

## RECOVERING FROM A FLOOD

This fact sheet will help you prioritise tasks during the immediate aftermath of a flood. It also provides guidance around what needs to be done in the weeks and months following, particularly if you are dealing with silt and/or slips.

### PEOPLE

#### Immediate priorities

1. Is everyone accounted for: family, staff and neighbours?
2. Are homes safe?
3. Check if power and phones are working. Report any outages (see contacts on page 8).
4. Watch out for new hazards: the lie of the land will be different; and stressed livestock are unpredictable to handle.
5. Consider appointing a Crisis Manager to handle people-related matters. There's an excellent health and safety post-flood pamphlet about how to safely make best use of volunteers (see B+LNZ resources on page 8).

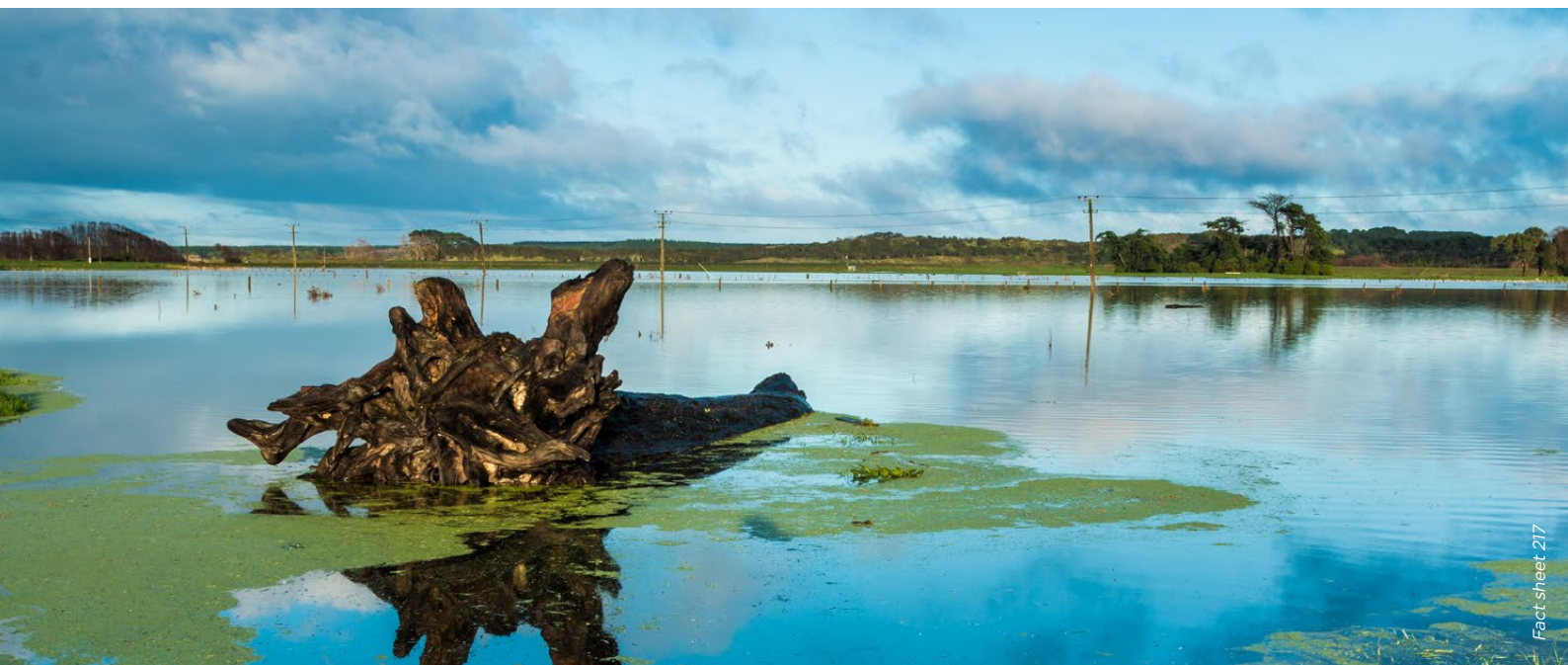
#### During the first week

1. Look after your physical and mental health.
2. Eat well.
3. Take breaks, when you can.
4. Accept help.
5. Keep in regular contact with your neighbours and work in with each other, where you can.

