M E M O R A N D U M

TO: EARIP Steering Committee Members and Stakeholders

FROM: Robert L. Gulley

DATE: September 21, 2010

SUBJECT: Support Information for September 23-24, 2010 EARIP Meeting

INTRODUCTION

At the September 9 and 10 meeting, the EARIP narrowed the issues with respect to the minimum flow requirements and how to get water to the species to meet those requirements. The EARIP, however, was unable to bridge the differences with respect certain aspects of these issues. As agreed on September 10, the purpose of this memorandum is to provide information on a process for the Habitat Conservation Plan ("HCP") that may be useful in resolving differences with regard to two of those fundamental issues.

1. Summary of September 9 and 10 EARIP Meeting Discussions

On September 9, 2010, Thom Hardy and Ed Oborny agreed that flows of 30 cfs at Comal Springs and 45 cfs at San Marcos Springs were sufficient to ensure that the listed species could survive a repeat of the drought of record with the potential for recovery. This position was subject to two conditions: (1) that the key mitigation measures tentatively adopted by the EARIP, including the ERPAs and recreation management, would be implemented; and (2) that pulses of 80 cfs for 2-to-3 months would be used to ensure that the minimum flows did not extend for longer than six months. While a majority of the Steering Committee would support using the 30 cfs at Comal Springs and 45 cfs at San Marcos Springs flow minimums, some stakeholders believed that these flows were not adequately protective without an additional "buffer."

The EARIP reached general agreement to use a "bottom up" approach that attempts to stack up a number of "non-engineered" options (*e.g.*, the dry year option) to attain the minimum flows. Under this approach, if the "non-engineered" options are not adequate to attain the minimum flows, an engineered option (*e.g.*, an ASR) would be added to close the gap.

Program 2 evaluated by HDR, an example of a "bottom up" approach, did not achieve continuous springflows at Comal Springs let alone the minimum flow described by Hardy and Oborny for Comal Springs. Attempts to work through a "strawman" proposal using the "bottom up" approach reached agreement to include four "non-engineered" options (dry year option, limited use of SAWS ASR, brush management/Canyon Reservoir, and water conservation programs), but did not reach agreement at the last meeting on enough options to keep Comal Springs flowing. The effort faltered because of differences in views as to whether a reduction in the Critical Period Management ("CPM") floor from 340,000 to 320,000 acre-feet should be included among the "non-engineered" options to get springflow above zero at Comal Springs,

and the difficulty in coming up with other options to attain the minimum springflow at Comal Springs.

On September 23rd and 24th the EARIP will be asked again to make decisions on minimum flows and on the use of a "bottom up" approach to achieve those flows during the term of the permit. Prior to trying to make those decisions, I recommend that the EARIP consider and adopt the following plan for developing and implementing the HCP.

RECOMMENDED PROCESS FOR DEVELOPING AND IMPLENTING THE HCP

As agreed at the meeting on September 10, I recommend that the EARIP consider and adopt the following process for developing and implementing the HCP that I believe may be useful in resolving the differences on the two issues on which agreement could not be reached on September 9th and 10th. The process includes the following elements: (1) make an initial decision now on a narrow, but acceptable range of minimum flows; (2) use the "bottom up" approach to stack up "non-engineered" options that get the simulated flows as close as possible to those flow ranges and commit to close the remaining "gap" through the use of an engineered solution such as an ASR; (3) implement "non-engineered" options and mitigation and minimization measures as soon as possible after the issuance of the permit; (4) make decisions to establish more precise minimum flows during the permit term through the adaptive management process; (5) make changes or adjustments to the actions during the permit term based on the decisions on the minimum flows and other information developed in the adaptive management process; and (6) implement the engineered solution determined by the adaptive management process.

The implementation of the HCP is phased with the actual construction of the engineered solution not beginning until after the initial phase of the adaptive management process. The EARIP will commit to achieve the minimum flows that come out of the adaptive management process. The "non-engineered" options will be implemented promptly after the issuance of the permit. The "non-engineered" options will not have to attain the minimum range of flows alone, but they must be adequate enough to ensure that the species will not be exposed to an unacceptable risk to their survival and recovery until the engineered solution is constructed and operational.

ELEMENTS OF THE RECOMMENDED PROCESS

1. Permit Term

United States Fish and Wildlife Service ("FWS") regulations set out the following requirements for evaluating the duration of any permit proposed by an applicant:

> The duration of permits issued under this paragraph shall be sufficient to provide adequate assurances to the permittee to commit funding necessary for the activities authorized by the permit, including conservation activities and land use restrictions. In determining the duration of a permit, the Director shall consider the duration of the planned activities, as well as the possible positive and negative effects associated with permits of the proposed duration on listed species, including the extent to which the

conservation plan will enhance the habitat of listed species and increase the long-term survivability of such species.

