

ATTACHMENT 1 TO THE JWS - STRENGTHENING THE PERMITTED ACTIVITY RULE

Prepared by Susan Ruston, 23 May 2023

Context

[1] The planning experts were asked to address the following questions:

Question 1(a)

Are there any drafting improvements that could be made to Rule 78 to strengthen the protection of ecological and cultural values identified by the Court in its Sixth Interim Decision (excluding paragraphs 268 – 295 that have been recalled) within the scope of the appeals on the rule?

Question 1(b)

Are there any drafting improvements that could be made to Rule 78 to improve the operation, implementation and/or workability of the permitted activity rule.

[2] MMC, LK, BF, TD are of the opinion that the protection of ecological and cultural values could be strengthened through the permitted activity rule by inclusion of the additional clauses included at para 255 of the 6th Interim Decision.

[3] While I agree with this statement, I consider that there is opportunity to further strengthen such protections in Rule 78, and this attachment to the JWS sets out my rationale in this regard.

[4] In answering Question 1(a), MMC, LK, BF, TD are also of the opinion that, if it is within the scope of the appeals, the rule could be further strengthened by requiring implementation of best-practice requirements through Farm Environmental Management Plans or a management plan approach for watercourses managed by a public entity. At the same time, they note that such changes are unlikely to be sufficient to resolve the fundamental challenges of the rule, as identified in the Ecology JWS.

[5] Concerning Question 1(b), MMC, LK, BF, TD are of the opinion that Rule 78 cannot be strengthened to improve the operation, implementation and/or workability of the rule, while at the same time acknowledging that some permitted activity conditions lack certainty and drafting could be improved. With this they note that no appeals have sought changes to the conditions that lack certainty.

[6] This attachment to the JWS reflects the considerations that I have given to the matters under appeal and how Rule 78 could be strengthened to advance protection

of the values that are the focus of the appeals, and to advance the ‘workability’ of the permitted activity rule. Farm Environmental Management Plans and required practices are, in my opinion, key mechanisms for strengthening the rule in the manner sought.

Ecological and cultural values

[7] I understand the ecological and cultural values identified by the Court in its Sixth Interim Decision, excluding those referred to in paragraphs 268 to 295, include:

- a) The area, functioning and quality of wetlands and wetland habitats (paragraphs 248 and 249(b) of the Sixth Interim Decision);
- b) Freshwater indigenous species, including threatened species (paragraph 248 Sixth Interim Decision), and more specifically taonga species listed in Appendix M and related habitats (paragraph 249(c) of the Sixth Interim Decision); and
- c) Water quality, habitats, indigenous biological diversity, tangata whenua cultural values, river morphology, flood risk and infrastructure assets (paragraph 249(a) of the Sixth Interim Decision).

Scope of appeals

[8] I understand that the Appellants to Rule 78 include the Royal Forest and Bird Protection Society of New Zealand Inc, Southland Fish and Game Council, the Director-General of Conservation and Te Runanga o Ngai Tahu (Ngā Rūnanga). While none of the Appellants sought a change to the permitted activity status in Rule 78, they did seek changes to the conditions of Rule 78. The relief sought by the Appellants is summarised as follows:

Appellant	Relief sought
Ngā Rūnanga	Amend Rule 78 by inserting the following condition: <u>(xv) No activity in relation to drainage maintenance shall significantly adversely affect the habitat or health of any taonga species as identified in Appendix M.</u>
Director-General of Conservation	Amend Rule 78 by inserting the following condition: <u>xiv) the modified watercourse is not a habitat of non-migratory galaxiids.</u>

