



River Flow for Good Ecological Potential

Some views

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General comments

- Coming from a mainly Scottish upland perspective
- Broadly support general approach, think main issues appear at least been identified
- Acknowledges uncertainties, need for some flexibility and trial and error. Seems pragmatic.



Purpose of talk

- Provide some observations and thoughts on some of the flow proposals.
- How significant in terms of impact on “use” etc would increasing some of these flows really be?



Base flow

- Not going to say much on this topic
- Glad to see report acknowledges Q96 could significantly reduce ecological productivity compared to natural.
- Would like to have seen more evidence / justification for Q96, or at least to better understand the limited data available.
- For example, Acreman data on flow versus wetted area seem significant, but where do they apply? Are there differences between stream types?









Base flow

- Perhaps undue reliance on just wetted width and depth in determining fish habitat suitability.
- Water velocity is also very important for salmonids.
- As flows decrease, velocity may decrease faster than width and depth in a boulder channel because roughness increases progressively.







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- Water velocity is also very important for salmonids.
- As flows decrease, velocity may decrease faster than width and depth in a boulder channel because roughness increased progressively.
- May be tolerated as temporary condition for a few weeks in summer, but if is the whole summer norm, greater competition between fish may result in population effects.
- Both depth and velocity need to be taken into account before assessing habitat quality for juvenile salmonids.



Late summer and autumn rises

- These channel forming events are hardly relevant in many of our situations because of periodic natural spillage.



Adult salmon migration / spawning flows

- This area gives most concern of all.
- Level of flow proposed, suspect could be ok in many situations, may need to be higher in smaller streams, or in long reaches with no natural flow accretion.
- Most concern is with duration and frequency of events. Weekly 12 hour freshets may not work in all situations.



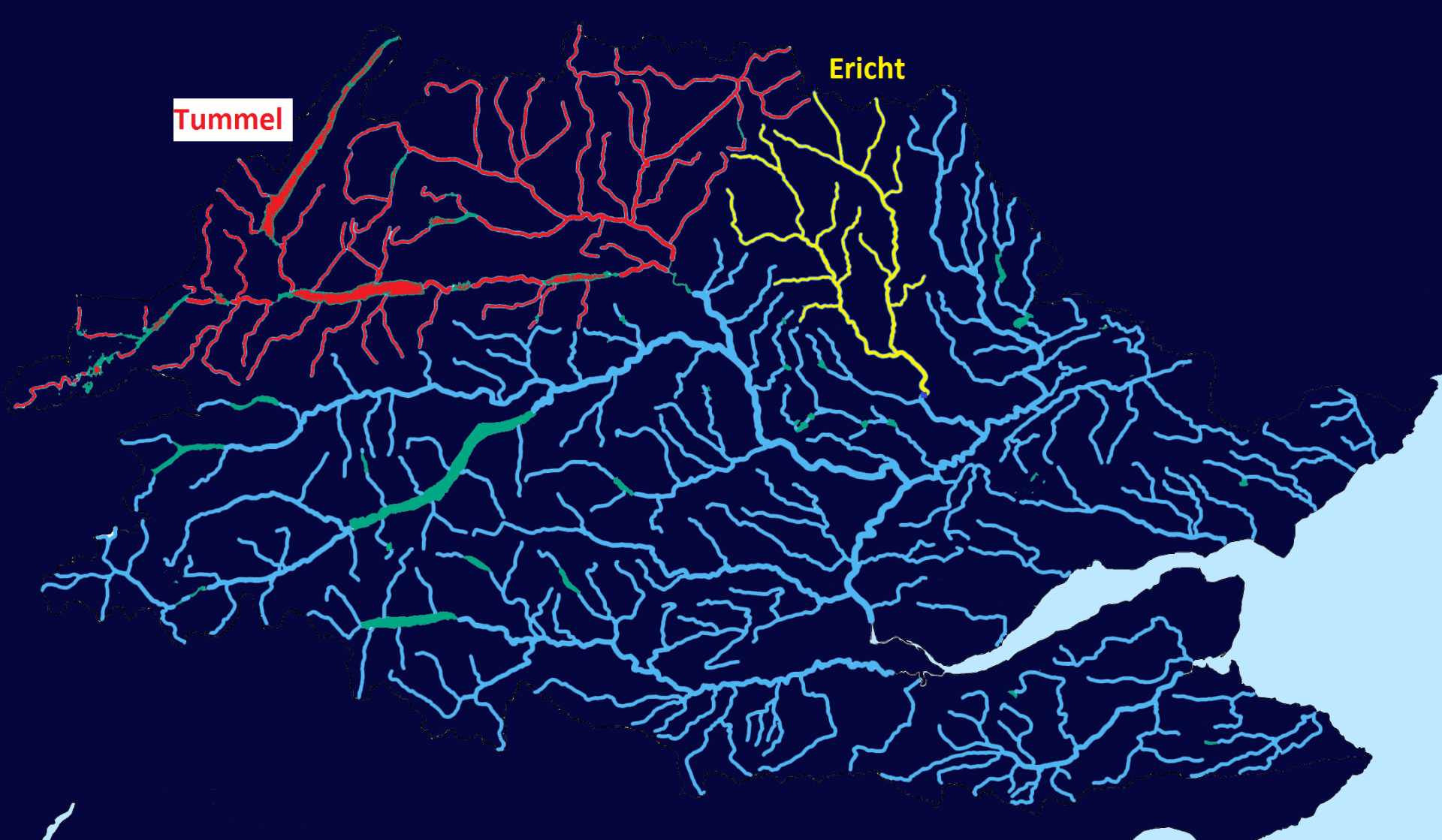
Components of adult salmon spawning migrations

