

Summary of comments from ECan Staff (Jean Jack, Frances Schmechel, Phil Grove, Phil Burge, Shaun McCracken Melissa Shearer), Nick Ledgard - BRaid, Niall Mugaan – Keystone Ecology, Jim Jolly – Independent Surveyor, Bob Willis - Fulton Hogan, Colin O'Donnell – Department of Conservation.

Theme of feedback	Specific comments made by reviewers (black) and response from WMIL (blue)
<p>Preferred option</p>	<ul style="list-style-type: none"> • Overall, of the three options presented in the report, the preferred option of those who gave feedback is Option 3. <ul style="list-style-type: none"> ○ We would strongly advise against dismissing options 1 and 2 without first carrying out a much more in-depth evaluation of their feasibility. Option three is no more effective at managing the impacts of this activity on shorebirds than the status quo, and delivers minimal cost savings to the gravel extraction industry. Not only would this be the worst possible outcome from this review, but probably means that the outcome of this review doesn't justify its cost.
<p>Interpretations have been made based on limited data on rivers where gravel extraction is regularly occurring.</p>	<ul style="list-style-type: none"> • Do we need to modify Figure 2.12 to include the rivers not assessed (or just say all other rivers) if they meet other criteria...? The report identified "several significant gaps in our knowledge of the distribution of shorebirds in the Canterbury region, all on rivers where there has been gravel extraction taking place. These rivers include the Selwyn, Eyre, Okuku, Waipara, Opihi and Hakataramea Rivers. (Jean J) <ul style="list-style-type: none"> ○ Good point. We've added some additional text to the report to clarify this. Basically, any river not assessed should be treated as "knowledge gaps" and will require a pre-works survey to be carried out as a precaution. I.e, "knowledge gaps" are treated as "high importance" river reaches, unless its demonstrated otherwise from survey data • Concern that a lot of the inferences that have been made are based on DOC survey data, and limited survey data for rivers where gravel extraction is routinely carried out. Table 2.3 - There has never been gravel extraction on the Ada, Godley, McCauley or Pukaki rivers. The Top 20 rivers for gravel extraction in Canterbury (in order of most consented extractions): Opihi, Orari, Pareora, Waimakariri, Ashburton, HaeHae Te Moana, Ashley, Waihao, Tengawai, Rakaia, Temuka, Waiau, Kowai, Makikihi, Rangitata, Eyre, Selwyn, Waipara, Waimate Creek and Conway. So what do we do for those rivers where the most gravel extraction is occurring, but they haven't been included in the table (blue text = they are in the table) (Ecan) <ul style="list-style-type: none"> ○ As mentioned in comments to other reviewers, there is no problem here. If river reaches haven't been categorised as "high" or "low" importance in the table, then we're recommending that they be treated as knowledge gaps, and that a pre-works survey be carried out as a precaution, under options 2 and 3. In other words, knowledge gaps sites are treated as "high importance" sites, unless DoC survey data exists to demonstrate otherwise. No inferences are made about sites for which no survey data exists, which is what this comment seems to be implying. We've added further wording to the report to make this clearer. <p>It's also worth reiterating here that should ECan adopt our recommendation to develop a region-wide strategy for shorebird surveys, prioritising knowledge gaps, ensuring surveys are repeated on a regular cycle (ideally a three-year on, three-year off cycle), and carrying out</p>

	<p>surveys to 1km resolution, rather than 10-25 km; this will greatly improve our ability to categorise river reaches into “high” and “low” importance, and will minimise future data gaps.</p> <ul style="list-style-type: none"> • The reviewers have attempted to identify and prioritise high importance areas of rivers primarily by collating the records of riverbed bird surveys held by DOC. However the data used omits the results of many bird surveys and the model used for assessing high and low value areas is inappropriate (Jim J). <ul style="list-style-type: none"> ○ This approach is robust to data gaps. In the report, we take a precautionary approach and recommend that any sites not categorized as either “high” or “low” importance for shorebirds on the basis of available shorebird survey data should be considered as knowledge gaps, and effectively be treated as “high importance” sites, requiring a pre-works survey to be carried out. This precautionary approach wasn’t entirely clear in the text of the report however, so we’ve added some sentences to make this clearer. • Survey data cited by Mr Jolly for upper Waimakariri, lower Rangitata, Orari River and Opihi paints a different picture of bird presence/abundance than what was portrayed in the review report. <ul style="list-style-type: none"> ○ If this is all correct, then we’ve mis-categorised these rivers as a result of these data not being accessible or readily discoverable at the time this review was carried out. Rather than indicating that our approach is “inappropriate”, it simply reflects how important it is for these survey data to be stored in one centralized location where they can be easily discovered and accessed – which is one of the recommendations in our report. <p>We’d be happy to re-assess these sites (and any others) in light of any new survey data provided to us, and given the potential discrepancies described above, we’d recommend that this reassessment be done before this table of “high” and “low” importance bird sites begins to be used to inform decision-making regarding whether pre-works surveys should be carried out. Further, the process carried out by WMIL is robust to such data omissions. Because the Opihi River isn’t categorized as either “high” or “low” importance at present, a pre-works survey would be required as a precaution (as a “knowledge gap”. Once again though, we are happy to reassess this site once we gain access to the dataset described.</p> • Both methods of assessing priorities are inappropriate. The numerical approach of requiring that a section of river should be ranked in the top 20% of sections of rivers Canterbury wide for abundance of a species to qualify as high priority is clearly too restrictive as demonstrated above (Jim J). <ul style="list-style-type: none"> ○ We disagree, and dispute that this point has been “demonstrated above”. No changes made to the report.
<p>Assessment of pre-works survey results and issues with survey timing missing colonial nesting</p>	<ul style="list-style-type: none"> • Many extractors request bird surveys to be undertaken in August / September in order to meet their consent conditions. It should be made clear to them that BFTs and BBGs are unlikely to finally select sites and start nesting until October. And as the report suggests, the loss of a few BD or PS breeding opportunities may be acceptable, but not so with large colonies of gulls and terns (Nick L) • The review claims that the survey results indicate that gravel extraction has had only minor or negligible adverse impact on the breeding of riverbed birds and that the resources spent in the surveys and in measures to minimise impacts are likely to have delivered a negligible benefit to the birds. Whether or not this is the case is unknown as both the method of analysis and the measure of benefit are flawed. Most surveys are done in early

	<p>September to meet Environment Canterbury’s requirement. This would include the early nesting waders but completely omits monitoring of the colonial nesting gulls and terns which start nesting in late October or November. There is therefore no measure of impact on these important birds including threatened species. (Jim J)</p> <ul style="list-style-type: none"> ○ This is simply not true. Of the 322 pre-works surveys submitted to ECan since 2004, 15% were carried out in August, and 25% in September. A further 20% were carried out in October, 15% in November, 8% in December and 15% in January. This analysis clearly shows that survey effort is distributed comparatively evenly throughout the shorebird breeding season, and the 58% of surveys carried out between October and January would have presumably detected the presence of colonial nesting terns at gravel extraction sites, had they been present. For this reason we totally disagree with Jim’s conclusion that “there is no measure of impact” on these birds. <p>We have added this analysis of the temporal distribution of shorebird survey effort to the report, to try to clear this misconception up. Further to this, we’re comfortable that the risk posed to colony-nesting birds under the existing consent conditions, and under the three options presented here is being adequately managed.</p> <p>Firstly, it should be noted that among the 322 pre-works surveys completed since 2004, only two nesting colonies were located that required mitigation measures to be put in place. This indicates that the risk of colonies being adversely affected by gravel extraction activities has been exceedingly low over the past 14 years. Further to this, the gravel extractors themselves have described to us instances where they have located nests and colonies without the aid of a “suitably-experienced surveyor” and have implemented their own measures to avoid adverse impacts. This suggests that in the case of large, conspicuous colonies, in the event that they’re not picked up during pre-works surveys, there’s a high likelihood that the gravel extractors themselves will detect these colonies and implement appropriate mitigation measures.</p> <p>Regarding the timing of pre-works surveys, these are required to be carried out within 8 days of the commencement of gravel extraction. Surveys are done in Aug/Sept in cases where gravel extraction is due to start early in the shorebird breeding season, but they’re frequently done later when gravel extraction starts later, due to the 8-day constraint, thus creating the opportunity to detect the nests or colonies of shorebirds that begin breeding later in the season. We consider it unlikely (and this is supported by the data we’ve extracted from the pre-works surveys, and by the observations of the gravel extractors themselves) that colonies will form at gravel extraction sites once extraction activities commence.</p> <p>To summarise, we agree that the loss of large gull or tern colonies as a result of gravel extraction activities is not acceptable, however we’re comfortable that both the existing pre-works surveys, and the three alternative options presented in this report adequately minimise the risk, based on the extremely low incidence of colonies recorded occurring at gravel extraction sites in Canterbury over the past 14 years.</p>
<p>Consideration for extraction starting prior to</p>	<ul style="list-style-type: none"> • Many gravel extraction operators work on the river all year or start before the bird nesting season and may, or may not, discourage birds from nesting there as a consequence. The analysis used in the Review has not taken into account either of these problems (Jim J)

