



Memorandum

*To: South Carolina Department of Natural Resources (DNR)
South Carolina Department of Health and Environmental Control (DHEC)*

From: CDM Smith

Date: September 2015

Subject: Pee Dee River Basin SWAM Model Framework

This memorandum presents the Simplified Water Allocation Model (SWAM) framework for the Pee Dee River Basin. Several tables and figures are provided to help understand how the tributaries, water users, and discharges are being represented in the SWAM modeling environment. The tables and figures include:

Table 1 Permitted and registered water users included in the Pee Dee River Basin model framework.

Table 2 NPDES discharges included in the Pee Dee Basin model framework.

Figure 1 Overview Map

This map consolidates and presents all active permitted and registered water users; significant discharge locations; USGS stream gage locations; and tributaries (the “higher order tributaries” are not represented explicitly in the model, but their contributions to flow are included in the flows of larger, modeled tributaries). Significant discharge locations generally include NPDES discharges that average over 3 million gallons per month (Mg/m).

Figure 2 Model Tributaries and USGS Gages

This map presents the Pee Dee River Basin hydrography. Also represented are major branches, primary tributaries and several secondary tributaries. The contributions of many of the secondary and higher order tributaries are accounted for in the aggregate flow in the larger tributaries that are modeled explicitly. Both active and inactive USGS streamflow gages are displayed. All streams which have a current or former USGS streamflow gage are explicitly included in the model.

Note that in the Pee Dee Basin, there are several tributaries which share the same name, but are not connected. These include Boggy Swamp and Turkey Creek. To

differentiate these, an (N) and an (S) has been added to each tributary name to represent the north and south instances of these tributaries.

Figure 3 Surface Water Users

This map presents the location of permitted surface water users, except for golf courses.

Figure 4 Golf Courses

This map presents the location of golf courses with surface water withdrawal permits. Where certain golf courses share an intake, or have intake locations very close together on the Atlantic Intercoastal Waterway (AIW), they have been aggregated into one golf course water user object (e.g., GC: Agg 1). The names of the golf courses which are included in these aggregate water user objects are listed in Table 1.

Figure 5 Registered Agricultural Users

This map presents the location of registered agriculture surface water users.

Figure 6 Dischargers

This map presents the location of all significant NPDES discharge locations, including one discharge that originates from a withdrawal outside the basin (Lancaster County Water & Sewer District). There are no known transfers of water outside of the Pee Dee Basin. Significant discharge locations generally include NPDES discharges that average over 3 Mg/m; however, discharges that average less than 3 Mg/m, but with some months greater than 3 Mg/m are also included.

Figure 7 Pee Dee Basin SWAM Model Framework

This figure represents the SWAM model schematic, including tributaries, water users, and dischargers. Note that water and wastewater discharges can be simulated two ways in SWAM. First, they can be associated with a water user object, each of which may specify five points of discharge anywhere in the river network. These discharges are not represented with visual model objects, but are identified within the dialogue box for the associated water user object. An example in the Pee Dee Basin is the City of Florence, which is represented by a water user object but not a separate discharge object. The discharge is represented within the water user object. Alternatively, discharges can be specified as a discharge object. In the Pee Dee, some dischargers that do not have associated surface water withdrawals are represented in this manner. Numerous dischargers have a groundwater withdrawal, and have been represented using a water user object, even though they do not withdraw from surface water. Representing them as water user objects provides more flexibility in conducting future management and planning because their discharge can be directly related to changing water demand.

Portions of the coastal Pee Dee River Basin are tidally influenced. This includes all of the AIW, much of the Waccamaw River, and the lower portions of the Sampit River, Black River, and Great Pee Dee River. The tidally influenced areas, based on USGS gaging station information, are noted on Figure 7. Representation of these areas in SWAM will be limited since streamflow data is generally unavailable. At several USGS gaging stations (e.g., Sampit River near Georgetown, 02136358; Pee Dee River at Hwy 701 near Bucksport, 02135200; and Crabtree Swamp at Conway, 02110701), tidal effects have been removed (filtered) and estimated flows are available, although the data quality is generally classified as “fair” by the USGS. As the unimpaired flows (UIFs) are developed and the SWAM model is constructed, a determination will be made as to where to establish the model boundary conditions, based on the available data.

Similar to the other basins already in development, the guiding principles in determining what elements of the Pee Dee River Basin to simulate explicitly were:

1. Begin with a simple representation, with the understanding that it is easier to add additional details in the future than to remove unnecessary detail to make the model more efficient.
2. Most tributaries with current uses (permitted or registered withdrawals or significant discharge) will be represented explicitly. This includes most primary tributaries to the Great Pee Dee River, the Waccamaw River, the Lynches River, and the Black River and some secondary tributaries.
3. Generally, tributaries that are unused are not included explicitly, but the hydrologic contributions from these tributaries is embedded in the unimpaired flows (or reach gains) in downstream locations. As UIFs are developed throughout the Pee Dee, some additional tributaries may be added explicitly if warranted as candidates to support future use (or these can be easily added at any time in the future as permit applications are received). In the Pee Dee, there are a several tributaries that are explicitly included but have no significant withdrawals or discharges. This is because there are current or former USGS streamflow gages located on these tributaries.

The proposed framework is submitted with the understanding that it is malleable – that is, we may find that additional tributaries are warranted as explicit model objects (to support simulation of future withdrawals or discharges) rather than implicit flow additions, or that further simplifications are possible without compromising model utility.

The proposed model framework is a starting point based on discussions with DNR and DHEC, and on CDM Smith’s initial estimate of an appropriate framework for planning and permitting in South Carolina. Feedback from water users, environmental organizations, and other stakeholders within the Pee Dee River Basin will be important in refining the representation of the river system. The

framework will be presented at the first planned stakeholder meeting for the Pee Dee River Basin, and feedback will be used to refine the framework as appropriate.

Table 1. Permitted and registered surface water users included in the Pee Dee Basin model framework.

