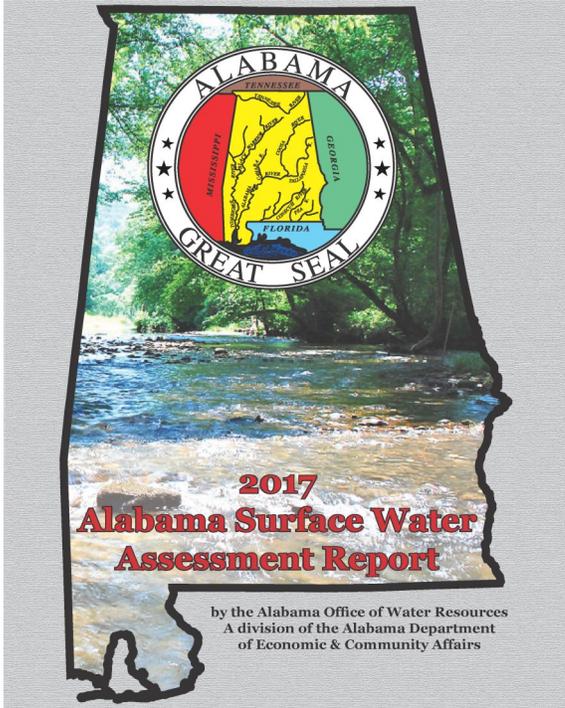
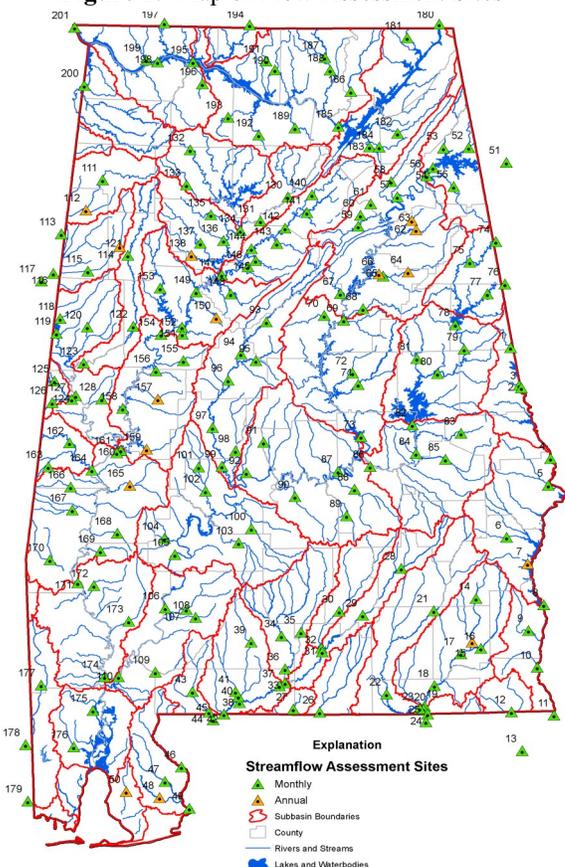


## 2017 Surface Water Assessment Report Fact Sheet



**Figure 1.** Map of Flow Assessment Sites



This fact sheet, prepared by the Alabama Department of Economic and Community Affairs, Office of Water Resources (OWR), provides a summary of information contained in the “2017 Alabama Surface Water Assessment Report.” The report provides a comprehensive summary of water withdrawals and net consumption for each of the state’s 53 subbasins; statistical summaries of statewide streamflows; and comparative analysis of consumption and streamflows at the subbasin level. The report consists of these four specific elements:

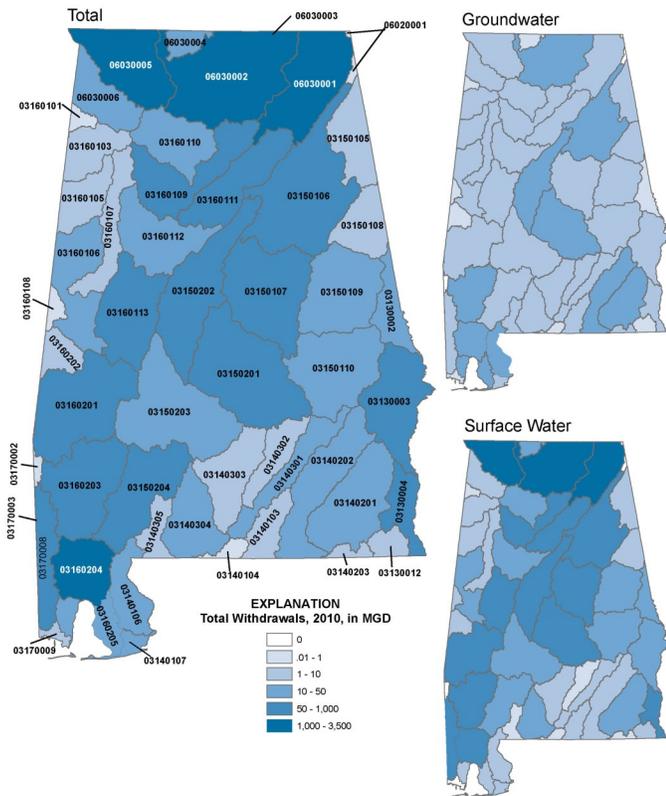
- An assessment of the 2010 water withdrawals and returns and resulting consumptive use in the state;
- An estimate of projected 2040 water withdrawals and returns and resulting consumptive use in the state;
- An assessment of streamflows at 201 locations throughout the state; and,
- The development of ratios between both the 2010 and projected 2040 consumptive water use and the streamflows called Relative Net Demand (RND) ratios by subbasin for each month of the year, four seasonal periods and average annual.

