BEFORE THE HEARINGS PANEL

IN THE MATTER of hearings on submissions concerning the Proposed One Plan notified by the Manawatu-Wanganui Regional Council

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SUPPLEMENTARY EVIDENCE OF JAMES STUART LAMBIE FOR THE END OF HEARING REPORT (WATER) ON BEHALF OF HORIZONS REGIONAL COUNCIL

PART ONE: RECOMMENDED CHANGES TO THE ENVIRONMENTAL CODE OF PRACTICE FOR RIVER WORKS (ECOP)

1. Change to dotterel clause to allow for work when an inspection shows no dotterel are present

1. Due to the way Sites of Significance – Riparian (SOS-R) were mapped using Ornithological Society of NZ data, it is possible for there to be gravel beaches without nesting dotterel present during the nesting period. The intention of the clause (to provide opportunity for works if no dotterel are present) should be retained.

2. The Supplementary Evidence of Mr Logan Brown for the Minister of Conservation (dated March 2010) highlights on page 7 that confirming the absence of dotterel is difficult without suitable training. I believe it is possible to train staff and contractors on how to correctly assess the absence or presence of dotterel and that a training programme for staff and contractors is something Horizons and the Department of Conservation (DOC) could work on together.

Recommendation:

3. Change the inspection clause in the **Special Standards for Good Practice** for all SOS-R dotterel sites to read:
<u>when an inspection of the site by a suitably trained person shows no dotterel are present;</u>

2. Inagna spawning clauses

4. Mr Brown is adamant that the clauses to protect inanga spawning which he presented in Appendix 7 of his main body of evidence (pp 98-99) are necessary whereas I maintain no change is needed to those that are in the November 2009 version of the ECOP (Generic Special Standards 1.3).

5. In response to Mr Brown's suggested Inanga Spawning Clause 2, I believe blanket exclusion of bank protection works defeats the purpose of protecting inanga spawning where those works are attempts to re-establish vegetation on naked soils. I believe the original clause (4), which is to avoid the loss of vegetative cover, would adequately limit the degree to which bank protection works would damage inanga spawning habitat while allowing for inanga habitat enhancement.

6. I do not fully support Mr Brown's Inanga Spawning Clause 6, because Horizons does not conduct any mowing in inanga spawning areas. While adoption of the clause is of no consequence to Horizons, there is concern that adopting the clause would cause a degree of flippancy to creep into the ECOP.

7. Horizons does on occasion mulch trees along river margins using a mower or similar machine. Mulching retains a long vegetative sward and so would not have the same effect as mowing in reducing the humidity at ground level, which is required for successful inanga egg development. If Mr Brown's Inanga Spawning Clause 6 is to be adopted, it should exclude mulching.

8. I do not fully support Mr Brown's Inanga Spawning Clause 7c because in a drought it could be difficult to establish vegetative cover within one month. Clause 7c could read "… within one month where practicable. Where it is not practicable …" (where the clause would then follow the standard practicability clause used in the ECOP. Using the practicability clause in this case assures that where vegetation cannot be established within one month, the reasons for delay are documented. Such documentation helps to develop appropriate and practical remedies for future iterations of best practice.

Recommendation:

9. Change inanga spawning clause 7c to read:
Any cleared area shall be revegetated within one month where practicable. Where it is not practicable to revegetate the area within one month, the reason why shall be documented in accordance with the Code of Practice reporting and monitoring standards.

3. Dwarf galaxias juvenile recruitment

10. In his Supplementary Evidence (para 24), Mr Brown provides an observation made by him on the basis of field work carried out in December 2009 to support his view that the ECOP exclusion period (page 103) to protect the critical habitat requirement for dwarf galaxias recruitment ends too soon, ie. 31 December. He proposes to extend the exclusion period to 31 January.

11. With the addition of trout spawning provisions on many of these sites, the opportunity for any river management to take place is already highly constrained, leaving 1 January to 30 April available for in-stream works. The extra degree of constraint sought is high in contrast to the evidence he provides to justify it.

12. It is fair to suggest that small fry are more sensitive to the effects of disturbance than older fry and Mr Brown's observation is consistent with McDowell (1990, pg 131) where that author states that small fry are most abundant in November and December. However, Mr Brown's evidence does not further elucidate why he has changed the preference he expressed in his original evidence for the exclusion period to end on 31 December and has now chosen instead a 31 January ending. According to McDowell (1990, pg 132) young dwarf galaxias are free-swimming for two or three months before they behave more like adult fish. It may be argued on that basis that exclusion to the end of March is necessary.