	<p>Also amend Rule 78 by including mapping of non-migratory galaxiids habitat in the Planning Maps.</p>
<p>Royal Forest and Bird Protection Society of New Zealand Inc</p>	<p>Amend Rule 78 by inserting the following conditions:</p> <p><u>(iii) any incidental bed disturbance and removal of gravel shall be only to the extent that it is necessary to undertake the activity and shall be kept to the absolute minimum and the gravel removed shall comprise not more than 5% of the total sediment removed</u></p> <p><u>(xiv) the modified watercourse is not a habitat of threatened native fish.</u></p> <p>Also amend Rule 78 by including a schedule to identify habitats of threatened native fish.</p>
<p>Southland Fish and Game Council</p>	<p>Amending the following conditions of Rule 78 as shown:</p> <p>(ia) the removal of river bed material, <u>including gravel,</u> other than aquatic weeds, plants, mud or silt is <u>avoided as far as practicable:</u></p> <p><u>(1) only to the extent that is necessary to undertake the activity and shall be kept to the absolute minimum; and</u></p> <p><u>(2) shall not exceed more than 5% gravel (>10mm diameter) by volume; and</u></p> <p>(iv) upon completion of the activity, fish passage is not impeded as a result <u>because</u> of the activity; and</p> <p>(xiii) where the modified watercourse is spring-fed, removal of aquatic weeds and plants is only to the extent that is necessary to undertake the activity and is <u>shall be</u> kept to the absolute minimum.</p> <p>(b) The removal of aquatic weeds and plants and <u>fine</u> sediment from any modified watercourse for the purpose of maintaining or restoring drainage outfall</p>

	and any associated bed disturbance and discharge resulting from the carrying out of the activity that cannot meet one or more of the conditions of Rule 78(a) is a discretionary activity.”
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[9] In summary, I understand the key focus of the combined relief sought to be:

- a) Protecting the habitat and health of:
 - taonga species identified in Appendix M;
 - non-migratory galaxiids;
 - threatened fish; and
- b) Minimising the removal of gravels from the bed of modified watercourses.

[10] The sections that follow focus on strengthening achievement of a) and b), while the drafting changes I have considered have not been limited to the wording of the Appellants’ drafted relief.

Strengthening the protection of ecological and cultural values through Rule 78 and improving the operation, implementation and/or workability of Rule 78

[11] The starting point I have adopted in answering Questions 1(a) and 1(b) is Rule 78 in the October Consolidated Plan (Final SRC Changes) at 137-138. The following table considers the components of this version of the rule with respect to the protection provided to ecological and cultural values and the operation, implementation and/or workability of Rule 78.

Provision of Rule 78	Comment
October Consolidated Plan (Final SRC Changes) at 137-138)	
<p>Rule 78 – Weed and sediment removal <u>from modified watercourses for drainage maintenance</u></p> <p>(a) The removal of aquatic weeds and plants and sediment from any modified watercourse for the purpose of maintaining or restoring drainage outfall, and</p>	<p>The SRC amendment to the title of Rule 78 provides greater recognition that the waterbody is not an artificial drain, rather it is a watercourse that has been modified for a purpose. In my opinion, this strengthens the potential for plan users to make the connection between</p>

<p>any associated bed disturbance and discharge resulting from carrying out the activity, is a permitted activity provided the following conditions are met:</p>	<p>the watercourse and the ecology that may be present.</p> <p>The chapeau clearly constrains the extent and purpose of the activity.</p>
<p>(ai) general conditions (e), (f), (g), (h) and (l) set out in Rule 55A.</p>	<p>These conditions in Rule55A include:</p> <p>(e) No fuel storage or machinery refuelling occurs on any area of the bed;</p> <p>(f) No contaminants, other than sediment released from the bed, are discharged to water as a result of use of the structure unless allowed by a relevant permitted activity rule in this Plan or a resource consent;</p> <p>(g) Before any equipment, machinery, or operating plant is moved to a new activity site it is effectively cleaned to prevent the spread of “pests” or “unwanted organisms” as defined by the Biosecurity Act 1993;</p> <p>(h) All equipment, machinery, operating plant and debris associated with the structure or bed disturbance activity is removed from the site on completion of the activity;</p> <p>(l) From the beginning of November until the end of May, there is no disturbance of whitebait spawning habitat.</p>

	<p>Of these, (e), (g), (h) and (l) can be directly applied to the removal of aquatic weeds and plants and sediment from a modified watercourse. While (f) relates to the use of structures.</p> <p>In my opinion, the workability of Rule 78 would be strengthened by directly referring to these matters in the conditions of Rule 78 rather than cross referencing to Rule 55A, and amending (f) so that it applies to the activity that Rule 78 addresses.</p>
<p>i) the activity is undertaken solely to maintain or restore the drainage capacity of a modified watercourse that has previously been modified or maintained for drainage maintenance or restoration purposes at that location;</p>	<p>This condition repeats the purpose of the activity in the chapeau to the rule. On this basis, I consider that condition i) is repetitive and detracts from the implementation and/or workability of Rule 78.</p>
<p>(ii) the activity is restricted to the removal of aquatic weeds and plants or sediment deposits, <u>provided that at least 95% of the sediment removed shall have a grain size of less than 2mm;</u></p>	<p>Condition (ii) without SRC's edits repeats the extent of the activity identified in the chapeau to the rule. On this basis, I consider such words are repetitive and detract from the implementation and/or workability of Rule 78.</p> <p>SRC's recommended edits to condition (ii) are, in my opinion, unimplementable as a condition of a permitted activity since it is unlikely that either the person undertaking the activity or an SRC officer would be able to determine that at least 95% of the sediment removed from</p>

