Off Allocation node

This feature is not available in Source (public version).

The off-allocation flow sharing node is used to determine how much off-allocation flow is available in the river (at the node), as well as how to share this between the downstream water users that have licence shares. Off-allocation flows are those that are in excess of regulated requirements. They can be generated from unallocated tributary inflows downstream of storages, and from storage spills.

Off-allocation flow sharing is comprised of two major components: determining the total volume of water to share and the accounting and sharing of that water. It is triggered when the flow volume at an off-allocation node meets the defined criteria for an off-allocation flow sharing event. This event can be a proportion of the volume of water either above the threshold or above all regulated downstream requirements, which can then be shared between the water users who have an account at the node. A trigger is a condition that must be met in order to allow allocated water to become available.The main condition is the flow threshold, as described in the node's parameters. Start and end season could also be considered a trigger.

An off-allocation node (OAN) is connected to a water user (via a supply point node), which may generate a request for off-allocation water. This can be met from either off-allocation or overbank flow. The OAN determines how much of the request can be met taking into consideration what may already have been met by other OANs in the system. It uses various parameters to determine whether off-allocation requests can be met:

- Off-allocation event starts and finishes using flow and date triggers;
- Total off-allocation volume available - the volume of water either above the threshold or above all order debit downstream requirements; and
- Share the off-allocation volume between accounts under that OAN. An account can be held downstream by storages, water users and an OAN immediately downstream.

These can be assigned while adding and configuring an OAN, which is explained next.

Note: An off-allocation system in Source works only if ***New rules based ordering system*** has been configured as the ordering approach in ***Edit » Scenario Options » Ordering Algorithm*** and if account based sharing is used (when the water user has been assigned a regulated account).

Configuring off-allocation systems

An off-allocation system forms part of a resource assessment system and can be added to all three types of resource assessment system. Note that only one off allocation system can exist per Resource Assessment system.

Configuring an off allocation system is done in the Resource Assessment Explorer and is a two-step process:

1. Add an off-allocation system - right click and choose ***Add Off Allocation System***. Th e example shown in Figure 1 shows the off-allocation system as part of the Annual Accounting system. Table 1 defines the parameters to specify; then
2. Specify account types - An OAN must be linked and configured via an account type, otherwise it cannot be used to allocate off-allocation water. Right click on the off-allocation system and choose ***Add Account Type*** (Figure 2). Here, you define specific rules that apply to that OAN. The value specified for ***Annual Usage Limit*** is shared amongst users in the ratio of their shares to the total limit. This way, users cannot exceed their cap. Note that other OAN users are ignored when calculating the total number of shares. OAN users with no shares can be filtered out ticking the checkbox ***Hide Accounts with Zero Shares***, and other filters can be applied according to name in the ***Node Name Filter.***

Figure 1. Off-allocation system

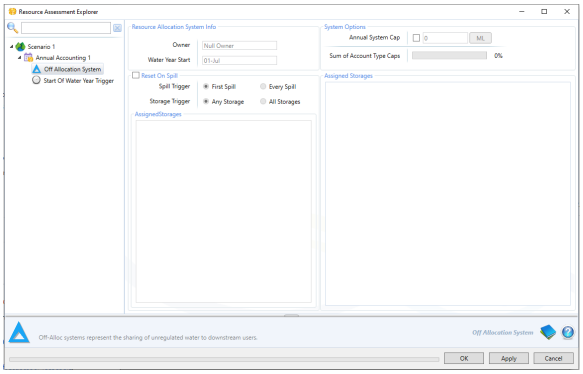
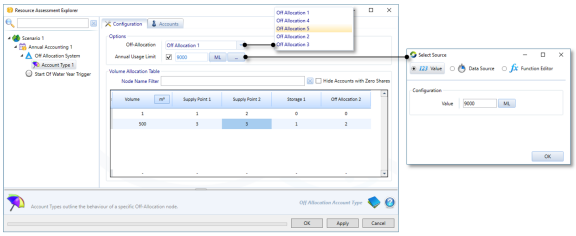


