

## How modelling helps us understand changes to cease-to-pump events

*This fact sheet explains cease-to-pump events, how changing harvestable rights limits could affect them and what further analysis of modelling results tells us.*

The Coastal Harvestable Rights Review uses hydrological modelling to help us understand how river flows could change if we increase harvestable rights limits. See the [Coastal Harvestable Rights Review—Discussion paper](#)<sup>1</sup> for more details.

The modelling estimates how changes in the size, number and location of harvestable rights dams could affect daily river flow volumes at the end of each case study catchment. Each model run estimates more than 15,000 daily flow values over a 42-year period. We interpret and compare the different modelled scenarios measuring aspects of different flow types (e.g. low flows, freshes, annual volumes) that are made up of a series of daily flow values. Looking at changes to the pattern, timing and volume of different flow types or events can help us answer questions about how an increase in harvestable rights could impact downstream water users and environments.

This fact sheet looks at the modelling results for cease-to-pump flows in more detail to better explain the changes that may occur.

## What cease-to-pump events are

Cease-to-pump rules require licence holders to stop taking water when river flows fall below a certain level set by a relevant water sharing plan. A cease-to-pump event occurs for the time river flows remain below that level. A cease-to-pump ‘trigger’ level is generally a very low flow, with just enough water to flow through the river system. We express cease-to-pump flow levels either as a flow rate (for example, 2 ML/day) measured at a specific gauge or as a description (for example, ‘no visible flow’). Cease-to-pump events can last several days or weeks.

## Why we look at cease-to-pump events

Changes in cease-to-pump events are likely to be of interest to licensed users who cannot take water from the river during such events. This includes irrigators and water utilities supplying town water to small towns. Cease-to-pump events are also important for the environment (including riverine and estuarine ecosystems), which relies on cease-to-pump rules to maintain river health in dry times.

Allowing harvestable right dams to capture more water could change how often and for how long cease-to-pump events occur. If they occur more often and last longer, downstream licensed users would have less access to water, particularly in dry times when they need it most.

## How the modelling defined cease-to-pump events

Cease-to-pump events were defined for each of the case study catchments based on cease-to-pump levels from the relevant water sharing plan. The modelling determines the proportion of days when flow is above and below the cease-to-pump level.

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<sup>1</sup> Available at [www.dpie.nsw.gov.au/coastal-harvestable-rights-review](http://www.dpie.nsw.gov.au/coastal-harvestable-rights-review)

It is important not to make comparisons of total time below cease-to-pump levels between case study areas, as they have different cease-to-pump trigger levels.

### What could happen to cease-to-pump events if we increase harvestable rights?

The modelling shows us that when we increase harvestable rights limits, the number of days when flow is below the cease-to-pump level could increase, though the scale of change varies considerably among the 10 case study catchments.

The modelling report looks at the number of days below the cease-to-pump level. Further analysis of the results can help us identify and better understand effects on the number of longer lasting cease-to-pump events. The results in this fact sheet show the upper limit of changes that would occur if we increased harvestable rights limits.