### LIVESTOCK

#### Immediate priorities

1. Are stock safe?
2. Check fences.
3. If possible, move stock to where there is shelter, such as trees.
4. Check they have access to clean water. If not, move them to a paddock with a reliable water supply or set up a portable trough.
5. Ensure adequate feed, but be careful stock don't overeat any newly-introduced feed (introduce new feed in limited amounts to reduce the risk of acidosis).
6. Monitor pasture for excess silt. Silt intake can cause ketosis and scouring (check flooded troughs for excess silt, also).
7. Keep an eye out for stressed stock, e.g. lone animals that have wandered away from other stock, lethargic stock, or stock running up and down fence lines.



## OPERATIONAL

### During the first week

1. Be proactive. Make an action plan and prioritise tasks. See example to the right.
2. Revise your business plan, financial budget and feed budget.
3. Assess damage: access ways, fences, pastures (record type and depth of silt).
4. Use your networks and accept offers of assistance.
5. Keep your bank manager and insurance company informed.
6. For insurance (and potentially compensation), take photos of damage and keep receipts.

### Action Plan: Example

**Outcome and timeframe:** To be back to full pasture production within two years.

**Budget available:** Up to \$25,000 per annum for two years (re-assign some capital fencing budget).

#### Tasks (in order of priority):

- 1) Crisis Manager to review the farm safety management system and identify new hazards as well as reviewing the H&S guidelines to induct volunteers on farm.
- 2) Call contractor today, to action repair of washout in main raceway and remove excess shingle from bottom flats.
- 3) Call contract fencer - today.
- 4) Get in an additional labour unit for at least the next month. (Pete's son still home from uni?)
- 5) Full farm assessment of pasture by Friday lunchtime, including access ways, fences, pasture condition, silt depth. TAKE PHOTOS. Ask Dad to feed out this week, so I have time to do it.
- 6) Put a courtesy call into bank and insurance by end of week.
- 7) Aim for relaxed debrief with team, late Fri afternoon.
- 8) Complete new feed budget this weekend.
- 9) Count up supplements on hand. Also this weekend.
- 10) Aim to update financial budget late next week. Contact consultant for assistance, if I need to.

### Immediate priorities

1. Clear access ways.
2. Are critical fences still secure?
3. Check the stock water system.
4. Check electricity supply. Are pumps and electric fences working? Report any outages (see contacts on page 8).
5. Be aware of new hazards, such as washed out tracks or fallen overhead lines.

### During the first week

#### Calculate a new feed budget

Depending on the budget's outcome, react accordingly. The usual management strategies apply (e.g. apply nitrogen, cull stock early, bring forward stock sale dates, don't mate hoggets, buy in supplements, etc).

#### Dealing with silt

The *Decision tree for flood damaged farms* (pages 4-5) will help you work through the aftermath of flooding, silt, sand, shingle and sediment. Simply start at the top and yes/no your way from there.

#### Plan your recovery regrassing programme:

1. Assess each paddock for damage.
2. Soil test silt.
3. Develop a timeline for regrassing. Some paddocks will need immediate action, while others will need to dry before cultivation.

## Regrassing programme: Example

### *Tasks (in order of priority):*

- 1) Identify paddocks that will take the least work and cost to return to full production: Upper Flats A and B, Smithys Block 4. Total approx 6 ha.
- 2) See *Decision tree* for options on species. Also ask your farm consultant or seed rep for advice on best options, under these circumstances. Order seed.
- 3) Book in contractor for start of next month.
- 4) Identify next priority paddocks: Lower Flats. 2 ha. Need shingle removed. Ask contractor to fit me in over next two weeks.

### Dealing with slips

When it comes to loss of dry matter production, slip damage looks worse than it is.

Two years after a major storm in the lower North Island in 2004, slip scarps had 30% ground cover, the slip middle had 50% and the tailings had completely recovered.

Often, moderate slip damage only produces the same loss in dry matter as a poor pasture growth year and similar strategies can be used to offset the loss (e.g. apply nitrogen, cull stock early, bring forward stock sale dates, buy in supplements, etc).