ID	Type	Facility Name	Withdrawal Tributary	Model Object ID
33IR033S01	IR	ATKINSON FARMS, LLC	Brown Swamp	IR: Atkinson
43IR007S03	IR	BLACK CREST FARMS MCLEOD W R FARMS	Pocotaligo River	IR: Black Crest
43IR007S01	IR	BLACK CREST FARMS MCLEOD W R FARMS	Pocotaligo River	IR: Black Crest
43IR007S02	IR	BLACK CREST FARMS MCLEOD W R FARMS	Pocotaligo River	IR: Black Crest
16IR080S01	IR	CAROLINA PLANTATION RICE	Great Pee Dee River	IR: Carolina Plantation
16IR030S01	IR	CHAPMAN FARM	Boggy Swamp (N)	IR: Chapman
16IR030S02	IR	CHAPMAN FARM	Boggy Swamp (N)	IR: Chapman
16IR015S01	IR	DARGAN FARMS PARTNERSHIP	Back Swamp	IR: Dargan
16IR015S02	IR	DARGAN FARMS PARTNERSHIP	Back Swamp	IR: Dargan
16IR006S01	IR	DUNLAP FORESTY LLC	Great Pee Dee River	IR: Dunlap
14IR016S01	IR	HALEY FARM	Bear Creek	IR: Haley (Bear)
14IR016S03	IR	HALEY FARM	Bear Creek	IR: Haley (Bear)
14IR016S04	IR	HALEY FARM	Bear Creek	IR: Haley (Bear)
14IR016S12	IR	HALEY FARM	Bear Creek	IR: Haley (Bear)
14IR016S05	IR	HALEY FARM	Deep Creek	IR: Haley (Deep)
14IR016S06	IR	HALEY FARM	Deep Creek	IR: Haley (Deep)
14IR016S07	IR	HALEY FARM	Deep Creek	IR: Haley (Deep)
14IR016S02	IR	HALEY FARM	Ox Swamp	IR: Haley (Ox)
14IR016S13	IR	HALEY FARM	Ox Swamp	IR: Haley (Ox)
34IR002S01	IR	HINSON FARM	Hagins Prong	IR: Hinson
34IR002S02	IR	HINSON FARM	Hagins Prong	IR: Hinson
45IR002S01	IR	IRWIN MCINTOSH FARMS, INC.	Pudding Swamp	IR: Irwin
16IR041S01	IR	LAWSON TURF FARMS	Bellyache Creek	IR: Lawson Turf
16IR041S02	IR	LAWSON TURF FARMS	Bellyache Creek	IR: Lawson Turf
16IR041S03	IR	LAWSON TURF FARMS	Bellyache Creek	IR: Lawson Turf
16IR041S04	IR	LAWSON TURF FARMS	Bellyache Creek	IR: Lawson Turf
34IR007S01	IR	MCDONALD FARM	Little Pee Dee River	IR: McDonald
34IR004S01	IR	O'TUEL FARM	Naked Creek	IR: O'Tuel
22IR038S01	IR	PLANTERSVILLE TURF FARMS	Great Pee Dee River	IR: Plantersville Turf
22IR038S02	IR	PLANTERSVILLE TURF FARMS	Great Pee Dee River	IR: Plantersville Turf
34IR003S01	IR	RICHARD ROGERS FARMS	Crooked Creek	IR: Richard Rogers
16IR016S01	IR	ROGER BROTHERS FARM	Black Creek	IR: Rogers
16IR016S02	IR	ROGER BROTHERS FARM	Black Creek	IR: Rogers
26IR025S01	IR	SOD FARM THE	Lake Swamp	IR: The Sod Farm
16IR012S01	IR	SUGAR HILL ACRES, LLC	Boggy Swamp (N)	IR: Sugar Hill
16IR012S02	IR	SUGAR HILL ACRES, LLC	Boggy Swamp (N)	IR: Sugar Hill
31IR008S01	IR	TOLSON FARMS	Lynches River	IR: Tolson
13IR008S01	IR	TURF CONNECTIONS	Westfield Creek	IR: Turf Connections
13IR008S02	IR	TURF CONNECTIONS	Westfield Creek	IR: Turf Connections
13GC001S01	GC	CHERAW STATE PARK	Juniper Creek	GC: Cheraw
13GC003S01	GC	WHITE PLAINS COUNTRY CLUB	Fork Creek	GC: White Plains
13IN002S01	IN	HANSON AGGREGATES - BREWER FACILITY	Black Creek	IN: Hanson (Brewer)
13MI003S01	MI	HANSON AGGREGATES - JEFFERSON FACILITY	Lynches River	MI: Hanson (Jefferson)
13WS001S01	WS	TOWN OF CHERAW WTP	Great Pee Dee River	WS: Cheraw
16IN004S01	IN	GALEY & LORD	Cedar Creek	IN: Galey & Lord
16IN004S02	IN	GALEY & LORD	Great Pee Dee River	IN: Galey & Lord
16IN005S01	IN	SONOCO PRODUCTS CO	Black Creek (Prestwood Lake)	IN: Sonoco
16IN005S02	IN	SONOCO PRODUCTS CO	Black Creek (Prestwood Lake)	IN: Sonoco
16IN006S01	IN	NUCOR CORP	Black Creek	IN: Nucor
16PN001S01	PN	H.B. ROBINSON NUCLEAR PLANT	Black Creek (Lake Robinson)	PN: HB Robinson
16PN001S2	PN	H.B. ROBINSON NUCLEAR PLANT	Black Creek (Lake Robinson)	PN: HB Robinson
21GC001S01	GC	FLORENCE COUNTRY CLUB	Jeffries Creek	GC: Florence
21IN001S01	IN	WESTROCK - FLORENCE MILL	Great Pee Dee River	IN: WestRock
21WS002S01	WS	CITY OF FLORENCE PEE DEE SWTP	Great Pee Dee River	WS: Florence
22GC001S01	GC	RIVER CLUB	Waccamaw River	GC: River Club

Table 1. Permitted and registered surface water users included in the Pee Dee Basin model framework.