13. I argue the contrary and contend that dwarf galaxias fry that are in the post-larval/pre-adult free-swimming stage should be able to move away from small disturbances, and therefore some disturbance of the bed can be deemed to be minor. Protection of recruitment can be achieved by limiting the frequency and scale of the activity rather than avoiding it altogether. Granted, exclusion dates to avoid activities during egg and larval development are still necessary because these are the life phases that cannot move away from disturbance.

14. The Site Specific Special Standards for dwarf galaxias sites A4 to A8 in the ECOP are devised to avoid disturbance of eggs and larval stages, and impose a year-round constraint to limit activities as much as possible to the dry channel and to keep stream crossings to a minimum. I believe this is a good compromise to allow for river management activities to proceed while protecting dwarf galaxias recruitment, and does not rely on guessing which exclusion period dates should be use to protect juvenile stages.

15. One of the three sites where the year-round constraint is not imposed is of site A3 on the Tamaki River upstream of Top Grass Road as far as the confluence with West Tamaki (the west branch of the Tamaki River). The lack of constraint is balanced with the year –round constraint on West Tamakai and high constraint on East Tamaki (east branch of the Tamaki River), where activities are only permitted in March and April.

16. An oversight in earlier documentation meant that site A1 does not contain a clause protecting dwarf galaxias spawning and larval development and I propose that this should be remedied by imposing the 1 September to 31 December exclusion period for this site. The year-round confinement to the dry channel for this site does not work in this case because the works involve the occasional (ie. one week annually) clearing of channel debris. Taking into account the imposition of trout spawning and koaro

exclusions, the only opportunity to undertake this work is from 1 January to 31 March. The loss of the opportunity to undertake this work during January that would result from imposing the 31 January exclusion proposed by Mr Brown cannot be accommodated. The work occurs in about one third of the mapped Sites of Significance – Aquatic (SOS-A) and does not occur in the streams where dwarf galaxias observations have actually been made. This would suggest the effect of the work on dwarf galaxias recruitment is likely to be minor.

17. The other site where there is no year-round constraint on bed crossings is the Kumeti Stream. This site requires a degree of flexibility in the timing and scale of in-stream activities that makes any further impositions unworkable. Much of the good quality dwarf galaxias habitat on this stream is in DOC estate and is not subject to works. This would suggest the effect of the work on dwarf galaxias recruitment is likely to be minor.

18. On balance, I still believe the existing compromise in the ECOP is the best way to provide for opportunities to manage these rivers while minimising the effect on dwarf galaxias. An extension to the exclusion date to 31 January is untenable.

19. In discussing the constraints that Mr Brown's proposed 31 January date has on the ability to carry out necessary works, my colleagues concede that there is unlikely to be any works contracts awarded for the period 31 December and 7 January. I suggest extending the exclusion period to 7 January to capitalise on this opportunity to further avoid in-stream works. This is potentially a small gain for the fish in sites A1-A3.

Recommendation:

20. Extend the exclusion date for the Special Standards for Good Practice in sites A2 to A8 from 31 December to 7 January. (ECOP p103)

21. Add an exclusion period to site A1 from 1 September to 7 January. (ECOP p103)

4. Site A41

22. In my Supplementary Evidence (para 35), I recommended leaving out a clause requested by Mr Brown to include a need for staff with appropriate training to be on-site to assist with the recovery of aquatic life.

23. I have reconsidered the clause with the alteration Mr Brown puts forward in his Supplementary Evidence with reference to Brown Mud Fish at Himatangi (pg 10 site

A41). I believe the intent of this clause should be adopted. However, I recommend the clause be worded to include external observers if the need arises.

Recommendation:

24. Add the clause to Site A41:
A suitably trained person is to be present during the operation to retrieve brown mudfish, record numbers, and then replace them to the stream.

5. SOS-C (Site Specific Eel Provisions)

25. For Tanenuiarangi o Manawatu Incorporated (TMI) (238/16) Mr Paul Horton requested the addition of a Site of Significance – Cultural (SOS-C) to the Lake Kopurata outlet stream from wetland to sea, for the provision of protection of juvenile tuna (longfin and shortfin eel) migration.

26. This is a very pragmatic compromise in response to Mr Horton's request for the ECOP to cater for longfin and shortfin eel (tuna) migration.

