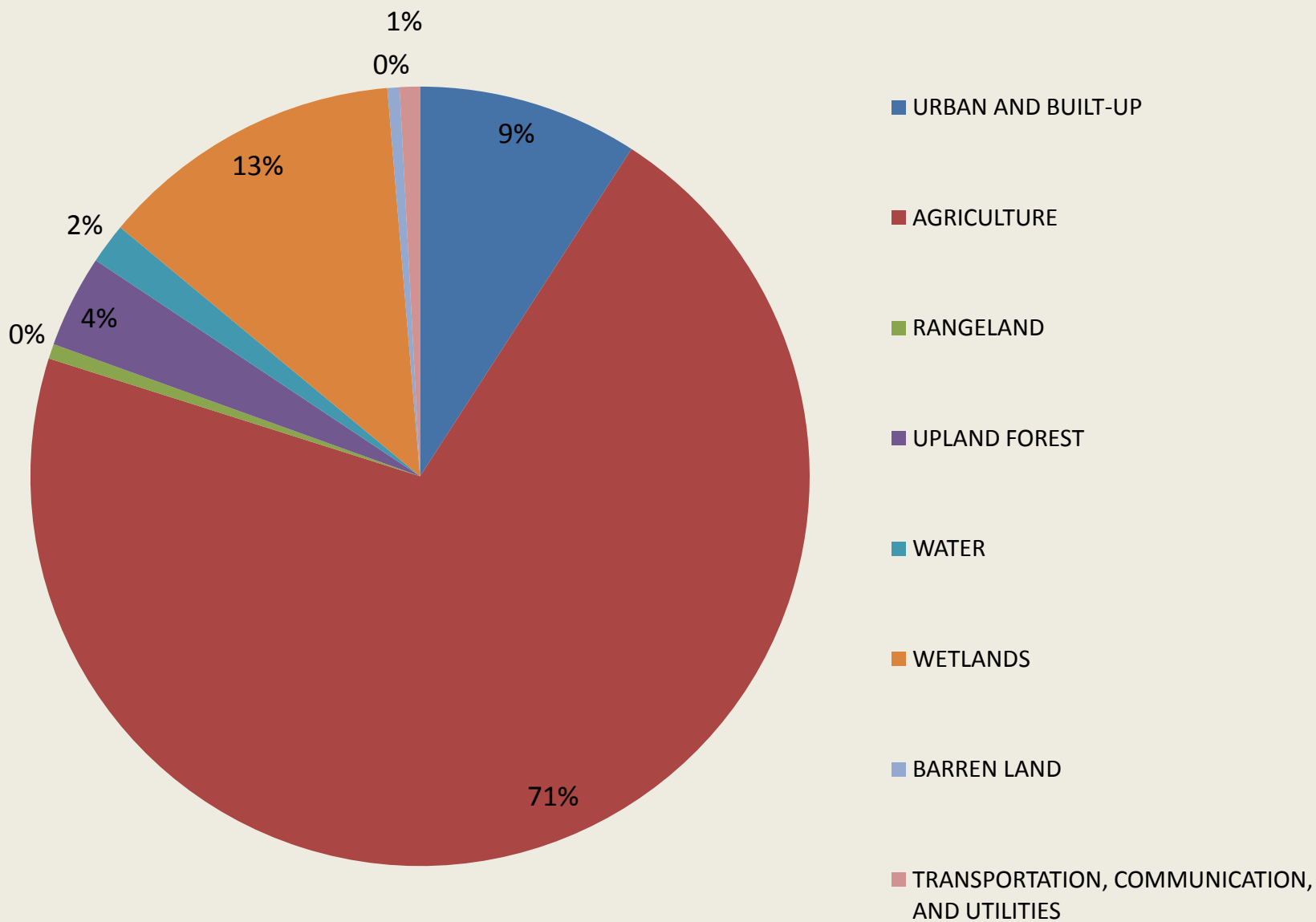
NORTH FORT ST. LUCIE RIVER (WBID 3194) LEVEL 1 LAND USE (1999)