ID	Type	Facility Name	Withdrawal Tributary	Model Object ID
22GC006S02	GC	FOUNDERS CLUB	Waccamaw River	GC: Founders Club
22GC008S01	GC	WILLBROOK PLANTATION	Waccamaw River	GC: Agg 3
22GC009S01	GC	HERITAGE CLUB - PAWLEYS ISLAND	Waccamaw River	GC: Agg 4
22GC017S01	GC	THE TRADITION GOLF CLUB	Waccamaw River	GC: Agg 3
22GC018S01	GC	THE RESERVE GOLF CLUB	Waccamaw River	GC: Agg 2
22GC022S01	GC	TRUE BLUE PLANTATION GOLF	Waccamaw River	GC: Agg 4
22GC022S02	GC	TRUE BLUE PLANTATION GOLF	Waccamaw River	GC: Agg 4
22GC023S01	GC	CALEDONIA GOLF & FISH CLUB	Waccamaw River	GC: Agg 4
22GC023S02	GC	CALEDONIA GOLF & FISH CLUB	Waccamaw River	GC: Agg 4
22GC025S01	GC	THE RESERVE AT LITCHFIELD COMM. ASSOC	Waccamaw River	GC: Agg 2
22IN001S01	IN	3V INC	Sampit River	IN: 3V Inc
22IN001S02	IN	3V INC	Sampit River	IN: 3V Inc
22IN006S01	IN	INTERNATIONAL PAPER - GEORGETOWN MILL	Great Pee Dee River	IN: IP (Georgetown)
22IN008S01	IN	INTERNATIONAL PAPER - SANTEE WOODYARD	Turkey Creek (S)	IN: IP (Santee)
22IN008S02	IN	INTERNATIONAL PAPER - SANTEE WOODYARD	Turkey Creek (S)	IN: IP (Santee)
22WS001S01	WS	GEORGETOWN COUNTY W&S DISTRICT	Waccamaw River	WS: GCW&SD
22WS002S01	WS	CITY OF GEORGETOWN WTP	Whites Creek	WS: Georgetown
26GC007S01	GC	DUNES GOLF & BEACH CLUB	AIW	GC: Agg 1
26GC007S02	GC	DUNES GOLF & BEACH CLUB	AIW	GC: Agg 1
26GC011S01	GC	MYRTLEWOOD GOLF COURSE	AIW	GC: Myrtlewood
26GC011S02	GC	MYRTLEWOOD GOLF COURSE	AIW	GC: Myrtlewood
26GC014S02	GC	BURNING RIDGE GOLF CLUB	Socastee Swamp	GC: Burning Ridge
26GC017S01	GC	ARCADIAN SHORES GOLF COURSE	AIW	GC: Agg 1
26GC023S01	GC	WATERWAY HILLS GOLF CLUB	AIW	GC: Waterway Hills
26GC029S01	GC	RIVER HILLS GOLF & COUNTRY CLUB	AIW	GC: River Hill
26GC030S03	GC	RIVER OAKS GOLF PLANTATION	AIW	GC: River Oaks
26GC032S01	GC	SHAFTESBURY GLEN GOLF & FISH CLUB	Waccamaw River	GC: Shaftesbury
26GC034S01	GC	HEATHER GLEN GOLF LINKS	AIW	GC: Heather Glen
26GC039S01	GC	BLACK BEAR GOLF CLUB	Buck Creek	GC: Black Bear
26GC049S01	GC	ARROWHEAD COUNTRY CLUB	Socastee Swamp	GC: Arrowhead
26GC049S02	GC	ARROWHEAD COUNTRY CLUB	AIW	GC: Arrowhead
26GC053S04	GC	BLACKMOOR CLUB	Waccamaw River	GC: Blackmoor
26GC058S01	GC	WORLD TOUR GOLF LINKS	AIW	GC: World Tour
26GC061S01	GC	BAREFOOT GOLF	AIW	GC: Barefoot
26GC064S01	GC	TPC OF MYRTLE BEACH	Collins Creek	GC: TPC
26GC066S01	GC	GRANDE DUNES VILLAGES	AIW	GC: Grande Dunes
26GC067S01	GC	ABERDEEN COUNTRY CLUB	Buck Creek	GC: Aberdeen
26PT001S01	PT	SANTEE COOPER GRAINGER STATION	Waccamaw River	PT: SC Grainger
26WS009S01	WS	GRAND STRAND W&S - MYRTLE BEACH SW PLANT	AIW	WS: GSW&SA (Myrtle Beach)
26WS053S01	WS	GWSA - BULL CREEK SWTP	Bull Creek	WS: GSW&SA (Bull Creek)
28MI001S01	MI	MARTIN MARIETTA MATERIALS PLANT	Buffalo Creek	MI: Martin Marietta
34IN005S01	IN	DOMTAR PAPER	Great Pee Dee River	IN: Domtar
34MI001S03	MI	HANSON AGGREGATES - MARLBORO FACILITY	Naked Creek	MI: Hanson (Marlboro)
34WS001S01	WS	BENNETTSVILLE WTP	Crooked Creek (Lake Wallace)	WS: Bennettsville

In certain instances, two or more golf courses have been aggregated into one Water User object, based on proximity.

AIW = Atlantic Intercoastal Waterway

Table 2. NPDES discharges included in the Pee Dee Basin model framework.