The information is presented in a number of tables, charts, and maps as well as appendices that supplement the main report and provide additional detailed information on water demands and streamflows within individual subbasins. The map at left (figure 1) depicts the 201 flow assessment sites that were analyzed to develop streamflow summaries for individual subbasins. These locations were selected to provide comprehensive information from across the state and span a wide variety of stream types and physical characteristics. Once streamflow summaries were developed, they were compared to both the 2010 and 2040 net consumption summaries described in table 1 on page 4 and page 5. This data is also represented in the maps on page 6.

The resulting RND maps for average annual values for 2010 and 2040 are shown on page 8 with complete summaries of the RND values for all time periods, average and minimum flow summaries, and both 2010 and 2040 water demands (a total of 64 separate maps) are contained in the complete report.

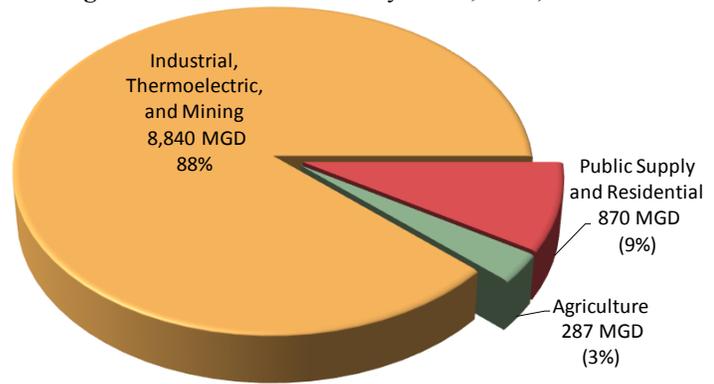
# 2010 Withdrawals

**Figure 2.** Total withdrawals, 2010, in MGD.



Total withdrawals in Alabama for 2010 were determined from estimates of withdrawal from three major water use sectors: public supply; agriculture (including aquaculture, golf courses, irrigation, and livestock); and industrial, thermoelectric, and mining. Total water withdrawals for 2010 were estimated to be 9,999 MGD. For 2010, the industrial, thermoelectric, and mining sector accounted for 88 percent of the total water withdrawals (8,840 MGD), the public supply and residential sector accounted for 9 percent of total withdrawals (870 MGD) and agriculture made up the remaining 3 percent (287 MGD) (figures 2 and 3).

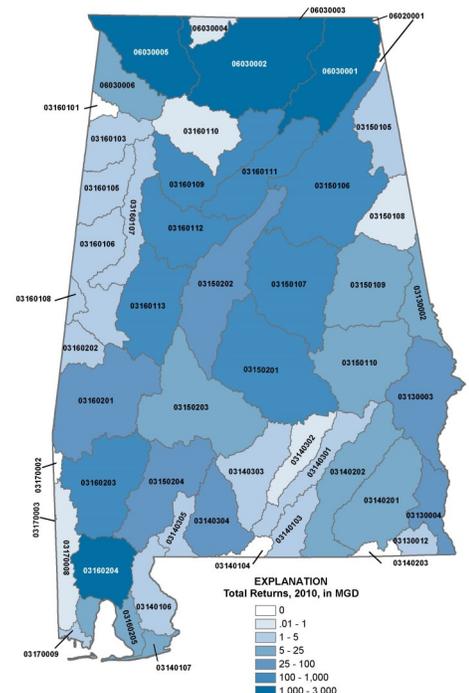
**Figure 3.** Total withdrawals by sector, 2010, in MGD.



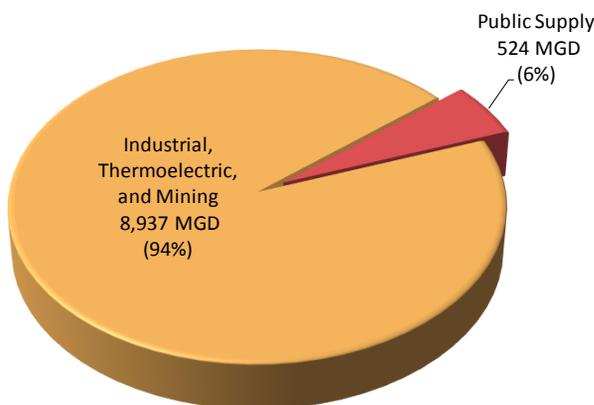
# 2010 Returns

Total Alabama statewide returns for 2010 were estimated to be 9,461 MGD. Estimates of returns by sector indicate that the industrial, thermoelectric, and mining sector accounted for approximately 94 percent (8,937 MGD) of the total returns for 2010, with the public supply sector accounting for the remaining 6 percent (524 MGD) (figures 4 and 5).