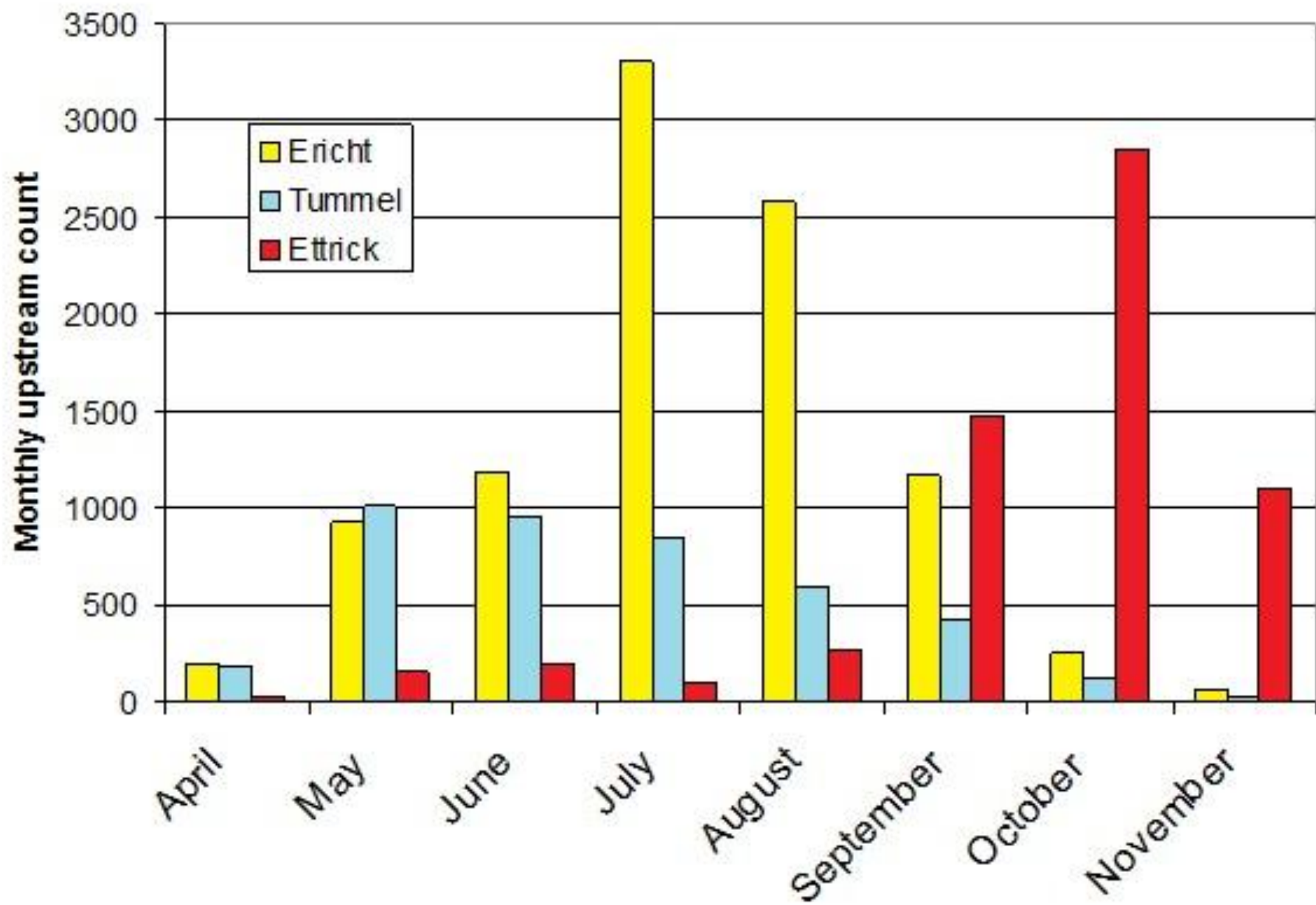
- Migration to the spawning region
- Final spawning run.
- Both need increased flows, but can take place at different times.