NPDES ID	Pipe(s)	Facility Name	Discharge River or Tributary	Surface Water Permit	Groundwater Withdrawal ID	Model Object ID
SCG730286	-1AA	HANSON AGGR SE/BREWER	Black Creek	13IN002	none	IN: Hanson (Brewer)
SCG730062	-000	HANSON AGGR SE/JEFFERSON	Lynches River	13MI003	none	MI: Hanson (Jefferson)
SC0020249	-001	CHERAW WWTF	Great Pee Dee River	13WS001	none	WS: Cheraw
SC0002704	-001	GALEY & LORD/SOCIETY HILL	Great Pee Dee River	16IN004	16IN004G	IN: Galey & Lord
SC0003042	-001, -002, -003, -004, -005, -006	SONOCO PRODUCTS/HARTSVILLE	Black Creek	16IN005	16IN005G	IN: Sonoco
SC0002925	-001	PROGRESS ENERGY/ROBINSON	Black Creek	16PN001	16PN001G	PN: HB Robinson
SC0002925	-003, -006, -008, -009, -011, -013, -014	PROGRESS ENERGY/ROBINSON	Black Creek	16PN001	16PN001G	PN: HB Robinson
SC0000876	-001	WESTROCK	Great Pee Dee River	21IN001	21IN001G	IN: WestRock
SC0039624	-001	DARLINGTON/BLACK CREEK WWTF	Black Creek	21WS002	16WS002G	WS: Florence
SC0045462	-001	FLORENCE/PEE DEE RIVER PLANT	Great Pee Dee River	21WS002	21WS002G	WS: Florence
SC0000868	-001	INTERNATIONAL PAPER/GEORGETOWN	Whites Creek	22IN006S01	22IN006G	IN: IP(Georgetown)
SC0048984	-001	GCW&SD/DEBORDIEU COLONY WWTP ALTERNATIVE DISCHARGE	Waccamaw River	22WS001	22WS001G	WS: GCW&SD
SC0040959	-001	GCW&SD/MURRELLS INLET WWTF	Waccamaw River	22WS001	22WS001G	WS: GCW&SD
SC0039951	-001	GCW&SD/PAWLEYS AREA WWTP	Waccamaw River	22WS001	22WS001G	WS: GCW&SD
SC0040029	-001	GEORGETOWN, CITY OF WWTP	Whites Creek	22WS002	22WS002G	WS: Georgetown
SC0001104	-001	SCPSA/GRAINGER GENERATING STAT	Waccamaw River	26PT001	26IN007G	PT: SC Grainger
SC0001104	-002	SCPSA/GRAINGER GENERATING STAT	Waccamaw River	26PT001	26IN007G	PT: SC Grainger
SC0022161	-001	N MYRTLE BEACH/CRESCENT BEACH	AIW	26WS009	26WS001G	WS: GSW&SA (Myrtle Beach)
SC0022152	-001	N MYRTLE BEACH/OCEAN DRIVE	AIW	26WS009	26WS001G	WS: GSW&SA (Myrtle Beach)
SCG646050	-001	GSW&SA/BULL CREEK WTP	Bull Creek	26WS009/ 26WS053	26WS009G	WS: GSW&SA (Myrtle Beach)/ WS: GSW&SA (Bull Creek)
SC0037753	-002, -003, -004	GSW&SA/SCHWARTZ PLANT	AIW	26WS009/ 26WS055	26WS009G	WS: GSW&SA (Myrtle Beach)/ WS: GSW&SA (Bull Creek)
SCG646011	-001	GSW&SA MYRTLE BEACH SW PLANT	Bull Creek	26WS053	26WS003G	WS: GSW&SA (Bull Creek)
SC0021733	-001	GSW&SA/CONWAY WWTP	Waccamaw River	26WS053	26WS007G	WS: GSW&SA (Bull Creek)
SC0025348	-001	GSW&SA/LORIS WWTF	Lake Swamp	26WS053	26WS008	WS: GSW&SA (Bull Creek)
SC0041696	-001	GSW&SA/GEORGE R VEREEN WWTP	AIW	26WS053	26WS009G	WS: GSW&SA (Bull Creek)
SC0041696	-007	GSW&SA/GEORGE R VEREEN WWTP	AIW	26WS053	26WS009G	WS: GSW&SA (Bull Creek)
SC0025798	-001	KERSHAW/HANGING ROCK CREEK *	Hanging Rock Creek	29WS005	none	LCW&SD Import
SC0036111	-001, -01B	3V INC	Sampit River	2IN001	22IN001G	IN: 3V Inc
SC0042188	-001	DOMTAR PAPER CO LLC/MARLBORO MILL	Great Pee Dee River	34IN005	none	IN: Domtar
SC0025178	-001	BENNETTSVILLE WWTF	Crooked Creek	34WS001	34WS001G	WS: Bennettsville
SC0020419	-001	MANNING WWTF	Ox Swamp	none	14WS001G	WS: Manning
SC0021580	-001	HARTSVILLE WWTF	Black Creek	none	16WS003G	WS: Hartsville
SC0043702	-001	LAMAR WWTF	Lynches River	none	16WS005G	WS: Lamar
SC0021776	-001, -002, -003, -004	DILLON/LITTLE PEE DEE	Little Pee Dee River	none	17WS001G	WS: Dillon
SC0025402	-001	LATTA, TOWN OF	Buck Swamp	none	17WS003G	WS: Latta
SC0025933	-001	JOHNSONVILLE/EAST PLANT	Lynches River	none	21IN002G	IN: Johnsonville
SC0039284	-001, -01A	MCCALL FARMS INC	Lynches River	none	21IN008G	IN: McCall Farms
SC0025356	-001	TIMMONSVILLE, TOWN OF	Sparrow Swamp	none	21WS003G	WS: Timmons ville
SC0046311	-001	LAKE CITY/LAKE SWAMP WW PLANT	Lynches River	none	21WS005G	WS: Lake City
SC0021351	-002	PAMPLICO, TOWN OF	Great Pee Dee River	none	21WS007G	WS: Pamplico
SC0001619	-001	TREBOL USA LLC	Boggy Swamp (S)	none	22IN007G	IN: Trebol
SC0035378	-001	BISHOPVILLE WWTF	Lynches River	none	31WS001G	WS: Bishopville
SC0042676	-001	LYNCHBURG WWTF	Lynches River	none	31WS002G	WS: Lynchburg
SC0046230	-001	MARION/S. MAIN ST. WWTF	Great Pee Dee River	none	33WS001G	WS: Marion
SC0029408	-001	MULLINS/WHITE OAK CREEK WWTF	Brown Swamp	none	33WS002G	WS: Mullins
SC0001996	-001, -002, -003	MOHAWK IND/OAK RIVER PLANT	Great Pee Dee River	none	34IN003G	IN: Mohawk
SC0041963	-001	MCCOLL WWTF	Little Pee Dee River	none	34WS003G	WS: McColl
SC0040606	-01C	CLIO WWTF	Hagins Prong	none	34WS050G	WS: Clio
SC0040606	-01A	CLIO WWTF	Hagins Prong	none	34WS050G	WS: Clio
SC0000795	-001	PILGRIMS PRIDE POULTRY PROC. PLANT	Pocotaligo River	none	43IN005G	IN: Pilgrims Pride
SC0000795	-002	PILGRIMS PRIDE POULTRY PROC. PLANT	Pocotaligo River	none	43IN005G	IN: Pilgrims Pride
SC0027707	-001	SUMTER/POCOTALIGO RIVER PLANT	Turkey Creek (N)	none	43WS001G	WS: Sumter
SC0003123	-001, -002	MARTEK BIOSCIENCES KINGSTREE	Black River	none	45IN001G	IN: Martek
SC0039934	-001	HEMINGWAY, TOWN OF	Great Pee Dee River	none	45WS001G	WS: Hemingway
SC0035971	-001	KINGSTREE, TOWN OF	Black River	none	45WS002G	WS: Kingstree
SC0040479	-002	HAILE GOLD MINE	Little Lynches Creek	none	none	Haile
SC0001431	-001	ISG GEORGETOWN	Sampit River	none	none	ISG
SC0024767	-001	JEFFERSON WWTF	Little Fork Creek	none	none	Jefferson
SC0003018	-001, -002	KOPPERS INC	Black Creek	none	none	IN: Koppers
SC0021504	-001	PAGELAND/NORTHWEST WWTF	Lynches River	none	none	Pageland
SC0021539	-001	PAGELAND/SOUTHEAST WWTF	Black Creek	none	none	Pageland

No shading identifies dischargers that have a surface water withdrawal permit and are represented by a Water User object.

Blue shading identifies dischargers that have a public water supply permit or registration to withdrawal groundwater, but no surface water permit, and are represented by a Water User obj

Gray shading identifies dischargers that do not have a public water supply permit or registration to withdrawal groundwater, and are represented by a Discharge model object.