27. TMI has also identified SOS-C for the Manawatu River from mouth to gorge, Foxton Loop, the Oroua River from confluence with Manawatu River to 150 metres upstream of SH56 bridge, and on the Pohangina River from confluence with Manawatu River to approx. T24 450-973. These SOS-C encompass a wide range of cultural and historic values attached to these awa and it is beyond the ability of the ECOP to capture and address these as site specific standards at this stage.

28. Ngati Kahungunu (180/81) has identified SOS-C on the Akitio River from mouth to source. This SOS-C also encompasses a wide range of cultural and historic values attached to this awa and it is beyond the ability of the ECOP to capture and address these as site specific standards at this stage.

29. The degree to which eel provisions, and what eel provisions, might apply to these sites was discussed with Horizons Area Engineers and it was concluded that a blanket provision to exclude in-stream activities during the migratory periods (from the start of April to the end of June for adult downstream migration and from the start of August to the end of November for upstream juvenile eel migration) over the whole SOS-C is unworkable.

30. The sediment discharge limitations in the revised ECOP (section 2.4.2) are an ecologically sensible way of controlling the effect of in-stream activities on eel migration.

These are in line with the Permitted Activity (PA) standards in the Proposed One Plan, with the added consideration of providing recurrence of work at a site if there have been flow events that reset the bed of the river. While a flow related recurrence is in contrast to my recommendation on the PA standards in general above, I believe Horizons Area Engineers are capable of determining when the trigger flow events have passed and so a standard based on resetting flows is workable

Recommendation:

31. Insert new maps with SOS-C to replace the Himatangi Scheme, Lower Manawatu Scheme, Pohangina Scheme, and Akitio Scheme maps.

32. Insert SOS-C C1 in the Special Standards for Good Practice Table below site A41 (ECOP pg 101) to read:

Site Number	Scheme	Species	Special Standards for Good Practice
C1	Himatangi Scheme	Longfin and shortfin eel (tuna)	Drain clearance (either mechanical or herbicidal) between 15 August and 30 November shall be undertaken only to enhance eel migration.

33. Insert SOS-C C2-C5 in the Special Standards for Good Practice Table below site A35 (ECOP pg 102) to read:

Site Number	Scheme	Species	Special Standards for Good Practice
C2, C3, C4, C5	Lower Manawatu, Moutoa, Foxton East, Whirikino, and Pohangina Schemes	Longfin and shortfin eel (tuna)	Works will be undertaken in accordance with the generic standards set out in the Code of Practice

34. Insert SOS-C C5 in the Special Standards for Good Practice Table below site A137, A138 (ECOP pg 107) to read:

Site Number	Scheme	Species	Special Standards for Good Practice
C6	Akitio Scheme	Longfin and shortfin eel (tuna)	Works will be undertaken in accordance with the generic standards set out in the Code of Practice

6. Site A45

35. Mr Brown seeks to extend to 30 November the exclusion date for site A45 (page 11 in his Supplementary Evidence), to accommodate redfin bully spawning. I described in my Supplementary Evidence (para 40-44) the degree to which Horizons shifted away from accommodating redfin bully spawning towards accommodating the critical habitat requirements of koaro and banded kokopu, based on concerns expressed by Mr Brown.

36. At this site, there is always going to be the need for a compromise between providing for the spawning and migration of three fish species and the timing of in-stream works.

37. Approximately one fifth of the SOS-A is in the works area. I continue to contend that the problem of most concern is the control of sediment in the works area, so that juvenile fish can migrate past and get up into the more suitable habitat upstream. As a practical compromise between the needs of fish and the need to undertake works, this is best achieved by imposing a sediment standard rather than a blanket exclusion of in-stream activities.

Recommendation:

38. No change.

7. Site A129

39. Mr Brown seeks to extend the exclusion date for Site A129 (p 17 in his Supplementary Evidence) to include 1 July to 30 November, to accommodate redfin bully spawning. While not expressly stated in his evidence, support for this position can be found in McDowell (1990, pg 300) where that author observes that spawning "… occurs from about July onwards, probably until at least November". The dates are also supported by McArthur *et al*. (pg 77).

40. The negotiated position within Horizons is to apply an exclusion period between 1 September and 1 November to the ECOP. The 1 September date was based on an interpretation of the newer reference provided by McDowell (2000, pg 180), where that author states that redfin bully "spawns in spring …" (with spring officially beginning on 1 September in New Zealand).

41. It is not known whether McDowell's (1990) July and August observations are for years where temperature and rainfall patterns are conducive to early spawning or if the later reference to "spring" was simply to keep the authors' publication generic. Normally,

these months have frequent high rainfall events that cause bed movement which would not be conducive to successful spawning. This leads me to presume that July and August observations for spawning would be exceptional.