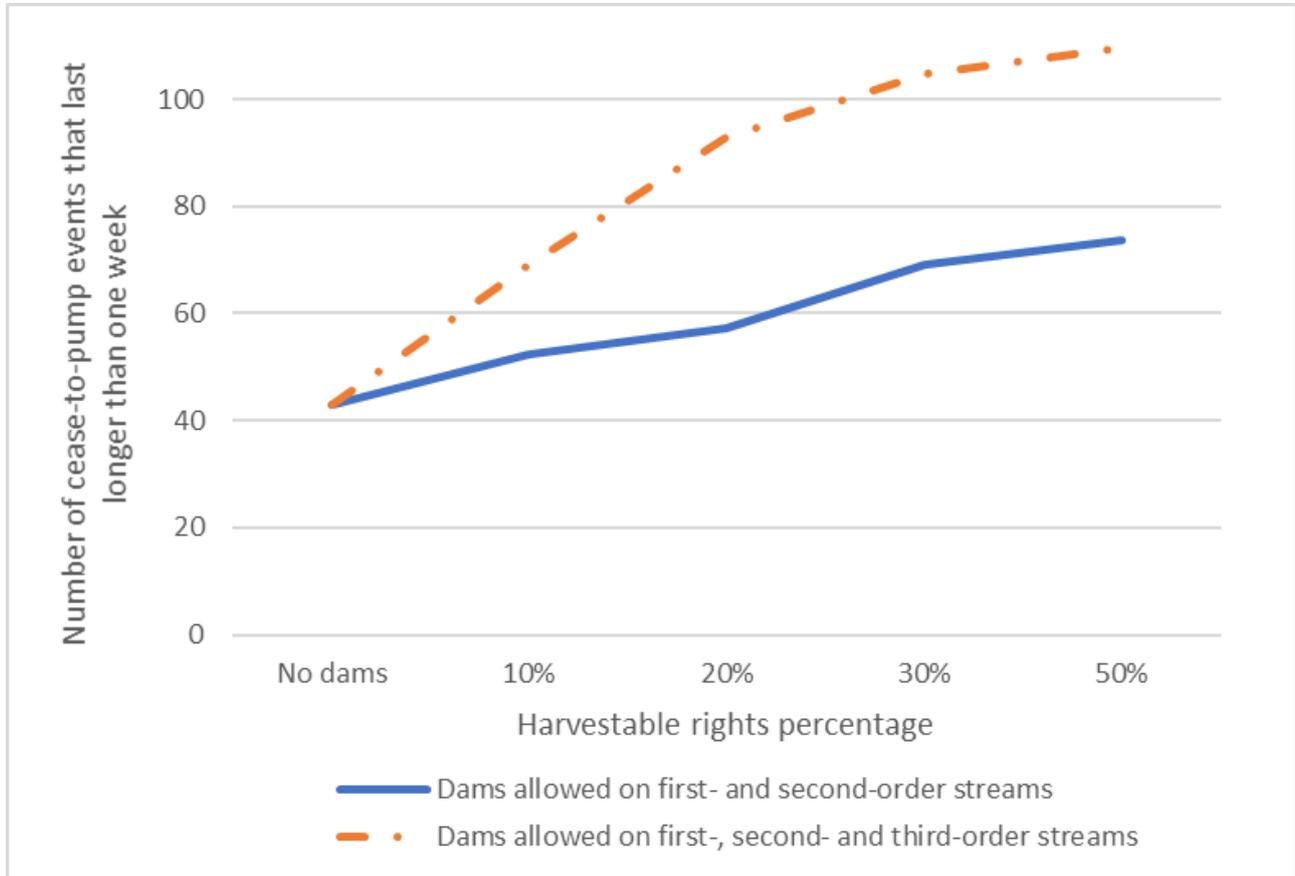
### What happens to cease-to-pump events that last longer than one week?

Further analysis of the modelling results shows that increasing harvestable rights could affect the frequency of cease-to-pump events lasting longer than a week. This fact sheet focuses on the Wyong River catchment, which contains many spring-fed streams, as a case study.

Figure 1 shows that as the harvestable rights percentage increases, the number of cease-to-pump events lasting longer than a week also increases. Using a baseline scenario of no dams in the catchment, we expect a one-week-or-longer cease-to-pump event to occur 43 times over a 100-year period. A number of scenarios are compared with the baseline scenario in the discussion paper. As an example, under a 30% harvestable rights scenario, a cease-to-pump event would occur 69 times when dams are on first- and second-order streams and 105 times if dams are also allowed on third-order streams.

The frequency of cease-to-pump events may not be evenly distributed over the 100-year period. Drier years may experience several cease-to-pump events lasting longer than a week, whereas wet years may experience none.

