

From: Paul Rusanowski [<mailto:paul.rusanowski@shibleygroup.com>]  
Sent: Monday, October 20, 2008 3:03 PM  
To: phil@isenberg-oharen.com; Guillen, Sergio@CALFED; Ullrey, Nancy@CALFED  
Subject: FW: Delta ecosystem health

Gentlemen: I just wanted to call your attention to a letter I sent to Representative Miller and an email to John Engbring of the USFWS. This correspondence discusses solutions to improving Delta health that are consistent with recommendations being made in the Delta Visions Committee report. If they have not already been discussed I think there are 3 points that merit exploration in solving both the health of the Delta and water needs throughout California. The first is a massive filtration system to provide water to the existing water transportation system without the entrainment impacts currently on the delta. This is discussed in both the letter to Representative Miller and the email to John. The second ties in with your recommendations for recycling water. I think much can be gained by moving reclaimed water from Southern California back to the delta. We already know how to move it one way; why not use the same expertise and methods to move the reclaimed water back to the delta. Along the way we can reap numerous recreational, agricultural, and ecosystem benefits that can help pay for the costs. Again, this is discussed in the letter to Representative Miller. Finally, I think much can be gained by looking to desalination as a solution that can provide more water to the overstressed system. The more water available from desalination the less is needed from the delta. However, much of the debate centers on coastal shoreline locations that can exacerbate ecosystem problems. Many issues associated with desalination can be minimized or eliminated if deep water discharge of brines is considered, as well as deepwater withdrawal of water for treatment. Such technology has a minimal impact on costs but reaps huge rewards in preserving valuable coastal ecosystems.

Thanks for taking a look at this material. I applaud you for your efforts in finding a solution to the delta health disaster facing California and the nation. I think you are on the right track. If we act fast enough, and decisively, maybe we can save what is surely a national treasure.

Sincerely,

Paul C. Rusanowski, Ph.D.

-----Original Message-----

From: Paul Rusanowski [<mailto:paul.rusanowski@shibleygroup.com>]  
Sent: Tuesday, November 20, 2007 3:10 PM  
To: 'john\_engbring@fws.gov'  
Subject: Delta ecosystem health

John - I just ran across the article on reviving a canal for bypassing the delta to bring water to Southern California. You were quote das saying it was the only viable option that lets the State move forward at this time. I have been following the delta issue for some time and thought you might be interested in the attached letter I sent to Representative Miller. You might find it interesting in light of building the canal mentioned in the Mercury News article (11-18-07).

I would suggest that you consider another issue that I think is related to the canal, that is the issue of entrainment. The canal concept needs to be tied to the rate of withdrawal at the present pump stations. If water is withdrawn from further upstream, the same amount of water should not be withdrawn from the delta pumps. That would have an immediate benefit to the delta smelt. The second issue that need to be addressed is a cost effective filtration system for water that is pumped out of the delta. I believe that we need to think in terms of surface filtration area versus flow rates. To reduce the entrainment we need to filter out the larval and

juvenile forms that are to be preserved and maintain an acceptable flow to the pumps. That means we need to spread out the area from which water is being withdrawn. Since the pumps are already in place that means we have to move the point of intake of water to another location and build a canal to transport that water to the pumps. That could be accomplished by building a porous dike that will pass water over a distance of one to several miles into an impoundment on the other side. The water in the impoundment then flows to the present pump locations through a canal. The porous dike concept is similar to a flowing river that is losing water to near surface groundwater. Water is moving into or out of the river based on groundwater dynamics through a porous medium (sands and gravels) By sizing the sands and gravels to exclude the larvae and juveniles of concern, and providing a linear dike to reduce the flow rate to an acceptable level, we create an artificial flow that can sustain the pump withdrawal requirements without the entrainment impacts.