50 C.F.R. 17.22 (b)(4). FWS guidance also explains that "[I]f the permittee's action or the implementation of conservation measures continually occur over a long period of time … the permit term would need to encompass that time period." 65 Fed. Reg. 35,242, 35,256 (June 1, 2000).

I suggest that the EARIP seek a permit of no less than 15 years, up to 25 years.[1] The permit term will be divided into three phases: (1) an 8-year initial adaptive management phase during which time the "non-engineered" options will be put into place, refinements made in the minimum flows, and decisions made regarding the size and use of the engineered solution; (2) the construction phase during which the engineered solution, if necessary, will be constructed and its effectiveness evaluated; and (3) the continued operation of the actions, monitoring and adaptive management.

A permit term of at least fifteen years allows enough time during the permit term (1) for the adaptive management process to develop the necessary information to allow an informed decision regarding the minimum flows and engineered solution; (2) for the engineered solution to be put in place; and (3) to evaluate the effectiveness of the overall action.

2. Flows at Comal and San Marcos Springs

a. Where the EARIP Is on the Issue

After extensive data collection, analysis, modeling, and joint discussion, on September 9, Thom Hardy and Ed Oborny reported that flows of 30 cfs at Comal Springs and 45 cfs at San Marcos Springs would be the lowest minimum flows that would be adequate to ensure that the listed species could survive a repeat of the drought of record with the potential for recovery. This view was conditioned on the assumption that increased flows of 80 cfs for 2-to-3 months would be used to ensure that the minimum flows did not extend for longer than six months.

After discussing the minimum flows, the EARIP took a straw vote on the flows. Fifteen Steering Committee members would support a minimum flow 30 cfs at Comal Springs and 45 cfs at San Marcos Springs with pulses of 80 cfs for 2-to-3 months. Seven Steering Committee members would oppose these minimum flows. Four members did not vote. Those that objected to the minimum flows generally believed that these flows would not be adequately protective without an additional "buffer" or safety factor for managing uncertainty.

In the discussion of the minimum flows, concern was voiced that the minimum flows are expressed as monthly averages – *i.e.*, that significantly lower flows could be experienced during any given month. Due to uncertainty in modeling results, Ed Oborny and Thom Hardy believe that flows lower than the minimum flows should be avoided.[2] HDR said it would try to develop

[1] For purposes of this memorandum, I assume a 15-year permit term.

[2] I have confirmed with Ed Oborny and Thom Hardy that a daily average would be sufficient for these spring fed systems as springflow does not fluctuate greatly on a daily time-step after CPM was put in place.

a correction factor that could be applied to the minimum flows to derive monthly averages that would result in daily average flows of at least 30 cfs at Comal Springs and 45 cfs at San Marcos Springs.

HDR has developed these "correction factors." To manage to a daily average for Comal Springs, one would have to apply a correction factor of approximately 16 cfs. To manage to a daily average at San Marcos Springs, one would have to apply a correction factor of approximately 8 cfs. Thus, in terms of monthly average flows, to achieve Ed's and Thom's minimum flows, the management targets would be 46 cfs at Comal Springs and 53 cfs at San Marcos Springs. If the upper end of the working range agreed to by the EARIP were used, the management targets would be 56 cfs at Comal Springs and 60 cfs at San Marcos Springs.

At the end of the day on September 10, the EARIP agreed to use as a "working" assumption for discussion purposes minimum flows in the range of 30-to-40 cfs at Comal Springs and 45-to-52 cfs at San Marcos Springs.

b. The Suggested Path Forward With Respect to Flows

Based on discussions with the Steering Committee members this week, I believe that positions with respect to the minimum flows are strongly held. I am not going to suggest specific flow numbers to form the basis for your discussion. Thom Hardy and Ed Oborny have presented their views of the lowest acceptable minimum flows based upon their consideration of the available science, and I believe they have done an excellent and defensible job. It is well within the discretion of the EARIP, however, to adopt higher minimum flows to ensure the protectiveness of the actions covered by the Incidental Take Permit.

For the reasons set out below, I urge you to avoid impasse and a likely stalemated issues team by <u>not</u> engaging now in an untimely and unnecessary battle over what is the most appropriate flow number. Rather, I urge you to commit to use the best data available now to define a range of flow targets and, thereafter, to commit to improve that data to define the specific minimum flows through the adaptive management process during the permit term. I encourage you to remember that, at the end of the day, the goal is to ensure that the species and their habitat survive - - flows are a means to that end, not the end itself.