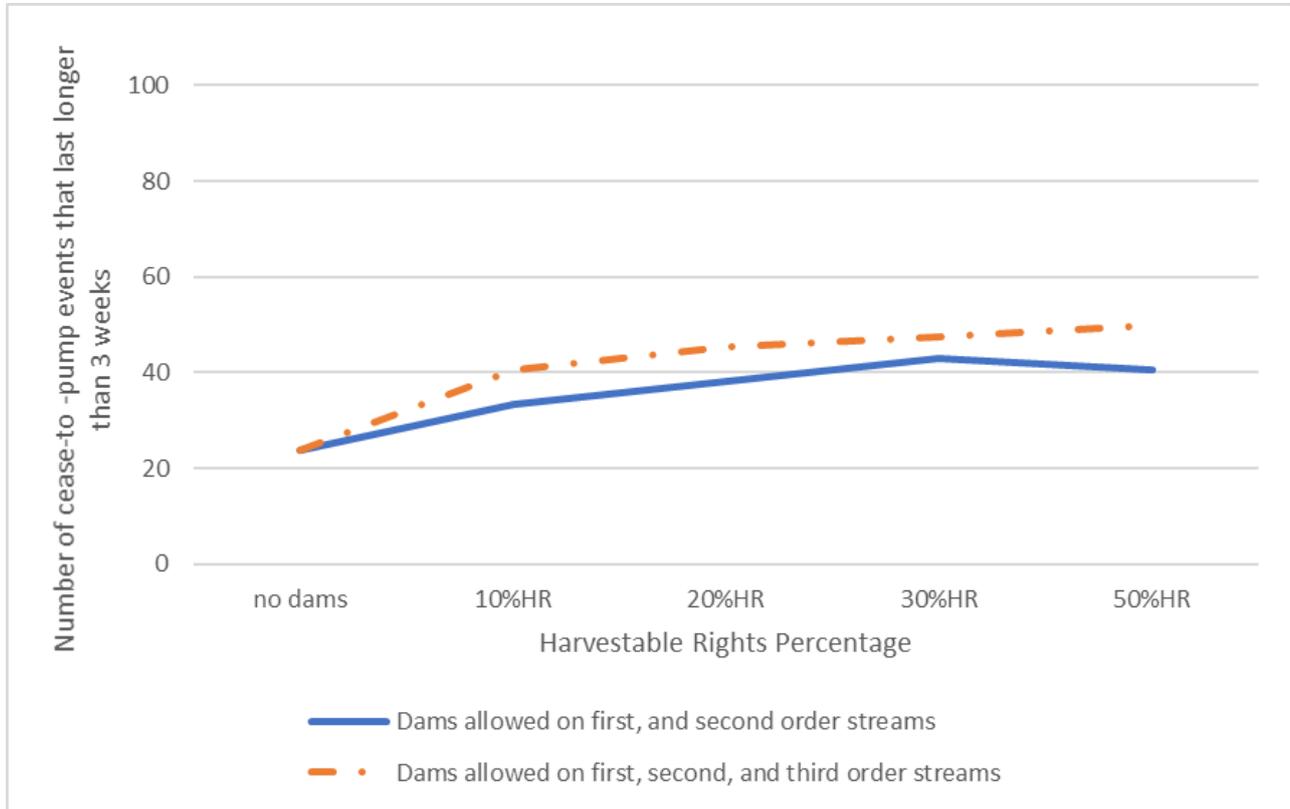
Figure 1. Number of cease-to-pump events lasting longer than one week over a 100-year period in the Wyong River catchment at full uptake of a range of harvestable rights scenarios



### What happens to cease-to-pump events that last longer than three weeks?

Figure 2 shows that as the harvestable rights percentage increases, the number of cease-to-pump events lasting three weeks or longer also increases. For example, under a no-dams scenario, we expect a three-week-or-longer cease-to-pump event to occur 24 times over a 100-year period. However, under the 30% harvestable rights scenario, it would occur 43 times when dams are allowed on first- and second-order streams. The graph shows that slightly fewer cease-to-pump events last longer than three weeks as the harvestable right increases from 30% to 50% if located on first- and second-order streams only. But this is due to separate cease-to-pump events merging into one longer event.

**Figure 2. Number of cease-to-pump events over a 100-year period in the Wyong River catchment lasting for three weeks or longer for different harvestable rights percentages**



### Summary

Increasing harvestable rights limits could affect how often and for how long a cease-to-pump event occurs. The further modelling analysis in this fact sheet shows that increasing harvestable rights limits may result in more cease-to-pump events lasting one week or longer as well as those lasting three weeks or longer. Additionally, some longer cease-to-pump events may merge to create longer, single events.

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