

MEMORANDUM

**To:** EARIP Steering Committee Members and Stakeholders

**From:** Robert L. Gulley  
Program Manager

**Date:** June 7, 2010

**Subject:** Summary for Discussion Related to Agenda Item No. 3 - June 14-15, 2010  
EARIP Meeting Agenda

At the June 14 and 15 meeting, the EARIP will have to address two significant issues related to getting water to the species during a drought of record. The first issue deals with how much water we will need to have in storage to supplement springflow during severe drought. This issue will require the EARIP to reach tentative decisions on three issues:

- (1) what is the flow regime we need to use to provide protective flows to the species - - Science Subcommittee, Bio-West, or a modulated minimum;
- (2) if the modulated minimum is going to be considered, what flow levels will be protective of the species; and
- (3) what floor should we assume in calculating the amount of water needed to supplement springflow.

The second issue involves the specific engineering options for actually storing the water to be used for supplementation and how do we get that water to the springs during drought. Specifically, we need to decide on June 14 and 15 which “programs” the EARIP should ask HDR to conduct further analysis on.

This summary provides background information and recommendations regarding this first issue. Information regarding the second issue will be discussed under Agenda Item No.4.

I am offering these considerations in the spirit of helping the EARIP move forward to maintain our schedule and focus. As always, the decision about the path forward is the EARIP’s.

Issue Statement:

How much water we would need to have in storage to supplement springflow during severe drought?

Recommendations:

(1) In recognizing the goal of balancing the needs of the species for water with the region's need for water, the EARIP should first focus on those flows which will be necessary to satisfy the standard that FWS must consider in issuing an Incidental Take Permit (*i.e.*, that an action cannot "appreciably reduce the survival and recovery of the species in the wild") and on the programs that are necessary to achieve that standard. Later, the EARIP can consider and adopt additional actions to contribute to the recovery of the species;

(2) The EARIP should "park" the Bio-West regime for now until we know whether the modulated minimum regimes are protective, or can be made to be protective, and then decide whether to also consider the relative advantages of modulated minimums compared to the Bio-West regime with deeper pumping cuts; and

(3) The EARIP should allow Dr. Hardy to select the starting point for the modulated minimum flow requirements based on his experience with the spring systems and analyze this flow with his model.

A detailed discussion of each of these recommendations follows.

A. What Should Be Our Objective with Respect to Water for Supplementing Springflow during Drought?

Although, as a recovery implementation program, the EARIP is committed to contributing to the recovery of the species, we should initially identify actions that simply satisfy the requirements for issuance of the Incidental Take Permit and approval of the Habitat Conservation Plan. Then, we can include additional actions or more protective actions that contribute to the recovery of the species. This approach is consistent with our agreement to balance the needs of the species with the need for water in the region.

Most pertinent to our discussions on June 14 and 15 is the requirement that any "take" for which protection is sought will not "appreciably reduce the likelihood [probability] of survival and recovery of the species in the wild." 16 U.S.C. § 1539(a)(2)(B)(ii).<sup>1</sup> Further, because FWS's decision to authorize "take" is an "agency action," FWS must consult with itself on the decision. As part of that consultation, FWS must determine that the action, *i.e.*, the "authorization of take," is not "likely to jeopardize the continued existence" of listed species and will not destroy or adversely modify critical habitat. The term "jeopardize the continued existence" is defined as an action that will "reduce appreciably the likelihood of survival and recovery of the species in the wild." 50 C.F.R. § 402.02. Thus, the required determination for issuing the Incidental Take Permit is essentially the same as the jeopardy determination for FWS's biological opinion.

The requirement that an action cannot "appreciably reduce the survival and recovery of the species in the wild" does not require the applicant to recover the species. *National Wildlife*

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<sup>1</sup> The statutory requirements for issuing an Incidental Take Permit include: (1) the taking will be incidental; (2) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking; (3) the applicant will ensure that adequate funding for the plan will be provided; (4) the taking will not appreciably reduce the survival and recovery of the species in the wild; and (5) Any measures FWS deems "necessary and appropriate" will be met. 16 U.S.C. § 1539(a)(2)(B)(i)-(v).