**Figure 4** Total returns, 2010, in MGD.

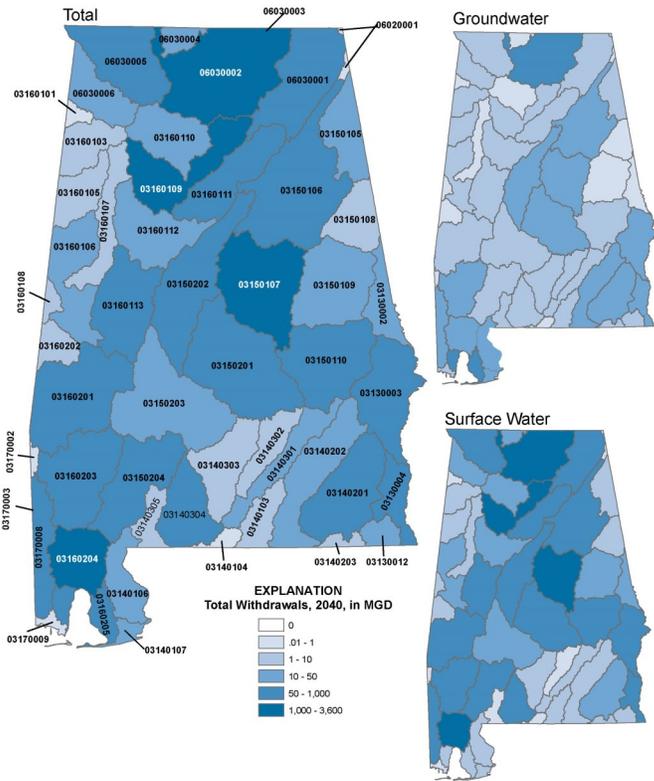


**Figure 5.** Total returns by sector, 2010, in MGD.



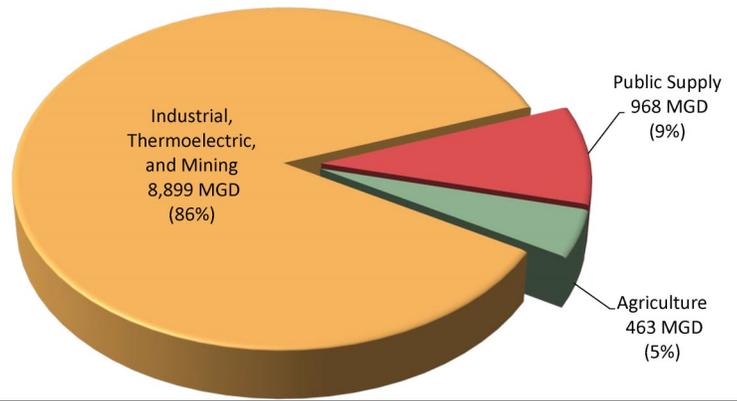
## 2040 Withdrawals

**Figure 6.** Total withdrawals, 2040, in MGD.



Total withdrawals in Alabama for 2040 were determined from estimates of water withdrawals from three major water use sectors: public supply; agriculture (aquaculture, golf courses, irrigation, and livestock); and industrial, thermoelectric, and mining. Total water withdrawals for 2040 are estimated to be 10,331 MGD. For 2040, the industrial, thermoelectric, and mining sector accounts for 86 percent of the total water withdrawals for 2040 (8,899 MGD). The public supply sector accounts for 9 percent of the total water withdrawals for 2040 (968 MGD) and the agriculture sector makes up the remaining 5 percent (463 MGD) (figures 6 and 7).

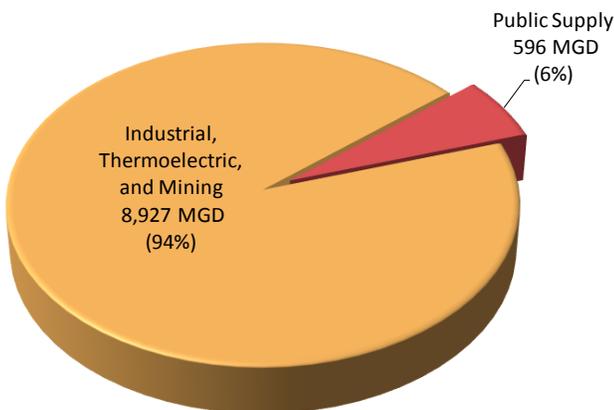
**Figure 7.** Total withdrawals by sector, 2040, in MGD.



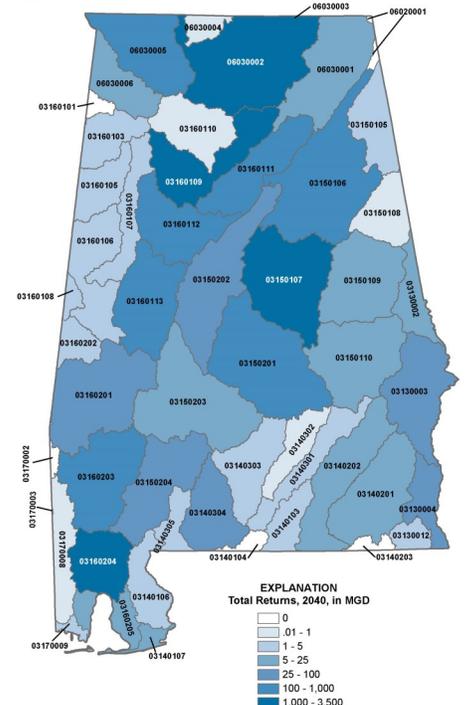
## 2040 Returns

Total Alabama statewide returns for 2040 are estimated to be 9,523 MGD. Estimates of returns by sector indicate that the industrial, thermoelectric, and mining sector accounts for approximately 94 percent (8,927 MGD) of the total returns for 2040, with the public supply sector accounting for the remaining 6 percent (596 MGD) (figures 8 and 9).

**Figure 9.** Total returns by sector, 2040, in MGD.



**Figure 8.** Total returns, 2040, in MGD.



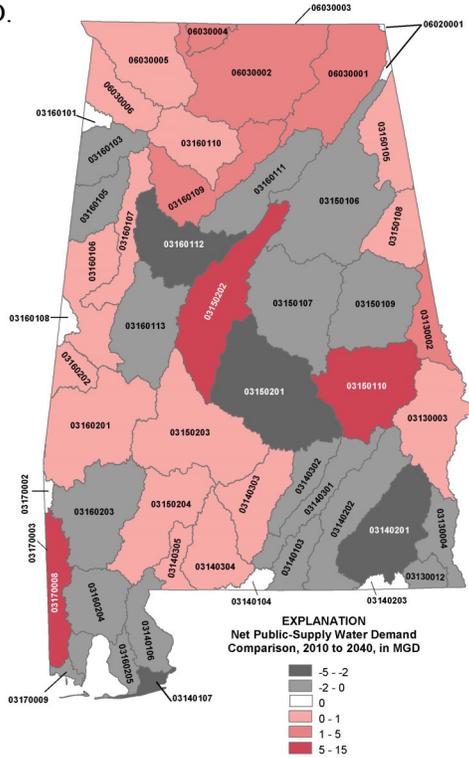
**Table 1.** Net demand summary table, in MGD.