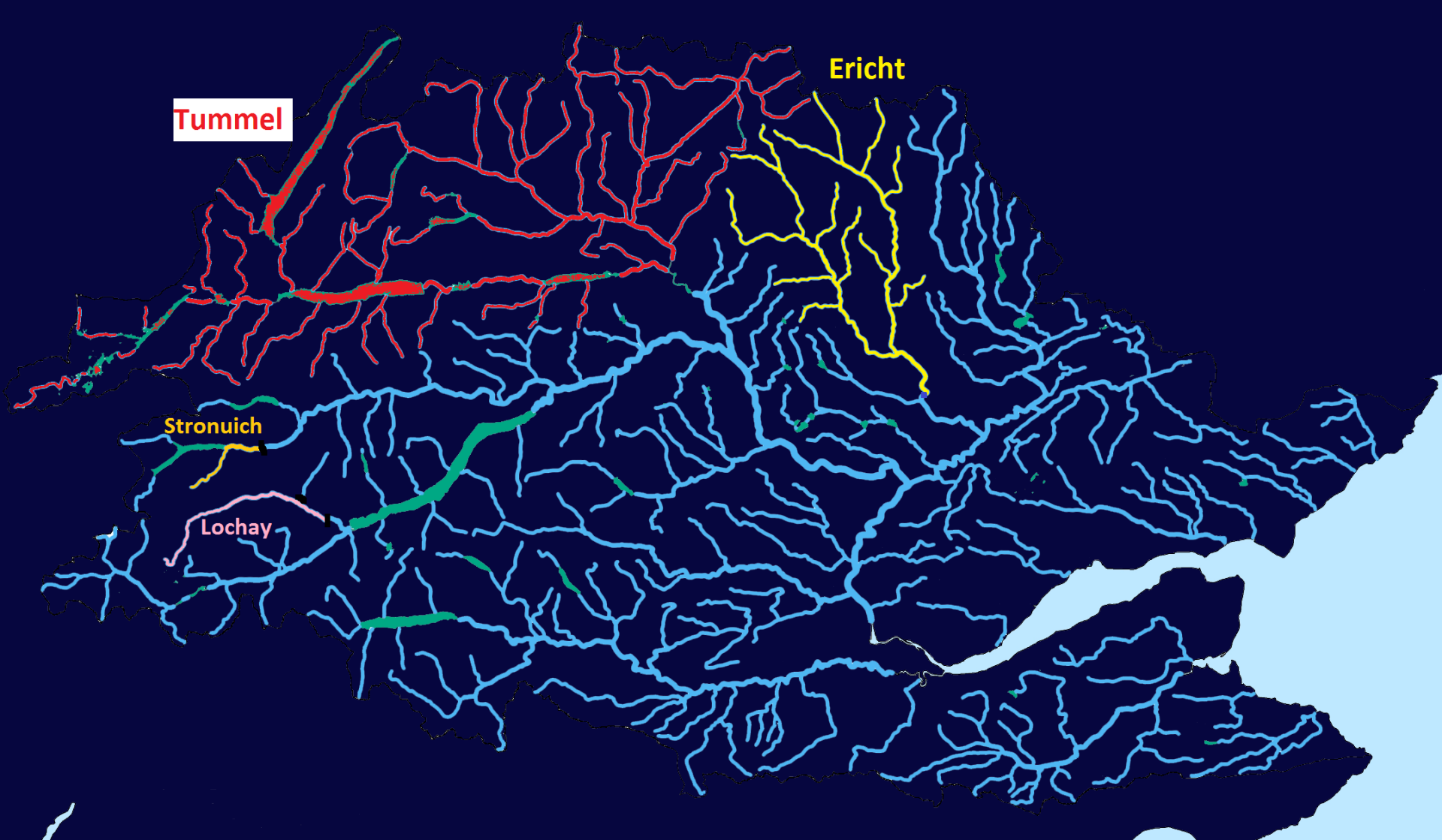


Components of adult salmon spawning migrations