<p>nesting season impacting likelihood of nesting</p>	<ul style="list-style-type: none"> ○ Nonsense, we have considered this and there is no evidence to suggest that this has a negative impact on shorebird survival rates or reproductive success. Shorebirds are almost certainly less likely to nest within active gravel extraction sites (although there is some evidence to the contrary), however given the tiny proportion of Canterbury’s braided river habitat that is subject to this activity at any given time we consider it to be highly unlikely that this is having an adverse impact on shorebirds, either at the individual or population level. The majority view among shorebird ecologists is that NZ’s shorebirds are not habitat-limited. Due to the impacts of introduced mammalian predators, Canterbury’s braided rivers are unlikely to be anywhere near carrying capacity for shorebirds. This being the case, even if it could be shown that gravel extraction activities do displace breeding birds, it’s highly unlikely that this will affect their subsequent survival and reproductive success. <p>No changes made to the report.</p>
<p>Consideration of cumulative impacts of other threats to nesting success (weeds, 4wd’s etc)</p>	<ul style="list-style-type: none"> ● It is very likely that predation is the most important factor in the demise of riverbed birds, as suggested by the Review, but the cumulative effect of other impacts including gravel extraction, shrub weed spread, depleted flows, off-road vehicles, etc and, particularly public perception of these, are important and should be tackled individually (Jim J) <ul style="list-style-type: none"> ○ We agree that there are a range of threats affecting shorebirds, and that they should all be tackled with appropriate conservation management. We don’t agree that they should be tackled individually, or in isolation however, as many of these threats interact with one another, or impact shorebirds in a hierarchical fashion. We therefore believe it’s appropriate to take into account the impacts of predators, woody weeds and recreational river users when assessing the impacts (both positive and negative) of gravel extraction activities. <p>No changes made to the report.</p> ● One aspect of shingle extraction not mentioned is the construction of major access roads, suitable for 2WDs. In our AR experience, these can be significant attractions for unwanted vehicles and social occasions (BBQs, bonfires, rave-ups etc), especially when close to urban centres. Social media networking can organise such events just hours beforehand. These can be a major disturbance factor for birds. Plus such tracks open up easy access to other parts of the riverbed. On the AR, we have an agreement with the Combined 4WD Clubs to block off access ways during the breeding season, and this undoubtedly reduces wheeled disturbance. There are currently over 50 past and present blocked access ways (all GPS’ed, photographed and mapped). However, there will always be 10% of off-road enthusiasts who ignore signs and regard blockages as challenges to circumvent, and you cannot readily stop them. But blockages work well for the ‘casuals’ out for a drive in berm areas. Good access tracks as created by extractors are open invitations for such folk to proceed further than they would normally go. And they are the sorts who will stop by the river for a picnic / swim and to exercise the dog. Stopping such access is not difficult, as the diggers used to load trucks can easily lift concrete blocks or large logs aside on entry and reposition them on departure (Nick L) <ul style="list-style-type: none"> ○ This is a good point, and something that we’d not considered or had come up in the course of this review. This could be solved by either adding a requirement that accessways be blocked off when not in use as a consent/authorisation condition, or by asking gravel extractors to do this on a voluntary basis. We’d favour the latter option for three reasons. Firstly, given the impact of this increased access on shorebirds is being caused primarily by the recreational users who are choosing to use these accessways (rather than the gravel extractors who are creating them), there appears to be little justification to require gravel extractors to block off accessways as a condition of their consent or

	<p>authorisation. Secondly, the gravel extractors we've consulted during this review have already expressed a willingness to voluntarily carry out habitat protection or enhancement works for shorebirds at gravel extraction sites, provided they receive advice on the most appropriate work to do. Based on this, we'd expect gravel extractors to be willing to do block off accessways on a voluntary basis, if asked to do so by ECan. Thirdly, gravel extractors are likely to be highly motivated to do this on a voluntary basis, as a number have mentioned problems they've experienced with vandalism and rubbish dumping as a result of the public gaining access to worksites and stockpile areas.</p> <p>Rather than include the blocking of accessways off as a recommendation in this review therefore, we recommend that ECan and gravel extractors discuss the potential for doing this on a voluntary basis, to reduce public access to any particularly high value river sites for shorebirds.</p> <p>This issue of the public placing additional pressure on shorebirds as a result of using accessways also reinforces our recommendation that ECan investigates more efficient options for delivering shorebird education and advocacy to the full range of river users, rather than focuses on delivering advocacy to a relatively small group of river users via pre-works surveys.</p> <p>No changes made to the report.</p>
<p>Retain requirements for protection of nesting birds identified – setback distances</p>	<ul style="list-style-type: none"> • 100m setback is excessive, so support an alternative setback distance proposed <ul style="list-style-type: none"> ○ Good, though we now strongly recommend that these setback distances be based on quantitative data rather than expert opinion, to clear up any debate on appropriate distances. A one-off investigation into the "flushing distances" of incubating shorebirds at each stage of incubation would provide this. We've added this as a recommendation in our report. • How does extraction site size come into this (re comments around chances of birds moving into an extraction area are low)? The overall extraction area could be very large with the extraction activities progressively moving around through time meaning birds could move into an area proposed to be extracted from while extraction was occurring at another patch of their extraction area. The whole area would have been subject to a pre-works survey. Possibility for limiting the extent that could be covered in the pre-work survey to that which will be extracted within the next X days/weeks? (Jean J & Other Ecan) <ul style="list-style-type: none"> ○ Our view is that it will be either near-impossible, or prohibitively expensive to develop a system of pre-works surveys that will completely eliminate the possibility of adversely impacting shorebird nests that are initiated after the first pre-works survey is carried out. Under this scenario (in a relatively large site only being worked at one end), the extractor would need to repeat a pre-works survey every eight days for the duration of the site being worked to completely avoid impacts, which is both expensive, and in our view doesn't strike a pragmatic balance between protecting shorebirds and enabling this activity to continue. <p>As stated in the report, we're comfortable that the risk of this situation developing is very small, for several reasons. Firstly, most gravel extraction sites are very small (based on our review of 322 pre-works surveys, and first-hand visits to dozens of gravel extraction sites in both Canterbury and Wellington regions). Secondly, many of the shorebird species in question are territorial during the breeding season, so don't tend to move around a great deal unless disturbed, or pushed off their territories (e.g. during flood events). Thirdly, gravel extractors themselves</p>

have demonstrated that they take voluntary steps to protect nests that they find that were not found during initial pre-works surveys. For these reasons, we stand by our recommendations under options two and three that pre-works surveys be carried out at “high value” sites and “knowledge gap sites” no more than 8 days prior to the commencement of works carried out between Sept and Feb, and that pre-works surveys only be repeated if gravel extraction doesn’t resume within 8 days of the resumption of normal flows following a flood event.

However, if these options are a concern to ECan, then we stand by our recommendation that the offsetting option (option one) should be carefully considered in preference to either of the pre-works survey options (options 2 and 3). This would ensure that any losses of nests that occur as a result of birds moving into a gravel extraction site will be offset by improvements in hatching success at other sites receiving pest control funded by the “shorebird impacts offset fee” paid by gravel extractors.

- The set-back distances of works from nests or chicks have already been modified by Ecan after discussions with bird surveyors. The resulting distances “at the discretion of the surveyor” is probably more appropriate than fixed distances. However, experience by gravel extractors and bird surveyors have indicated that distance from nests from trucks on access tracks to sites could be less than 10 metres without disturbance and, perhaps, 40 - 50 metres from nests or chicks at works sites rather than the Review’s blanket 75 metres for nests and 50 metres for chicks. Ashley-Rakahuri Rivercare Group’s experience is very relevant in this (Jim J).
 - We’d recommend that these setback distances be tested/trialled experimentally, so that they can be based on quantitative evidence rather than ‘expert opinion’. We agree there’s the possibility that they could be reduced, provided this work is done. We don’t agree that they be left to the discretion of the surveyor, as this approach is vulnerable to inconsistencies relating to the personal views, and level of expertise of the surveyor. This approach would also be open to abuse – the surveyor with the shortest set-back distances will eventually be the one who attracts the most business!
- Re distances from birds with chicks, but the likes of wrybill, BD, PS and SIPO chicks are, of course, very mobile from the word ‘go’, so can largely look after themselves – especially if in the company of adults (Nick L)
 - Yes, we think managing impacts on chicks is really difficult. Because they’re mobile, and because at some ages they’re quite capable of getting out of the way of machinery, we’ve recommended smaller exclusion zones for chicks. However, this could potentially expose younger chicks to heightened risk, because when younger they tend to exhibit a ‘freeze’ response when alerted to danger by their parents. Because chicks are mobile, and often difficult to detect, we’ve been unable to come up with practical mitigation measures that successfully avoid or minimise the potential risk that this activity poses to chicks, and we’re not aware of any measures being used by any regional council that adequately address this.

No changes made to the report.