Table 1. Off-allocation system, parameters

Parameter	Definition
System options	These can be enabled if required. As its name suggests, ***Annual System C ap*** is the total capacity of the system. When allocating, ensure that this number is not exceeded
Threshold options	For all off-allocation account types, thresholds are defined to determine when and what volume of off-allocation water is available. The meaning of a threshold is defined for the river system as a whole. In ***First spill***, the relevant account balances will only be reset if spilling was not occurring at the previous time-step. In ***Every spill***, the relevant account balances will be reset each time a selected storage spills. ***Storage Trigger*** defines if accounts are reset if any of the assigned storage spills or only when all selected storages are spilling. This can be specified in the node's feature editor as well.
Reset on spill	This is used in conjunction with the storage/s in a scenario. When a selected storage spills in a time-step, the ***Usage*** for all accounts in the off-allocation system are reset to '0'.

Figure 2. Off-allocation system, Account type (Configuration)



Off Allocation Configuration Options

The Off-Allocation drop down selector is used to assign the Off Allocation Node with the Off Allocation Account in the Resource Assessment System. Any Off Allocation Nodes that are in the model will appear in this selector.

If the Annual Usage Limit is activated the volume that is entered is the maximum volume that can be used by this account during the year. Annual Usage Limit can be set using a Value, Data Source or with the Function Editor.

Working with the Volume allocation table

The Volume Allocation table defines how off-allocation water is shared between supply points in the reach, any storages in the reach and downstream of the OAN. It must be set up before any off-allocation water is made available to water users. The numbers in the table represent priorities (with 1 being the highest priority), and are proportional to the shares of each off allocation account. Take the example shown in Figure 2 (second row with off allocation volume of 500ML):

- First priority - Storage 5;
- Second priority - Off Allocation 6; and
- Third priority - Supply Points 3 and 4. sharing is done proportionally based on share of the allocation account.

Given an off allocation volume that the system shares at this off allocation node, locate the corresponding row in the table that uses the same priority. Locate the row we look for the the row in the table we are going to use as our priorities. We do this by finding the row with an off allocation volume specified that is closest yet less than the off allocation volume to share. Water is then shared out via the priorities given at this row. If more than one account have the same priority, water will be shared proportionally.

> **Note**: When using a non-debit setup in the resource assessment system, the share also includes debit balance. Also, if you are using equalisation in the off allocation system, then sharing is based on equalising the accounts based on their shares, and how much they have already used.

For ease of navigating the table, columns can be filtered according to node name using the ***No de Name Filter*** field. Also, the columns corresponding to zero off allocation shares can be hidden by activating the ***Hide Accounts With Zero Shares*** checkbox, as these accounts will be not have access to off allocation water irrespective of their priority.

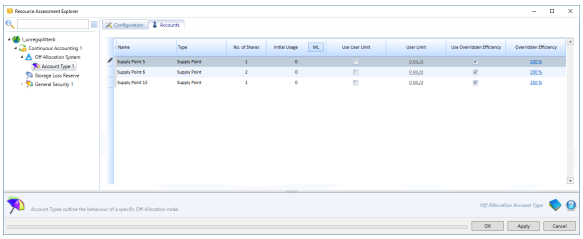
Viewing accounts

The ***Accounts*** tab shows a table which lists all supply points which have a share in that OAN system and the details for those accounts can be entered. If any downstream OAN nodes or storages are also part of the OAN system, these are also configured here. Table 2 outlines the parameters in this table.

Table 2. Off allocation system, Account type, Accounts parameters

Parameter	Definition
Name	Name of the account
Type	Type of node that account is held in.
No. of shares	The share of available water.
Initial usage	The starting volume of used off-allocation for the account.
Use user limit	Allows you to enable usage limit for an account.
User limit	Limits the amount of usage to a daily maximum value.
Use Overridden Efficiency	When selected the values in the Overridden Efficiency column will be applied
Overridden Efficiency	The percentage increase to the Delivery Efficiency to account for losses in the Off Allocation System. E.g. if there is a 50% loss the Overridden Efficiency needs to be set to 200%.