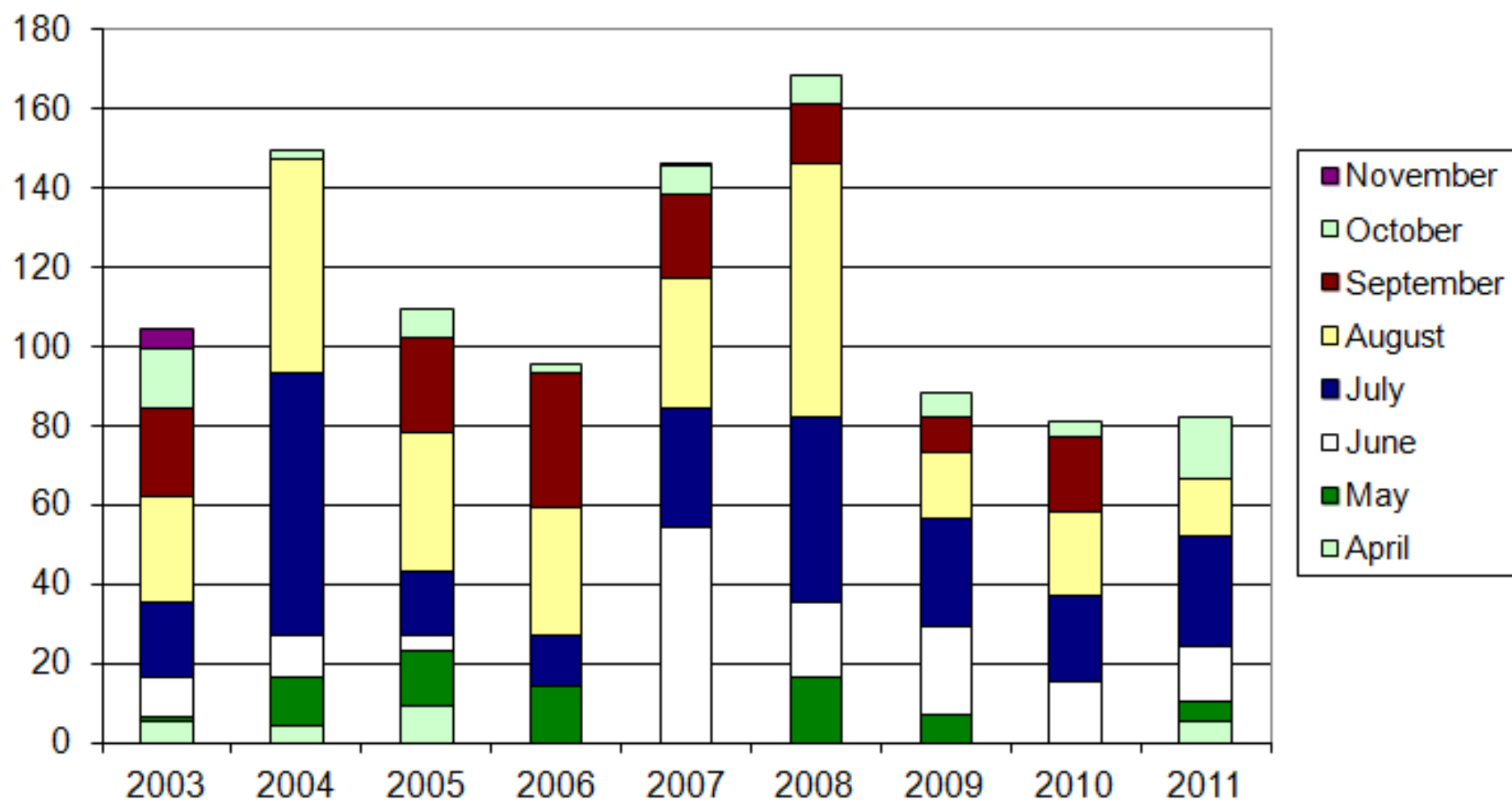
- Most of our HMWBs are in uplands – means early spawning “spring” salmon populations.