	<p>the modified watercourse has a grain size of less than 2mm.</p> <p>In my opinion, an alternative condition is needed to minimise the removal of gravels from the bed of modified watercourses.</p>
<p>(iia) the removal of river bed material other than aquatic weeds, plants, mud or silt is avoided as far as practicable;</p>	<p>In my opinion, this condition is unimplementable as a condition of a permitted activity since it leaves discretion as to what is “practicable”.</p> <p>I consider that an alternative condition is needed to minimise the removal of gravels, or other materials beyond aquatic weeds, plants, mud or silt, from the bed of modified watercourses.</p>
<p>(iii) any incidental bed disturbance is only to the extent necessary to undertake the activity and must not result in lowering of the bed below previously modified levels;</p>	<p>In my opinion, the first part of this condition is unimplementable as a condition of a permitted activity since it leaves room for discretion to be applied to determine “<i>the extent necessary</i>”.</p> <p>It is possible that the latter part of the condition is also unimplementable as a condition of a permitted activity. To confirm this, an expert opinion on the likelihood of identifying previously modified levels would be needed.</p> <p>In my opinion, an alternative condition is needed to minimise the lowering of the bed below previously modified levels.</p>
<p>(iv) upon completion of the activity, fish passage is not impeded as a result of the activity;</p>	<p>In my opinion, this condition is clear and readily implementable and provides some protection to the migration of fish species.</p>

<p>(v) the operator takes all reasonable steps to return any fish captured or stranded by the activity to water immediately preferably to a location upstream of the activity;</p>	<p>In my opinion, this condition is unimplementable as a condition of a permitted activity since it leaves discretion as to what is “all reasonable steps” and to whether fish should be returned to a location upstream of the activity or not.</p> <p>In my opinion, an alternative condition is needed to address fish recovery matters.</p>
<p>(vi) between the beginning of June and the end of October, there is no disturbance of the spawning habitat of trout; and</p>	<p>For this condition to be workable it relies on the operator knowing where trout spawning occurs, or what characteristics make up trout spawning habitat. In the absence of map references, this condition leaves discretion in identifying the spawning habitat of trout and for this reason the condition is not implementable. I consider that an alternative condition is needed to protect trout spawning areas.</p>
<p>(xiii) where the modified watercourse is spring-fed, removal of aquatic weeds and plants is only to the extent that is necessary to undertake the activity and is kept to the absolute minimum; and</p>	<p>In my opinion, this condition is unimplementable as a condition of a permitted activity since it leaves discretion as to “the extent that is necessary”.</p> <p>I consider that, an alternative condition is needed to minimise the extent of the activity to only being what is needed to achieve the purpose of maintaining or restoring drainage outfall.</p>
<p>(xiv) the modified watercourse is not shown in Map Series 8 as a</p>	<p>I am unclear what maps make up Map Series 8. However, if the maps can be</p>

<p>habitat of threatened non-diadromous galaxias</p>	<p>readily identified, then this condition could form a clear condition of a permitted activity.</p> <p>At the same time, if Map Series 8 are the maps provided in Ms Linda Kirk's Rebuttal Evidence dated 22 February 2022, then I note the clustering of such habitat and the potential for unintended consequences should farmers choose not to undertake the activity as a consequence of having to apply for a resource consent. I address this further below.</p>
<p>(b) The removal of aquatic weeds and plants and sediment from any modified watercourse for the purpose of maintaining or restoring drainage outfall and any associated bed disturbance and discharge resulting from the carrying out of the activity that cannot meet one or more of the conditions of Rule 78(a) is a discretionary activity.</p>	<p>In my opinion, this condition is clear and readily implementable and can:</p> <ul style="list-style-type: none"> a) provide protection to the habitat and health of taonga species identified in Appendix M; non-diadromous galaxias; threatened fish; and b) minimise the removal of gravels from the bed of modified watercourses.