* Discharge from Catawba River Basin water source

AIW = Atlantic Intercoastal Waterway

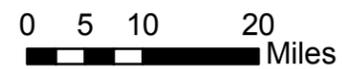
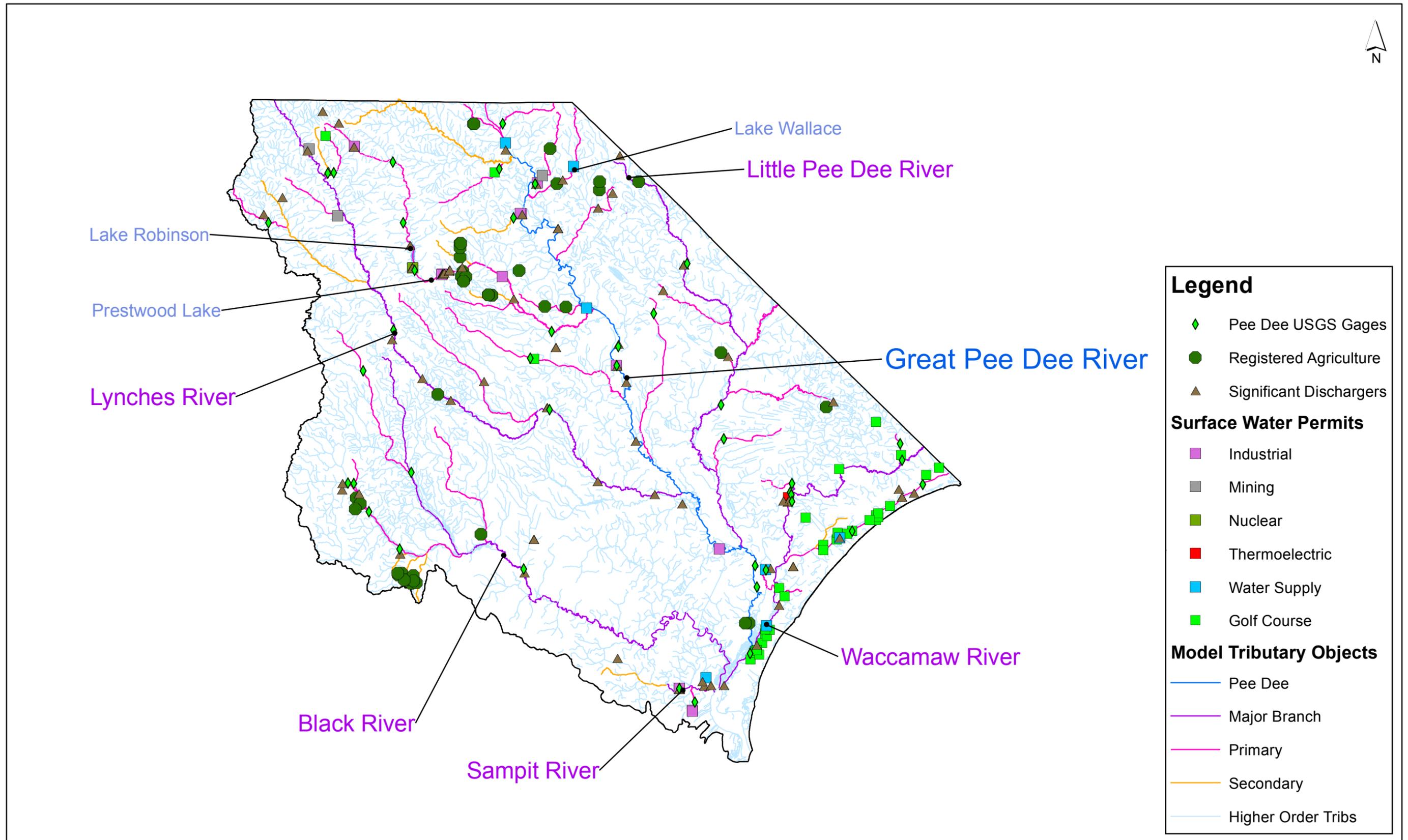