		Public Net				Industrial Net	
		2010 Average	2040 Average	Change from 2010	Percent Change	2010 Average	2040 Average
03130002	Middle Chattahoochee-Lake Harding	8.36	9.83	1.47	18%	-2.13	-2.13
03130003	Middle Chattahoochee-W.F. George Reservoir	1.79	2.42	0.63	35%	6.66	7.13
03130004	Lower Chattahoochee	-4.18	-5.02	-0.85	20%	7.76	7.44
03130012	Chipola	-1.62	-2.13	-0.51	31%	0.00	0.00
03140103	Yellow	-1.35	-1.39	-0.04	3%	-0.18	-0.06
03140104	Blackwater	0.00	0.00	0.00	0%	0.00	0.00
03140106	Perdido	-2.32	-2.85	-0.53	23%	-0.38	-0.38
03140107	Perdido Bay	-6.44	-10.94	-4.50	70%	0.00	0.00
03140201	Upper Choctawhatchee	-12.26	-14.84	-2.59	21%	-3.64	-3.99
03140202	Pea	-5.84	-6.62	-0.78	13%	-0.93	-0.80
03140203	Lower Choctawhatchee	0.00	0.00	0.00	0%	0.01	0.01
03140301	Upper Conecuh	-1.95	-2.11	-0.16	8%	1.58	2.42
03140302	Patsaliga	-0.41	-0.43	-0.02	4%	0.05	0.05
03140303	Sepulga	-1.92	-1.79	0.13	-7%	-0.04	-0.03
03140304	Lower Conecuh	-2.33	-2.15	0.18	-8%	1.10	2.17
03140305	Escambia	-2.92	-2.72	0.20	-7%	-0.10	-0.23
03150105	Upper Coosa	0.13	0.14	0.01	11%	0.01	0.01
03150106	Middle Coosa	-8.20	-9.26	-1.06	13%	-6.37	-6.82
03150107	Lower Coosa	-0.67	-0.88	-0.20	30%	-7.59	-12.66
03150108	Upper Tallapoosa	0.59	0.62	0.02	4%	0.02	0.02
03150109	Middle Tallapoosa	11.09	10.95	-0.14	-1%	-0.22	-0.22
03150110	Lower Tallapoosa	17.78	23.01	5.23	29%	0.38	0.38
03150201	Upper Alabama	-39.98	-44.87	-4.89	12%	-23.47	-26.12
03150202	Cahaba	24.08	29.83	5.74	24%	-0.59	-0.74
03150203	Middle Alabama	-0.46	-0.37	0.08	-18%	-0.49	-0.44
03150204	Lower Alabama	-1.08	-0.92	0.17	-15%	-3.41	-4.32
03160101	Upper Tombigbee	0.00	0.00	0.00	0%	0.02	0.02
03160103	Buttahatchee	0.47	0.42	-0.05	-11%	0.04	0.04
03160105	Luxapallila	1.09	0.94	-0.15	-13%	-1.56	-1.93
03160106	Middle Tombigbee-Lubbub	-0.80	-0.76	0.04	-5%	-0.25	-0.25
03160107	Sipsey	-1.42	-1.40	0.01	-1%	0.59	0.59
03160108	Noxubee	0.00	0.00	0.00	0%	-3.05	-3.05
03160109	Mulberry Fork	38.15	40.45	2.30	6%	55.61	87.35
03160110	Sipsey Fork	18.85	18.98	0.13	1%	0.03	0.03
03160111	Locust Fork	-29.89	-30.99	-1.10	4%	-20.24	-21.16
03160112	Upper Black Warrior	-29.18	-31.89	-2.71	9%	-71.50	-79.99
03160113	Lower Black Warrior	-4.94	-5.77	-0.83	17%	-0.96	-1.85
03160201	Middle Tombigbee-Chickasaw	-2.32	-1.89	0.42	-18%	12.88	10.37
03160202	Sucarnoochee	-1.12	-0.96	0.16	-14%	1.07	2.24
03160203	Lower Tombigbee	1.12	0.97	-0.15	-14%	-16.02	-22.46
03160204	Mobile-Tensaw	-45.19	-45.56	-0.37	1%	-13.74	-19.46
03160205	Mobile Bay	-2.55	-2.96	-0.41	16%	-3.21	-12.72
03170002	Upper Chickasawhay	0.00	0.00	0.00	0%	0.00	0.00
03170003	Lower Chickasawhay	0.00	0.00	0.00	0%	0.00	0.00
03170008	Escatawpa	69.86	82.76	12.90	18%	0.00	0.00
03170009	Mississippi Coastal	-0.97	-1.01	-0.04	4%	-0.39	-0.38
06020001	Middle Tennessee-Chickamauga	0.00	0.00	0.00	0%	0.00	0.00
06030001	Guntersville Lake	20.15	23.66	3.51	17%	-36.91	1.45
06030002	Wheeler Lake	10.06	13.52	3.46	34%	-3.53	-2.56
06030003	Elk	0.00	0.00	0.00	0%	0.00	0.00
06030004	Lower Elk	7.78	10.26	2.48	32%	0.33	0.33
06030005	Pickwick Lake	4.66	4.74	0.08	2%	-0.79	26.21
06030006	Bear	3.96	4.05	0.09	2%	-3.11	-3.11
	<b>Totals</b>	<b>27.69</b>	<b>45.06</b>	<b>17.37</b>	<b>63%</b>	<b>-136.71</b>	<b>-79.61</b>