[12] Based on the preceding assessment, I consider that there is considerable opportunity to strengthen the protection of ecological and cultural values in Rule 78 and the operation, implementation and/or workability of the rule.

[13] In my mind, the latter requires clarity of compliance (or noncompliance) with little, if any, room for discretion in determining compliance. At the same time the former requires greater direction on how the activity can be undertaken while minimising the potential effects on the ecological and cultural values present. Minimising (that is to reduce to the smallest amount reasonably practicable) the potential effects on the ecological and cultural values present, in my opinion, requires tailoring of the methods applied to 'minimise' on a site-by-site basis.

Strengthening the Permitted Activity Rule for On-Farm Modified Watercourses

- [14] The following considerations focus on removal of aquatic weeds and plants and sediment from modified watercourses that is undertaken by farmers (or their contractors). I understand from the JWS that MMC, LK, BF, TD are of the opinion that, the rule could be strengthened by requiring implementation of best-practice requirements through a management plan approach for watercourses managed by Southland Regional Council (provided that there was scope for such strengthening). I agree that such an approach could assist the rule, however, limited time has meant that I have not attempted drafting an example of such an approach.
- [15] Concerning the removal of aquatic weeds and plants and sediment from modified watercourses that is undertaken by farmers, I consider that the Farm Environmental Management Plans could be used as a key tool in providing the clarity needed for a condition of a permitted activity (as it is in Rule 20) while at the same time driving improved on-farm practices. With respect to the latter, I have looked to the evidence of the ecological experts to identify practices to reduce the potential effects of the activity on the ecological and cultural values. I elaborate on these matters as follows.
- [16] Rule 20 of the pSWLP has adopted as a condition of the permitted activity (being the use of land for a farming activity) the requirement that a Farm Environmental Management Plan (FEMP) is prepared, certified, and compliance audited, in accordance with Appendix N. This requirement applies to landholdings of 20ha or more and drives improved on-farm environmental practices that are tailored to site-specific environmental risks.
- [17] While I understand that the content of Appendix N has yet to be decided on, I understand that there is the potential for a requirement that the following objective be met through the contents of the FEMP:
- Habitat management: activities in waterways (including modified watercourses), natural wetlands and their margins are managed so that in-stream and riparian habitat values are not diminished, and where practicable are improved.*
- [18] To strengthen the likelihood of achieving improved on farm practices (with respect to the removal of aquatic weeds and plants and sediment from modified watercourses) and the achievement of this Appendix N objective, I consider that key practices for undertaking the activity could be identified and be required to be adopted in the FEMP. Adoption of such practices in the FEMP, rather than in conditions of the permitted activity, allow the practices to be tailored to the environmental values and

risks present on a site-by-site basis. This approach also ensures that there is some oversight (through certification and auditing of the FEMP) that the practices address the risks and are implemented.

[19] In considering possible key practices for adoption in the FEMP, I have looked to the following Joint Witness Statement:

- a) Expert Conference – Ecology, Proposed Southland Water and Land Plan – Southland Regional Council, 1 December 2021; and
- b) Attachment 1 to the above JWS, Memo from Michael Greer to Environment Southland, 23 April 2021.

[20] In Mr Greer’s memo he has identified “*Practices to reduce effects*” resulting from the removal of aquatic weeds and plants and sediment from modified watercourses. The 1 December 2021 JWS (page 6) notes that:

Various guidance documents recommend the use of the mitigation measures similar to those listed in Table 1. These mitigation measures would be best incorporated into the plan via reference to the requirement to adhere to a drainage best practice code, as done for other regions (e.g. Canterbury and Greater Wellington). This best practice code might give direction to both sustainable drainage management (prevention of weed and sediment accumulation) and mitigation measures.

[21] Table 1 of this JWS identifies “*Examples of additional or alternative best practice water course maintenance measures that could be applied across the modified watercourses in Southland to avoid or reduce effects on indigenous species and their habitat.*” I understand these to be ‘additional’ to Mr Greer’s “*Practices to reduce effects*”.

[22] I have looked to Table 1, and the recommendations of Mr Greer, and have drafted an example Appendix of practices that Rule 78 could require to be adopted in FEMPs.