42. The 1 November date proposed by Horizons was based on interpretation of "… probably until at least November" from McDowell (1990, pg 300). This has a wide margin for interpretation, to which Horizons and DOC have taken opposing dates to suit each organisation's agendas. In interpreting McDowell (1990), it is clear that there is a period over November where larval redfin bully are migrating to sea and juvenile redfin bully are migrating back up the river. There is not a defined date where there should be a change from a concern to protect spawning and larval development to a concern to protect migration, ie. 1 November and 30 November are equally valid dates.

43. There is risk that in-stream activities at site A129 could affect the success of redfin bully spawning and larval development in July and August in exceptionally mild winters and in November in exceptionally poor years. From an ecologist's perspective, it is desirable to adopt Mr Brown's interpretation.

44. However, the change would impose a significant impediment to undertaking works, and since the parameters initially negotiated fit the published literature, a change to the ECOP is not supported.

Recommendation:

45. No change

8. Site A148

46. Mr Brown seeks to extend the exclusion date for Site A148 (p 18 in his Supplementary Evidence) to 30 November, to accommodate redfin bully spawning, with the justification that I have identified above.

47. Horizons' position is not negotiable, for the reasons I have stated above.

Recommendation:

48. No change

9. Site A62

49. Mr Brown seeks to apply to Site A62 (p 20 in his Supplementary Evidence) redfin bully exclusions that better fit spawning and larval recruitment rather than the juvenile upstream migration requirement.

50. The site is on the Rangitikei River mainstem. The area has been identified as SOS-A due to the presence of 14 redfin bully caught in 2000. The number of redfin bully caught suggests that the site supports adult redfin bully, as opposed to this being a record of fish passing through. The area is not ideal spawning habitat and so the original standards focused only on redfin bully migration. However, a change in focus to spawning and migration is valid.

51. The main river works activity in this site is vegetation management and there is little need for any in-stream works to be undertaken. However, there may be a need for restorative work to be undertaken that might involve the need for machinery to be in the riverbed for a brief period of time. The speed at which such work needs to be undertaken would be hampered by the consent process, and constrictions on in-stream access need to accommodate a timely response. Invoking the practicability clause at this site is not likely to decrease the long-term success of redfin bully spawning and migration, and would enable Horizons to undertake emergency work at this site if necessary.

52. The activity in this place that has the most profound effect on spawning success is gravel extraction, which is not taken by Horizons or on behalf of Horizons, so is not under the auspices of the ECOP.

Recommendation:

53. Adopt the restriction dates proposed by Mr Brown (1 August to 30 November and 1 December to 31 December) but maintain the ability to undertake work without the need for consent by using the practicability clause.

10. Site A22

54. I did not correctly report the provisions for this site as they stood in the November 2009 version of the ECOP, which are that consent will be required to undertake in-stream works in the Manga Atua site of significance between 1 March and 30 June. Mr Brown identified this error and has also proposed that the exclusion be 1April to 30 June, which better fits the shortjaw kokopu spawning requirement.

Recommendation:

55. Adopt Mr Brown's recommendation for this site.

PART TWO - CHANGES TO THE POP

10. Permitted Activity sediment thresholds

56. Horizons, DOC and Fish and Game caucused on a Permitted Activity standard for short-term high-intensity sediment release. We agreed that a short-term high-intensity event could be catered for and that the event should not last longer than 12 hours in total, should not go longer than 5 days, and should not recur more frequently than 12 months.

57. We also made reference to schedule BA, where the sediment discharge should not breach the Proposed One Plan standards. However, we missed an important point – that is, this clause is to apply to any ongoing discharge of sediment as a result of the activity once the activity is completed. Post-completion (after 24 hours), any sediment that continues to arise from the site as a result of the activity must conform to the Schedule BA standards.

58. We resolved this oversight with further discussion and rewording.

59. We discussed whether the constraint on doing works in the same place could be based on flow rather than 12-month constraint. We felt it was difficult to impose such a standard because the person undertaking the activity could not be reasonably be expected to know at what stage a river is flowing at the time works are undertaken.

Recommendation:

60. Adopt the reworded Permitted Activity thresholds for sediment proposed by the Horizons, DOC, and Fish and Game revised caucus report dated 22 March 2010.