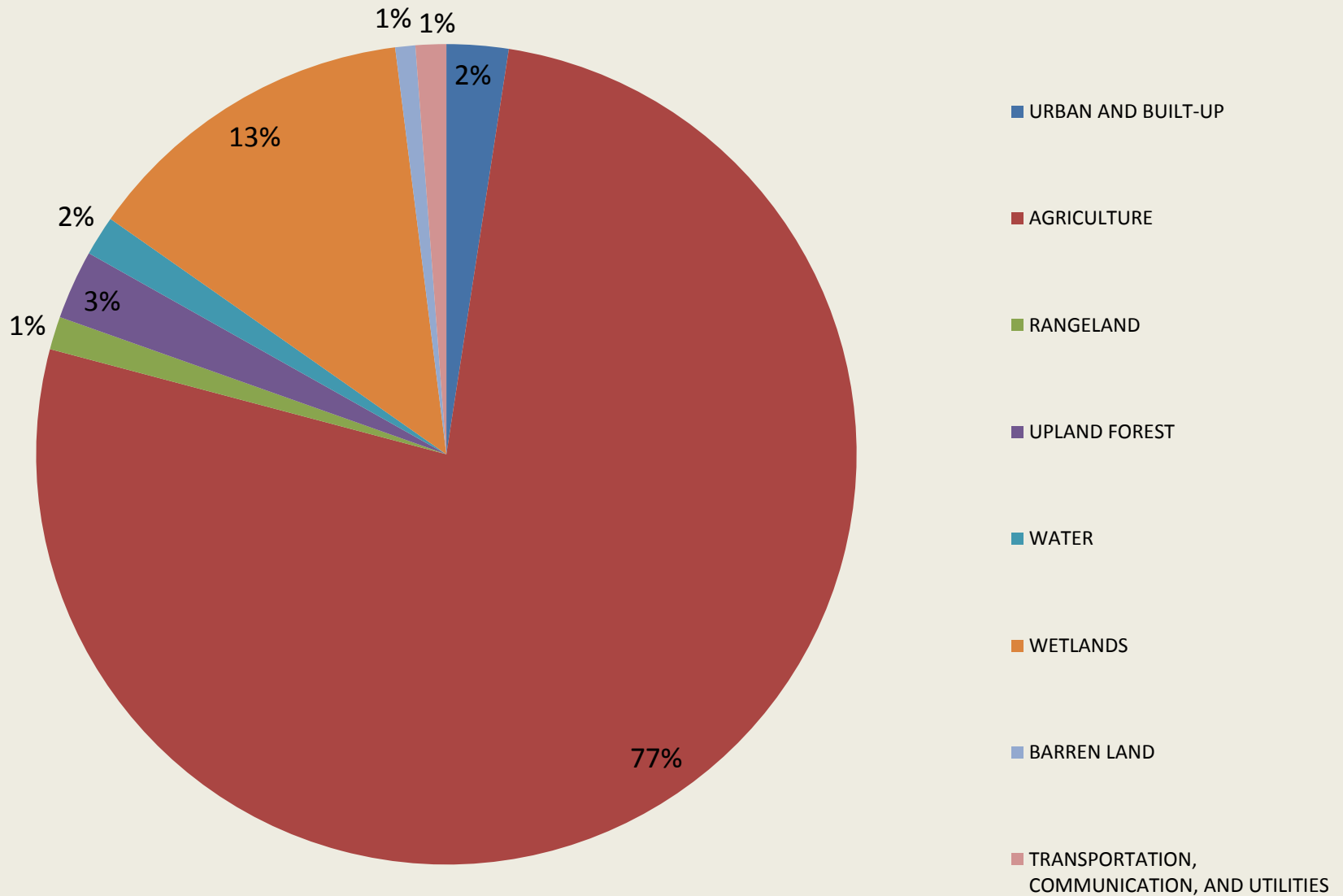
NORTH FORK ST. LUCIE ESTUARY (WBID 3194B) LEVEL 1 LAND USE (1999)