I, therefore, suggest that the EARIP instruct the consultants now to assume that the HCP and Implementing Agreement will contain a commitment to achieve by year 13 of the permit average monthly minimum flows <u>identified through the adaptive management process</u> and to assume for the time being that that these flows may range between 45 and 55 cfs at Comal Springs and 52 and 60 cfs at San Marcos Springs.[3]

I urge the EARIP not to put too much emphasis on finding the optimal minimum flows at this time. The specific flow numbers do not have particular significance in and of themselves. They are simply surrogates for biological conditions that are apt to occur over a range of flow conditions. In fact, Thom Hardy made clear in his presentation that there may not be

[3] These flows are the "workin" flows agreed on for discussion purposes on September 10 adjusted by the respective correction factors. The EARIP did not indicate support for applying the correction factors to the minimum flow numbers either in its straw vote or in the working numbers. I believe, however, that Hardy and Oborny intended that their minimum flows were to be treated as daily averages.

quantifiable biological differences over a fairly wide range of flows. Thus, there may be no discernable difference in the biological conditions that exist at a monthly average flow of 46 cfs at Comal Springs and a monthly average flow of 56 cfs at Comal Springs. Accordingly, I believe the use of a range of flows is appropriate for a starting point in light of the data at hand, and that the "working" average monthly minimum flows that you agreed on, corrected for daily time steps, are likewise a reasonable starting point - - recognizing that the actual minimum flows eventually developed in the adaptive management process could be outside of this initial range.

There may be a good argument that, because the Hardy and Oborny found that 30 cfs at Comal Springs and 45 cfs at San Marcos are minimally acceptable flows, as a matter of policy, it is better to provide a buffer for those flows. However, that decision does not have to be made now. One of the principal purposes of the adaptive management process is learn more about the uncertainty attendant to the biological flows, and the effectiveness of the habitat restoration and mitigation and minimization measures. Under the phased approach recommended here, the actual minimum flows do not have to be determined until the initial phase of the adaptive management process is complete. At that point, unlike now, the EARIP be able to make the decision on the flows based on an updated MOD-FLOW model, direct observations of the effects of different low flows on habitat from the experimental channel ERPA, the results of efforts to transplant and maintain Texas wild rice, and the effectiveness of the habitat restoration and recreation management measures. *See infra* at pp. 6-7.

Finally, the decision the EARIP will be making now is simply a decision to turn the minimum flow ranges over to our consultants for use in evaluating the options for attaining the minimum flows. Contemporaneously, FWS will begin evaluating them and the underlying science through an open and transparent process to determine if the proposed action is likely to jeopardize the continued existence of the species.[4] Thus, it really makes no sense to have an unnecessary fight now when either our consultants' work or the FWS's analysis could provide a basis for revising the minimum flows prior to the submission of the HCP.

3. Implementation of the HCP

The following projects, if included in the action, would be put into place or be in place immediately upon issuance of the permit:

- The Mitigation and Minimization measures and ERPAs set out in Attachment 1;[5]
- A robust monitoring program;
- Dry Year Option;
- Expanded use of the SAWS ASR[6];
- Water conservation programs;
- Emergency Stage V restrictions[7]; and

[4] FWS will not actually make this determination until after it receives the completed application for the incidental take permit.
[5] These measures include, but are not limited to, the old channel study area, recreational management measures at San Marcos Springs, and replacement of non-native vegetation at San Marcos Springs with Texas wild rice.
[6] See infra at pp. at p. 9.
[7] *See infra* at pp. 8-9.

- Creation of refugia at the NFH&TC, with a level of support to be determined through further discussion.

Construction of the ASR, or any replacement engineered solution, will begin at the start of Year 8 of the permit. To be prepared for final decision making on engineered options, siting, permitting, and initial design for the ASR should begin reasonably promptly after the issuance of the permit.

The final mix and priority of all of the activities and projects will be determined through adaptive management no later than the beginning of Year 7 of the permit, including any adjustments/refinements to the "non-engineered" options already implemented in the early years of the permit. Some of the elements may be replaced with other projects and/or the size and scope of a project may be changed through the adaptive management process.