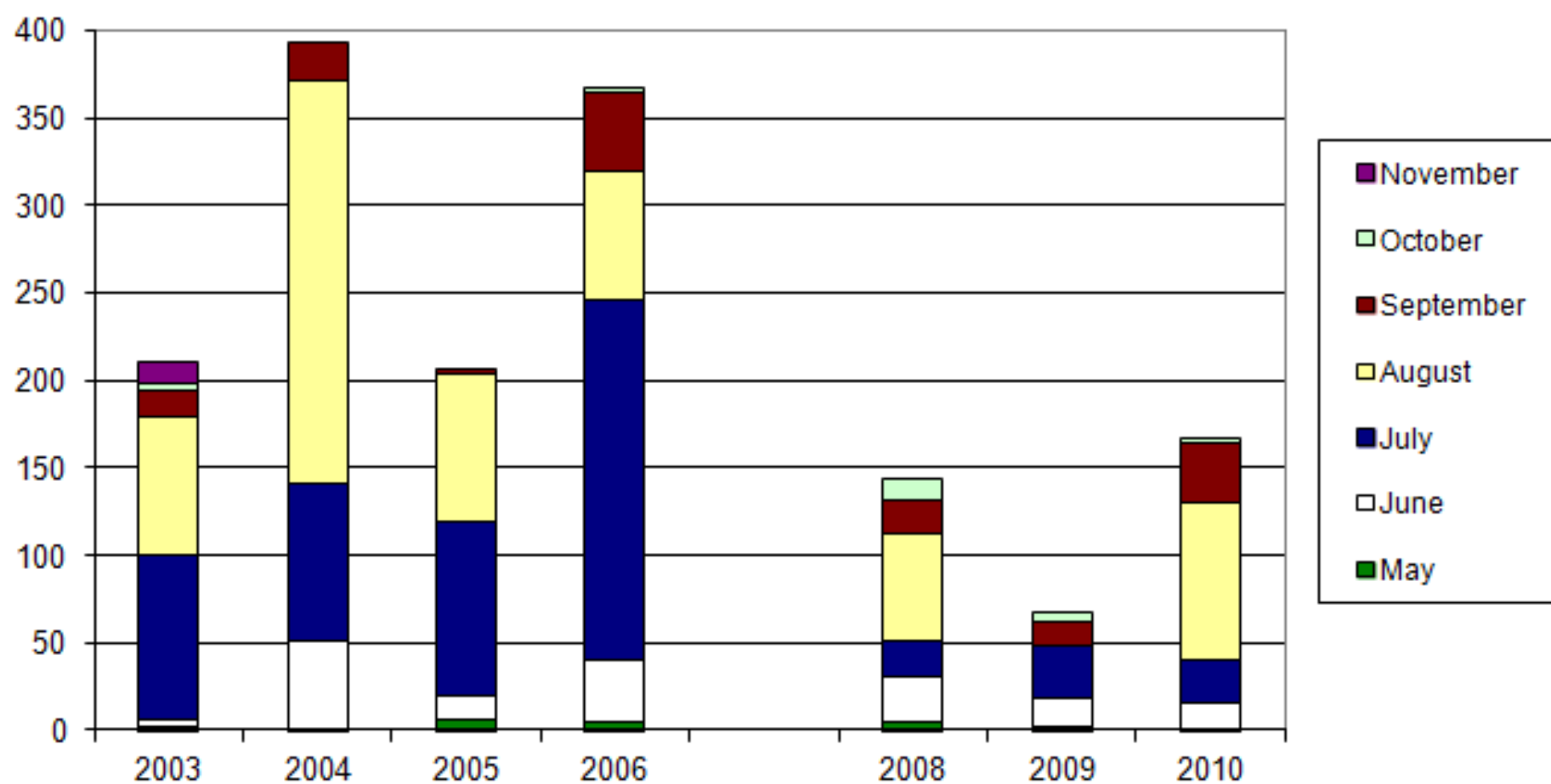




River Lochay net monthly salmon counts



Stronuich Weir, River