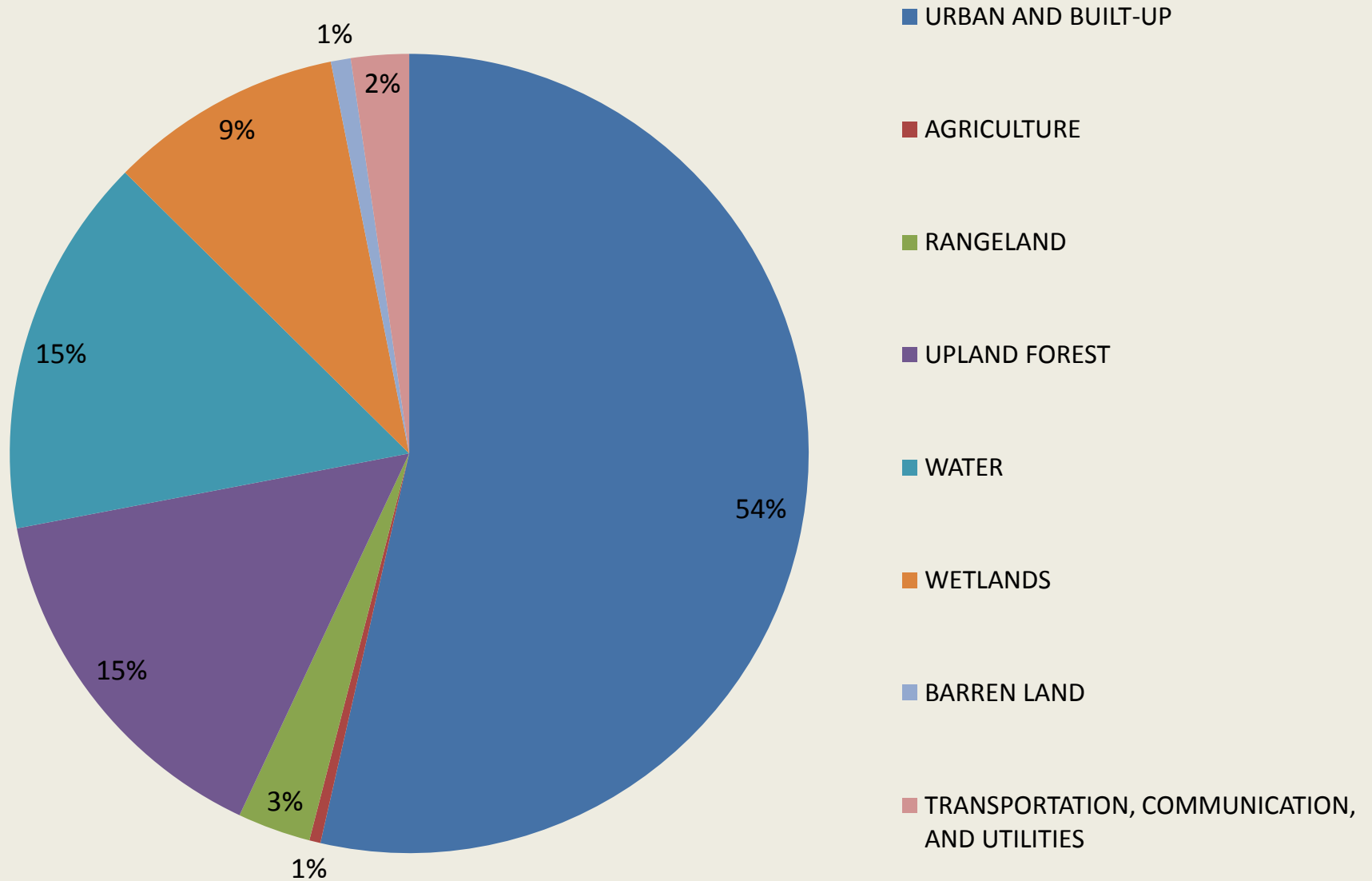
C-24 CANAL (WBID 3197) LEVEL 1 LAND USE (1999)