**Note:** Regrassing tailings doesn't improve revegetation and there are only minor benefits to regrassing the slip scar. Therefore, if you do decide to re-sow, keep costs low.



# Decision tree for flood damaged farms

**START HERE**

**IS PASTURE GREEN AND GROWING?**

YES

Is pasture density OK?

YES

Is there a special need for winter and spring feed that can't be met from regrassing other paddocks?

NO

When soil is dry enough for machinery direct drill with perennial pasture species of choice

Apply normal farm fertiliser programme with additional immediate nitrogen to aid recover of pasture.

NO

NO

YES

When soil is dry enough for machinery undersow with short-term ryegrass of choice<sup>6</sup>

**KEY:**

**Alive grass**

**Pasture dead no flood sediment**

**Flood sediment damage**

<sup>1,2,3</sup>... Additional notes on pages 6-7.

**Note:** In the medium-long term river silts are a fertile, valuable resource and gravel overlays can be managed to be cost-neutral.

Apply fertiliser to flood sediment affected soils according to expert advice based on soil tests<sup>2</sup>

Is there a special need for winter and spring feed that can't be met from regrassing other paddocks?

Is the pasture covered in silt or sand?<sup>1</sup>

NO

Does the soil smell?<sup>4</sup>

NO

Is there a lot of thatch?

NO

Mow thatch

Wait for soil to dry enough to cultivate normally and sow perennial grass/clover or short-term ryegrass/clover mix

Wait for sediment to dry and then spread sediment evenly on paddock. Use a form of deep cultivation to bring buried soil to surface. Is the resulting seed bed mainly flood sediment?

NO

Sow short-term ryegrass or forage oats on heavy/medium silt or accretion mix on sand

Oversow using coated short-term ryegrass seed.<sup>10</sup>

Wait for silt to dry. Then use light weight machinery and lightly break up surface, drill forage oats or short-term ryegrass and harrow behind.<sup>9</sup>

Build up organic matter through grazing and mulching. Be prepared to recultivate in the following spring or autumn.

Consider river bank planting strategies to increase organic matter.<sup>11</sup>

Is debris present?<sup>1</sup>

NO

Mound up. Trees can be burnt.

Is flood sediment less than 5cm deep?<sup>5</sup>

YES

Is flood sediment 5-10cm deep?<sup>7</sup>

YES

Is flood sediment between 10-20cm deep?<sup>8</sup>

YES

Is the deep (>20 cm) flood sediment silt, sand or gravel?<sup>9</sup>

Sand

Gravel

Silt

NO

Do you want to graze this area in the next 2 years?

NO

Pile gravel in a big heap for use on races/lanes/tracks and for sale. Cultivate and sow remainder of paddock as normal for your accretion areas.

Have the flood waters just receded leaving silt moist with no sign of drying and cracking?