*Federation v. National Marine Fisheries Service*, 524 F. 3d 917, 936 (9<sup>th</sup> Cir. 2008); *Salmon Spawning & Recovery Alliance v. National Marine Fisheries Service*, 2009 WL 2487917\*1 (9<sup>th</sup> Cir., Aug. 14) (*See* Exhibit A to this Attachment 2). It simply requires that the applicant's actions "will not appreciably reduce the odds of success for future recovery planning, by tipping a listed species too far into danger" - - *i.e.*, the chances of recovery cannot be "appreciably" reduced by the plan. *Id.*

**Thus, I suggest we focus initially on those flows which will be necessary to satisfy the "appreciably reduce" standard and the "programs" for attaining that standard.**

B. What is the Role of the Science Subcommittee's Flow Recommendations?

The flow recommendations made by the Science Subcommittee (*see* Exhibit B to this Attachment 2) are designed to ensure the recovery of the species:

Our interpretation of a protective flow regime is one that will ensure the 'survival and recovery of the species in the wild'. To accomplish this goal, the subcommittee determined that the recommended flow regime must sustain an overall trend of maintaining or increasing the populations of the threatened and endangered species.

Analysis of Species Requirements in Relation to Discharge Rates Associated with Reductions for Stages of Critical Period Management of the Edwards Aquifer ("J Charge Report") at iv (emphasis added). Accordingly, using the Science Subcommittee flow recommendations to design an action would result in an action that significantly exceeds what is required for the issuance of the Incidental Take Permit - - *i.e.*, the action goes beyond what is needed to ensure that the action does not "appreciably reduce the likelihood of survival and recovery of the species in the wild." **If we are going to focus initially on those flows which will be necessary to satisfy the "appreciably reduce" standard, we may want to consider the Science Subcommittee's flow standards to be aspirational, at least for now.**

In recognizing the goal of balancing the needs of the species for water with the region's need for water, the EARIP should focus now on identifying a regime that is likely to achieve the "appreciable reduction" requirement for issuing the Incidental Take Permit. Subsequently, the EARIP can include additional actions to contribute to the recovery of the species. Such actions could be simply implementing one or more measures from the recovery plan, using flow targets that exceed the level of "protectiveness" suggested by Dr. Hardy's upcoming analysis, or using the more recovery based flows identified by the Science Subcommittee. It seems to me that the latter decision is best made when more is known about what is necessary and how much the necessary elements may cost, the relative benefits of the additional actions, and how much more the actions to "contribute to recovery" are likely to cost.

If the EARIP wants to use the Science Subcommittee approach, it should consider asking the Subcommittee to consider whether some adjustments to the regime that they identified are appropriate. For example, in arriving at the standards, the Science Subcommittee assumed only that the *status quo* would be maintained with respect to the species habitat. Their assumption that no mitigation would occur is inconsistent with the requirements for issuing the Incidental Take Permit. 16 U.S.C. § 1539(a)(2)(B)(ii) ("The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking") (emphasis added). Further,

using the “no mitigation” assumption results in flow requirements that are more stringent than what is needed to achieve the “appreciable reduction” requirement for issuing the Incidental Take Permit. Thus, the Science Subcommittee might be asked to consider whether its recommendations need to be revised to reflect the mitigation measures already tentatively adopted by the EARIP.

Moreover, the Science Subcommittee recognized that, by choosing a regime that “must sustain an overall trend of maintaining or increasing” the populations of listed species conditions could not be allowed to go below the limits set by the regime. J Charge Report at 12. Thus, the EARIP may wish also to ask the Science Subcommittee, if the goal is simply to ensure that the flow regime does not “appreciably reduce the survival and recovery of the species in the wild,” whether the standards in its recommended regime have to be attained all of the time?