Figure 1: Overview Map

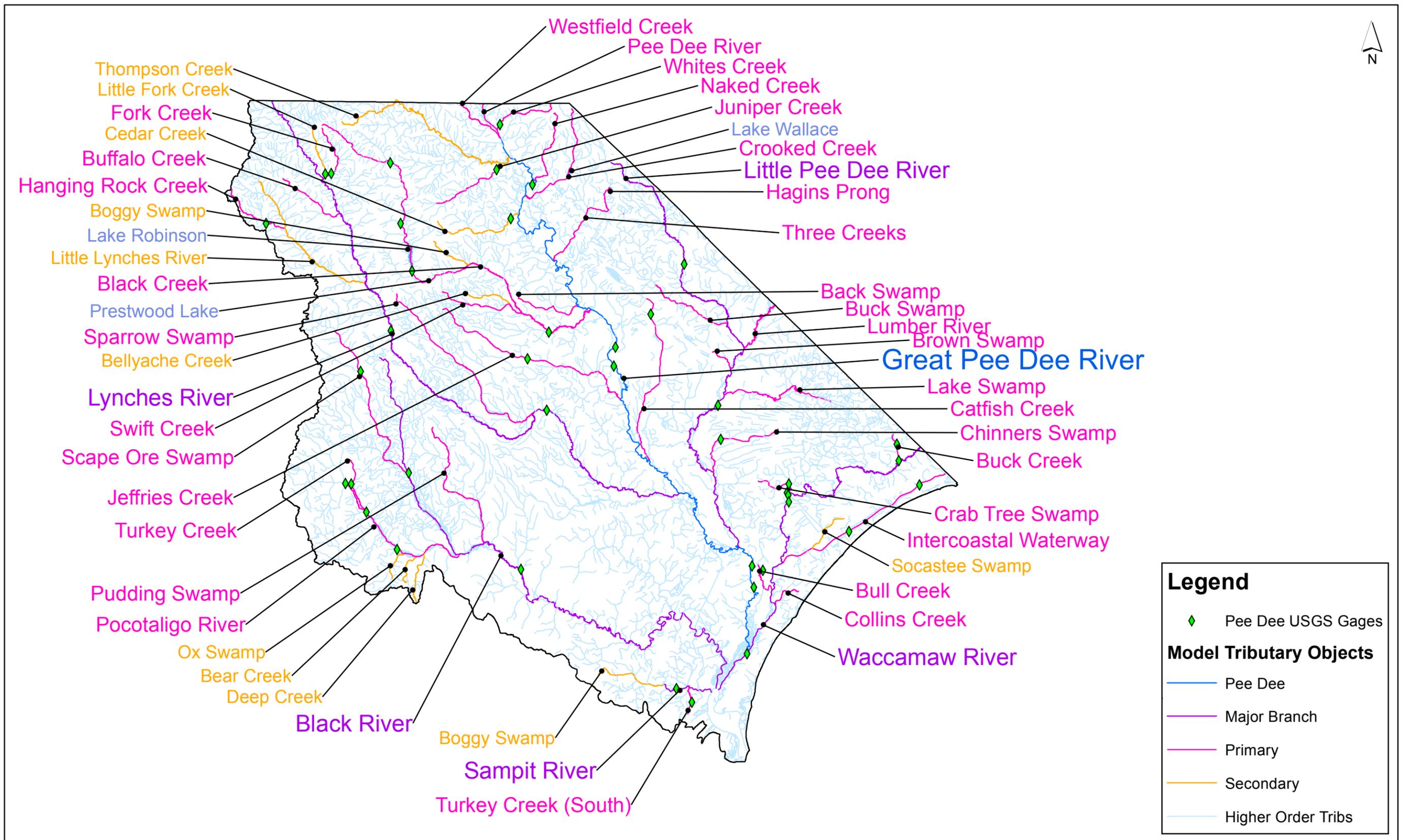


Figure 2: Model Tributaries and USGS Streamflow Gages

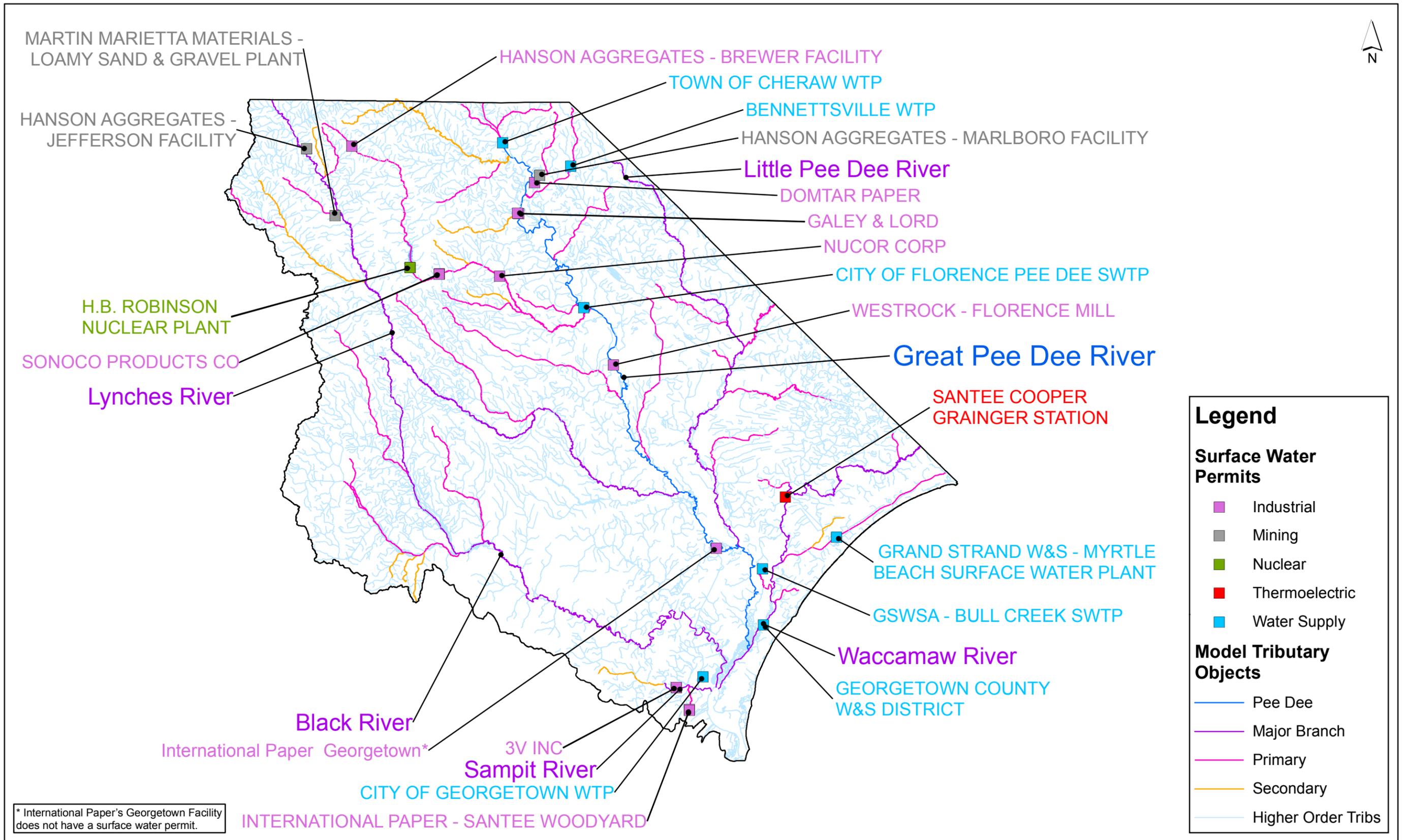


Figure 3: Permitted Surface Water Users

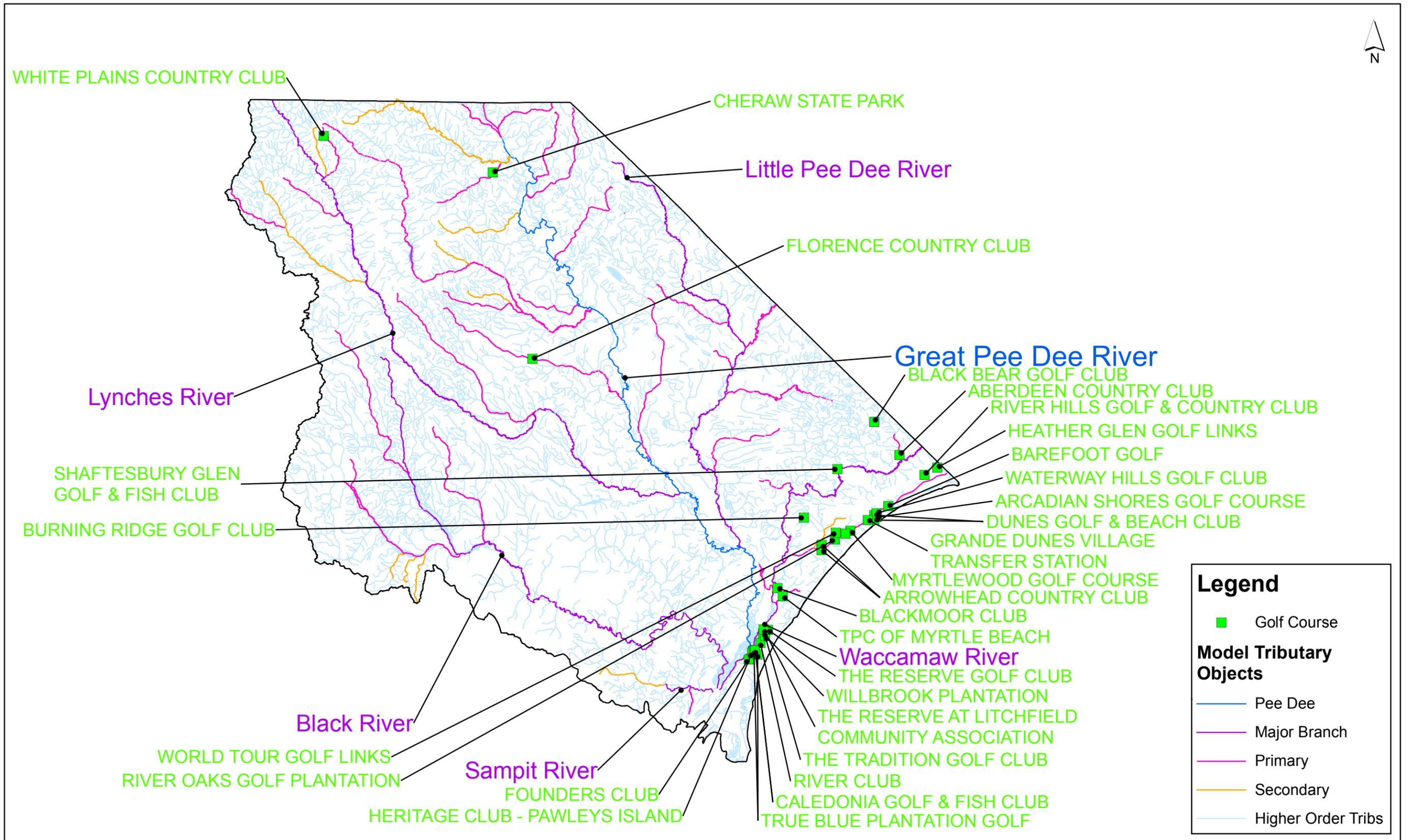


Figure 4: Golf Courses

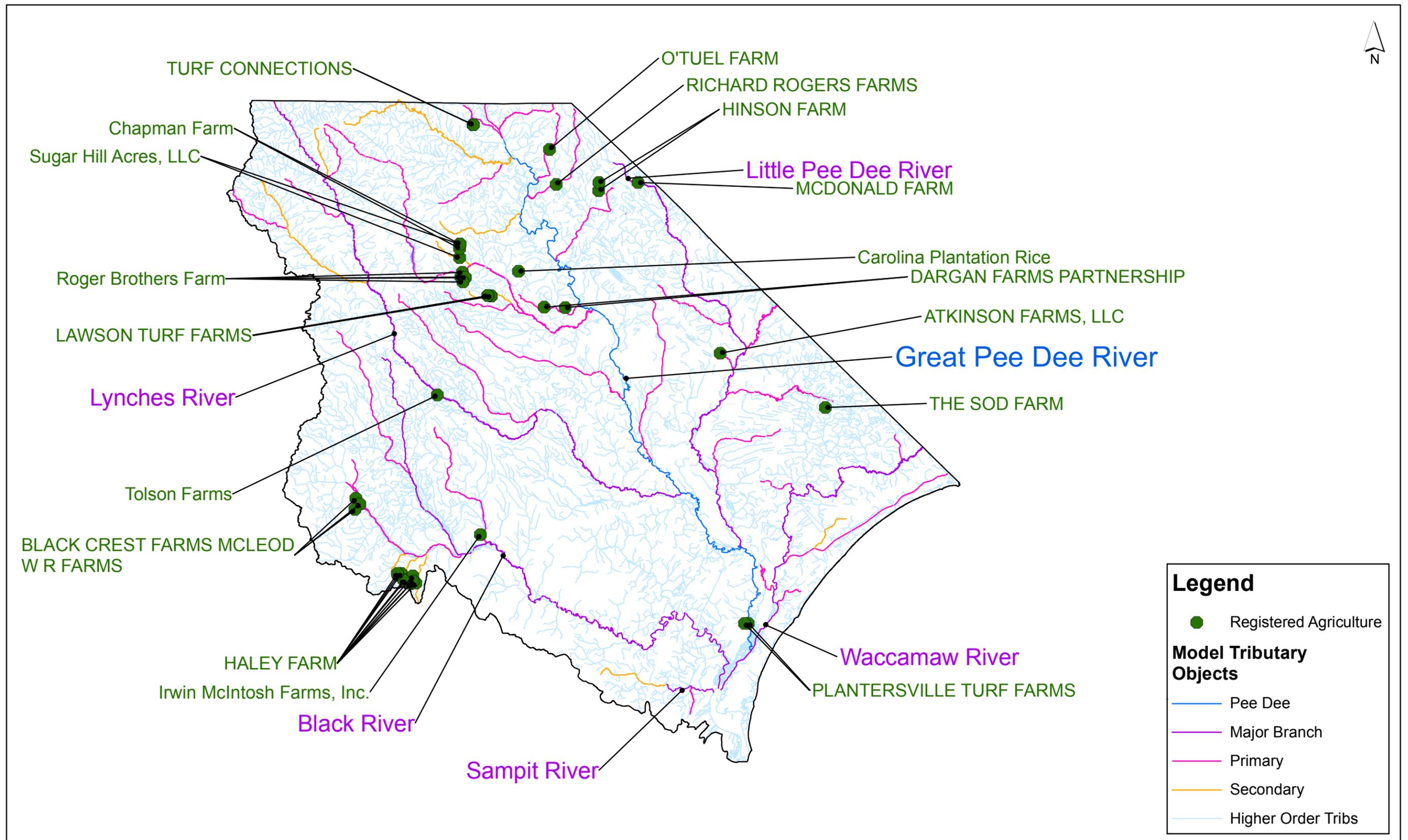


Figure 5: Registered Agricultural Users