Re-surveying requirements after flood events

- “Flood flow” and “resumption of normal flows” needs defining (Ecan)
 - We recognise that the term “resumption of normal flows” is both undefined in our review, and may be open to interpretation. Furthermore, shorebirds can re-colonise higher gravel beaches well before the “resumption of normal flows”. For this reason, we’ve changed the wording of this condition to: “if gravel extraction activities are disrupted by a flood event, then a re-survey of the worksite should be carried out if gravel extraction activities haven’t resumed within eight days of *peak flood flows*”. Peak flood flows will not only be easier and less ambiguous to measure from flow gauges, but this change also takes into account the possibility of birds recolonising the riverbed as soon as flood waters begin to recede. Do we really need to define what a flood is? If so, presumably ECan river engineers or flood protection staff have a standard definition that can be put to use here.
Again, if the implementation of this condition is considered contentious or difficult by ECan, then we recommend ECan gives careful consideration to implementing option one in preference to options two or three.
- Can you get a flood flow outside a gravel extraction area – which may not disrupt the extraction but may have disrupted bird nesting areas elsewhere on the river? Could flood flows occurring in alpine fed rivers displace birds onto hill fed rivers (no flood flows) where extraction occurring? What are the implications of this for needs to re-survey after floods (Jean J)
 - Based on our observations of the behaviour of shorebirds on Wairarapa rivers, we find that most shorebirds tend to return to the same river once flooding recedes, however we acknowledge that this could be highly debatable, given the weak evidence to support this (we’ve based our view on observations of similarities in shorebird distribution and abundance pre- and post-flood, rather than documenting the movements and/or site fidelity of individually-marked individuals). Again, we consider the risk this uncertainty poses to the effectiveness of options 2 and 3 to adequately avoid or minimise impacts on shorebird nests to be low. This is because the gravel extractors we’ve talked to have told us that they almost always resume operations within 8 days of the resumption of normal flows, and this requirement will further incentivise them to do so.

Again, if the implementation of this condition is considered contentious or difficult by ECan, then we recommend ECan gives careful consideration to implementing option one (offsetting) in preference to options two or three.
- Like the idea of adding the extra condition re if a flood has occurred within X days then gravel can proceed (we don’t currently have that specifically included) (Ecan)
 - We can add this. But it seems likely that this condition would deliver only the occasional ‘blind luck’ benefit to gravel extractors however, since they can’t just sit around waiting for a flood to happen before getting into the river. And because it’s unlikely to alter gravel extractors’ behaviour, and obviously won’t have any additional benefits for shorebirds (which will have just been wiped out by said flood), we can’t see how adding this condition will provide much tangible benefit to either shorebirds or gravel extractors. Rather than adding this as a condition therefore, it seems more appropriate to add this as one more exemption to the requirement to carry out pre-works surveys, along with woody weed infestations, dry riverbeds and riverbeds with <25m widths. We’ve gone ahead and added this exemption into options 2 and 3.

<p>Support for exemption from survey requirement provided certain criteria are met</p>	<ul style="list-style-type: none"> • Support the ability for an assessment to be made whether or not pre-work survey is needed, however the assessment of the site being “dry” needs to be carefully set out. Decision diagram current says “my site” whereas this should perhaps be the whole river or a large stretch of the river upstream and downstream of the extraction site. Further note of caution that birds such as BD and SIPO have been seen nesting in dry beds. Question whether or not dry riverbeds actually mean that nesting doesn’t occur <ul style="list-style-type: none"> • Both the existing consent conditions, and those proposed in this review will never provide a 100% guarantee that impacts on nesting shorebirds will be avoided under all possible scenarios. As we all know, some birds do some strange things. Rather, these conditions serve to greatly minimise the risk of adverse impacts occurring, and it’s our experience that it’s a relatively rare for shorebirds to nest on “completely dry” riverbeds. For that reason, we’re comfortable that this exemption is warranted, as it both minimises the risk of this activity having an adverse impacts on shorebirds, while reducing costs to gravel extractors by reducing instances of extractors paying for pre-works surveys in habitats highly unlikely to support nesting shorebirds. For improved clarity, we’ve defined “completely dry” as any stretch of riverbed lacking flowing or standing water, or damp seepages. <p>We’re happy to also add clarification regarding the length of river affected. Namely: “If the site falls within a river reach that has been designated as being of “high importance” for riverbed-nesting shorebirds, but the riverbed is completely dry (i.e. no standing or flowing water or damp seepages present), at least 500m upstream and downstream of the site, then no-pre-works survey is required.” We’ve added this new wording to the report.</p> • I would suggest that Environment Canterbury considers whether it can refine the trigger for survey requirements using the qualifiers in the Review that I mentioned above: Width of open riverbed, extent of woody shrub cover (including Russel lupin) and depleted flow or dry riverbed (Jim J) <ul style="list-style-type: none"> ○ Good to see that the reviewer agrees with at least one of the recommendations in this review. However, this would provide no additional benefits to shorebirds, and only minimal cost-savings to the gravel extraction industry. It’s also worth noting that it minimizes the potential loss of business to local shorebird ecologists being engaged to carry out these pre-works surveys, of which the reviewer is one. <p>We highly recommend that ECan carefully examines the offsetting option outlined in the review, as this has the potential to deliver much greater benefits to shorebirds, coupled with much greater cost-savings to the local gravel extraction industry.</p>
<p>Do not support offsetting concept where nesting has been identified</p>	<ul style="list-style-type: none"> • Finding that gravel extraction perhaps does have comparatively smaller impacts on nesting birds does not remove the Councils responsibilities to require mitigation measures to avoid or minimise those adverse impacts. <ul style="list-style-type: none"> ○ We agree that Council or consent holders are not freed from their responsibilities as long as it can’t be demonstrated that impacts exist, and we haven’t suggest that they should be. However, surely if offsetting has the potential to produce better outcomes for the environmental value in question (as in this case), the relevant legislation and/or regional plan would have sufficient flexibility to allow for this possibility? It needs to be remembered that the results of this review are suggesting that offsetting will deliver <i>better</i> outcomes for shorebirds, than current or proposed efforts to avoid impacts will. This is because the offsetting option takes into account, and minimises, the impacts of other threats, (namely predators), whereas the avoidance option does not. We should be using the RMA/WA to manage shorebirds in a way that maximises beneficial outcomes for shorebirds. We <u>should not</u> be managing shorebirds to maximise beneficial outcomes for the

RMA/WA. The legislation has been put in place as a means to achieving an end, it isn't an end in its own right. The lack of flexibility being exhibited in this feedback shows reverse logic, and is inconsistent with the primary aim of this review, namely to maximise beneficial outcomes for shorebirds, while at the same time minimising the cost and inconvenience imposed on the gravel extraction industry. Why bother wasting your money in this review, if you're only going to seriously consider maintaining the status quo?

- The offset concept may need some careful consideration, including RMA-Wildlife Act interactions. It may not be appropriate to allow for the discretion illustrated in Figure 3.3 and may be inconsistent with the limitation placed on offsets by the RPS to first avoid effects (s9.3.6). Also, if discretion does exist, it may not appropriately sit with the consent holder (Jean J)
 - Yes, we wholeheartedly agree this option needs careful consideration, we just hope that ECan does just that before dismissing it. The tenor of some of these comments suggest that this option is going to be prematurely dismissed, before such careful consideration is given.

As noted elsewhere, the authors of this review are shorebird ecologists, rather than experts in the RMA or WA. We therefore lack the qualifications or expertise to provide expert advice on the legal ramifications of these options, so we highly recommend that ECan seeks this from an appropriate source before making a decision. However, as mentioned above, we'd be surprised if the relevant legislation, policies or plans lack the flexibility to allow offsetting in this instance, given that the *intent* behind this offsetting option is consistent with the intent of the RMA and WA. As an example, the authors are aware of large consents (e.g. NZTA's Mackays to Pekapeka, and Pekapeka to Otaki roading projects), where environmental impacts have been offset rather than avoided, once it was clear that avoiding impacts was not possible. Furthermore, there is some precedent to suggest that RMA-WA interactions can be managed by issuing Wildlife Act permits or authorities (see <https://researchcommons.waikato.ac.nz/bitstream/handle/10289/6258/Wallace%202009%20Wild%20things.pdf?sequence=1&isAllowed=y>)

Having reviewed s9.3.6 of Canterbury's RPS, we see no inconsistencies with the offsetting option we're proposing, given the precedents set by other councils under similar policies. For example, in cases where gravel extraction activities cannot proceed given the presence of a shorebird nest within an extraction site, and size of any exclusion zones that are required as a result, then we believe this meets the limitation that "adverse effects cannot be avoided, remedied or mitigated", this justifying the use of an offset.

- Not comfortable with option 1 or 2 approach which specifies that if a nest or chick of solitary nesting species is found then the gravel extractor can have the option to offset the potential adverse impacts by paying the off-set fee. This is kind of like saying its ok to affect the birds provided that you pay a fee
 - No it's not. Instead, it's saying that it's okay to affect those birds, as long as that effect is appropriately offset. The fee is simply the means of doing that. Offsetting impacts is allowed for under the RMA in some circumstances, as Canterbury's RPS states. In this particular case, offsetting will likely lead to better outcomes for Canterbury shorebird populations than are currently achieved than under current gravel consent or authorisation conditions, and better outcomes than either options 2 or 3 suggested in this review. For this reason, we don't understand this reviewer's discomfort. The reason why offsetting is a better outcome is that it takes into account the primary threat to Canterbury's shorebirds, and the biggest cause of nest failure, is depredation by mammalian predators. Under this offsetting system, any loss of shorebird productivity will be offset by improving productivity elsewhere through the implementation of predator control. In

contrast, the current conditions require gravel extractors to spend substantial resources on avoiding having an impact on nests at sites without mammalian predator control, and it's highly likely that a large proportion of those nests don't subsequently hatch, due to depredation. In other words, the gravel extractors are spending resources avoiding effects that either have no net effect on shorebird productivity (due to subsequent predation), or to have their efforts completely overridden by the impacts of predators, depending on how you look at it. The offsetting option overcomes this problem, by offsetting potential impacts caused by gravel extraction by reducing shorebird nest depredation rates.

