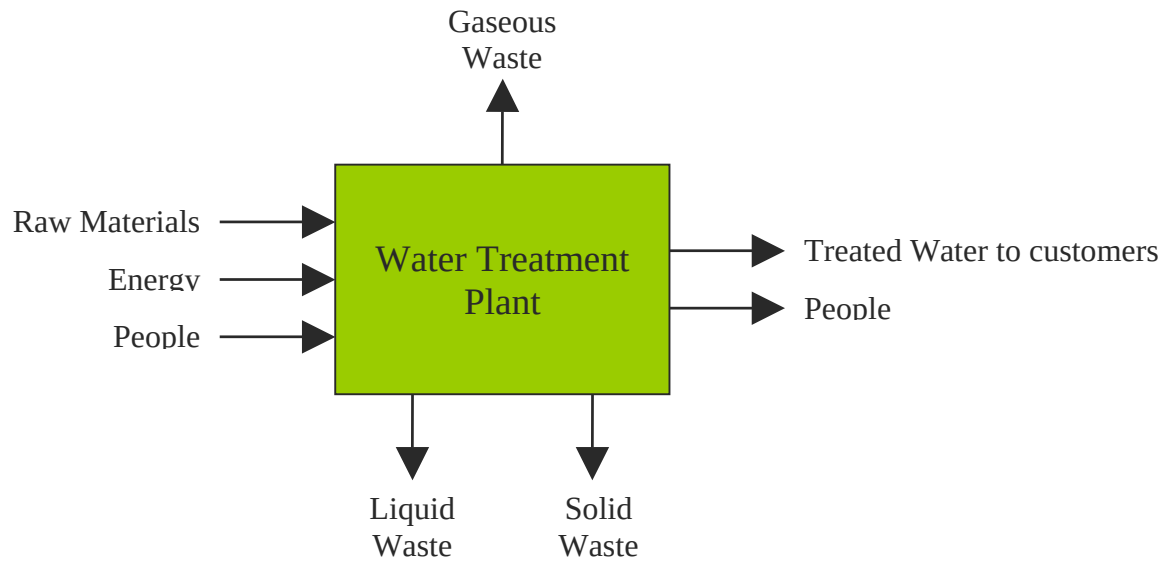
The Benefits of Water (Mass) Balance Diagramming

For the management objective of minimizing water withdrawals by increasing water conservation and reuse, EPD and a team of technical advisors have built on the principles for creating water (or mass) balance diagrams. While the exercise is just beginning, the initial concept is to 1) account for the volume of water taken from our state's water sources, 2) estimate water use by sector and 3) identify the gaps in our current knowledge base. The data gathering and assessment for this process allows for a great deal of flexibility to recognize existing gaps and to continuously incorporate additional information. Beginning our evaluation of water use in this way provides us with a road map to filling information gaps and enhancing water conservation practices.

A water balance or mass balance is generally described as an accounting of where water (or other material) originates and where and how it is used. The process of creating a water balance is in many ways similar to the process used to balance our bank accounts. It can help us see where our money is going and for what purpose. It can also tell us whether we can afford to spend more or if we need to restrict or cut back on our expenditures (KGS 1993).

Water balances can be used at a variety of scales, from small water-dependant business operations, to large river basins. Defining the boundaries of the areas to be "balanced" is therefore very important.

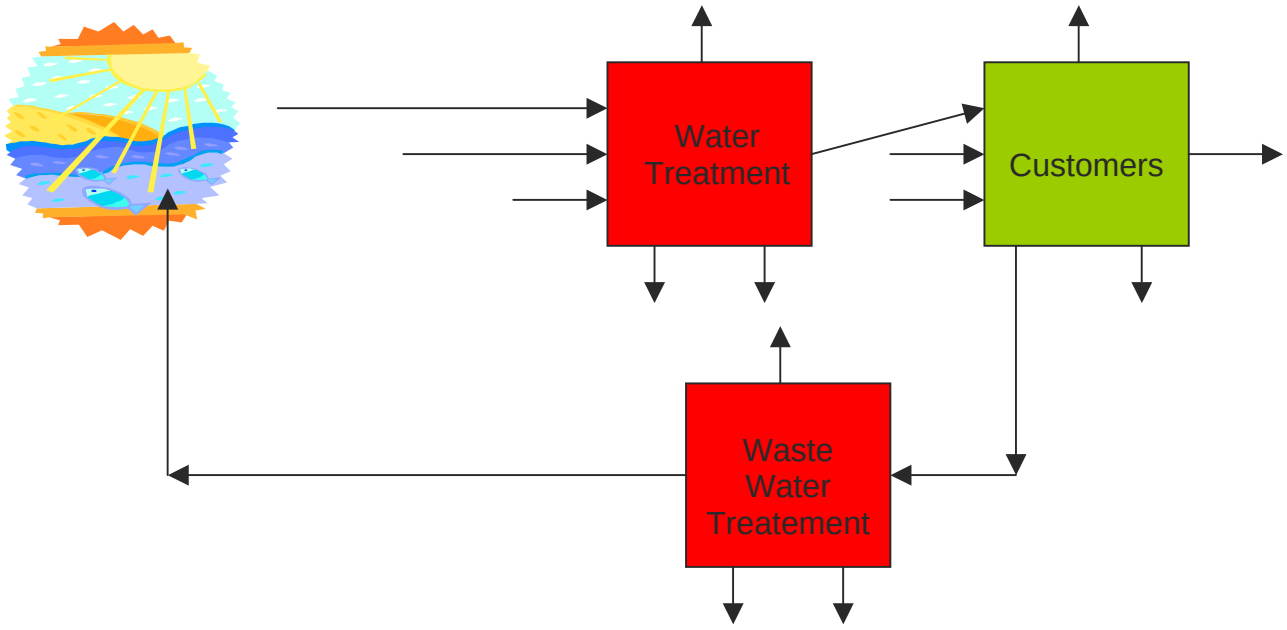
Example of a basic system boundary for a Water Treatment Plan (courtesy of D.Gustashaw 2005)



Once the boundaries of the system being discussed are defined, diagramming can begin. A water balance diagram is very adaptable and can be kept quite simple or be made very detailed, depending on situation and the information available. By populating a flow diagram with available data, we can use a water balance to :

- utilize available, often incomplete, information,
- identify gaps in our information base,
- accept more information/data as it becomes available or remove information to look at water use from a macro-scale,
- diversify, or break out, the information to reflect a variety of situations, and expand the balance to reflect information regarding water returns, transfers and/or flow duration.

Example of system boundaries assembled into water balance diagram (courtesy of D.Gustashaw 2005)



In order to gain a statewide perspective on activities affecting Georgia's water resources, we will be defining the boundaries of our water balance diagram in two ways. The first diagram uses state lines as our system boundaries. This will provide a general overview of where and how water is used statewide. Secondly, we will define system boundaries by the 14 major river basins in Georgia. This perspective will reflect the regional differences in water use and demand patterns that impact water withdrawal activities. Both ground water and surface water withdrawals will be reflected in the diagrams.

As discussed in a previous section, detailed information regarding target flows and flow thresholds are not currently available. For this reason, we do not expect to prepare a detailed and accurate water balance for our state at this time. We do

however, expect to begin populating the water balance diagrams with details regarding water withdrawals and water returns. Using the information currently available to us, we have enough statewide and basin-wide information to represent those activities that contribute to or undermine our ability to manage water resources in a sustainable manner. A water balance is, in no way, static. It can be populated with more and better information as it becomes available.