State of California
Department of Fish and Game

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# Memorandum

**Date:** October 5, 2009

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**To:** Steve Herrera
Environmental Program Manager, Division of Water Rights
State Water Resources Control Board

**From:** Carl Wilcox
Chief, Water Branch
Department of Fish and Game

**Subject:** Instream Flow Report for Rush and Lee Vining Creeks

Thank you for the opportunity to review and comment on the Instream Flow Study Report for Rush and Lee Vining Creeks prepared for Los Angeles Department of Power and Water by Taylor et al. (2009). The Taylor et al. (2009) report presents instream flow data for trout in Rush and Lee Vining Creeks which includes the use of benthic macroinvertebrate flow-discharge relationships. The Department of Fish and Game (Department) has reviewed the report and does not concur with the recommendations made in the report for modifying flow regimes in Rush and Lee Vining Creeks.

It is premature to alter current instream flows before stream habitats are restored. Monitoring information as referenced by Taylor et al. (2009) indicates that stream habitats (e.g., suitable winter holding habitat for larger trout) have not fully recovered. Although Rush and Lee Vining Creeks are evolving in response to flows, it is clear that habitat in these streams is not yet restored as required by Order D-1631. Channel maintenance and flushing flows for each stream may need to be reevaluated in an effort to restore stream habitats and maintain conditions that benefit the fishery and recovery of adjacent riparian areas. The focus on any management effort for Rush and Lee Vining Creeks should be to investigate what is needed to move habitat restoration forward. Habitat restoration goals must be attained before altering flows for fish.

Taylor et al. (2009) is requesting modifications to the flow regimes for Rush and Lee Vining Creeks to provide winter holding habitat for larger brown trout based upon a habitat mapping method. The modifications requested by Taylor et al. (2009) would reduce flows, in an attempt to reduce velocities preferred by adult trout for holding during winter. The report assumes that reducing flows would result in larger fish in these creeks. The Department does not support the modifications

to the flow regime as recommended by Taylor et al. (2009) for Rush and Lee Vining Creeks because the study does not provide the data and information to determine instream flows needed to maintain the fishery for Rush and Lee Vining Creeks suitable to reflect Order 98-05 criteria. Order 98-05 directs the Mono Basin Stream Scientists to evaluate and make recommendations based on the results of the monitoring program, regarding the flows necessary for restoration of Rush Creek. In summary, the Taylor et al. (2009) study is not consistent with Order 98-05 because:

1) Study design was inappropriate since habitat restoration goals have not been attained, and it is premature to alter flows before habitat is restored.
2) An evaluation of the effects of altering flows for lifestages (e.g., fry and juvenile) other than adults was not conducted.
3) Any change in flow regimes should be partitioned by water year types.

The Taylor et al. (2009) study data are not useable for management decisions related to flow needs in Rush and Lee Vining Creeks. The study as presented leaves the Department with questions and uncertainty related to the quality of the data. Such data of "unknown quality" are suspect and should not be used for decisions as part of the water rights process and developing stream flow requirements. Taylor et al. (2009) relied on a habitat mapping methodology, which lacks reproducibility and precision, validation, and a scientifically reviewed protocol. Further, the Taylor et al. (2009) data are suspect because:

1) The study lacks any performance data including measures of precision;
2) The study lacks any quality assurance/quality control procedures as a means for assessing satisfactory results;
3) The study methodology lacks clarity, detail, and appears to misuse available representative literature-based habitat suitability criteria (HSC) data for brown trout in Eastern Sierra streams.

The Department has interest in assuring that water flows within streams are maintained at levels which are adequate for long-term protection, maintenance and proper stewardship of fish and wildlife resources. Rush and Lee Vining Creeks are important tributaries of Mono Lake, Mono County. In the mid-late 1980's the Department participated in a cooperative investigation to identify stream flow needs in Rush and Lee Vining Creeks (CDFG, 1991 and 1993). As part of those studies the Department developed HSC preference data for brown trout applicable to Eastern Sierra streams (Smith and Aceituno, 1987). The HSC data were used as part of the flow investigations to develop stream flow recommendations for Rush and Lee Vining Creeks in the early 1990's based on a cooperative Instream Flow Incremental Methodology (IFIM) approach.