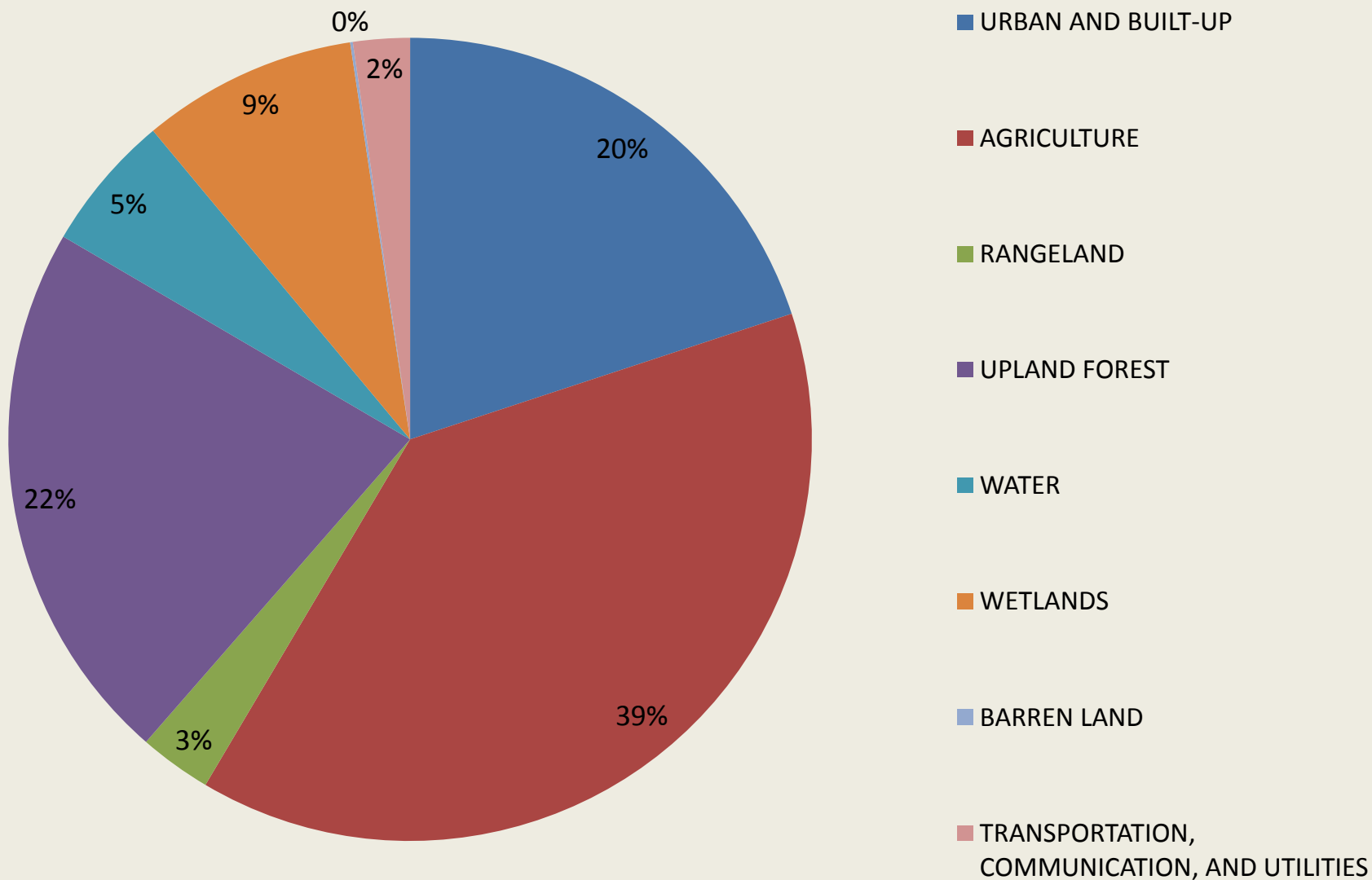
C-23 CANAL (WBID 3200) LEVEL 1 LAND USE (1999)



