

Pasture options after a coastal flood

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What pastures might survive a flood?

Pasture species differ in their ability to survive inundation and water-logging. Sensitivity to waterlogging also varies with temperature, so a flood in summer kills pasture much quicker than a winter flood.



It appears that pastures which are inundated for a short time are virtually unharmed by flooding in winter provided they are not covered by mud, sand or debris. As an example, many pastures survived 7 to 10 days of waterlogging after the June 2007 floods in the Hunter Valley, but these same pasture types were killed by 2 to 3 days inundation and waterlogging on the North Coast in January 2008.

Pasture species such as lucerne, barley and oats are very sensitive to waterlogging, while couch grass, fescue, setaria, maku lotus, strawberry clover and broadleaf paspalum are much more tolerant and likely to survive. Kikuyu and ryegrass are in between these two extremes.

What if I do nothing?

If you do nothing to flooded pastures you will likely find tolerant species such as couch grass will come back first (but for couch not until it warms up). Annual grasses and broadleaf weeds will establish from self sown seed.

Replanting – how, when and what to plant

After a winter flood

Late June is an extremely difficult time to plant pastures. It is too late for normal autumn/winter pasture sowing and too early for spring sowing.

The main options are the winter pastures and forage crops such as ryegrass, oats, barley, clover and some brassicas. The problem is that with low temperatures these new-sown pastures are unlikely to provide significant grazing for 8–12 weeks, i.e. not until August/September, and then continued spring growth will depend on pasture variety and continued spring rain.

Ryegrass is the main option for sowing before the end of July. Seed could be broadcast into flood mud; expect to wait at least 8 weeks before full grazing. A small grazing could be possible earlier but this will affect overall establishment and production.

Oats and barley would provide quicker feed than ryegrass (possibly 6 weeks) but they are a larger seed and less suitable for broadcast seeding and they are both sensitive to waterlogging.

Clovers are relatively easy to sow by air or broadcasting but they are slow to grow and may cause bloat in cattle. Some clovers such as persian, berseem, balansa and strawberry will tolerate wet ground and berseem is less likely to cause bloat.



New grass seedlings and regrowth from lucerne which has survived an April flood.



Lucerne can be replanted at the end of winter. It is very sensitive to waterlogging and several root and crown rots associated with wet conditions. It would be better not to plant lucerne straight back into an old lucerne paddock. With lucerne it is important to maintain a rotation with other crops to reduce



disease and insect pest build up.

Lucerne survival depends on depth, temperature and time underwater.

After a spring flood

If summer growing pastures such as kikuyu, paspalum or setaria have survived the flood, allowing them to regrow will provide the quickest grazing. Topdressing with a nitrogen fertiliser after the area has drained and is no longer waterlogged will promote faster regrowth.

Note. Flooding usually causes significant loss of nitrogen from the soil due to a combination of runoff, leaching and denitrification. Most grass dominant pastures will be nitrogen deficient after a flood.

If the flood has killed existing pastures or crops then shirohie millet is the first of the spring/summer crops to be sown. Shirohie can be sown when 9 am soil temperatures rise to 14°C, usually in September. Shirohie seed is usually cheap and could be broadcast if the weather is mild. Broadcasting seed is more risky in warmer conditions as the soil or flood mud will dry and crust quicker with increasing temperatures.

When morning soil temperatures exceed 16°C forage sorghums may be sown. Being a larger seed they should be drilled 1 to 3 cm into the soil.

Cowpeas and other summer forage legumes including lab lab or soybean can be sown when morning soil temperatures are 20°C. They also have large seeds and are generally sensitive to waterlogging. Cowpea is the most sensitive and soybean more tolerant of waterlogging.

After a summer flood

A summer flood can cause significant damage to sensitive crops and pastures. If the flood is early in

summer then 'spring' options are possible with the 'cheap' millet option often the most attractive for a short term forage crop. If the flood is later in summer then it is best to wait and undertake normal autumn options.

Pasture species such as setaria, paspalum and maku lotus have some tolerance to waterlogging and may survive a flood provided they are not completely inundated for an extended time. Setaria survived shallow flooding at Casino in the January 2008 floods.

A late summer or autumn flood can also stimulate an outbreak of army worms which will seriously affect the recovery of surviving pasture, especially kikuyu, and the establishment of new sown pasture or forage crop.



White clover regrows while lucerne and summer grass is still covered in flood mud following an autumn flood.

After an autumn flood

Autumn is normally the main season for sowing pastures, so follow normal autumn sowing guidelines. Soft, wet ground may mean that broadcasting seed is an option if heavy tractors and machinery cannot be used.

How to plant

Initially the main option is to broadcast seed into soft mud before the surface dries out. The problem is bogging and disturbance of the paddock if trying to drive tractors on soft, wet soil.

Aerial seeding using helicopters (best for smaller areas) or fixed wing aircraft (cheaper on larger areas) is possible but expensive, especially if the winter sown pasture may only provide one to two grazings in spring depending on pasture variety and seasonal conditions.

If sediment is a deep layer of sand, soil fertility will be affected and re-sowing is a problem. In some situations removing the sand layer could be considered. Alternatively plant species which can grow in sand will be required.

Seed rates

Details on normal seed rates are available in the publication 'Pasture and winter forage crop sowing guide: Hawkesbury–Nepean, Hunter and Manning Valleys', available from <http://www.dpi.nsw.gov.au/> or from your local NSW DPI office.

Normal seed rates are still appropriate, although increasing seed rate will increase the pasture growth at first grazing, while reducing the seed rate obviously reduces cost.

Fertiliser

The main soil nutrients to be concerned about are nitrogen and phosphorus.

Heavy rainfall and waterlogging causes nitrogen to be lost from soil and this will limit growth from pastures which survive the flood. Topdressing forage crops or actively growing pastures with a nitrogen fertiliser such as urea will give the best response.

Phosphorus undergoes a range of reactions in waterlogged soil. It may be adequate in high-fertility alluvial soils.

If sowing into flood affected areas the suggestion is to not apply fertiliser when sowing but to be prepared to apply urea when the new grass establishes.

Weeds after the flood

Floods spread serious weeds which must be controlled to stop them establishing in new areas. Major weeds will vary with locations.

- Green cestrum is an extremely poisonous shrub which is widespread on river banks in the Hunter Valley. The floods will spread green cestrum across the river flats and into areas where it is not normally a problem.
- Blue heliotrope and galenia are two spreading weeds which are extremely difficult to control and have been common on river banks upstream from Maitland. Blue heliotrope is especially a problem on sandy soil.
- Water hyacinth and salvinia are floating water weeds which are spread by flood. Check all dams and billabongs for these weeds before spring. Both water hyacinth and salvinia will grow very quickly in warm weather. It is important to find and control new infestations before they spread and take over new water bodies in summer.
- Spiny emex (cat heads), burrs, golden dodder, fireweed and mother of millions are examples of the many other weeds which can be spread by flood.
- In the Macleay Valley, bahia grass can be a viable pasture on lower fertility hills, but a weed if it invades lucerne or kikuyu pastures after a flood.



Water hyacinth spread over flats will eventually dry out and die but plants will also infest creeks and dams.

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Pasture improvement cautions

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

The *Native Vegetation Act 2003* restricts some pasture improvement practices where existing pasture contains native species. Inquire through your office of the Department of Natural Resources for further details.

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