I think a combination of three things will significantly improve ecosystem health in the Sacramento/San Joaquin delta. They are the bypass canal you support, a passive entrainment elimination system for delta water withdrawals as described above, and moving reclaimed water back to the delta through the San Joaquin River. This last item is described in my letter to Representative Miller. While I know there are many worthwhile uses for reclaimed water, I think the most valuable is for restoration of riverine ecosystems and shallow groundwater aquifers. That is why I have proposed that the San Joaquin River channel be used for transporting this water. However, if we focus exclusively on the delta that reclaimed water could be moved by canal to Fresno or points further north to conserve the amount of reclaimed water available for discharge into the delta. There are a myriad of opportunities associated with the reclaimed water once it reaches the top of Tejon Pass.

I hope you find these ideas helpful in trying to resolve the restoration of the delta ecosystem. I know it must seem like herding a hoard of wild cats, with few if any of them truly focused on ecosystem restoration as opposed to maintaining their piece of the water pie. Anyway good luck in your efforts, and if I can be of help please do not hesitate to contact me.

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March 2, 2006

The Honorable George Miller  
United States House of Representatives  
2205 Rayburn House Office Building  
Washington, D.C. 20515-0507

Subject: Collapse of the Sacramento-San Joaquin River Delta Ecosystem

Honorable George Miller:

I am writing to you in regards to your recent hearing in the House Resources Committee regarding the collapse of the Sacramento-San Joaquin River Delta ecosystem. I share the frustration you showed in questioning government scientists on addressing threats to the Delta that have resulted in significant declines of Delta resources and jeopardize the quality of life and economy of the region. I was particularly disturbed by the inability of government scientists to chart a clear path of action for the future to address what appear to be well defined culprits responsible for the decline. I wish to share with you some of my thoughts on how to restore Delta resources while maintaining current uses of Delta waters. Perhaps an outside perspective on how to move forward would be helpful to you in addressing the health of the Delta.

As a way of introduction, I grew up and was educated in California. I subsequently obtained a Masters Degree from the University of British Columbia, and a Doctorate from the University of Maine. I have worked as a professional environmental scientist my entire career and consider myself an ecosystem ecologist. I have enjoyed the outdoors in California my entire life, and still travel to California each year to fish for stripers on the Delta, fish for trout and Steelhead, hunt wild pigs, and hunt dove, ducks and geese in the Sacramento and San Joaquin Valleys. I maintain a membership in a California hunting club even though I am now a resident of Utah.

With regards to the health of the Delta and restoring important resources I think there is an opportunity to think outside of the box and consider practical ways to address each of the identified culprits. However, those solutions need to be considered within the ecosystem context and avoid political entanglements. While politics are strong and run very deep, I think if solutions are developed without political influence then people such as you, who are well versed in the political process, can effectively move a solution forward to implementation.

Government scientists have identified three main culprits responsible for degradation of the Delta. However, I believe that the most important one is the export of water to Southern California. The other two, invasive species and pollution, may be easier to resolve once water export has been addressed.

The problem with the export of water can be summarized as:

- The export of water will not stop;
- The export of water has modified the Delta;
- There is a demand for more water from the Delta; and
- Solutions to the health of the Delta are postured in allowing more water to enter San Francisco Bay exacerbating water allocation issues.

Clearly, the way forward is to find more water. That would ease the pressures from water managers, government agencies and the special interest groups as well as improve the health of the Delta. There are several sources that can be used to create more water in the Delta:

- **Reclaimed water above the Delta** - There are numerous towns and cities that use water, treat it and then discharge that water under NPDES permits. In fact, one city in the San Joaquin Valley is proposing to grow a 200 acre forest because they will be precluded from discharging tertiary treated water from their sewage plant when their permit is renewed. This will occur even though the tertiary treated water is virtually drinking water quality and much higher quality than the water in the San Joaquin River. If all upstream cities along the Sacramento and San Joaquin Rivers were required to tertiary treat wastewater, and discharge it back to the river systems, we would provide a significant amount of water to the Delta. How much more this would provide depends on what is happening to the water now. But when cities are considering growing forests in order to not discharge treated water to the river, it is doing nothing to help solve the problems on the Delta.