Lyon, net salmon counts





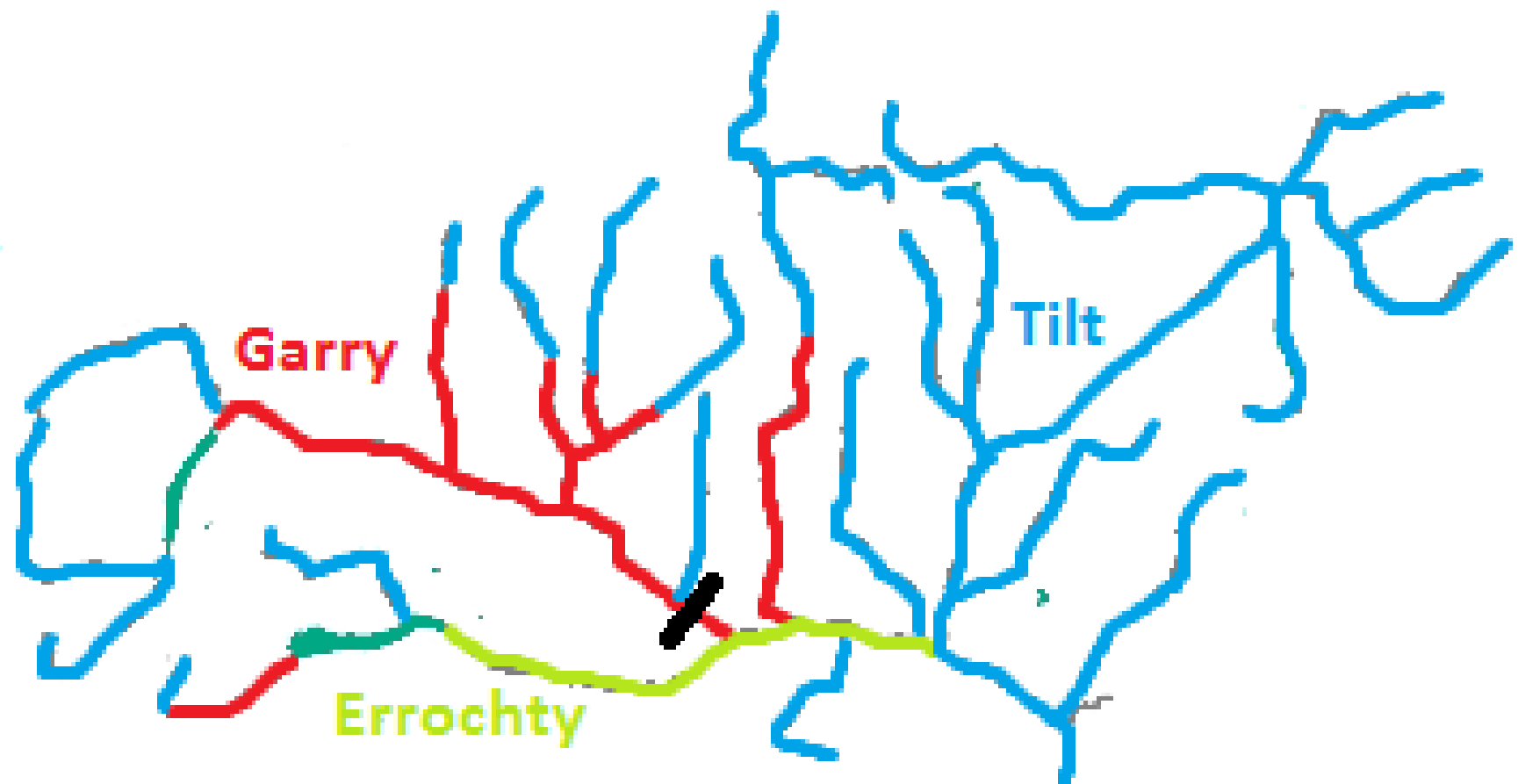
Components of adult salmon spawning migrations