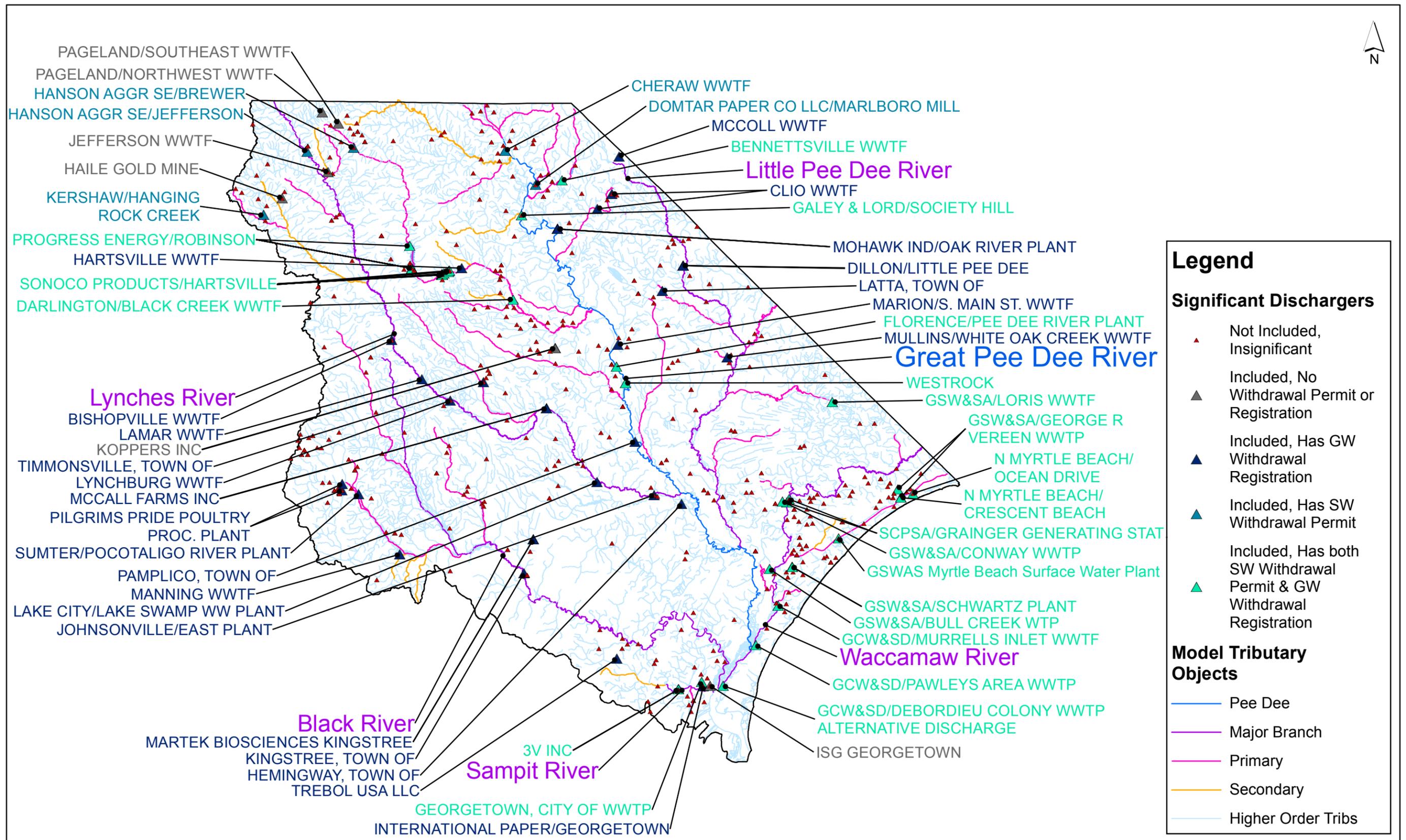


Figure 6: Dischargers

Figure 7. Pee Dee River Basin SWAM Model Framework

Model Objects

 Tributary

 Discharge

 Reservoir

 Current or Former USGS Stream Gage (with last 5 to 6 digits of Gage ID)

Water User Objects

 Municipal

 Agriculture (Irrigation)

 Thermoelectric or Nuclear