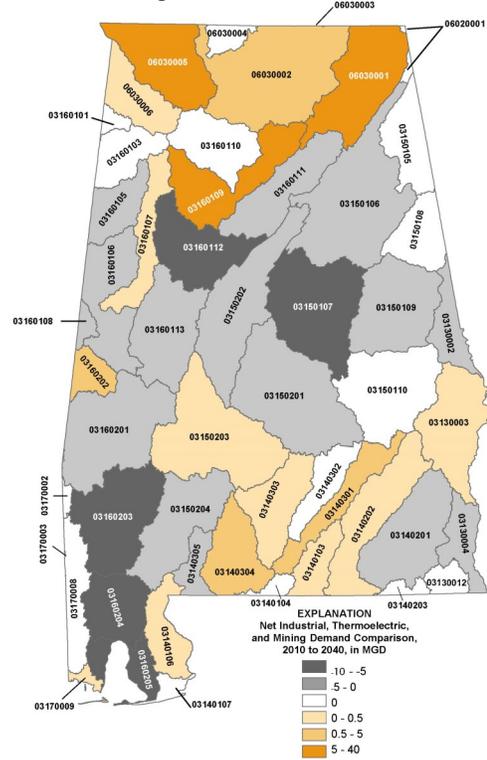
**Table 1. (continued)** Net demand summary table, in MGD.

Industrial Net		Agriculture Net				Total Net			
Change from 2010	Percent Change	2010 Average	2040 Average	Change from 2010	Percent Change	2010 Average	2040 Average	Change from 2010	Percent Change
0.00	0%	0.49	0.32	-0.16	-33%	6.72	8.02	1.30	19%
0.47	7%	8.82	20.45	11.63	132%	17.27	29.99	12.73	74%
-0.32	-4%	2.99	5.28	2.29	77%	6.57	7.69	1.12	17%
0.00	0%	1.38	2.29	0.91	65%	-0.24	0.16	0.40	-166%
0.13	-69%	1.03	1.95	0.92	90%	-0.50	0.50	1.01	-200%
0.00	0%	0.14	0.22	0.07	50%	0.14	0.22	0.07	50%
0.00	0%	2.23	5.25	3.02	136%	-0.48	2.02	2.50	-524%
0.00	0%	1.50	2.38	0.88	59%	-4.94	-8.57	-3.62	73%
-0.35	10%	10.21	16.38	6.18	61%	-5.69	-2.45	3.24	-57%
0.14	-15%	3.97	8.25	4.27	108%	-2.80	0.83	3.63	-130%
0.00	0%	0.47	1.22	0.76	162%	0.47	1.23	0.76	160%
0.84	54%	1.79	2.31	0.52	29%	1.42	2.62	1.20	84%
0.00	0%	0.67	0.82	0.15	22%	0.31	0.44	0.13	43%
0.01	-33%	2.30	2.99	0.69	30%	0.34	1.18	0.83	242%
1.07	98%	0.72	0.67	-0.05	-7%	-0.51	0.69	1.20	-235%
-0.13	124%	0.25	0.77	0.52	204%	-2.77	-2.18	0.59	-21%
0.00	0%	3.59	6.55	2.95	82%	3.73	6.70	2.97	80%
-0.45	7%	18.66	27.40	8.73	47%	4.09	11.32	7.23	177%
-5.07	67%	3.63	5.05	1.42	39%	-4.63	-8.48	-3.86	83%
0.00	0%	0.66	0.47	-0.19	-29%	1.27	1.10	-0.17	-13%
0.00	0%	1.98	1.59	-0.39	-20%	12.85	12.32	-0.53	-4%
0.00	0%	7.15	10.58	3.42	48%	25.32	33.97	8.65	34%
-2.65	11%	7.28	13.50	6.21	85%	-56.17	-57.50	-1.33	2%
-0.15	25%	8.27	7.67	-0.60	-7%	31.76	36.75	5.00	16%
0.05	-11%	16.18	21.34	5.16	32%	15.23	20.52	5.29	35%
-0.91	27%	0.72	0.54	-0.18	-24%	-3.77	-4.69	-0.92	25%
0.00	0%	0.10	0.06	-0.04	-39%	0.11	0.08	-0.04	-33%
0.00	0%	0.32	0.55	0.23	72%	0.83	1.01	0.18	21%
-0.37	24%	0.34	0.57	0.24	70%	-0.14	-0.42	-0.28	204%
0.00	1%	10.87	10.42	-0.46	-4%	9.83	9.41	-0.42	-4%
0.00	0%	1.04	0.98	-0.06	-6%	0.21	0.17	-0.05	-22%
0.00	0%	1.04	1.07	0.03	3%	-2.01	-1.99	0.03	-1%
31.74	57%	1.63	1.93	0.30	18%	95.39	129.73	34.34	36%
0.00	0%	1.61	1.03	-0.58	-36%	20.49	20.04	-0.45	-2%
-0.92	5%	2.82	3.03	0.20	7%	-47.31	-49.12	-1.81	4%
-8.50	12%	3.69	2.68	-1.02	-28%	-96.99	-109.21	-12.22	13%
-0.88	91%	25.06	26.97	1.91	8%	19.15	19.35	0.20	1%
-2.51	-19%	2.76	2.81	0.04	2%	13.32	11.28	-2.04	-15%
1.17	110%	0.81	0.74	-0.07	-8%	0.76	2.03	1.27	167%
-6.44	40%	0.27	0.28	0.01	3%	-14.63	-21.21	-6.58	45%
-5.71	42%	3.07	1.83	-1.24	-40%	-55.87	-63.19	-7.32	13%
-9.50	296%	5.22	9.51	4.29	82%	-0.54	-6.17	-5.63	1045%
0.00	0%	0.01	0.01	0.00	-6%	0.01	0.01	0.00	-6%
0.00	0%	0.00	0.00	0.00	0%	0.00	0.00	0.00	0%
0.00	0%	0.67	1.12	0.45	66%	70.54	83.88	13.34	19%
0.01	-4%	0.39	0.46	0.07	19%	-0.97	-0.92	0.05	-5%
0.00	0%	0.16	0.07	-0.09	-57%	0.16	0.07	-0.09	-56%
38.35	-104%	3.68	4.45	0.77	21%	-13.08	29.56	42.63	-326%
0.97	-27%	11.14	23.39	12.25	110%	17.68	34.36	16.68	94%
0.00	0%	0.00	0.00	0.00	0%	0.00	0.00	0.00	0%
0.00	0%	1.56	1.93	0.37	23%	9.67	12.52	2.85	29%
27.00	-3405%	4.63	9.92	5.29	114%	8.50	40.87	32.38	381%
0.00	0%	1.06	2.77	1.71	161%	1.91	3.71	1.80	94%
<b>57.09</b>	<b>-42%</b>	<b>191.04</b>	<b>274.79</b>	<b>83.75</b>	<b>44%</b>	<b>82.02</b>	<b>240.24</b>	<b>158.21</b>	<b>193%</b>