[23] The 1 December 2021 JWS (page 6) advises that prevention of the need for “*drain maintenance*” should be the priority (prior to avoiding, remedying or mitigating the potential adverse effects of the activity). I understand that the objectives, policies and rules throughout the plan that control the loss of sediment to waterbodies, and maintain or enhance riparian values, will lead to a reduction in the need for, and therefore frequency of, clearance of modified water courses.

[24] Based on the preceding assessment, I have drafted an example of a ‘strengthened Rule 78’ and this is provided in Attachment 1 to this statement.

- [25] In summary, the strengthened Rule 78 sets fundamental requirements of all on-farm removal of aquatic weeds and plants and sediment from modified watercourses, regardless of the size of the landholding. These requirements lie within the rule itself. Where a landholding is 20ha or larger, the rule requires that the farms FEMP adopt the *Management Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse* (that would be contained in a new Appendix to the plan) as methods to achieve the objective for Habitat Management in modified watercourses in Appendix N (assuming this objective is retained through decisions on Appendix N).
- [26] The matters addressed in the conditions of the October Consolidated Plan (Final SRC Changes) at 137-138) that I have previously identified as unimplementable have been addressed through the *Management Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse*, and a new condition has been inserted requiring that where mechanical methods are to be used to carry out the activity the Southland Regional Council is notified at least three working days prior to the activity commencing.
- [27] A key gap in the conditions within the example 'strengthened Rule 78' and the example *Management Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse* is identification of particular locations and dates when the activity should not occur so as to provide greater protection to threatened fish and other taonga species. This should not imply that such constraints are not warranted, rather it reflects the difficulty I have had in overlaying the information available to prioritise locations and timing in a helpful manner that does not result in the bulk of the modified watercourses being prevented from maintaining flood conveyance capacity. This challenge has been compounded by the migratory habits of many species. It may be possible for the ecological experts to prioritise such limitations in a manner that does not render a permitted activity rule redundant. At the same time, in the absence of such prioritised limitations, the 'strengthened Rule 78', with associated management practices, can lead to significant improvements in on-farm practices and the maintenance or enhancement of the habitat and health of aquatic ecology in modified watercourses, beyond what would be achieved by the version of Rule 78 in the October Consolidated Plan (Final SRC Changes) at 137-138.
- [28] More specifically, with respect to non-diadromous galaxias habitat, I understand from Kirk's Rebuttal Evidence dated 22 February 2022, that such habitat is readily identifiable. To provide greater protection to such habitat, specific management

practices may be able to be identified and added to the example Appendix *Management Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse*. Targeted management practices may also be able to be applied to other valued habitats. Ecological expertise would be needed to clarify whether such targeted practices would be helpful.

Benefits of the strengthened Rule 78

[29] Benefits of the strengthened Rule 78 include:

- a) Provides greater clarity to farmers of the improved practices that are required when undertaking the activity, and consequently provides greater protection to the habitat and health of aquatic ecology;
- b) Allows efficiencies to be gained through use of the existing FEMP requirements to bring about improved practices on-farm;
- c) Removes unenforceable conditions of the version of Rule 78 in the October Consolidated Plan (Final SRC Changes) at 137-138;
- d) Avoids overwhelming the consenting pathway with the large number of resource consent applications from farmers – *I have not been able to source a definitive number of farms that have modified watercourses on their landholdings, but MMC has indicated that it is likely to be more than 1,000*;
- e) Is consistent with Policy 30 in the 6th Interim Decision at paragraph 235.

[30] Further to the above, an accessible permitted activity option avoids the unintended consequences that can arise from a compulsory consenting pathway. If a consent is required (i.e. there is no permitted activity option), the information requirements and associated costs could deter farmers from clearing the modified watercourses. Uncleared modified watercourses will result in reduced flood conveyance capacity. Reduced flood conveyance capacity will likely result (at some point in time) in some flooding of the farmers paddocks, however this maybe a risk that the farmer is prepared to accept. At the same time reduced flood conveyance capacity could result in flooding of communities. Policy 30 recognises the community benefits of maintaining flood conveyance capacity within the modified watercourses. To achieve these benefits the maintenance of flood conveyance needs to be enabled, while managing the potential adverse effects of the activity.