Perhaps the source of the reviewer's discomfort depends upon whether we're trying to avoid impacts on individual birds, or on populations or species. Biodiversity conservation typically involves making decisions that maximise outcomes for populations and species, rather than individuals. Indeed, there are numerous cases where decisions are made that have a negative impacts in individuals, for the sake of managing populations or species (the aerial application of 1080 is a classic and high-profile example). In this case, surely the aim is to minimise the impacts of this activity on populations, to ensure a healthy shorebird community is maintained on Canterbury's rivers. If this involves sacrificing a few individual nests for the greater good, so be it, provided the net outcome at the population level is positive.

- Would be very concerned if Option 1 was selected. It is a massive jump from status quo to Option 1.
 - Yes and no. It's a massive jump in that it will deliver better outcomes for shorebirds and reduce costs for the gravel extraction industry. It's not such a massive jump given that this option aligns with the intent of the RMA, RPS and WA, and that there are many precedents for the use of biodiversity offsets.
- In Option 2, pg 84/85 it currently reads that if someone finds a nest, but opts to pay the offsetting fee, they can disregard the nest that has been found. That nest is still protected by other Acts so wouldn't be wise to decouple these requirements.
 - As already mentioned, the apparent conflict between using this option under the RMA, and the requirements of the WA could potentially be managed through the issuing of Wildlife Act permits or authorities. The requirements of the two acts would not be 'decoupled' as stated by this reviewer, they'd simply be managed using mechanisms provided for under the Act.
- A third objection to offsetting, is that having paid an offset fee it would very easy for the gravel extraction operators to dismiss the birds as someone else's problem (Jim J)
 - This is a cynical view and is not supported by evidence. Our impression from spending around 10 hours talking with gravel extractors during the course of this review is that the majority, if not all, of the people we've spoken to have a genuine interest in the shorebirds of Canterbury's rivers, and a desire to avoid adversely impacting them. Furthermore, there is ample evidence that gravel extractors themselves are taking a range of voluntary initiatives to protect shorebird nests at their worksites. Conversely, we've seen no evidence to suggest that gravel extractors are dismissive or indifferent to shorebirds. Furthermore, this view is supported by the many hours of interaction the authors have had with Flood Protection staff and contractors from Greater Wellington Regional Council, the majority of whom take an active interest in the shorebirds they encounter when working on the braided rivers of the Wairarapa.

	No changes made to the report.
Offsetting concept in general	<ul style="list-style-type: none"> • Don't believe that the industry would be happy paying an offsetting fee if it has been determined that there aren't likely to be effects on nesting from their operation – why should they? (ECan) <ul style="list-style-type: none"> ○ Whoever has made this comment has presumably not had much interaction with the gravel extraction industry. We asked the five gravel extractors we consulted with for their feedback on each of the three options presented in this report. All were in favour of ECan looking into developing a system allowing for the payment of an offset fee in lieu of pre-works surveys, and several were very strongly in favour. Several firms stated that they would be happy to fund a mammalian predator control project for the simple fact that it would create the opportunity for the industry to 'give something back' to braided river conservation, and to be seen to be responsible river users. All of the gravel extractors consulted pointed out that it wasn't the cost of the pre-works surveys themselves that bothered them, rather it was the fact that it was obvious to them that pre-works surveys were delivering negligible outcomes for shorebirds. This view is consistent with the findings of our analysis of the 322 pre-works surveys that we reviewed. <p>It's worth reiterating here that irrespective of whether our analysis of pre-works surveys carried out since 2004 show that the industry has had an adverse effect on nesting shorebirds or not, we're <u>not</u> recommending that the activity be permitted to take place in the future without any conditions aimed at offsetting or avoiding impacts being imposed. The reason for this is that the presence or absence of effects is likely to be related to the total area of riverbed habitat affected by gravel extraction activities, so any system for avoiding or offsetting effects needs to scale up or down to match the scale of the activity in question. Both the offsetting option (provided the fee is paid per cubic metre of gravel extracted), and the use of pre-works surveys both achieve this.</p> • I note that there is a lot of onus being placed on ECan to determine the significance of the potential adverse effects. This is contrary to the way the resource consent process is intended to work, i.e. the onus is on the applicant to demonstrate that they won't have (significant) effects. The RMA also notes that "effects" include <u>potential</u> effects. (Phil B) <ul style="list-style-type: none"> ○ Happy to place the onus back on the industry in order to be more consistent with the RMA. We've altered the wording in the report accordingly. • In any RMA process applicants must get through two decision gateways; notification and then the substantive grant/refuse decisions. While we can take into account the "offsetting" when it comes to grant or refusal of consent, we can't consider it for the notification decision which only looks at the significance of <u>adverse</u> effects (and whether they can be avoided or mitigated). Given that, any applicant that just proposed the "offset" payment, without any evidence to show nesting birds aren't likely to be affected, or methods to avoid or mitigate the (potential) effects on nesting birds, is likely to be notified on the basis of (potential) adverse effects on nesting birds. (Phil B) <ul style="list-style-type: none"> ○ Sorry we don't really understand what you're getting at here. Happy to address this comment if it can be explained more clearly. • Question how Hakatere has been determined as an appropriate site for the focus of offsetting spend.

- No robust process was followed – it was only put forward as an example of a site that might be appropriate, given that it was well known to the authors (the lead author for this review was also a co-author on the Ashburton River shorebird management plan). We’ve altered the wording of this text to better reflect that this site was put forward as an example only, and we’d welcome a more robust, and less biased assessment to identify the most appropriate site to receive offset predator control.
- The recommended options from the report are problematic (from gravel industry perspective), particularly given the conclusions around the likely nature of adverse effects being negligible. There would appear to be little justification for charging a fee. This would seem to be a case of “having your cake and eating it too” – you’re having little or no effect, but we want you to contribute towards a pest control programme anyway. Also, it is not clear that such a fee would be permitted under the RMA (Bob W)
 - Again, we’ve spent substantial amount of time consulting with industry representatives, and the majority were in favour of offsetting – see comments above. The fact that our analysis suggests that adverse impacts on shorebirds between 2004 and 2018 were likely to have been negligible does not guarantee it will always be so, as this will depend on the scale of gravel extraction activities. So we don’t see this as a case of “having your cake and eating it too”.
- Concern re report saying that there are negligible effects on birds, but then saying that the offsetting fee could be paid to offset the potential adverse impacts of gravel extraction activities on riverbed-breeding birds. The industry could choose to adopt this as an additional extra they could do however.
 - See previous comments.
- Not sure what the legal status of the offsetting recommendation would be given Wildlife Act obligations
 - See previous comments.
- Offsetting - this is the option favoured by the reviewers. Bio-diversity offsets are fraught with difficulties (see for instance Brower et al NZ Journal of Ecology 2018 (1)) including monitoring outcomes and administration costs and efficacy on such a large scale. (Jim J)
 - We agree that this could be a challenge to implement. However, a detailed outline of how such an offset scheme could work falls beyond the scope of this report and the expertise of its authors. Rather, we recommend that ECan investigates this option thoroughly, as we believe it has the potential to deliver better outcomes for shorebirds, and for the gravel extraction industry than the current system of using pre-works surveys to avoid or minimize impacts.

No changes made to the report.
- It seems very unlikely that a gravel extraction offset fee for the much larger area of Canterbury riverbeds could be anywhere near sufficient to be a significant contribution to achieving effective predator control. (Jim J)
 - We are not suggesting that the gravel extraction industry be required to fund region-wide pest control, as this would place an unfair financial burden on the industry. Rather, we suggest the industry should fund sufficient pest control to offset their estimated annual negative impacts on shorebird nests. Based on our analysis of 322 pre-works surveys, over the past 14 years gravel extraction activities *may* have caused the

loss of an average of four shorebird nests per year, had pre-works surveys and mitigation not been carried out. At a minimum therefore, the area of pest control required as an offset over the past 14 years should be sufficient to ensure the hatching of an annual average of four more shorebird nests than would be expected in the absence of pest control. It is highly likely that the estimated \$13800 being spent per year over the past 14 years would have been more than sufficient to achieve this outcome.

No changes made to the report.

- As I understand it, the below decision tree (Figure 3.3) is not consistent with the Wildlife Act. Once a native bird nest is located at a site neither the Council or the consent holder has the discretion to disturb the nest. Not sure if you have consulted with DOC on this point. We have this same issue for lizards (something else to look in to(!). Our discretion then lies more in the requirement for the initial survey.

This is the single most important comment made by any of the reviewers. We share this concern that under certain circumstances, option 2 may be inconsistent with the Wildlife Act if the consent/authorisation holder knows of the location of a shorebird nest, then subsequently chooses to disturb or destroy it in exchange for paying an offset fee. The experience we've had with the RMA/consents process is that yes, exemptions can be made if it's not possible to avoid impacts, and a quick literature search suggests this could be dealt with by DoC issuing a Wildlife Act permit or authority to accompany the consent or authorisation. However, as repeatedly stated, the authors are shorebird ecologists and not experts on the RMA or WA. We therefore recommend that ECan takes a detailed look at option one before discarding it as an option, including seeking detailed advice on any legal issues and options to overcome them, from appropriate subject matter experts.