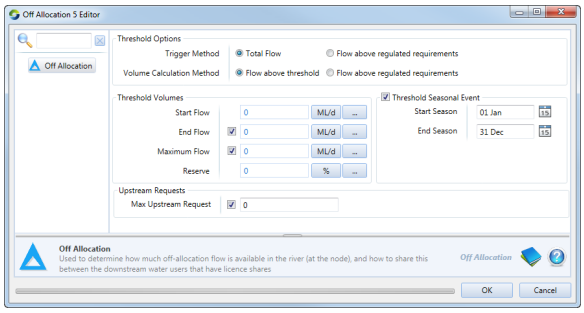
Figure 3. Off-allocation system, Account type (Accounts)



Viewing an off-allocation system

Double click the off-allocation node to open its feature editor (Figure 4).

Figure 4. Off-Allocation node



Specify the following ***Threshold Options***:

- ***Trigger Method*** specifies how an off-allocation event is triggered for that off-allocation reach. For ***Total Flow***, an off-allocation period will only be triggered if the flow at the node exceeds the threshold defined. For flow above regulated requirements, an off-allocation period is triggered if the flow at the node exceeds the volume required for all downstream order debit orders;
- ***Volume Calculation Method*** specifies how the volume of off-allocation water is calculated. For ***Flow above threshold***, the threshold is not available for off-allocation. For ***Flow above regulated requirements***, any flow above the regulated requirement is made available. If a threshold value has been defined, this can be included in off-allocation volume once the threshold has been reached.

For ***Threshold Volumes***:

- Start and End volume - Defines the start and end flow volumes at the node, the flow above this threshold may trigger an off-allocation flow event. The default units are ML per day, but you can change this using the Function manager;
- Reserve - The percentage of off-allocation flow which cannot be allocated; and
- Threshold Season Event - The time period when the off-allocation flow event may occur (optional);

Max Upstream Request allows you to place a cap on the maximum off allocation request being passed upstream.

Multiple OANs in a system

In the instance where one OAN orders from another OAN, the first OAN will act much the same as a normal user - ie supply point. The main differences are that the OAN users:

- Will not be capped by account type caps; and
- They can use more then they are allocated.

As an example, consider the configuration shown in Figure 2. For off-allocation volumes equal to or above 500 ML, equal priority is given to supplying requirements of Supply Points 3 and 4 and all downstream users. Note that the latter has been configured by making the downstream OAN (Off Allocation 2) equal priority to the supply points in the current reach.

Consider an OAN that has been assigned 1500 shares. If sharing of off-allocation water with downstream reaches is not required, then the downstream OAN can be assigned zero shares. Otherwise, the shares should be set to the sum of all accounts in downstream reaches for which sharing is required. For example, if equal sharing was required between thr OAN and six downstream reaches, then the total shares of accounts in the six downstream reaches should be entered as the number of shares assigned to the second OAN.

Deleting a node

Note: If you delete a node or link that uses off-allocation node accounts, you must make changes at each node to accommodate the removal.

When deleting an OAN, a warning message will appear indicating that you are about to remove account type settings for off-allocation systems. After confirmation, you must delete all off-allocation account types in any system that are associated with the OAN.

Evaluation of results

You can view the effects of off-allocation at various nodes in a model in the ***Results Manager***:

- Check the declaration of off-allocation water using the ***Off Allocation Flow Volume*** attribute for an OAN;
- Check the off-allocation order and off-allocation water extracted to fill the water user storage. Select the ***Demand & Storage Interface*** attribute of a water user node and view the ***Opportunistic Requirement*** of the system. This can be met from off-allocation water as well as other sources such as overbank flow; and
- Compare the sharing of off-allocation water between supply points using ***Usage Today*** for each supply point's account in ***Resource Assessment*** under ***Off Allocation System***.

Note: The recorder entitled ***Rules Based Orders » Off Allocation Requests*** records the total request to the node in question (ie. it does not represent what the water user is requesting).