**Figure 10.** Net public-supply demand comparison, 2010 to 2040, in MGD.

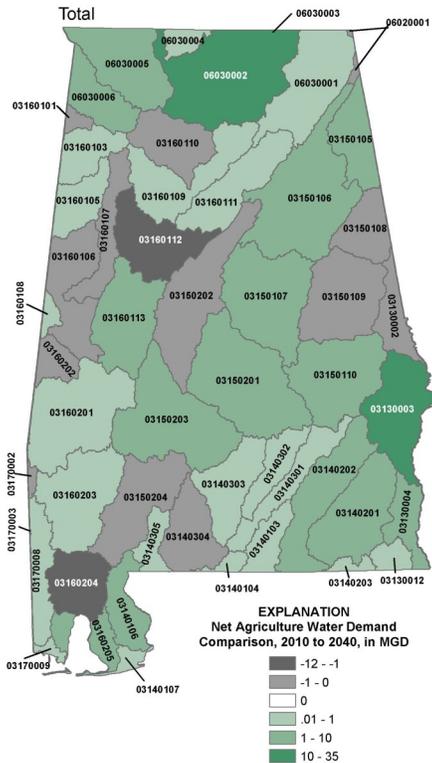


**Figure 11.** Net industrial, thermoelectric, and mining demand comparison, 2010 to 2040, in MGD.

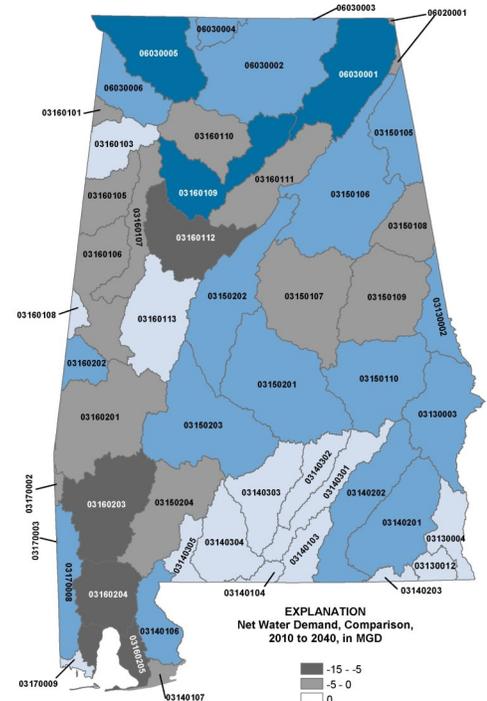


Net water demand comparisons were completed for three categories of use: public supply (figure 10); industrial, thermoelectric, and mining (figure 11); and agriculture (figure 12) as well as net total water demand (figure 13). These maps are visual representations of the comparative data provided in table 1 on pages 4 and 5.