- Most of our HMWBs are in uplands – means early spawning “spring” salmon populations.
- Adults may reach areas close to spawning destinations in summer or early autumn, not just during spawning period in late autumn.
- These tributaries often have natural obstructions etc – early arrival provides higher probability of having opportunity of suitable flows. Water temperature also more favourable for ascending obstacles.
- The final spawning run is therefore much shorter, either in main channel or into a smaller tributary.



Components of adult salmon spawning migrations

- Therefore, in this environment, require migration flows possibly much earlier than suggested. Depends on local factors – obstacles, temperatures etc.
- Duration of event is an issue. A short duration event may help for a short movement, but fish may have to move a long distance. They may have to be attracted from refugia well downstream of the obstruction of interest for example.





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- Also, at obstacles fish need a bit of learning time. Also they jump in day not night.
- Should coincide with natural rises.



Components of adult salmon spawning migrations

- Once there, they have to stay there!
- Need suitable refugia. Deep secure pools and sufficient flow.
- Do not think permanent Q96 might be enough. Fish may drop downstream!



Spawning flows

- At spawning time, episodes really need to be more than 12 hours, ideally continuous higher flows over critical spawning period.
- Should coincide with natural events.
- Maybe should be higher than proposed in smaller tributaries.
- River Almond is a good example of how this can work in practice. By having a higher HoF you get water when there is a natural spate.



What's needed?

- Higher base flow from late summer at least in refuge areas – maybe not in side tribs.
- Earlier freshets, maybe more and longer.
- Bigger requirement for water.
- Maybe build refuges. Dig out pools in bedrock zones?