However, the authors of this report are shorebird ecologists, rather than experts in environmental law, so the approach we've taken in this review has been to develop options that we consider will maximise positive outcomes for riverbed-nesting shorebirds in Canterbury, while at the same time minimise the costs associated with achieving these outcomes that are incurred by gravel extractors. This approach is consistent with the wording of the original RFP, and the terms of the contract signed between WMIL and ECan.

While we're satisfied that the options presented (particularly options one and two) will lead to improved outcomes for Canterbury shorebirds at equal, or less, expense to Canterbury gravel extractors, we lack the expertise to provide advice on whether or not these options are consistent with both The RMA and Wildlife Act. As a next step therefore, we recommend ECan seeks advice from relevant experts regarding the legality of the options presented here. Such advice should include assessing the feasibility of implementing solutions such as carrying out regional plan changes (if needed to create the option to offset impacts in preference to avoiding impacts) or the issuing of Wildlife Act permits or authorities to either ECan or consent holders to enable impacts on individual nests to be offset rather than avoided, while avoiding the risk of prosecution under the Wildlife Act.

At this stage we've left all three of these options in our review report, however we're willing to make further revisions, including removing one or more options entirely, should expert advice conclude that they're inconsistent with either the RMA or Wildlife Act.

- **not an offset fee** = compensation NOT offset (Colin O'D)

	<ul style="list-style-type: none"> ○ Assume this is a disagreement over the term used to describe the fee in option one. We think “offset” is a better descriptor, as the purpose of the fee is to fund work designed to increase hatching success elsewhere on Canterbury braided rivers, to offset potential decreased hatching success at gravel extraction sites. The use of the term “compensation” would be more appropriate if the fee was instead used to fund work <u>not</u> designed to offset reduced hatching success by increasing hatching success elsewhere. For example, if the fee was used to pay an allowance to local shorebird ecologists subsequently left unemployed due to reduced demand for pre-works shorebird surveys, then we’d then consider it appropriate to call this a “compensation fee”.
<p>Support suggested further research on quantifying actual effects of gravel extraction on nesting birds</p>	<ul style="list-style-type: none"> ● Support the further research needed to quantify actual adverse effects of gravel extraction on nesting birds. <ul style="list-style-type: none"> ○ Good. As mentioned above, we’ve altered the wording in the review to state that responsibility for this investigation lies with the industry rather than ECan, to align with the requirements of the RMA. ● Thought this was meant to be part of the review so not sure why this question wasn’t answered?? <ul style="list-style-type: none"> ○ That’s really funny. The reason it wasn’t answered was because the necessary data doesn’t exist, and the timeframe for carrying out this review was winter, outside of the shorebird breeding season. This means that even if ECan were prepared to fund this research, it wouldn’t have been possible given the timing of this review – the authors of this review are ecologists, not magicians. We’ve done the best we can with the data available – specifically, we’ve analysed a very large number of pre-works surveys to quantify the maximum potential adverse impact that this activity could have had across Canterbury over the past 14 years. The results suggest this potential impact was minor, (maximum of 60 nests affected over 14 years, or an average of 4 nests per year), and the effects are likely to have been even lower if the impacts of mammalian predators are taken into account (which is impossible for us to do, because none of these nests were monitored to determine whether they hatched or not). We believe this paints a pretty clear picture of the potential adverse impacts of this activity on riverbed nesting birds, and at least between 2004 and 2018, we’re satisfied that it was negligible. If either ECan or the industry require more robust evidence however, or want to examine the impacts of this activity on nest outcomes, taking into account the impacts of other threats such as predators, then we recommend conducting a field experiment to quantify this. This is the basis for the recommendation included in the report. To expect us to complete this research as part of the review, given the level of funding and timeframe provided by ECan is absolutely ridiculous.
<p>General comments/improvements to condition text</p>	<ul style="list-style-type: none"> ● The report finds that adverse impacts of all gravel extraction has been relatively small, and negligible <i>in comparison</i> to the other widespread impacts (predation, weeds, water abstraction). However, I am not sure this comparison/finding (true for many conditions imposed upon consented activities) removes the Councils responsibilities to require mitigation measures to avoid or minimise those adverse impacts. Presumably the report is implying that the impacts at any site are less than minor under our consenting framework. Until this is clarified (perhaps with the investigation research recommended here) I support the continued precautionary approach recommended by the report to continue using conditions to manage any potential adverse impacts – which as the report notes, may increase with future scenarios (page 28).

- These are good points. The results of our analysis do suggest that the impacts of gravel extraction activities are “less than minor” irrespective of the impacts of other threats (predators, weeds etc), given that the worst case scenario is that an average of four nests per year would have been lost since 2004 as a result of gravel extraction activities, had pre-works surveys not been carried out. This ‘worse case scenario’ assumes that all of these nests would have subsequently hatched, which we neither know (given that the outcomes of these nests weren’t monitored) or would reasonably expect (given the lack of predator control at these sites).

We do believe that there’s justification in taking other threats into account when assessing the impacts of gravel extraction activities, because we believe that given the lack of predator control at gravel extraction sites, the failure of nests due to disturbance by gravel extractors in many cases wouldn’t have altered the outcomes of these nests, given the large proportion of nests that fail each year due to depredation by mammalian and avian predators. And in fairness to the gravel extraction industry, we see little point in them investing time and money to avoid disturbing or destroying nests that have a high likelihood of failure due to other causes. Hence our recommendation to carry out an investigation to quantify the impacts of gravel extraction activities, taking these background nest failure rates into account.

Irrespective of the outcome of this investigation however, and as Jean points out, we do not use this as justification to recommend that no effort be made to avoid, minimise or offset gravel extraction activities on nesting shorebirds, for the simple reason that such a recommendation would not be robust to any future increases in the scale of gravel extraction activities on Canterbury rivers.

Given that we are recommending that some form of avoidance, minimisation or offsetting of impacts continues to be implemented therefore, we believe it’s unnecessary at this stage to alter the wording of the report to clarify whether we’re taking other threats into account or not, when describing the likely impacts of gravel extraction activities. As stated in the report, in the interests in maximising outcomes for shorebirds while minimising costs to gravel extractors, we believe they that should; however the results from our analysis of pre-works surveys carried out since 2004 suggest that the result is the same either way you look at it.

- we (gravel industry) consider that there is significant scope to fundamentally amend (or remove altogether) the bird survey conditions from consents in most cases. Given the broader benefits that accrue from gravel extraction (as acknowledged in the report), and the demonstrable lack of cost-benefit from bird survey requirements, it must be asked whether the current regime is the most efficient, effective and appropriate means of mitigating the risks to riverbed-nesting birds from gravel extraction (Bob W)
 - We disagree that there are sufficient grounds to remove altogether any conditions aimed at avoiding or offsetting impacts on nesting shorebirds, for reasons amply explained in the report and in our responses to feedback received. We have suggested several options to amend the bird survey conditions, and have also outlined these in detail in the report, two of which we’re confident will substantially improve the cost-benefit ratio to the industry.

- Like the clarification that is given in Horizons in the Blue Duck area, where the condition specifies “The work started at the same location prior to July and has not been interrupted for more than 7 days”.
 - We do too. But...this will be problematic for us to add, given we’ve substantially relaxed the 8 day rule regarding re-surveys. I.e. if we allow gravel extraction to proceed in the early and pre-breeding season (during the time that shorebirds are establishing their territories) without a pre-works survey, we’d probably have to re-instate the 8-day rule to ensure sufficient safeguards are in place to detect shorebirds moving into gravel extraction areas as they return to the rivers to breed.
- There is mixed interpretation of when a survey is triggered – ie if extraction starts before the 1st September then a survey isn’t needed. But what spatial area does this apply to?
 - There’s no mixed interpretation that we can see. There’s no survey required prior to 1st Sept, due to negligible likelihood of shorebirds nesting at this time. After 1st Sept, pre-works survey is required unless the extraction site meets one of a number of possible exemptions, all describing situations where there’s a negligible likelihood of shorebirds nesting at the site. **Where’s the problem?**
- Supportive of the move away from the arbitrary list of bird species currently on consents and in the Gravel COP to the threat classification criteria (Ecan review group)
 - Good to hear
- There is an additional potential oversight in both options in that only threatened or at Risk species are included. This would risk conflict with the Wildlife Act in which disturbance of any protected wildlife is illegal. Not only would the gravel extractor be liable if no survey was required and nests of any riverbed species were disturbed or damaged but Environment Canterbury itself could be in a difficult position. It would have granted consent to an activity that clearly risks disturbance to protected species but has not required a survey to determine the risk and would be reliant on a gravel extractor who could not be expected to identify the risk. (Jim J)
 - This is not an oversight. Instead it’s a result of the authors deliberately opting to exercise common sense, pragmatism, and to ensure our recommendations are aligned with current accepted practice by both ECan and other regional councils.