YES

NO

YES

NO

NO

NO

NO

NO

NO

NO

NO

YES

NO

NO

# REGRASSING FLOOD SEDIMENT

- 1. Sediment structure:** Flood sediment characteristically lacks structure and organic matter and comes in varying textures ranging from heavy to light i.e. from clay to silty loams to sand. The clay loams are normally flat and feel smooth and silky and are usually found in ponding areas some distance from the river. The clay loams retain water for some time and if deep can't be cultivated for considerable time because machinery will bog. Silt to silty sands are often ruffled in surface texture and slightly gritty to touch. The surface of this medium flood sediment dries fairly quickly but the subsurface remains moist. Sand flood sediment is often rolling, gritty to touch and drains very rapidly and is usually adjacent to the river and may contain a lot of gravel and flood debris.  
As a river floods, the coarser sand material is deposited in the higher reaches of a river and closer to the river bank and these will be of poorer quality – less fertile and less suitable for pasture growth. Further down a river and further away from the river more clay loams are deposited and in theory, contain higher nutrient levels. But the immediate fertility of the clay and silt loams will be highly variable and should be tested. Silt and sand can intermingle in layers making mixing a good option. The regrassing response will differ depending on the depth of silt. Shallow silt (<5 cm) can be ignored, up to 10-15 cm silt can be cultivated and greater than 20 cm will either need to be oversown or partially cultivated.
- 2. Silt fertility:** The silt washed onto your land can either be fertile material from a neighbour's farm upstream, or it could be subsoil washed from slips on steeper land. In any case it will contain very little or no organic matter, will probably have very low nitrogen (N) content, and may also be low in phosphate. Sands will be the least fertile and the clay loams will be more fertile. Flood sediment pH level is different to that of existing pasture. Soil tests can be taken in wet silt as the sample is dried in the laboratory. However remember that when the soil is wet less soil is collected per sample so more samples will be required. It can take up between 3-14 days to get the results back. Initial soil testing has shown silts from this flooding are pH high 6's, Olsen P's 4-11, K very low, sulphur OK, ASC (anion storage capacity) very low. Flood sediment will need potassium and phosphate fertilisers and nitrogen. Pure silt should not have large amounts of fertiliser in one dressing as flood sediment has limited capacity to store fertiliser due to its low anion storage capacity. Smaller more regular fertiliser applications will be necessary. Seek expert opinion based on your soil test.  
Analysis of flood sediment flowing under the Manawatu bridge showed that the resulting soils that will form from this flood will be highly fertile after the flood sediment has weathered.
- 3. Pasture damage:** Pastures that have been under water for 2-3 days will probably recover, but those under water for a week or more in warm summer conditions will be dead. Paddocks recently grazed before the flooding will be worse affected as will pastures with at least 5 cm of silt cover. If a pasture hasn't shown signs of recovery after a week then consider it to be dead. Better quality grasses and clovers will die first leaving plants with rhizomatous spreading habits – couch and browntop and creeping buttercup.
- 4. Is the silt smelling?** When river silts become smelly this indicates that toxins are present as a result of anaerobic organism activity. It is probable that seed germination after sowing directly on smelly silt will be impeded by these toxins. However recovery of the anaerobic silt following cultivation will be rapid. It is recommended that anaerobic silt be aerated or cultivated.
- 5. Plan recovery.** Understand the feed requirements for the upcoming winter and following spring and summer and plan pasture recovery practices accordingly. There is little point to putting the entire flooded farm into temporary pastures to find that an identical feed pinch exists in the following spring when the pastures have to be renewed again. Assess each paddock for time under water, density of live pasture remaining after 10 days, silt type (sandy, clay/silt loam) and depth (<5 cm, 5-10, 10-25, >25 cm). Using the damage information and feed requirements in the future, plan the recovery using the appropriate mix of short term and permanent pastures. Then develop a time line for regrassing. Some paddocks will need immediate action while others will need to dry before cultivation. Back up plans are needed if the contractor is delayed or will only visit once e.g. is there some way to get pasture established using own machinery or that available from other farmers?
- 6. Flood sediment less than 5 cm.** If there is less than 5 cm of silt and the grass has been under the water for less than 3 days then it is probable that the existing grass will come through the crust. Existing grass recovers much more quickly than sown grass. If there are open parts in the pasture then these can be undersown using perennial grass: clover mixes. If you are expecting a feed pinch in winter and spring due to the flooding and this can't be met from other regrassed then as a special case open pastures can be drilled with short-term ryegrasses. Apply nitrogen fertiliser (N) at about 50 kg N/ha to assist recovery, either as urea (110kg/ha), as ammonium sulphate (at 200kg/ha), or as DAP (at 275 kg/ha). Avoid using more than 25 kg N/ha down the spout if sowing seed with a drill.