**Figure 12.** Net agriculture demand comparison, 2010 to 2040, in MGD.

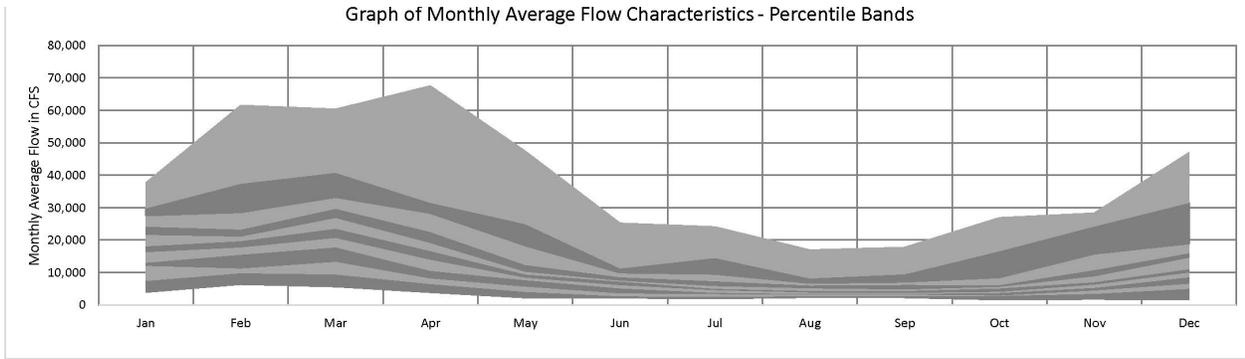


**Figure 13.** Net total demand comparison, 2010 to 2040, in MGD.



# Example Surface Water Assessment Subbasin Output - Middle Coosa River Subbasin (03150106)

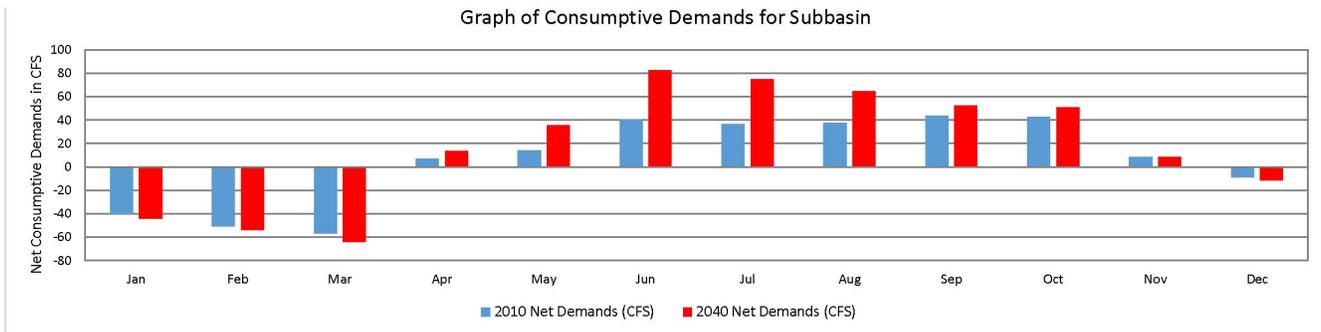
**Figure 14.** Monthly streamflow percentiles for Middle Coosa River subbasin (03150106).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average (CFS)	18,981	21,262	25,090	19,355	12,298	7,698	7,129	5,353	5,674	7,121	10,250	14,859	12,878
Median (CFS)	18,142	19,734	23,578	16,721	9,468	7,269	5,074	4,387	4,361	5,184	7,069	11,073	12,708
10th Percentile (CFS)	7,466	9,881	9,481	6,550	4,095	2,746	2,551	2,803	2,710	2,842	3,452	5,038	7,071
Minimum (CFS)	3,835	6,222	5,507	3,780	2,088	2,063	1,832	2,246	2,181	1,493	1,645	1,474	3,911

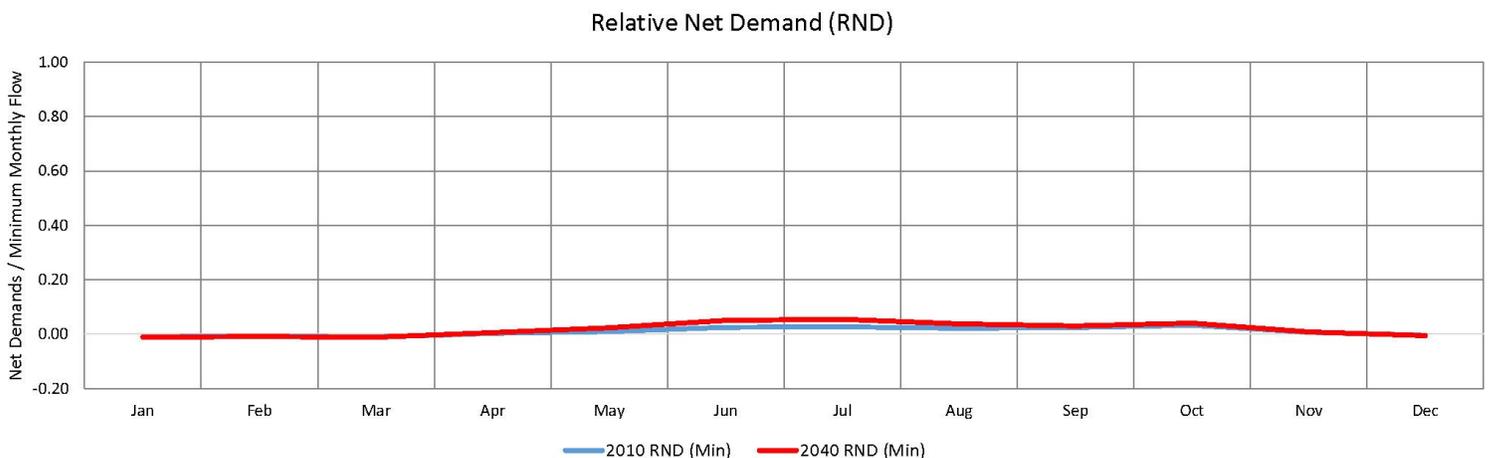
These charts provide samples of the output for each subbasin in the report using the Middle Coosa River subbasin (03150106) as an example. Figure 14 above displays the percentiles of the streamflow output in cubic feet/second (cfs) based on the data assessment period (January 1975 through December 2014). Figure 15 below depicts the consumptive monthly demands, in cfs, for this subbasin while figure 16 at the bottom of the page depicts the monthly minimum RND values for both 2010 and 2040 developed as a result of the comparison between the 2010 and 2040 monthly demands and the minimum streamflow values for each month of the year.