The greatest risk to wildlife posed by river-based gravel extraction activities are population-level impacts on Nationally Threatened or ‘At Risk’ endemic and native shorebird species, so we have chosen to focus on these. These species are inherently at risk of extinction due to small population sizes and/or declining populations and are also largely restricted to breeding in habitats in which river-based gravel extraction activities are occurring.

In contrast, the majority of New Zealand’s remaining protected bird species are either ‘Not Threatened’ (e.g. white-faced heron), don’t occur in braided river habitats (e.g. great spotted kiwi) or occur widely in both braided river habitats and in the surrounding landscape (e.g. NZ kingfisher). As a result, we consider it extremely unlikely that river-based gravel extraction activities will be having adverse impacts on these species.

Although these latter species are protected under the Wildlife Act, we're not aware of any other case where a regional council has required a consent applicant to, for example, carry out a pre-works survey for nesting grey warblers, to ensure that the application of the Resource Management Act is not in conflict with the Wildlife Act. We understand this to be a common sense, pragmatic decision based on the need to strike a balance between achieving adequate environmental protection and allowing land use activities to occur in order to meet the social, cultural and economic needs of our community.

Given this, it seems unlikely to us that gravel extractors, or ECan will be held liable for the disturbance of 'Not Threatened' but absolutely protected wildlife under the Wildlife Act, provided that adequate precautions have been taken to offset, avoid or minimize impacts on 'Nationally Threatened' or 'At Risk species. Rather, the reviewer is either engaging in scaremongering tactics here, or is making an unrealistic and inflexible interpretation of the relevant legislation.

However, if ECan is concerned about potential conflicts between the recommendations included in this report and its responsibilities under the Wildlife Act, we recommend that ECan seeks legal advice on this matter from suitably-qualified experts. Neither the authors, nor the reviewer are suitably-qualified to provide this advice.

No changes made to the report.

- I fully support encouraging extractors to improve the bird feeding /breeding habitat on riverbeds before they depart. This might take a little time and expense but could so easily be done – but at the moment it is largely not attempted. The extractors depart straight after the last truck leaves. Obviously, the river engineers would have to approve, but this should be no problem. (Nick L)
 - The message we've heard from gravel extractors is that the reason this isn't being done is because they're not receiving the expert advice they need to provide guidance on appropriate habitat improvement measures, or haven't received sufficient training to enable them to identify these opportunities themselves. We've therefore recommended that ECan investigates funding annual shorebird workshops or field days where this is covered.

No changes made to the report.

- Weed invasion. Yes, as stated in the report, a huge and increasing problem, particularly as with the new suite of invasive weed species, we cannot rely on regular major floods to keep riverbeds clear. In that respect, we fail to recognise that invasion by woody weeds (gorse, broom, blackberry, willows alders etc) is so dense in places, that they have become permanent. Whereas in the past, major floods (one in 10-20 years+) might have swept clear small-stature native plants and poorly rooted introduced species such as grasses and yellow lupins (not Russell), these days such floods usually do not clear the majority of really dense areas, although they do undermine margins. A major flood on the AR last year (a 1-in-20+ year event) went through (and over) hectares of dense woody weeds making small channels and depositing silt and woody debris, but it did not turn them back into open shingle riverbed. Hence, there is no option if we want such areas to revert back to open sites, than to

employ heavy machinery and then accept the challenge of maintaining them weed-free for ever and a day - via sprays or further machine works. (Nick L)

- Agree. What follows from this is that the gravel extraction industry should be given some credit for the benefit they provide to shorebirds by clearing areas of woody weeds during their gravel extraction activities, or preventing the establishment of weeds due to repeated disturbance. We believe this positive outcome for shorebirds should be taken into account and balanced against potential negative outcomes when it comes to devising consent conditions for this activity. Furthermore, the benefits of weed clearance carried out by gravel extractors could be improved further by ECan providing the industry with more training and guidance regarding when and where weeds should be cleared by gravel extractors as part of a voluntary initiative to further improve habitat values for shorebirds at extraction sites.

No changes made to the report.

- Follow-up surveys. One aspect of spring bird surveys which has always bothered me is their one-off nature. Surveyors report back on the birds seen on a one-pass visit, but no-one goes back to measure the outcomes of any breeding attempt. This season BRaid is asking for reports of all colonies (not single-nesting species) at least in mid to north Canterbury, and has budgeted for a member, Grant Davey, to try to return monthly to monitor outcomes. Grant is a keen birder and an experienced geohydrologist, who operates a drone and has excellent spatial mapping capabilities.

- We agree that it would be useful to carry out two investigations that involve monitoring nest outcomes, to inform this work. Firstly, we recommend carrying out an investigation to quantify the effects of gravel extract activities on breeding shorebirds, in the absence of any mitigation. This would involve comparing the hatching success of a sample of shorebird nests at sites undisturbed by gravel extraction, with sites at which gravel extraction is occurring, but with no pre-works surveys or mitigation. The data can then be used to quantify the effects (or lack thereof) of this activity on nesting shorebirds, testing the widely-held hypothesis or assumption that the effect of this activity is negative, and therefore needs to be avoided through the implementation of consent conditions. We believe this hypothesis or assumption needs testing, given that background nest failure rates on rivers not receiving intensive mammalian predator control are likely to be high, irrespective of whether gravel extraction is occurring or not.

Secondly, we recommend carrying out an investigation to quantify whether or not mitigation measures (pre-works surveys + exclusion zones) lead to an improvement in hatching success. This would involve comparing the hatching success of a sample of shorebird nests at gravel extraction sites with and without pre-works surveys + mitigation. Given the cumulative cost involved in carrying out pre-works surveys and mitigation, and that background nest failure rates are likely to be high on rivers without predator control, there is a possibility that these measures are not resulting in improved hatching success.

	<p>As noted above, Greater Wellington Regional Council is currently planning to carry out the second of these two investigations to be carried out on Wairarapa rivers in the 2019/20 breeding season. This investigation is likely to be hampered by small sample sizes however, so an opportunity exists for GWRC and ECan to collaborate to deliver these investigations, both to share costs and to improve sample sizes.</p> <p>No changes made to the report.</p>
<p>Support categorisations of stretches of rivers as high or low importance</p>	<ul style="list-style-type: none"> • Many of the rivers where extraction occur were not able to be assessed for ‘high’ or ‘low’ importance due to the inability to map abundance data for all 403 sites – just doing this for the 157 sites. There is a mismatch of bird data and extraction sites. (Jean J) <ul style="list-style-type: none"> ○ Not entirely true, as can be seen in the overlap between white and black dots in Figure 2.1. This isn’t really a problem for the categorisation system – any river sites lacking DoC survey data are treated as knowledge gaps, and pre-works surveys will be therefore be required at these sites. In other words, we’re proposing that all gravel extraction sites which lack DoC shorebird survey data be treated in the same way as “high importance” sites until the data exists to demonstrate otherwise. Again, this mismatch will also be reduced if ECan adopts our recommendation to develop a region-wide shorebird monitoring strategy. • To clarify the river sections deemed to be ‘high’ can we get the Figure 2.12 Map shown with a linear line rather than dots – assumedly for instance the entire mid and lower Waimakariri is deemed ‘high so would have a solid red line down it. (Jean J) <ul style="list-style-type: none"> ○ We tried this, but unfortunately at that scale, the maps look no clearer. Ie. it’s still difficult to see where adjacent reaches of ‘high importance’ river start and stop. We’ve instead dealt with this by including Table 2.3 – the ‘location description’ column in this table describes the upstream and downstream boundaries of each river reach that was assessed. • Alternative approach would be to just map the areas where a survey is not required, and then state a survey would be required for all other areas (Jean J) <ul style="list-style-type: none"> ○ Yes, we can do this if that’s simpler. However, we do think there’s benefit in also differentiating “high importance” sites from “knowledge gaps”, for the sake of raising industry awareness of where the known, important shorebird sites are. We believe the additional wording regarding how “knowledge gaps” should be treated that we’ve added to the report resolves the reviewer’s concerns in this regard. • The set-back distances of works from nests or chicks have already been modified by Ecan after discussions with bird surveyors. The resulting distances “at the discretion of the surveyor” is probably more appropriate than fixed distances. However, experience by gravel extractors and bird surveyors have indicated that distance from nests from trucks on access tracks to sites could be less than 10 metres without disturbance and, perhaps, 40 - 50 metres from nests or chicks at works sites rather than the Review’s blanket 75 metres for nests and 50 metres for chicks. Ashley-Rakahuri Rivercare Group’s experience is very relevant in this. <ul style="list-style-type: none"> ○ We’d recommend that these setback distances be tested/trialled experimentally, so that they can be based on quantitative evidence rather than ‘expert opinion’. We agree there’s the possibility that they could be reduced, provided this work is done. We don’t agree that they be left to the discretion of the surveyor, as this approach is vulnerable to inconsistencies relating to the personal views, and level of expertise of