### C. Bio-West’s Severe Drought Flow Regime

The Bio-West flow regime was designed to achieve a different goal than the recommendations of the Science Subcommittee. Rather than focusing on sustaining an overall trend of maintaining or increasing the populations, the purpose of Bio-West’s Severe Drought Regime was to ensure survival of the species during a severe drought, such as the drought of record, while ensuring that after the drought the species would still be able to recover:

The purpose is to develop a flow regime for survival of the threatened and endangered species during a severe drought using mitigation and management options beyond the status quo. The regime is also designed so that coming out of the severe drought the habitat remaining and species populations would be such that there is the potential for recovery.

Oborny PowerPoint, May 18, 2010 presentation, Slide 3

[http://earip.tamu.edu/EARIPMeetings/May1810/Drought\\_Regime\\_EARIP\\_May\\_2010.pdf](http://earip.tamu.edu/EARIPMeetings/May1810/Drought_Regime_EARIP_May_2010.pdf) .

This approach is consistent with an “appreciable reduction” standard required for the issuance of an Incidental Take Permit. Although it has not been evaluated by Dr. Hardy, the Bio-West Severe Drought flow regime probably is protective of the species.

The problem with the Bio-West regime is that we are unlikely to find storage capacity for the amount of water required to implement it (approximately 430,000 acre-feet with a 340,000 acre-foot CPM floor and 316,000 acre-feet with 320,000 acre-foot CPM floor). *See* Exhibit C to this Attachment 2.<sup>2</sup> Therefore, protective or not, it may be infeasible to implement the regime at least without much more severe pumping reductions. *Id.*

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<sup>2</sup> Exhibit C shows the deficit and storage water needed to achieve the Bio-West springflow regime with different CPM floors. The “deficit” is the amount of water needed in the springs to ensure that the springs do not fall below a particular minimum during the drought of record. To obtain the amount of water that must be stored to provide the deficit amount, the deficit is multiplied by an “inefficiency” factor to account for the water that does not go to the springs after injection or recharge. This factor is assumed to be 1.7 for injection or recharge near the Comal Springs and 1.2 for injection near the San Marcos Springs. These factors are preliminary and are subject to revision as additional modeling of various scenarios is performed. The inefficiency factor does not account for losses due to evaporation if a quarry or conventional reservoir were used for storage or any water that might not be recovered from an ASR.

**Thus, it may make sense to “park” the Bio-West regime for now until we know whether the modulated minimum regimes are protective or can be made to be protective and then decide whether to also consider the relative advantages of modulated minimums compared to the Bio-West regime with deeper pumping cuts.**

#### D. Modulated Minimums

A “modulated minimum” is a flow strategy for protecting the species by ensuring that flows do not drop below a specified flow level during severe drought. A simulation of 30 cfs modulated minimum flows at Comal Springs during the drought of record is illustrated in Exhibit D to this Attachment 2. The simulation assumes that the CPM floor is 340,000 acre-feet. Note that during worst part of the drought (1954-1957), the flows would be “flat” at 30 cfs.

Oborny said that a modulated minimum flow regime may also be protective if the Major Assumptions<sup>3</sup> are implemented (Oborny PowerPoint, Slide 22 [http://earip.tamu.edu/EARIPMeetings/May1810/Drought\\_Regime\\_EARIP\\_May\\_2010.pdf](http://earip.tamu.edu/EARIPMeetings/May1810/Drought_Regime_EARIP_May_2010.pdf)) and pulses are provided during any significant “flat flow” period (*i.e.*, 1954-1957). The initial step in evaluating the protectiveness of a modulated minimum regime is to analyze it using the new Hardy model.