Reclaimed city water could also be used to replace agricultural water for regional farms. Using the water in this way would free up agricultural allocations to flow to the Delta. In any case the bottom line is that there would be some finite increase in the amount of water flowing into the Delta if reclaimed water is put back into the rivers or traded for agricultural allocations.

- **Reclaimed water from Southern California** - Most of the water that is transported to Southern California ends up being discharged into the ocean after treatment, again under an NPDES permit. However, there is no reason why that water must be discharged into the ocean. It could equally well be treated to a tertiary level and used for beneficial purposes. In this case the beneficial purpose is restoration of the health of the Delta. The water merely must be moved back to where it came from.

If a return viaduct or pipeline system were put in place to move tertiary treated wastewater from treatment facilities in Southern California to the top of Tejon Pass, gravity would take over and move that water all the way back to the Delta through the San Joaquin River. As the water flows into the San Joaquin Valley it would provide recreational opportunities, additional water for agriculture (which is grossly oversubscribed in the Central Valley), replenishment of valley aquifers, and probably a host of other uses as it flows back to the Delta. The water could then make another cycle to Southern California once it reaches the Delta.

While this may seem farfetched at first, I think the cost of building such infrastructure will prove to be small compared to the benefits to the citizens and businesses in California. As an example of potential benefits, the reclaimed water could provide sufficient dilution of the concentrated selenium waters in the Western San Joaquin Valley near Kesterson, to allow them to be discharged into the San Joaquin River after limited treatment to lower the selenium concentration. Present solutions being considered for this selenium rich water are running into the billion dollar range.

Once the cycling of water is implemented between the Delta and Southern California there would be sufficient flows of fresh water into the Delta to manage water resources to improve the health of this vital ecosystem and begin effective restoration of its resources. Once the pressure to fight over limited water resources is removed we have the opportunity to resolve issues and prevent future problems. We know from the past what not to do. By cycling water back to the Delta we create the water supplies that allow us to craft management practices for the future that will prevent us from reliving the mistakes of the past.

The second culprit identified by government scientists is water pollution from agricultural chemicals and pesticides, and other anthropogenic uses along the river courses. Pollution of waterways has been falling since the 1970's. It may not be as fast as some would like, but the trend is downward, and continues to be so today. By continuing to do what we are doing, and improving farming practices, limiting use of chemicals, and moving to tertiary wastewater treatment pollution levels will continue to fall even more. If cycling of reclaimed water is implemented, then there is more water to dilute the effects of these pollutants while they still continue to decline. That dilution effect will provide immediate benefits to the ecosystem that may be years away if cycling of water is not implemented.

The final culprit was identified as invasive species that outcompete local floral and fauna within the ecosystem. This is not an easy one to address, and probably has no silver bullet to solve the problem. However, creating economic value from those species may be one way to reduce or minimize the effects from such species. For example the clams covering Suisun Bay may represent a resource in itself. The calcium from the clam shells can be used as a natural soil amendment. The organic tissues may represent a protein source that can be used in animal feeds and concentrates. The harvest of the clams can produce local employment. Systematic raking up and harvesting of clams in the Bay at the appropriate spatial and time scales may help to restore the ecosystem into the nursery it used to be. Perhaps the same type of strategy can be implemented for other invasive species as well.

I know this has been a somewhat lengthy letter, but brevity is not the answer at this time. I hope that some of these suggestions may find merit with you and your staff and stimulate creative problem-solving within the scientific ranks of government. You deserve better answers than "I've been advised by legal counsel not to speculate" given by Mr. Harlow. The Delta ecosystem deserves better as well. We have to take the shackles off, climb out of the box we have created for ourselves, and solve the problems we have created. The answers are there but can we see our way clear to find them and move forward.



If I can be of further assistance to you in your efforts on the House Resources Committee and improving the health of the Delta please do not hesitate to contact me.

Thank you for your efforts to make a difference. I know this is just one of many issues you seek to resolve. Please keep persevering in your efforts to restore the Delta to its former health and vitality.

Sincerely,

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