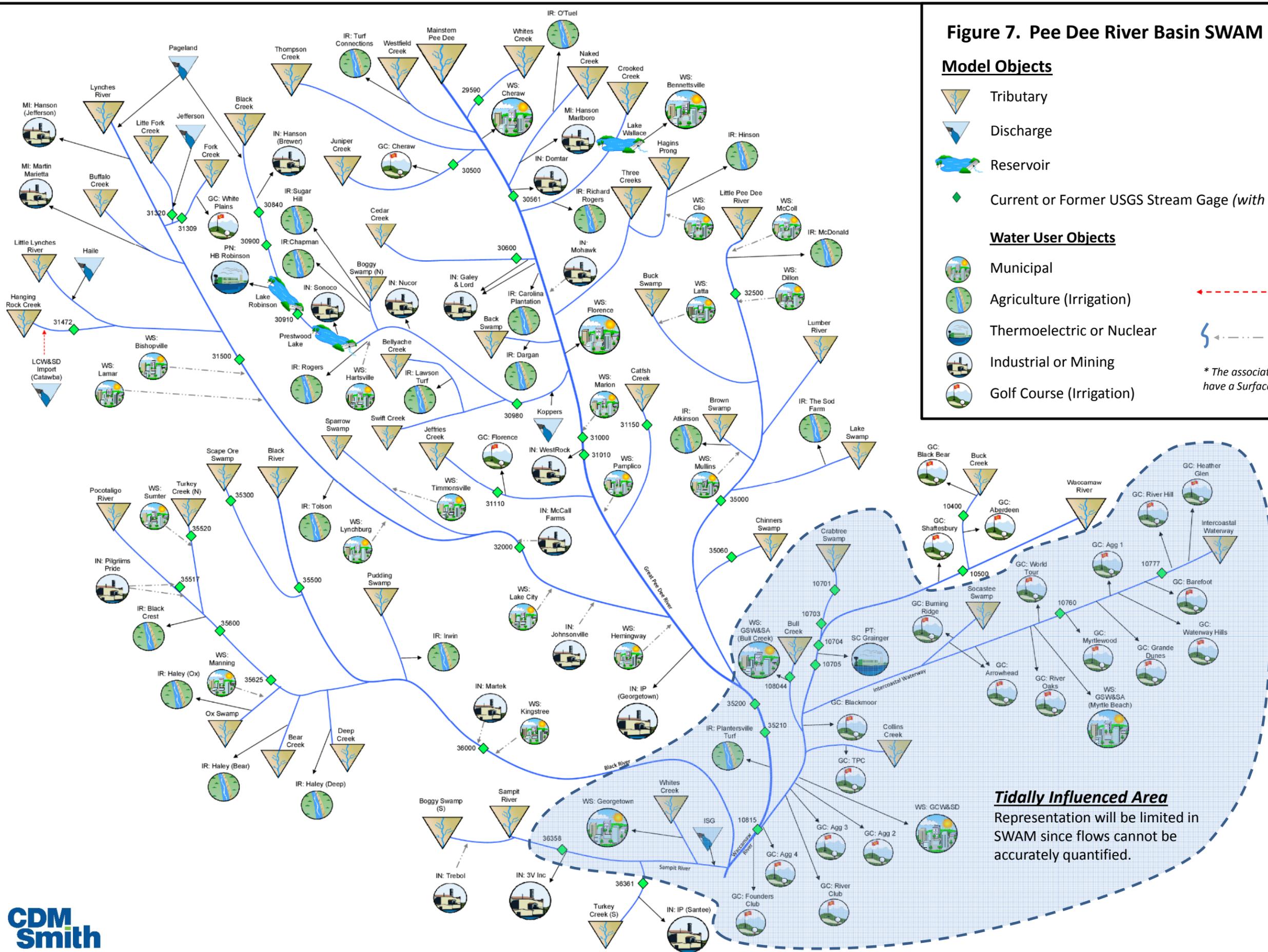
 Industrial or Mining

 Golf Course (Irrigation)

 Import or Export (Interbasin Transfer)

 Discharge from a Groundwater User*

* The associated Water User Object does not have a Surface Water Withdrawal.



Tidally Influenced Area

Representation will be limited in SWAM since flows cannot be accurately quantified.