11. Permitted Activity channel straightening thresholds

61. Horizons, DOC, and Fish and Game caucused on a permitted activity standard for small scale permanent straightening of the bed. We agreed that with the exception of installation of structures such as fords and culverts which tend to be self-governing one-off events, all other means of permitting small scale channel straightening could result in cumulative straightening of significant lengths of channel. The conclusion reached was that no permanent channel straightening, except that associated with structures, could be permitted.

Recommendation:

62. Adopt the reworded permitted activity threshold for channel straightening proposed by the Horizons, DOC, and Fish and Game revised caucus report dated 22 March 2010.

12. Conditions on Culverts (Rule 16-11)

63. The joint Forestry submission makes a number of observations and recommendations concerning the use of multiple or battery culvert installations and the use of culverts larger than 1.2 metres in diameter. In addition to review from an ecological perspective, the relief sought requires review from an engineering perspective which I cannot provide.

64. As I pointed out in my evidence (para 191) there may be situations where a multiple culvert barrel structure is appropriate. For instance a crossing over wide shallow stream that keeps stock and logging trucks off the bed and out of the water may result in overall better environmental outcomes than continuing the activity across the bed and through the water.

65. However, in considering the proposed relief sought by the Forestry companies, I disagree with the removal of clause 16-11 (c) iii. This is the clause that assures that one of the main considerations of culvert diameter choice is to ensure that the culvert is sufficiently large enough to provide for the full width of the bed of the stream or river.

66. The Fish Passage guidelines for the Auckland Region (Boubée, *et al.,* 2000. pg 25-26) provides a set of design principles that should be applied to assure a fish-friendly culvert installation. In this document the authors state that "the culvert width should be equal to or greater than the average streambed width at the elevation the culvert intersects the streambed".

67. Clause 16-11(c) iii follows this principle although different wording has been chosen that unfortunately that makes the clause vague. For ease of interpretation, the “wetted part of the channel” is synonymous with the definition of “bed” at the annual fullest flow. An average implies that at least two measurements are made, and for consistency, these measurements could be defined as being taken of the width of the bed at the place where the proposed culvert inlet and outlet would be - ie. the proposed location of the inverts.

68. Multi-barrel installations appear to require case-by-case consideration. In evaluating Boubée, *et al.,* 1999 (pg 27-29), it can be concluded that ecologically sensible designs

are not a guaranteed outcome of devising the barrel configuration to accommodate the flow based on single culvert discharge designs. Given that constructing an appropriately designed multi-barrel installation appears to be case specific, it is reasonable that all multi-barrel proposals be vetted for environmental effects on a case-by-case basis.

69. For fish passage, as long as the principles of Rule 16-11 Clause (c) iii are adhered to, there is no maximum limit to culvert width. However, there are other ecological considerations that limit the maximum permissible size after which a proposal should be vetted for environmental effects. Obviously, the larger the culvert, the greater the area of the bed that is disturbed, with an associated increase in the risk of the effects of sediment re-suspension, as well as increased disturbance of habitats for in-stream fauna and flora. For very large installations the effects associated with bank side earthworks also need to be taken into account.

70. There is no empirical scale that I am aware of that has been devised to determine an ecologically appropriate culvert width beyond which the act of installing the culvert is likely to have significant environmental effects. As I stated in my evidence (para 195), a maximum culvert diameter of 1.25 m is sensible if a threshold on bed occupancy is 20 square metres. Except for the slight increase in the area of bed disturbance and bed occupied, the 1.5 m relief sought does not seem extraordinary. However, even a small increase in the barrel diameter results in a considerable increase in the flow volume, so the relief sought requires review from an engineering perspective.

Recommendation:

71. No Change.

13. References

Boubée, J., Jowett, I., Nichols, S., and Williams, E., 1999. *Fish Passage at Culverts*. A review, with possible solutions for New Zealand indigenous species. NIWA and Department of Conservation.

Boubée, J., Williams, E. and Richardson, J., 2000. *Fish Passage Guidelines for the Auckland Region*. Technical Publication no. 131 Auckland Regional Council

McDowall, R.M. (1990). N*ew Zealand Freshwater Fishes – A Natural History and Guide*. Heinemann Reed and MAF Publishing Group. Auckland, New Zealand.

McDowall, R.M. (2000). *The Reed Field Guide to New Zealand Freshwater Fishes*. Reed Publishing (NZ) Ltd. Auckland, New Zealand.

McArthur, K., Clark, M., and McGehan, J., 2007. *Sites of Significance for Aquatic Biodiversity in the Manawatu-Wanganui Region*: Technical Report to Support Policy Development. Horizons Regional Council Report 2007/EXT/794.