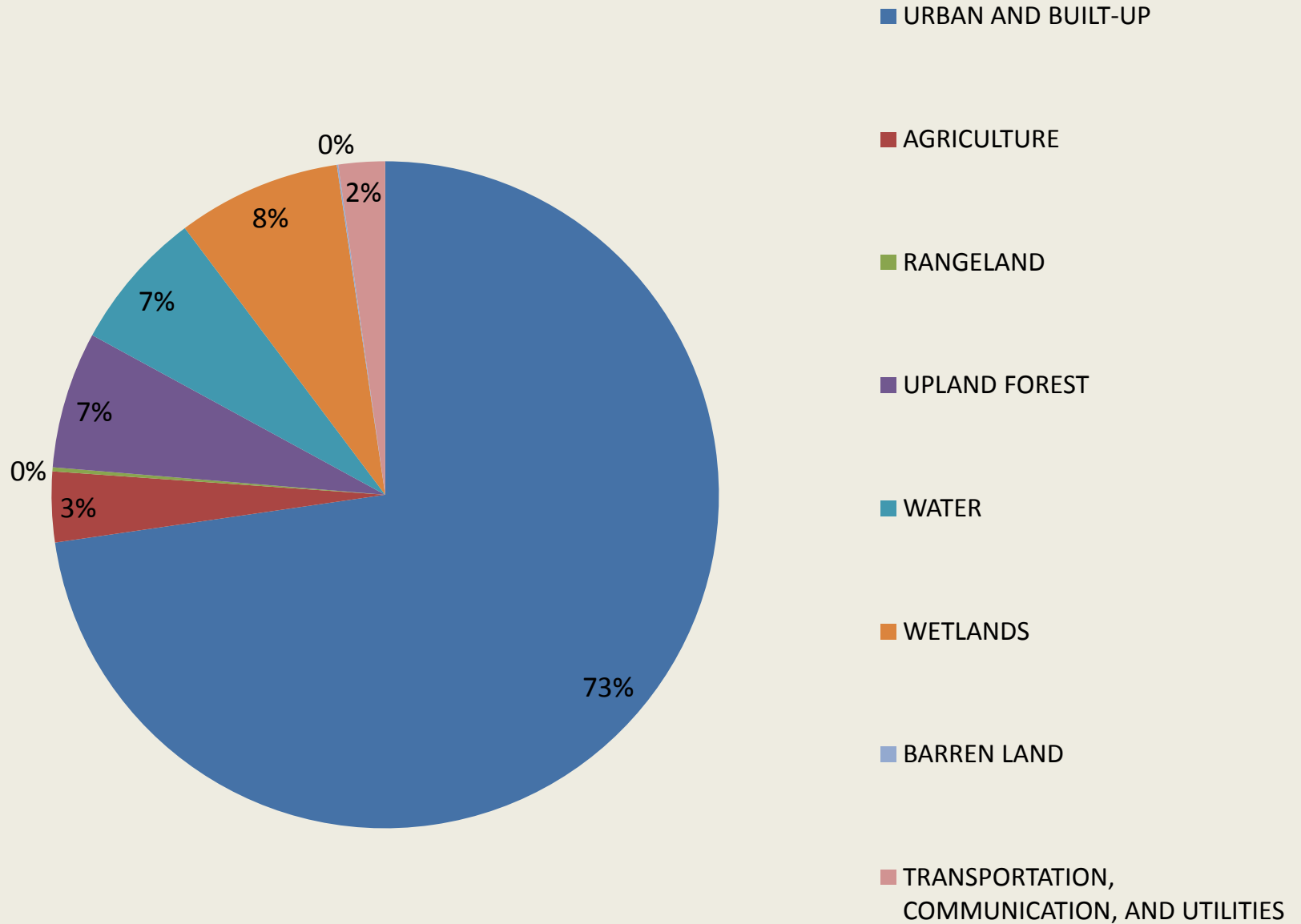
SOUTH FORK ST. LUCIE ESTUARY (WBID 3210) LEVEL 1 LAND USE (1999)