Limitations of the strengthened Rule 78

[31] Limitations of the 'strengthened Rule 78' approach include:

- a) A permitted rule does not provide opportunity (other than through non-regulatory methods) for Rūnanga to have input to the activity, or to gather information on aquatic ecology in the region (the same limitation applies to the version of Rule 78 in the October Consolidated Plan (Final SRC Changes) at 137-138);
- b) Quality preparation, certification and auditing of the FEMPs requires expertise that may be limited in availability in the short term (the same limitation would apply to a consenting regime and the ability for the regional council to undertake meaningful assessments of resource consent applications);
- c) The 20ha landholding limit for requiring FEMPs to adopt the *Management Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse* relies on non-regulatory methods (such as the SRC website) to promote the 'good practices' to the smaller landholder;
- d) A permitted activity rule will not avoid all adverse effects on the habitat and health of aquatic ecology in modified watercourses, rather its focus is limited to maintaining or enhancing the habitat and health of aquatic ecology in modified watercourses.

Conclusion

[32] If the activity is to remain a permitted activity, I consider that the alternative rule provided in Attachment 1 significantly strengthens the protection of ecological and cultural values (as identified by the Court in its Sixth Interim Decision and excluding paragraphs 268 – 295 that have been recalled), and improves the operation, implementation and/or workability of the permitted activity rule (Rule 78).

ATTACHMENT 1

Example of strengthened permitted activity rule for removal of aquatic weeds and plants and sediment from modified watercourses on farms

Rule 78

- (a) The removal of aquatic weeds and plants and sediment from any modified watercourse within a farm boundary for the purpose of maintaining or restoring drainage capacity, and any associated bed disturbance and discharge resulting from carrying out the activity, is a permitted activity provided the following conditions are met:
- i. where mechanical methods are to be used to carry out the activity, the Southland Regional Council is notified at least three working days prior to the activity commencing and the notification includes the name of the landholder and the location of the modified watercourse within which the activity will occur;
 - ii. no fuel storage or machinery refuelling occurs in any area of the modified watercourse;
 - iii. no contaminants are discharged to water, other than sediment released from the bed or banks of the modified watercourse;
 - iv. before any equipment, machinery, or operating plant enters the modified watercourse the equipment, machinery, or operating plant is cleaned to prevent the spread of “pests” or “unwanted organisms” as defined by the Biosecurity Act 1993;
 - v. upon completion of the activity, fish passage is not impeded as a result of the activity;
 - vi. where the landholding is 20 hectares or more greater than 20 hectares, the landholding’s Farm Environmental Management Plan adopts the *Management Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse* in Appendix XX as methods to achieve the objective for Habitat Management in modified watercourses in clause [9](b) of Appendix N.
- (b) The removal of aquatic weeds and plants and sediment from any modified watercourse within a farm boundary for the purpose of maintaining or restoring drainage capacity and any associated bed disturbance and discharge resulting from the carrying out of the activity that cannot meet the conditions of Rule 78(a) is a discretionary activity.

Note: In addition to the provisions of this Plan and any relevant district plan, any activity which may modify, damage or destroy pre-1900 archaeological sites is subject to the archaeological authority process under the Heritage New Zealand Pouhere Taonga Act 2014. The responsibilities regarding archaeological sites are set out in Appendix S.

Appendix XX Practices for the Removal of Aquatic Weeds and Plants and Sediment from any Modified Watercourse

1. Minimise frequency of works in modified watercourses

- a) Only carry out clearance of aquatic weeds and plants and sediment when there is an obvious need, for example when there is surface flooding during small rainfall events, submerged tile drain outlets, or raised water table.
- b) Minimise clearance works in the growing season when plants are likely to rapidly re-establish.
- c) Extend the time between clearance works by spraying plants that grow through or on top of the water.