The "non-engineered" options would be implemented promptly after the issuance of the permit. Although the complete set of actions, when implemented, will have to meet the minimum flow requirements, the "non-engineered" options together with the minimization and mitigation measures do not necessarily have to attain the minimum flows alone. *Southwest Ctr. For Biol. Diversity* 143 F.3d 515, 523 (9th Cir.1998) (approving the use of a phased approach, based on FWS's finding that the [species] could survive the loss of habitat during a four-year period in which an agency gradually acquired replacement habitat). Instead, they must be adequate enough to ensure that the species will not be presented an unacceptable risk to their survival and recovery until the ASR is constructed and operational. This means that the HCP may be approved so long as the magnitude of the risk posed by flows less than the minimum flows is not too great and the likelihood that those lower flows would occur before the ASR is operational is low.[8]

To approve the initial phase of the permit, I believe that, at a bare minimum, FWS will require assurances that the springs will continue to flow at some reasonable level until the engineered solution is operational. If the EARIP is able to stack up projects that it believes may not present an unacceptable risk of jeopardy, the EARIP should ask (1) HDR to simulate the continuous minimum flows that will be attained over the drought of record with the stacked up "non-engineered" options and the estimated size and cost of an ASR needed to achieve those minimum flows; (2) Hardy and Oborny to evaluate, in consultation with the Science Subcommittee, the magnitude of the risk to the species from those flows during the initial phase; and (3) RECON to prepare a qualitative risk assessment of the likelihood of the initial flow levels simulated by the HDR model will occur during the period before the engineered solution is operational. Based on these analyses, the EARIP should be in a position to determine whether or not it has an action that is likely to be acceptable to FWS.

4. Adaptive Management Process

[8] Recall that the analysis of risk frequently involves two components: (1) analysis of the magnitude of the harm; and (2) analysis of the likelihood that the harm will actually be realized.

Under the recommended process, the EARIP would continue to function at least through the initial adaptive management phase of the permit.[9] The adaptive management process will begin upon the issuance of the permit. It will include at a minimum the following elements:

- Updating the MOD-FLOW model to make it more responsive to the future needs of the EARIP;
- Studies in the old channel ERPA study area to evaluate the biological effects of flows between 5 cfs and 60 cfs;
- Programs to monitor the effectiveness of the initial actions;
- Evaluation of the effects of the habitat restoration measures implemented in years 1-7 of the permit; and
- A qualitative, probabilistic risk assessment analysis of the alternative flow minimums under consideration.

A decision about the actual minimum flows will be made no later than the beginning of Year 7 of the permit.[10] Initial decisions regarding any changes shall be made by the EARIP at least nine months prior to the beginning of Year 7 based on the results of the adaptive management process. Prior to any initial decision on the minimum flows, a qualitative risk assessment analysis of the minimum flows under consideration will be prepared by an independent consultant with the assistance of a panel of independent scientists from outside the region.

Any initial decision regarding the minimum flows will be subject to independent peer review. Final decisions will be made by the EARIP, subject to approval by FWS, based on the record developed during the adaptive management and peer review processes.

Construction of the ASR, or any replacement engineered solution, will begin at the start of Year 8 of the permit. Siting, permitting, and initial design for the ASR shall begin reasonably promptly after the issuance of the permit. A decision regarding any changes to the actions including the need for and purpose of the new ASR will be made no later than the beginning of Year 7 of the permit. Initial decisions regarding any changes shall be made by the EARIP at least nine months prior to the beginning of year 7 of the permit. Any such decision will be subject to independent peer review. Final decisions will be made by the EARIP, subject to approval by FWS.

5. The Elements of the "Bottom Up" Approach

I recommend continuing to use the "bottom up" approach to put together the action. The EARIP seemed to generally agree that this approach was preferable to simply implementing a large engineered solution. Figure 1 is the "strawman" that we used on September 10 to discuss the bottom up approach.

---

[9] If this approach is followed, the EARIP would have to decide what changes, if any, are needed to the existing structure and processes. **I suggest that this issue not be discussed at the September 23 and 24, meeting.**

[10] The adaptive management process may result in changes prior to this point if any of the underlying assumptions with respect to mitigation and minimization measures or the "non-engineered" solutions prove unrealistic.