	<p>the surveyor. This approach would also be open to abuse – the surveyor with the shortest set-back distances will eventually be the one who attracts the most business!</p> <ul style="list-style-type: none"> • Table 2.2 – don't agree that top 20% of sites with threatened spp are important – surely all are. See O'Donnell (2000) ECan report ranks bird values already. (Colin O'D) <ul style="list-style-type: none"> ○ It should be noted that the categorisation presented in this review is solely for the purpose of identifying river reaches on which pre-works surveys should and shouldn't be done, nothing more. It is not fit for purpose for ranking or prioritisation sites of significance for other purposes, for example for prioritising other conservation management activities. We believe that the 20% threshold is already fairly conservative, given that this threshold only needs to be met for one of eleven possible criteria for a site to be deemed "high importance". The fact that this threshold is relatively conservative is evidenced by the fact that almost 70% of the 157 sites that we assessed met one or more criteria for being "high importance", triggering the requirement for a pre-works survey.
<p>Support for proposed survey technique and standardised reporting template</p>	<p><i>No additional comments made, proposed technique and reporting template endorsed.</i></p> <p>Excellent, we believe this will deliver useful improvements, including reducing survey and reporting costs under options 2 and 3, and deliver a higher-quality, standardised survey dataset that can be analysed at larger spatial scales.</p>
<p>Support for proposed training for industry</p>	<ul style="list-style-type: none"> • The discussion around the potential to provide industry training for bird surveys is a welcome initiative and is supported by the industry. • Support the suggestion of an annual training day run by John Dowding <ul style="list-style-type: none"> ○ Excellent. • In order to ensure co-existence between gravel extraction and nesting, the extractors must be informed as to how to minimise disturbance i.e., to stick to formed tracks, not to wander machines over undisturbed ground, and not to get out of machines to chat or have smoko when close to nesting birds. While sitting in my vehicle, I am guilty of taking photos of birds on nests, or chicks feeding with parents in waterside areas, as I know that they will be much more disturbed if I get out and stand there in person. Hence, shingle extraction areas are great for 'vehicle' photography as they offer opportunities for getting close to birds with minimal disturbance. So, extractors need to be informed of how to conduct themselves when in the vicinity of nesting birds. In our experience, the majority of extraction crews really enjoy working close to nature. We send updates to the local Taggarts crew about what the birds are up to in their operating area, and that is sent around via their internal Facebook page. In conclusion to this topic, I would support a study to gather more details of actual extractor / bird interactions in their operational area and in a control patch not too far away. This year we have a great such area on the AR, and are attempting monitoring in the extraction site, but don't have the capacity to do so in the control area. (Nick L) <ul style="list-style-type: none"> ○ We agree with all of these points made.

	<p>We support the idea of providing gravel extractors with increased guidance on how to behave around shorebird nests. Given this guidance is too detailed to be summarised in a consent condition, we recommend that ECan adopt our recommendation to fund annual workshops or field days to create opportunities for gravel extractors to upskill in this area.</p> <p>We agree that evidence exists that at least under some circumstances, the exclusion distances of between 50-200m currently being implemented by regional councils are likely to be much greater than necessary to minimise disturbance to nesting shorebirds. These current exclusion zones are largely based on expert opinion, so we recommend that a one-off investigation be carried out to provide more evidence-based exclusion zones. Such an investigation would involve approaching a sample of nests of each key shorebird species, on foot and with machinery, and recording the distances at which birds flush from these nests. Such an investigation should test “flushing distances” at a range of incubation stages (as it’s known that shorebirds are more prone to being flushed from nests earlier in incubation). Median and upper quartile flushing distances can then be calculated for each species at each nest stage (e.g. early, mid and late incubation) and used to create evidence-based exclusion zones for incorporation in consent conditions.</p> <p>It should be noted that such an investigation, plus an experiment to examine the efficacy of pre-works surveys and exclusion zones is currently being planned by Greater Wellington Regional Council’s Environmental Science department, to be carried out on rivers in the Wairarapa region. This investigation will involve comparing the hatching success of nests at gravel extraction sites with and without pre-works surveys & mitigation. It is becoming clear however, that this investigation is going to be hampered by low sample sizes, due to the small number of nests typically found within gravel extraction sites in the Wairarapa in any given season. An opportunity exists therefore, for Greater Wellington Regional Council and Environment Canterbury to collaborate on this investigation, pooling their respective samples of nests monitored on both Wairarapa and Canterbury rivers to provide a more robust test of the efficacy of mitigation measures, and/or optimal exclusion zones.</p> <p>We’ve added details of these recommended investigations to the report.</p>
<p>Definition of suitably qualified</p>	<ul style="list-style-type: none"> • Issue with definition of suitably qualified, it specifies 160 hours monitoring nests – why is that relevant. <ul style="list-style-type: none"> ○ Its relevance is explained in the report. 160 hours represents the average time taken for completely inexperienced fieldworks to become competent and efficient at locating nests of a range of shorebird species. This is based on first-hand experience that the lead author has in training WMIL field staff to locate and monitor banded dotterel, wrybill, SIPO, black stilt and black-fronted tern nests for a large-scale nest monitoring project in the MacKenzie Basin carried out between 2016 and 2017. Ie. this guideline is evidence-based, rather based than on expert opinion. • Should it not be 160 hours of bird surveying/observations of bird nesting behaviours and nests more broadly? <ul style="list-style-type: none"> ○ No. Surveyors need to develop a detailed understanding of shorebird behaviour, and form a search image for cryptic shorebird nests in order to become competent at locating and monitoring shorebird nests. These skills cannot be learned by carrying out “bird surveying” in other habitats, or by monitoring the nests of widely different bird taxa such as forest birds or seabirds.

	<ul style="list-style-type: none"> • Concern that having the monitoring of nests specified will dramatically reduce the number of suitable people to carry out surveys, when the pool is already very limited. <ul style="list-style-type: none"> ○ I suspect all of the existing contractors being used to carry out these pre-works surveys will have sufficient levels of field experience to meet this definition. We stand by this definition, given that it is evidence-based. We see no point in relaxing this definition in order to widen the pool of surveyors, as this would likely lead to a reduction in the quality of the surveys being carried out. This would be completely self-defeating, and result in further wastage of gravel extraction industry resources, for reduced gains to shorebirds. Instead, if ECan or the industry wish to widen the pool of surveyors, they may need to fund, or otherwise create, opportunities for prospective surveyors to gain the field experience needed to meet this definition. <p style="margin-left: 40px;">Again, investigating the offsetting option would also solve this problem, by either eliminating or reducing the need for pre-works surveys.</p>
<p>Comments around costs of consenting and flood protection</p>	<ul style="list-style-type: none"> • A number of references are made to reducing the “<i>resource consent compliance costs to both the ratepayers of the Canterbury region, and the Canterbury gravel extraction industry</i>” (e.g. page i, page 19, page 25). Our (Fulton Hogan) understanding is that all costs associated with obtaining authorities/consents, and including compliance costs, are fully cost-recovered by ECan. Moreover, the gravel management fee further subsidises the wider community contribution to monitoring braided river bed levels across the Canterbury Region. Interestingly, despite these comments, the report does note, on page 4, that ECan relies on the gravel extraction industry to carry out much of the gravel extraction that occurs for flood management purposes, in order to keep flood management costs down for local ratepayers. Some clarification and/or correction of these statements – particularly around the cost to ratepayers - would improve the integrity of the report (Bob W) <ul style="list-style-type: none"> ○ We’re happy to make these changes, and have done so. We don’t see how our misattribution of the payment of compliance costs contradicts our observation of the importance of the gravel extraction to the economy and infrastructure of Canterbury, as seems to be implied in this comment. In general, this review has been largely sympathetic to this, and has attempted to find solutions that will deliver cost savings to the gravel extraction industry while equalling or improving outcomes to shorebirds. We’re confident that the options presented here achieve this.
<p>Missed opportunity for interaction with industry if surveying ceases</p>	<ul style="list-style-type: none"> • Improved public awareness of the birds and their breeding habits is essential to achieving better outcomes for bird breeding on braided rivers. And this is particularly so for the major users of braided river resources (water, shingle and recreational opportunities). Hence, I fully support the suggestion of bird ID cards and advocacy courses by the likes of John Dowding. And I don’t think we have made nearly enough use of the pre-operational bird surveys to educate / train shingle extractors about the birds. In the report (1.5.1) covering contractor interviews it is stated that riverbed visits with contractor representatives were ‘invaluable for gaining a more detailed understanding ...’ Likewise, if contactors always accompanied surveyors during site inspections, the new interest generated would be significant. Hence, if we adopted Option 1, that major awareness improvement opportunity could be lost. (Jim J and Nick L) <ul style="list-style-type: none"> ○ All of the shorebird experts asked to comment on this report were unanimous on this point. We agree that it is incredibly important to deliver shorebird advocacy and education to river users, however this a very weak justification for continuing with pre-works surveys. The