**Figure 15.** Consumptive monthly net water demands for Middle Coosa River subbasin (03150106).

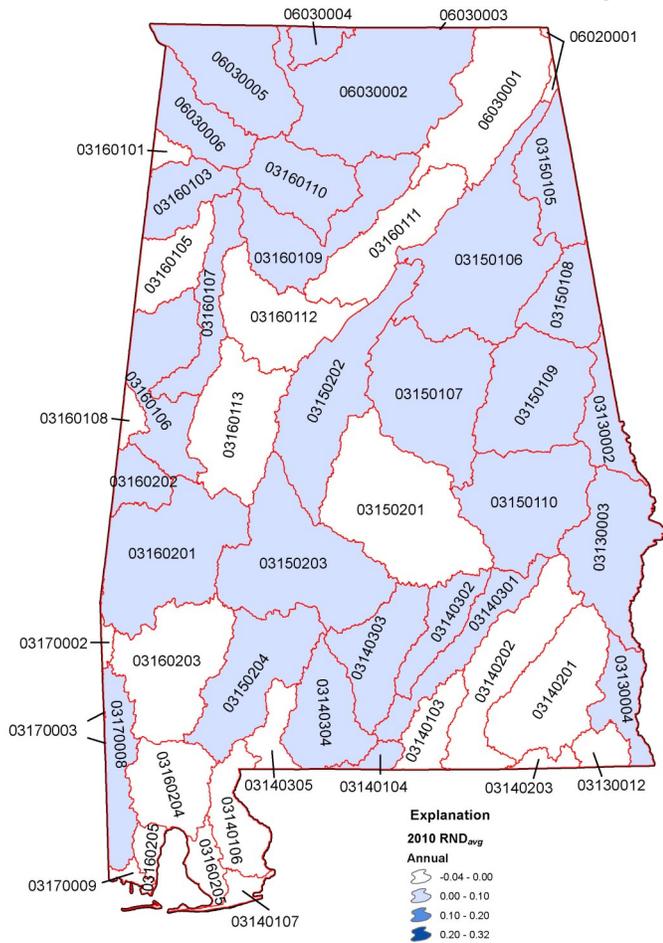


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2010 Net Demands (CFS)	-39.83	-50.83	-56.97	7.10	14.14	40.49	36.38	37.76	43.68	42.89	8.29	-8.64	6.21
2040 Net Demands (CFS)	-44.27	-53.64	-63.76	13.64	35.37	82.62	74.63	64.75	52.66	50.83	8.65	-11.32	17.51

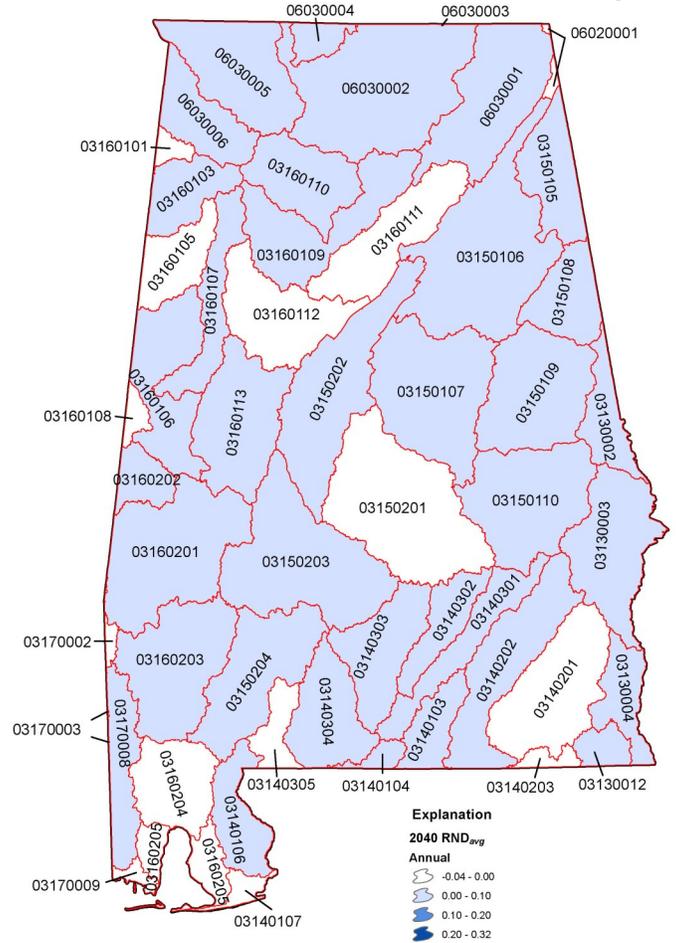
**Figure 16.** Minimum monthly Relative Net Demand (RND) values for 2010 and 2040 - Middle Coosa River subbasin (03150106).



**Figure 17.** Average 2010 Relative Net Demand ( $RND_{avg}$ ) values.



**Figure 18.** Average 2040 Relative Net Demand ( $RND_{avg}$ ) values.



Figures 17 and 18 above depict the average annual 2010 and 2040 Relative Net Demand (RND) values for subbasins in Alabama. The RND values for each subbasin were developed by calculating the ratio of the net water demand to the average annual flow in each subbasin. The results of the comparison show the average annual 2010 and 2040 RND values for each subbasin were all below 10 percent of the average annual streamflows.

The results of the OWR water assessment analysis show that, for a very large part of the state, consumptive use is equal to a very low percentage of streamflow and considerable increases in consumptive use can be sustained. It should also be noted that factors affecting water availability may also be related to limitations of the existing local or regional water supply systems that include reservoirs, wells, pipelines, as well as the suitability of the water for its intended use.

This water assessment analysis underscores the need for continued funding support to conduct water withdrawal and consumption assessments using data and information from the OWR Alabama Water Use Reporting Program (AWURP). The AWURP has been the state's most comprehensive data repository for water use information since 1993. The data OWR collected under AWURP is vital to the ability to connect the results of both the surface and groundwater capacity assessments with the ability to quantify the ability of individual subbasins to meet the current and future demands placed upon them. The complete report and each appendix are available for download from the website below.

**Authors:**

**J. Brian Atkins, Michael J. Harper, Douglas D. Johnston, and Thomas M. Littlepage**

Alabama Department of Economic and Community Affairs

Alabama Office of Water Resources

401 Adams Avenue, Suite 434

Montgomery, AL 36104

Phone: 334-242-5499

Fax: 334-242-0776

Website: <http://water.alabama.gov>