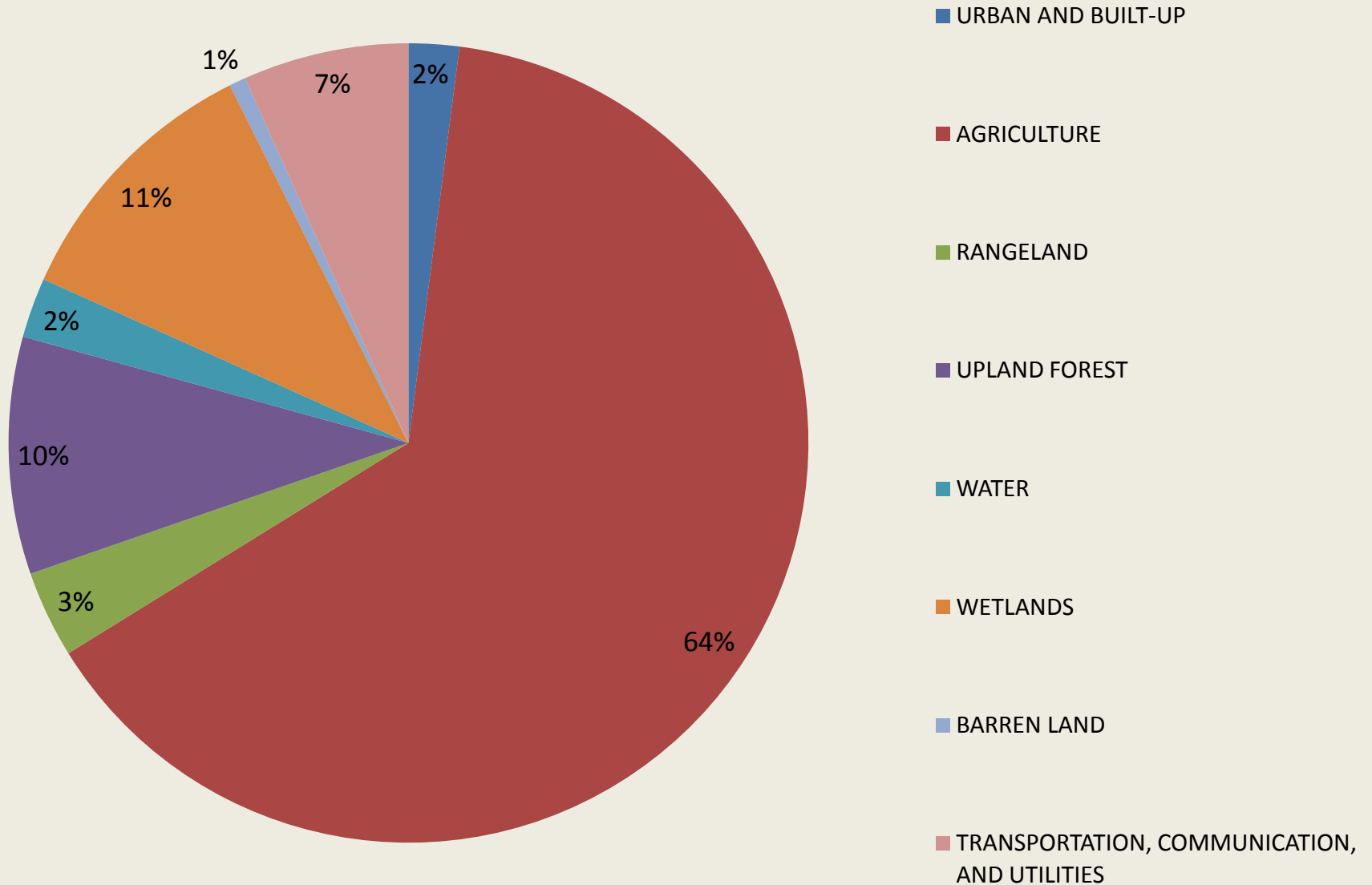
SOUTH FORK ST. LUCIE RIVER (WBID 3210A) LEVEL 1 LAND USE (1999)



BESSEY CREEK (WBID 3211) LEVEL 1 LAND USE (1999)



C-44 CANAL (WBID 3218) LEVEL 1 LAND USE (1999)