	<p>sole reason why pre-works surveys are currently required is to ensure that gravel extraction activities avoid adverse impacts on river-nesting shorebirds. If it is demonstrated that such an impact doesn't exist, or that the impact can be more effectively managed in some other way (e.g. by offsetting), then there is no longer any grounds to enforce a requirement for pre-works surveys to be carried out. Gravel extractors are not required to carry out pre-works surveys as a condition of their gravel consent or authorisation to create the opportunity for advocacy. This is simply not what they're designed for.</p> <p>We'd also argue that if advocacy is considered to be an important priority task, then delivering this advocacy via pre-works surveys is an extraordinarily inefficient way to achieve this, due to the fact that each advocacy 'event' (a pre-works survey) will only reach a handful of individuals, representing only one riverbed user group. A far more efficient way to deliver this advocacy work would be to hold workshops or field days for gravel extractors and other river users, where larger numbers of people can be assembled to receive information about shorebirds and their management.</p> <p>Another reason why we'd argue that the pre-works surveys are a poor vehicle for delivering advocacy is that the cost of this advocacy work is borne solely by the gravel extraction industry, which we consider to be unfair. The shorebird of the Canterbury region are valued by a wide cross-section of the Canterbury community (including the gravel extraction industry) so we'd argue that the costs of delivering shorebird education and advocacy to river users should be shared by the wider community, not borne by one small sector of it.</p> <p>Another consequence of justifying pre-works surveys on the grounds of advocacy is that this unfairly targets one type of river user (gravel extractors), by requiring them to fund their own advocacy and education. In contrast, many other river users (4WDs, fishers, dog walkers, whitebaiters) are not held to the same requirement, despite the fact that it is possible that they are having either an equal or greater adverse impact on nesting shorebirds.</p> <p>For these reasons we stand by our recommendation to consider the "offsetting" option; we do not recommend retaining pre-works surveys for advocacy purposes alone; and we instead stand by our recommendation that ECan instead investigates other options for delivering shorebird education and advocacy, for example by funding annual shorebird workshops or field days.</p> <p>No changes made to the report</p>
<p>General additional questions/comments/typo correction etc</p>	<ul style="list-style-type: none"> • Remember the review was also meant to be about ensuring that the current conditions are enabling gravel extraction just as much as about protecting nesting birds. Language is very much around just protecting nesting birds <ul style="list-style-type: none"> ○ Nonsense. This comment reflects the bias of the reviewer more than the report's authors. The three options presented here all reduce costs and increase flexibility for the gravel extraction industry. Option one removes the need for pre-works surveys, exclusion zones and re-surveying after stand-down periods, providing large cost savings and minimising inconvenience to gravel extractors. Options two and three provide a number of exemptions to the requirement for pre-works surveys to be carried out, and relax the rules around exclusion zones and stand-down periods. It would be impossible to further enable gravel extraction activities to take place without greatly increasing the risk of

adverse impacts on riverbed-nesting shorebirds. This reviewer needs to recognise that this activity is taking place in the habitat of several endemic, and nationally threatened shorebird species, and must therefore expect to be required to take steps to offset, avoid or minimise any negative impacts.

- Is it necessary/relevant to include the info around consent/authorisation costs on page 5?
 - In the interests of transparency, we'd say yes. Why is this a problem? This information is publicly-discoverable on ECan's own website.
- Section 1.1 focuses just on the rules and conditions in the Gravel Extraction Code of Practice but should also include resource consents
 - The conditions are the same for both, apart for some minor differences in structure and wording. To include both would be overly repetitious.
- Page 14, third line from the bottom. Start of that sentence should say "Environment Southland" not "Environment Canterbury".
 - We've corrected this error
- Table 1.4 – just make sure that the contractors are happy for their company/staff names to be used and their individual comments identifiable. Could it be collated and summarised to reflect an industry view?
 - We understand that the report has already been circulated to all of these staff who were consulted, so the horse has bolted on this one. For the record, we have received no objections to the way we've summarised this information in the feedback that we've received. We're happy to re-format this table if specifically requested to do so, but in the meantime we believe that in the interests of transparency, it should remain as it is. We note that gravel extraction meeting minutes also typically identify the staff member responsible for particular comments.
- Pg 51 second paragraph of 2.2.3 – typo, replace "concerted" with "converted".
 - We've corrected this error.
- Could section 1.3 be moved to an appendix? Really great stuff, but kind of out of the main focus of what this report is meant to be on.
 - No. The introduction and discussion sections of 1.3 explain why this information has been included. We believe that in order to generate the best possible outcomes for shorebirds, the interaction between the potential effects of gravel extraction activities needs to be considered within the context of the impacts of other threats that these shorebirds face. This is central to understanding why option 1 – offsetting is likely to represent the best solution to the problems that this review attempts to solve. Given the difficulty that many reviewers have had in getting their heads around the efficacy of option one, moving section 1.3 to an appendix won't help matters.
- Decision diagrams – keep the language consistent with the RMA
 - The authors are shorebird ecologists, not resource managers, policy, consents or environmental regulation officers. We're happy to make any changes to the language in these diagrams that are needed, but the reviewer(s) will need to be more specific about what changes are required.

- Comments at the end of the exec summary – the gravel extraction industry shouldn't come up with the effects mitigation, this should be done by ecologists/DOC.
 - Technically, it will ultimately be up to ECan, as the regulatory authority in this instance. But, we stand by the language used, as it reflects the collaborative approach that ECan has taken when addressing this issue. Namely, ECan has made concerted effort to engage and collaborate with the gravel extraction industry to find solutions that satisfies all parties, this has been made clear to the authors of the review both by ECan staff, and gravel extraction industry representatives. The language used in this report attempts to recognise and reflect this.

- Was there any analysis/findings of the temporal correlations between when the gravel extractors are working vs the bird data (which for DOC data will presumably be all pre-December). Any recommendations to shorten the bird survey requirement timeframe?
 - Not specifically, but a visual check of the DoC survey datasets and pre-works survey dataset shows a high degree of overlap. Presumably the reviewer is questioning whether the DoC survey data adequately maps the bird values present at the time that gravel extractors will be working on the river, and given the high degree of overlap between the two datasets, we're confident that this is the case.

- Any consideration of effects of gravel extraction also needs to look at the bigger picture positive effects such as vegetation clearance, the effects on the costs of local and national roading construction/repair/maintenance programmes and aggregate supply more generally, and reduced truck movements because of proximity of supply to demand.
 - We've done our best to mention potential positive effects of gravel extraction activities wherever relevant in the report. However, we've been unable to take these into consideration in terms of making use these positive effects to offset potential negative effects, for several reasons. Firstly, we are not aware of any quantitative data that exists that demonstrates that these positive effects do in fact occur, and no method exists for determining how such positive effects (if quantified) could be balanced with, or compared to, potential negative effects. Given the concerns and opposition already raised to the fairly simple offsetting scheme that we've outlined in option one of this review, we have no confidence whatsoever that an offset scheme based on balancing unquantified and untested positive effects with potential negative effects will gain acceptance. If the gravel extraction industry wishes to receive greater recognition for the positive effects they believe they're having on riverbed nesting shorebirds, we recommend they fund a field investigation aimed at demonstrating and quantifying these effects.

Again, we believe that all three options suggested in this report will provide cost savings to the gravel extraction industry, by either eliminating or reducing the requirements for pre-works surveys, and by relaxing rules around exclusion zones and stand-down periods. By doing this, we've given consideration to how we can reduce "costs of local and national roading construction/repair/maintenance programmes and aggregate supply more generally" as asked for by this reviewer.

- For "added value" works by extractors, recommend that Environment Canterbury develops a system of granting authorisations to carry out works for the purposes of improving habitat quality for riverbed-nesting birds, at no cost to the gravel extraction industry. (Support but may be site specific and complicated – usually needs quite a lot of project management(?) Island building diagrams available). (Jean J)

- Yes, but surely less expensive than ECan funding this work entirely from scratch, given the cost of transporting machinery to and from work sites. So yes, definitely may be tricky to set up given the time that may be required from ECan river engineers or shorebird experts, but given the offer is on the table, it would be foolish not to explore this opportunity. For example, it may be possible to train gravel extractors to carry out habitat improvements with very little oversight from ECan officers. For example, rather than focussing on island engineering work, perhaps just instructing gravel extractors to scrape off/bury any standing woody vegetation in their consented area?

No changes made to report.

- River Engineering are happy to enable a system of granting authorisations which enables gravel extractors to carry out works for habitat enhancement at no cost to the extractor – we can easily do this with our Gravel Extraction COP and Gravel Authorisation process.
Great.
- Using just the bird survey reports to inform this review is an under-representation of the situation on the ground. The surveyor will spend a lot of time on site with the gravel extractor to point out an area that will be good to work in, and areas they must avoid and then write the report based on that. So the survey report may say there are no birds present and extraction can proceed, but that is only because the surveyor has steered the extraction away from an area where they may have had issues. (Niall)
 - Then why weren't these "issues" (presumably the presence of nesting birds) documented in the survey report? This is the whole point of these surveys, and these reports. I find this difficult to believe – these comments are completely contradictory. In the 322 survey reports that we have read, the only time extensive consultation is required between the surveyor and extractor is when nesting birds are present, and this is documented in the report. If no birds are present, then there's no need for detailed consultation. At any rate, if the extractor wishes to continue to have this interaction with their bird surveyor, and values this interaction, they can always engage them as a voluntary measure. Just because a pre-works survey is not required, doesn't mean that the gravel extractor isn't allowed to do a pre-works survey! We find this comment very strange...
- The surveyor does work quite hard to enable the extraction to occur – there could have been many times when Niall would say it is just no good to be in here at all but he has been pragmatic. (Niall)
 - This is actually a weakness in the system, not a strength. Under such a system, where the surveyor is permitted to use their own discretion, consent conditions are open to abuse. All it would take would be for a surveyor to move in who is prepared to undercut all the others with regard to exclusion zones, and they'd capture the lion's share of the business – at a cost to shorebirds and to the credibility of the gravel extraction industry.