2. Minimise suspended sediment concentrations

- a) Use a weed rake when the bed of the modified watercourse is gravel and there is very little deposited fine sediment on the bed.
- b) Use a conventional excavator bucket in heavily silted modified watercourses.
- c) Place spoil in a location and way that prevents the sediment removed by the excavator falling back into the modified watercourse during floods or re-entering through surface run-off. In doing so, consider the bank gradient and maximum water height.
- d) To minimise the risk of sediment impacting fish and invertebrates downstream of the excavator, trap and retain disturbed sediment before it moves out of the reach being cleared by any one or more of the following methods:
 - i. Install permanent sediment traps. These are excavated pools that are wide, short and deep. As water flows into these pools, velocity reduces, allowing fine sediment disturbed by the excavator to settle out on to the stream bed. After clearance of the modified watercourse the fine sediment that has accumulated in the trap can be excavated. Note that installation of permanent sediment traps may require a resource consent.
 - ii. Install temporary sediment retention devices. These are commonly made by stretching filter cloth across the channel to form a silt fence, or by placing hay-bales on the bed and securing them with waratahs. Such devices should not be used for large clearance operations in fast flowing modified watercourses.
 - iii. Maintain an uncleared section of aquatic plant material downstream of the excavated area to trap and retain some of the sediment released during the clearance activity. The uncleared section of aquatic plants can then be excavated to prevent the sediment retained within it from moving downstream.
- e) Retain vegetation cover on the banks of the modified watercourse by minimising contact between the cutting edge of the excavator bucket and the dry bank, especially when working in deeply incised steeply banked channels.
- f) Seed or plant bare areas of the banks of modified watercourses.

3. Fish recovery

- a) Minimise the adverse effects of fish stranding during and after removal of aquatic weeds and plants and sediment from a modified watercourse by undertaking the following actions:
 - i. Search the spoil for fish as soon as the spoil is removed from the waterway; and
 - ii. If fish are recovered from the spoil and are not immediately returned to the modified watercourse above the upstream extent of the works, place them in a bucket or fish bin containing clear water sourced from the modified watercourse being cleared; and
 - iii. Place the bucket or fish bin in the shade and keep the water in the bucket or fish bin well aerated and below 18°C by using an aquarium bubbler or providing manual aeration by frequently stirring the water or pouring new water in from a height of at least one metre; and
 - iv. Hold the fish for no more than one hour before returning them to the modified watercourse above the upstream extent of the works; and
 - v. Periodically re-examine the spoil throughout the day, at the end of the day and the next morning for any remaining fish. Store and return recovered aquatic life to the modified water course using the process described above; and
 - vi. Where large numbers of native fish are being removed with the spoil, leave the excavator bucket submerged long enough at the end of each scoop to allow fish to escape.
- b) Using the methods set out in a) above, recover and relocate fish from within the modified watercourse that exhibit obvious signs of stress (for example gasping for breath at the surface or floating belly up).
- c) Enable eels to make their own way from the spoil back to the modified watercourse by spreading the spoil along the bank, at the minimum distance from the watercourse that is needed to ensure that the spoil does not re-enter the watercourse or any other surface waterbody.

4. Maintain some sections of vegetation

- a) Maintain at least some vegetation on the modified watercourse to minimise impacts on aquatic fauna by undertaking the following actions:
 - i. Where full restoration of hydraulic capacity is not required, adopt a staggered approach to clearing where short, uncleared sections of aquatic plants are retained at regular intervals along the length of the cleared reach.
 - ii. Where restoration of hydraulic capacity is of the utmost importance and leaving sections of the waterway undisturbed is not an option, limit plant removal to one side of the drain at a time, leaving a strip of vegetation along the opposite bank to provide refuge habitat for fish.

- iii. Where practicable, avoid excavating all the modified watercourses on a property in any one year. For example, if the modified watercourses on a property require clearing every five years, clear one fifth annually.
- b) Before undertaking the works, inspect the targeted section of the modified watercourse, identify and mark features, such as pools, riffles, or threatened species habitats or sections of channel that should not be disturbed during excavation and ensure the operator knows to preserve these features. In tidal areas identify potential inanga spawning habitat (riparian grasses that are covered by water during spring tides) and avoid either removing it with the excavator or destroying it when dumping spoil.

5. Minimise changes to the bed

- a) Only remove unconsolidated fine sediment that has been deposited on the bed since it was last cleared.
- b) Only remove fine sediment from the channel and minimise removal of gravels.
- c) Maintain some variability in the stream bed profile to provide habitat diversity.

6. Protect inanga spawning habitat

- a) Inanga spawning habitat is concentrated in tidal areas, and during the spawning season the adult fish form large shoals as they migrate towards the coast to spawn. If an excavator intercepts a shoal there is a risk of a lot of fish becoming stranded. Thus, if a lot of inanga are found in the spoil between March and May (the peak spawning season) drain clearance should stop. Inanga only spawn on two nights of the month (new and full moon) and migrating fish will generally pass by fairly quickly. Works should only resume when there is no presence of shoals.