AREAL LOADING RATES BY TMDL WBID

WBID	ACRES	TN load (lbs/yr)	TN (lbs/acre/yr)	TMDL Load Target (lbs/yr)	TN Target (lbs/acre/yr)	Required load reduction (lbs/yr)	Load reduction (lbs/acre/yr)
3193	3,228.21	[0.916]		[0.72]		[0.196]	
3194	37,052.08	186,962.00	5.05	140,134	3.78	46,828	1.26
3197	109,015.59	723,569.00	6.64	348,957	3.20	374,612	3.44
3200	106,840.24	501,201.00	4.69	242,202	2.27	258,999	0.00
3210	7,287.81	39,710.00	5.45	24,463	3.36	15,246	2.09
3211	3,600.35	39,374.00	10.94	29,981	8.33	9,394	2.61
3218	123,078.09	497,303.00	4.04	242,929	1.97	254,374	2.07
3194B	18,471.40	145,625.00	7.88	103,747	5.62	41,878	2.27
3210A	10,016.22	170,870.00	17.06	90,471	9.03	80,400	8.03

WBID	ACRES	TP load (lbs/yr)	TP (lbs/acre/yr)	TMDL Load Target (lbs/yr)	TP Target (lbs/acre/yr)	Required load reduction (lbs/yr)	Load reduction (lbs/acre/yr)
3193	3,228.21	[0.138]		[0.081]		[0.057]	
3194	37,052.08	27,265.00	0.74	15,765	0.43	11,500	0.31
3197	109,015.59	141,125.00	1.29	39,258	0.36	101,867	0.93
3200	106,840.24	127,572.00	1.19	27,248	0.26	100,325	0.94
3210	7,287.81	6,426.00	0.88	2,752	0.38	3,673	0.50
3211	3,600.35	6,917.00	1.92	3,373	0.94	3,544	0.98
3218	123,078.09	60,770.00	0.49	27,330	0.22	33,441	0.27
3194B	18,471.40	27,827.00	1.51	11,672	0.63	16,156	0.87
3210A	10,016.22	26,655.00	2.66	10,178	1.02	16,477	1.65

LOADING SPREADSHEET

- For each WBID calculate acreage associated with a given land use and soil type and assign an annual runoff coefficient.
- Calculate a gross annual runoff (acre-ft) by multiplying the individual acreages and runoff coefficient times a long-term annual rainfall.
- Assign event mean concentrations (EMCs) to individual land uses.
- Calculate annual TN and TP loads by multiplying gross annual runoff for each land use/soil type by the corresponding EMC.

Additional Modeling Options

- Intermediate level (WMM) – Setup the Watershed Management Model to simulate each year over the 1996 – 2005 period.
 - Requires additional information on perviousness and imperviousness of land uses
 - Requires baseflow concentrations
- Complex level (WaSh)–
 - Requires additional staff resources to validate model inputs, perform simulations, and process output information
 - Requires ARCMAP

Allocation Approach

- Using the GIS files for WBIDs that show land uses, we will create separate files for each entity that will receive allocations.
- These files will contain the total number of acres for each land use in each entity.
- Whatever model we choose will then be used to generate baseline loads for each entity receiving allocations.

Allocation Approach (2)

- From above, we have seen that each WBID has a calculated target load per acre per year (based on the TMDL).
- The target load per acre per year will then be multiplied by the acres for each entity. This is the target load for each entity.
- The required reduction for each entity is its baseline load (pounds per year) minus the target load for each entity (pounds per year).

Allocation Approach Summary

1. Calculate entity's baseline load (lbs/yr)
2. Calculate entity's target loading rate (lbs/acre/yr)
3. Multiply entity's target loading rate by multiplying by its acres (result in lbs/yr)
4. Required reduction is entity's baseline load minus the entity's target load (result in lbs/yr)

What are the entities?

- Cities, Towns, and Community Development Districts (CDDs that are not a City, Town, or County responsibility)
- FDOT District Four/ The Turnpike District
- Water Control (298) Districts
- Agriculture
- The remaining area is a County responsibility

Implications

- Towns, Cities, and CDDs are responsible for their area not including state roads, 298 Districts, and agricultural land use
- FDOT/Turnpike District is responsible for all state highways
- 298 Districts are responsible for all loads within their area, except for state roads
- Agriculture is responsible for all agricultural land use outside of state roads and 298 Districts

Implications (2)

- Counties are responsible for everything else (after removing state roads, 298 Districts, agricultural land, Cities, Towns, and CDDs)

Addendum

- Cities, Towns, and CDDs that are or contain a Phase II MS4 will be given separate allocations for that part of the entity that is in an MS4 and the remainder of the entity.