McClenagan, Laura

From: Gabriel Rossi <rossfactor@berkeley.edu>
Sent: Monday, November 22, 2021 3:40 PM
To: Planning Clerk
Subject: letter of support for Marshall Ranch project PLN-2019-15661
Attachments: Marshall Ranch Letter_Rossi.pdf

Please find attached my letter of support for the SRF Marshall Ranch flow enhancement project.

Thank you,

Gabe

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Gabriel Rossi
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Grantham Lab
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November 22nd, 2021

To Whom It May Concern:

I am writing to express my support for the Salmonid Restoration Federations' "Marshall Ranch Streamflow Enhancement" project. Flow enhancement from off-channel ponds is a promising and timely tool to help address the current crisis of declining salmon populations in California. While there is much to learn about how to best implement these projects, the scale of the Marshall Ranch Flow Enhancement project (i.e. magnitude and season of flow augmentation) suggests that it can have a significant beneficial impact to imperiled rearing salmonids. One of the factors that led me to support his project is the robust monitoring plan that SRF and their partners have described to me. I strongly encourage them to use this plan, within an adaptive framework, to maximize the benefit and minimize the risk of flow augmentation to salmon and other stream life. This letter is based on my experience as a fisheries ecologist and hydrologist, which includes research on a similar flow augmentation project in the Russian River. Thus, my comments focus on the potential ecological benefits of flow enhancement, rather than project design and engineering specifications.

Many of California's coastal salmon-bearing streams naturally experience low and intermittent streamflow conditions in the dry season (Grantham et al. 2012; Obedzinksi et al. 2018). Intermittency creates a natural bottleneck for rearing juvenile salmon by constricting habitat and degrading water quality. While this is a natural process, anthropogenic water diversions and habitat modification can increase the extent and duration of flow intermittency, pushing some streams over the edge from viable rearing habitat to conditions that are stressful or lethal for rearing salmonids (Obedzinksi et al. 2018). Research suggests that intermittent streams play a key role in salmon production (Wigginton 2006; Erman and Hawthorne 1976) and thus implementing and studying projects that limit flow impairment in such streams is important for regional salmon recovery efforts.

Redwood Creek in Humboldt County has been identified as a high priority stream for endangered Coho salmon and threatened steelhead trout, and is also targeted in ongoing streamflow restoration efforts by the California State Water Resources Control Board (SWRCB) and the California Department of Fish and Wildlife (CDFW 2014, 2016; NOAA 2014). Reaches of Redwood Creek, including the portion of the stream affected by SRF's proposed project, experience flow intermittency and stream drying by mid to late-summer each year, with rearing fish confined to isolated pools which remain wet. Anecdotal evidence from SRFs low flow monitoring and similar studies in near-by watersheds suggest that human water withdrawals may be contributing to an earlier recession of flow and more extensive stream channel drying than in the stream would experience naturally. Flow augmentation has the potential to significantly improve the extent and quality of juvenile rearing habitat in the project reach of Redwood Creek.

There is recent precedent for flow augmentation projects in the nearby Russian River (Deitch and Dolman 2017, Ruiz et al. 2019, Rossi et al. 2021 *in review*). These projects indicate that flow augmentation is a promising tool for facilitating movement of out-migrating smolts and improving summer rearing habitat salmonids—particularly in streams where humans have altered the natural flow regime (Rossi et al. 2020 *in review;* Rossi 2020; Ruiz et al. 2019). In

Porter Creek, a Russian River tributary with similar summer flow intermittency to Redwood Creek, we completed a recent study that evaluated the physical and biotic responses to a flow augmentation treatment (Rossi et al. 2020 *in revision,* Rossi 2020). We found that flow augmentation had a strong positive response on juvenile salmon foraging behavior, stream invertebrate flux, and indicators of habitat quality for rearing juvenile salmonids and other drift foraging fish. This study provides compelling evidence that enhancing dry season flows in small coastal streams, which are subject to high water-use pressures from agricultural and domestic water users, can improve habitat for aquatic species and promote the recovery of threatened salmonid populations.

It is important to note that there is still a lot to learn about when, and how to best implement flow augmentation projects, and not all flow augmentation may have the desired positive effects. In Porter Creek, we found that the magnitude, timing, and duration of flow enhancement necessary to trigger beneficial ecological responses is site-specific to (e.g. channel type) and strongly affected by the antecedent (ambient prior to augmentation) flow conditions in the stream. We also haven't studied the effects of augmentation on non-target species (e.g. amphibians), which warrants further investigation. But I believe that any risks of flow augmentation to stream life can be limited through project planning, monitoring, and adapting augmentation levels based on monitoring data – which I understand is part of SRFs project monitoring effort. Salmon populations are near a tipping point in many of our California coastal streams and flow augmentation is one tool to help to prevent catastrophic population losses as regional salmon recovery strategies are implemented. Thus, I strongly support continuing to invest in off-channel flow augmentation projects—with a caveat that it is vital to monitor the effects of this augmentation, and to use an adaptive science-driven approach to inform its implementation.

Please don't hesitate to follow up with me if you have any questions or would like additional information.

Sincerely,

Gabriel Rossi, PhD

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