- 7. Flood sediment 5-10 cm.** If silt has completely covered the pasture it will not survive and will need to be regrassed. Normal cultivation methods will apply at these depths. Cultivation is recommended because silt is relatively infertile, will contain no organic matter or N, and have poor structure making it prone to pugging. A barrier to water drainage may also occur on the interface between the old pasture and flood silt. It is better in the long run to cultivate these depths of silt so silt and underlying topsoil are combined. Sandy silts will dry quickly and heavy and medium silts more slowly. The resowing should have a high chance of success as it is normal farm practice in moist areas of lower North Island to resow pastures in early autumn March-early April. When sowing the whole paddock it is best to decide whether to sow short-term species, or perennials, as it is not always wise to mix them. Short-term Italian and hybrid ryegrasses will be preferred where feed production this winter is crucial, or where weeds/fertility are expected to make it difficult to establish a good perennial pasture mix this year. Apply potassium and phosphate fertilisers with regular dressings of nitrogen as there will be little or no nitrogen cycling in the silt.
- 8. Flood sediment 10 to 25 cm:** In silt of this depth there will deeper and shallower parts in the paddock. By levelling the paddock it may be possible to bring most of the paddock into the 10-20 cm depth category. Once the silt has dried heavy machinery can be used and deep ploughing (e.g. swamp plough) will help to mix the silt with the topsoil. If this is successful then cultivate and sow as normal. If the resulting soil is predominantly flood sediment rather than topsoil then sow in either short-term ryegrasses or forage oats or other deep rooted short term crops and return to permanent pasture the following spring or autumn.
- 9. Flood sediment >25cm.** There are two options for deep clay/silt loam flood sediment and these are either oversowing with a helicopter or cultivating the silt and drilling. In either case be prepared to recultivate in the following spring or autumn due to poor soil structure. If cultivating deep silt wait for the silt to dry sufficiently to support machinery. Use light weight machinery (including small tractors) and lightly break up surface, drill forage oats (annual, good option from farmer experience) or short-term ryegrass and harrow behind. After winter grazing forage oats can be mulched to aid in organic matter or made into silage in spring. On very sandy areas use the same seed mix as you normally use on your accretion area.
- 10. Oversowing** is not an option for very sandy flood sediment but is an option for clay/silt loams. Oversowing needs to occur when the silt is still damp and sticky and must occur quickly once water has receded. Only use coated seed. Once the silt has caked and cracked it is too late for oversowing. Relying on rewetting the silt after rain to foster germination of oversown seed is not likely to work. Oversowing is a more risky sowing method than cultivation or direct drilling, so use higher than normal seeding rates. If the silt is too wet, the seed may rot, and if it is too dry then the surface of the silt will cake and crack, and the ryegrass seedlings will struggle to grow primary roots into the "new" soil. Once silt is dry seed may also blow away and birds become a major problem because they can land on the dry silt. Oversow with short-term ryegrasses. Stocking of newly sown areas should begin as soon as possible without pugging. Mulching before regrassing is a good option for building up organic matter.
- 11. Revegetating shingle** will be difficult. If grazing is required within 2 years then the sand/shingle needs to be removed and stacked in a big stockpile. It can then be used for races/lanes/tracks or sold. Alternatively the area can be retired and revegetated using such things as blue lupins. However be careful not to build up seed stores of undesirable species if you are intending to regrass at a later date.
- 12. Information contributors:** *This information has been compiled on behalf of MAF Sustainable Farming Fund and Beef + Lamb New Zealand (previously Meat and Wool Innovation) using information provided from experienced farmers, researchers from AgResearch and Massey University and rural professionals from Greenfield's Communications, DairyNZ, Wrightsons, Ravensdown, Hills Laboratories, E-Lab, Agriseeds, Agricom, Balance, QuinPhos, Pioneer, Hills Laboratory, Wilsons and Keeling, Horizons Regional Council, Pyne Gould Guinness, and Williams and Kettle.*

## CONTACTS

**Rural Support Trust:** 0800 787 254

**Federated Farmers:** 0800 327 646  
(Also the “Feed Line”)

**Civil Defence:** [www.civildefence.govt.nz](http://www.civildefence.govt.nz)

**Power outage:** Call your electricity retailer  
(i.e. the company that bills you monthly)

**Water supply problems:** Your district council will likely have a flood relief co-ordinator in place. Call and log your problem.

## B+LNZ RESOURCES

**FeedSmart Calculator** - Quick and easy-to-use feed budgeting tool [www.feedsmart.co.nz](http://www.feedsmart.co.nz)

**Health and safety of volunteers working on farms post-flood - guidelines to help you safely manage volunteers on farm** [www.beeflambnz.com/knowledge-hub/factsheets/health-and-safety-post-flood-recovery-fact-sheet](http://www.beeflambnz.com/knowledge-hub/factsheets/health-and-safety-post-flood-recovery-fact-sheet)

Filter by region for your local B+LNZ Extension Manager [www.beeflambnz.com/contact-us](http://www.beeflambnz.com/contact-us)

## ACKNOWLEDGEMENTS AND MORE INFORMATION

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