Figure 1: The Strawman "Bottom Up" Approach Discussed On September 10					
San Marcos Springs			Comal Springs		
Months remaining not at 52 cfs	Months to 52 cfs	Activity	Months above 0	Months remaining	Estimated Annualized Costs
		ASR (45Kaf)	n/a		$24,500,000
0	8	CPM Floor Reduced to 320,000 acre-feet	16	1	The cost to obtain firm yield for this reduction could be significant
8	1	Purveyor/Ag Conservation	4	17	$2,300,000
9	6	Brush Mgmt - Canyon	3	21	$8,800,000
15	2	SAWS ASR (40 Kaf)	6	24	$8,000,000
17	3	Dry Year Option	8	30	$4,300,000
20	0	M&M	0	38	n/a
	20		37		$47,900,000

The EARIP was unable to stack up options to ensure continuous flows. The EARIP seemed to agree that the first five elements in the "strawman" should be included. The source of disagreement centered on the suggestion that the approach include a reduction in the CPM floor to 320,000 acre-feet. This element was suggested because it would close 16 months of the 17-month gap when springflows are below zero at Comal Springs.

a. A 320,000 Acre-Foot Stage V CPM Floor

At the outset, I want to make clear that I am not advocating reducing the CPM floor to 320,000 acre-feet, but I simply do not know how we can get to an approvable permit application using the "bottom up" approach without including such a measure. **I suggest that we revisit the issue of the CPM floor once again, but I suggest that this time we do so in the context of ways that the reduction could be implemented to minimize the impacts of doing so.**

I realize that making any change in the CPM floor is very controversial. I am particularly sensitive to the fact that such a change, even to 320,000 acre-feet, would be burdensome and costly to all pumpers, but particularly small municipalities and irrigated agriculture. Moreover, municipalities east of Cibolo Creek subject to the Edwards Aquifer Authority ("EAA") transfer rules are impacted differently from those that are not. Further, municipalities that have diversified their water supply or planned for growth or possible changes in the CPM plan are situated differently than those that have not.

One way to minimize the impacts of reducing the CPM floor would be to make the CPM reduction to a 320,000 acre-foot floor as a new a Stage V reduction rather than lowering the Stage IV reduction to 340,000 acre-feet. With this approach, the 320,000 acre-foot floor would not come into play unless the Stage IV reductions are not effective in stopping the springflow decline, *i.e.*, the reductions effectively serve as a "safety net" – an alternative of last resort. This

approach does not provide a perfect solution to the disparate impacts of reducing the CPM floor, but it does reduce the likelihood of the impacts being realized during the permit term.

Using the 320,000 acre-foot floor as a Stage V reduction is likely to produce significant beneficial effects on springflow as did the 320,000 acre-feet as the Stage IV floor. It is difficult, however, to predict the exact magnitude of that effect now. The EAA is currently modeling this scenario to determine its potential benefit. The results of the simulation should be available to the EARIP on Thursday.

There may be other ways to minimize the potential impact of a reduction in the CPM floor. For example, if we were to adopt the dry year option, irrigated agriculture would have a way to take out an "insurance policy" against the possibility that a reduction in the CPM floor would actually be realized. Moreover, the conservation programs we are discussing can minimize demand during CPM and help to stave off the likelihood of the Stage V reduction actually occurring. I urge you all to try to come up with additional ways we may be able to address the disparate impacts.

b. Expanded Use of the SAWS ASR

Even if the EARIP were to agree to utilize the Stage V reduction, further enhancement of springflow may be necessary to have an approvable HCP even using the phased approach. The SAWS ASR Work Group is currently exploring how the use of the existing SAWS ASR might be optimized. Water would be obtained to fill and maintain a portion of the capacity of the SAWS ASR for subsequent use to increase springflows during a severe drought. The water from the ASR would either be injected near the springs to enhance springflow or provided to SAWS as a trade-off for pumping cuts in Bexar County.

At this stage, the discussions are very conceptual. As with the Program 1 ASR option, the cost of water could be very significant depending on the mix of purchased or leased unrestricted irrigation permits and "1.14(h)" water. The EAA has agreed to fund three model runs by HDR to evaluate the potential benefits of this action to springflow and to get some initial cost estimates. The results of HDR's work should also be available to the EARIP on Thursday.

CONCLUSION

Any engineered solution will be expensive, and the need to use it may be infrequent. The recommended process for developing and implementing the HCP allows measures to be put in place immediately to protect springflow and enhance species viability while the region determines whether an engineered solution such as an ASR is necessary, or, if it is, what size facility must be constructed. Thoughtful sequencing of its decisions affords the EARIP an opportunity to evaluate whether an engineered solution other than an ASR will be more cost-effective. Further, the proposed process provides the EARIP an opportunity to assess whether, in light of the very limited number of times than an ASR may be called upon, the engineered solution could in some way be made to serve mixed springflow and water supply purposes.

In addition, the phased process affords the EARIP an opportunity to make decisions regarding the minimum flows based on better models and more actual field data. Finally,

although the phased approach delays some pieces of the solutions, it carries with it a commitment to achieve the minimum flows ultimately determined to be necessary. This provides certainty to the region and a solution to those who believe that a solution is long overdue.