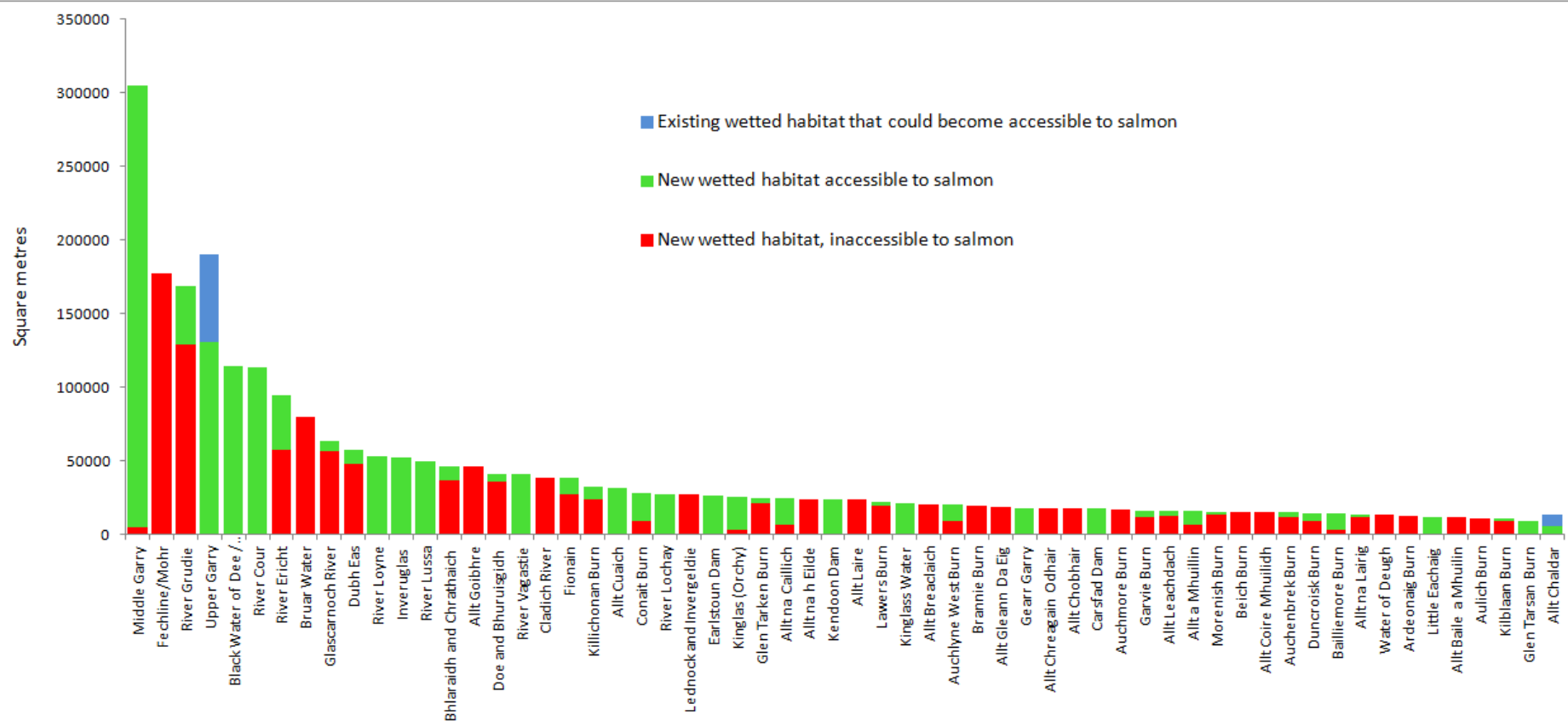
Conclusions of adult migrating and spawning flows

- May need a lot more water than first apparent!
- Is that game over?
- Maybe not!



How would this impact on “use”?

- Consultation says trying to find balance between ecological benefit and impact on “use”.
- It appears to be assumed that the flows proposed might be acceptable in terms of impact on “use”.
- Research etc focussed on the ecological benefit, but what of impact on use? That’s been little studied. Surely this should have to be done too.
- Fortunately, I have tried to quantify.





Conclusions from analysis of impact on use

- In Scotland, very few of the HMWBs previously classified <GEP are of much potential value for salmon.
- Could almost say that most of what I have been talking about is irrelevant except in a few cases.
- Many cases won't need spawning flows, as are steep impassable burns, nor any need for summer events, as spills occur not infrequently.
- Therefore, I argue that even if you do increase flows in those HMWBs that might have benefit to salmon, the overall effect on use will not be great, given limited scope for implementation.
- In truth, there will only ever be a few significant high profile projects. Let's at least get them right?



Reducing flows where they are “too high”

- This concept causes me great unease!
- Most of these will be on important salmon producing tributaries.
- Therefore, if there are actually few HMWBs that will become significant salmon producers through flow restoration, much more salmon producing habitat may be put at risk by these measures. Seems unbalanced.
- Maybe in some cases say there is a slight excess of flow, now we try to tune them to precision. Much more risky.
- Concerned, for reasons already explained about baseflows and migrations flows that there could be negative impacts, though I agree that some instances may be beneficial. While not natural flow regimes, examples of such flows do actually work.
- Find it ironic that if a river lacks high flows the solution is to extend low flows!



Reducing flows where they are “too high”

- There are other issues to consider too.
- Fishing considerations.
- Other recreations.
- Conflicts with NATURA etc.
- Likely to be strenuously opposed.