Taylor et al. (2009) was not appropriately designed to determine instream flow needs for Rush and Lee Vining Creeks suitable to reflect Order 98-05 criteria. For example, Taylor et al. (2009) only measured good-excellent habitat, and neglected

to include assessment of marginal habitat. Given that most habitats are still marginal, results and recommendations from Taylor are inappropriate. Further, Order 98-05 outlines the measures for restoration and protection of the fisheries, including both restoring and protecting larger fish but also to ensure that flow provided for certain lifestages does not cause severe reductions in available habitat for other life stages. Specifically, it is important to assess the effects on fry and juvenile habitat by the flows recommended by Taylor et al. (2009) which currently only target adult habitat in both Rush and Lee Vining Creeks. It is especially important to assess the effects on other lifestages of trout in Rush and Lee Vining Creeks since the large adults represent only a fraction of the overall fishery.

Taylor et al. (2009) uses a habitat mapping approach to quantify habitat-flow relationships areas at different flows. The Department recently requested a scientific peer review by a panel of local and national instream flow experts on a proposed Department project using the habitat mapping methodology employed by Taylor et al. (2009). The peer reviewers reported the habitat methodology as being subjective and lacking precision (CDFG, 2009). The peer reviewers also deemed the habitat methodology untested and unvalidated, possibly resulting in uncertain findings. Similarly, Gard (2009) reported the habitat mapping approach following Railsback and Kadvany (2008) procedures does not generate reproducible results. Taylor et al. (2009) acknowledged the difficulty with method reproducibility indicating they have improved the reproducibility of habitat mapping by developing brown trout habitat criteria based on measurable criteria and implementing a field protocol in which all points of a polygon boundary are measured. However, these method modifications do not provide any means of assessing and reporting the reproducibility, precision, or therefore the "quality" of the data.

Taylor et al. (2009) also did not appear to design their study to obtain any information on the performance of the methodology including the use of QA/QC procedures necessary to demonstrate the methodology was conducted in a manner to obtain satisfactory results and that the data generated are data of good quality. For example, it is unclear how sampling points are selected and how many points are needed to adequately identify a habitat polygon using the habitat mapping method used by Taylor et al. (2009). Further, there does not appear to be a scientifically peer reviewed protocol available that outlines the procedures of the methodology.

Taylor et al. (2009) reported the use of measured criteria from radio-tagged brown trout and criteria from the literature (Heggenes, 2002) for brown trout habitat suitability criteria. However, it is unclear whether the use of the Heggenes (2002) data are appropriate and relevant to Rush and Lee Vining Creeks, or any other creeks in the Eastern Sierra Nevada. Heggenes evaluated habitat preference of brown trout in Norway and Scotland in summer, and it is unclear that the very small number of brown trout in the larger (>350 mm) size class from the Heggenes (2002) data are representative of the larger brown trout in Eastern Sierra Nevada

streams. Site-specific and regionally-specific criteria (e.g., Smith and Aceituno, 1987) would be the most relevant habitat suitability criteria as compared to those criteria from other streams, regions, and/or countries, particularly if such criteria are not validated as transferable. Taylor et al. (2009) did not validate the transferability of Heggenes (2002) suitability criteria.

Taylor et al. (2009) incorporated the use of benthic macroinvertebrate habitat-flow relationships into the overall study design acknowledging that a healthy stream ecosystem requires a productive and diverse benthic macroinvertebrate community. Taylor et al. (2009) targeted riffle habitats for their benthic invertebrate habitat assessments. Riffle habitats generally support higher production of the ephemeroptera, plecoptera, and ephemeroptera (EPT) taxa, which make up a portion of the diet, in addition to small fish and crustaceans, of the larger adult trout. Taylor et al. (2009) did not indicate how the benthic invertebrate data would be used.

In summary, it is encouraging that the stream habitats in Rush and Lee Vining Creeks are improving and evolving. However, these habitats can not yet be considered recovered. Habitat restoration goals should be attained before modifying flows for fish. The Department requests to be a participant in any future study design and implementation activities to assure consistency with Order 98-05 and Department goals for protecting fishery resources in Rush and Lee Vining Creeks.

If you have any questions regarding this memorandum please contact Robert Holmes, Instream Flow Coordinator, at (916) 324-0838.

cc: Nancee Murray, Senior Staff Counsel, Office of General Counsel
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