The EARIP was unable to come up with a consensus regarding the initial flow numbers for such an evaluation.<sup>4</sup> A significant part of the problem, I believe, is that the group may not have fully understood how the Hardy model works. The Hardy model’s utility is not limited to saying whether a particular flow regime is protective. As long as the starting number is not too protective or too “unprotective,” Dr. Hardy will be able to use the initial numbers to determine what modulated minimum flow is protective or if a protective modulated minimum flow even exists. Thus, to evaluate the protectiveness of a modulated minimum, any mid-range starting point is likely to yield the information we need to reach decisions.

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<sup>3</sup> The Bio-West flow regime assumes that significant mitigation measures will be implemented. These “Major Assumptions” include the following measures:

- Water quality of the spring flow will have the same chemistry and biological components as Edwards Aquifer water.
- Mitigation activities will control (not eliminate) exotic plant and animal species including the gill parasite.
- Recreational impacts to species will be addressed and managed to limit impact.
- Intensive Management Areas (IMAs) are in place on both the Comal and San Marcos systems.<sup>3</sup>
- The IMA will be established in advance in preparation for severe drought and will include a total coverage of wild rice approximately 1,000 meters squared. For example, five – 200 meter IMA’s spread longitudinally down the river
- Flow split between the new and old channels at Comal will be part of the management strategy.

Oborny PowerPoint, Slides 18 and 19

[http://earip.tamu.edu/EARIPMeetings/May1810/Drought\\_Regime\\_EARIP\\_May\\_2010.pdf](http://earip.tamu.edu/EARIPMeetings/May1810/Drought_Regime_EARIP_May_2010.pdf). I recognize that significant concern exists that if we adopt IMAs, their existence will control the management strategy for the aquifer. If this is the principal concern, can we address that concern rather than abandoning the IMA strategy?

<sup>4</sup> At the May 18, 2010 meeting SAWS suggested that additional flows are not needed at the San Marcos Springs. We need to discuss this suggestion. If we allow Dr. Hardy to select the initial modulated flow, perhaps this discussion can be delayed until we have the analysis in hand.

**Given the difficulty we had in agreeing on an initial number on May 18, we may be better just allowing Hardy to select the starting point based on his experience with the spring systems.** Indeed, asking Dr. Hardy to select the starting point for the analysis has an additional advantage. If the starting point is close enough to being a protective flow, Dr. Hardy, using his updated model, may also be able to suggest “tweaks” to the assumptions that may make a lower flow protective. In conducting his analysis, we should ask him to assume that all of the Major Assumptions and the other high priority mitigation measures recently recommended by the Ecosystem Restoration Subcommittee will be implemented.

If the EARIP decides to select the flow requirements for the model run, I suggest we use flows of 40 cfs at Comal Springs and 52 cfs at San Marcos Springs. We also should include additional supplemental water to provide 80 cfs pulse flows at both springs every nine months during prolonged period of flat flows. *See* Exhibits E and F to this Attachment 2. These recommended flows, I believe, are likely to be within the range of protective flows that could yield useful information from Dr. Hardy’s modeling.

If, by June 15, 2010, Dr. Hardy is authorized to begin coming up with a starting point or given initial modulated minimum flows, he will have the results by August 3, 2010.

E. What Is the Role of the Hardy Analysis in the Decision-Making Process?

The results of the Hardy analysis do not dictate a particular flow regime or flow target. With input from Hardy, Oborny, RECON, HDR, and those members of the Science Subcommittee that are available to participate, the EARIP will need to consider whether adjustments to the flow regimes or another flow regime should be used. To do this, we will need to use the influence diagrams to develop information regarding the baseline so that Dr. Hardy can model it for comparison purposes. Further, we can use this information to consider whether additional adjustments to flows are appropriate or necessary and/or whether additional mitigation measures are appropriate.

We will also need to consider whether the uncertainty associated with the implementability and effectiveness of any flow regime or engineered solution requires adjustments to the regime. Finally, we may want to consider whether higher flow targets should be used to satisfy our goal of contributing to the recovery of the species.

At the end of the summer, Dr. Hardy will conduct another analysis after decisions are made on the final package that includes the final package of mitigation measures and any flow adjustments.