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What we want to hear, compared to what we need to know about Water and the Delta

In the seemingly endless battle between human uses of natural resources, and avoiding or minimizing environmental damage from those uses, the Sacramento-San Joaquin Delta is once again at the center of public debate. That is good, and sometimes not so good.

This is my 51st year of working in and around government and public policy, half as an elected official, half as a lobbyist or working with government commissions and agencies.

Some lessons are clear. Common purposes, things that drive society, are increasingly rare. There is considerable irony in public opinion polls showing that most citizens desire that virtually all government spending continue at the same or higher levels, but only lukewarm support for taxing someone else, and little support for taxing oneself. That might change with the November election, since Governor Brown appears to have a solid chance of passing his tax proposal.

To be sure, the current recession has led to increased levels of despair and anger. But something more is going on, and the debate over water and the Delta is a good illustration.

My normal workweek includes endless meetings with staff and stakeholders, occasional press queries, and then public events, including speeches like this. My time is consumed with Delta Stewardship Council meetings, where water districts, government agencies, environmentalists, business and agriculture representatives, and the public at large, come to say what they want to say. After all these years, I recognize most of these people, and have supported their views or opposed them, at various points in my life.

In public, most of the speakers say pretty much the same thing. The most common refrain is 'me, and my interest first'. However, when I talk to these people in private, they say things differently. In private, people are more candid, flexible and pragmatic. This difference between public posturing and reasonable private conversation irritates me. I occasionally demand they speakers in public what they tell me in private. Some smile, but mostly they glower or stare back without responding.

This is the American way to negotiate: demand more than you want or need, in the hope of getting something better than you expect. Ask tough questions of your opponents, but duck the ones that come your way. Offer to comprise 30 minutes before a final decision. This pattern is not a great way to make public policy.

Every time I give a speech like this, someone comes up and asks, "Why are you so cynical"? Actually, I consider myself optimistic, albeit with an appetite for uncomfortable questions, and a sense of history.

The Sierra Club is revising its water/Delta policy, and some audience members tonight, are part of that process.

Damn those scientists: some things I did not want to hear

For years, my environmental friends have demanded that scientists and scientific information drive water and environmental policy. That sounded good to me, so I joined the chorus. Over the last few years, however, I have spent a lot of time listening to scientists, who are starting to say things I never expected them to say.

Some of you have probably read the March 29, 2012 report *Sustainable Water and Environmental Management in the California Bay-Delta*[1], written by the National Research Council of the National Academies. If you have not read it, I strongly recommend you do. The message is short, clear and contrary to the conventional wisdom. Here are six short conclusions from the National Research Council:

- "…the future will require planning and management that specifically acknowledge and take into account that *there is not enough water to meet all desired uses in California with the required degree of reliability everywhere and all the time*." (NRC 2012, p. 32)
- "The fact of water scarcity does not mean that the state is 'running out of water.' Although most surface flows have been fully allocated or over-allocated, the state can use a number of tools that optimize the use of existing supplies." (NRC 2012, p. 38)
- "The historic strategy of developing storage and conveyance facilities in response to growth in water demand is being replaced with a variety of supply and demand-management alternatives, including conservation…" (NRC 2012, pp. 31-32)
- "…the Delta as it was before large-scale alteration by humans (before about 1880) cannot be recovered." (NRC 2012, p. 152)
    - When speaking of the Delta, "Consideration of the large number of stressors and their effects and interactions leads to the conclusion that efforts to eliminate any one stressor are unlikely to reverse declines in the listed species." (NRC 2012, p. 8)
    - "Given the diverse set of organisms and processes that constitute the Deltaecosystem, *the ultimate success of any approach targeted to particular species seems doubtful*." (NRC 2012, p. 6) Italics added.

Why would a bunch of smart, nationally recognized scientists say all these things? Why would they claim our water supply is scarce, but not running out? Why say we can't save every

endangered species in the Delta? Is this a scientific version of the Rolling Stones' "You Can't Always Get What You Want?"

It is a delicious irony that elected officials from California asked the National Research Council to get involved, in hopes they would answer the question: "How can we get out of this water/Delta mess?"

'Be careful what you ask for" goes the old adage, 'you may get it!' These scientists managed to turn the tables on us. They refused the invitation to pick sides in our water wars and declare one side the winner. Instead, they tell us there are limits: limits to the water supply, and limits to our ability to improve the Delta ecosystem. I call this what we need to know, not what we want to hear.

How did we get here?

In 1850, when California joined the Union, 93,000 residents of European ancestry lived in the state and wanted to find gold. They found abundant water was available, particularly in Northern California.

Norris Hundley Jr., author of *The Great Thirst*, a wonderful history of California and its water battles, observes that during the Gold rush we adopted "*…a spirited individualism and an appetite for profit that elevated the exploitation of nature to new heights…*"[2]

Move ahead to the year 2012. The state has 38 million people in its boundaries, an economy worth almost $2 Trillion, and a lot of people, farms and businesses living a very long way from adequate water supplies.

Second thoughts on water and environmental damage

As we developed over the last 162 years, our society began to have second thoughts about water development.

In 1933, California voters narrowly approved the Central Valley Project (supported in the North and Central Valley; opposed in Southern California).[3] In 1960, California voters narrowly approved the State Water Project (supported in Southern California, mostly opposed in Northern California).[4] The last time California agreed to a major water project was the 1960 election.

In 1982, California voters repealed a law to build the Peripheral Canal, but this time by a large margin --- 62.7% against the Canal![5] Hundley said it well:

"Just as the electorate has sanctioned these ventures (referring to water projects)*, so too have the people of California begun to register second thoughts, especially over the last several decades. Spiraling costs, mounting evidence of environmental damage, heavy public expense in the increasingly exorbitant subsidies to agriculture, inefficient and wasteful water practices …all have contributed to mounting demands for reform."*[6]

The fantasy of an endless water supply bumps up against a growing population and economy, and the contemporary view that environmental damage from water development must be contained. This collision led to a water/ecosystem policy deadlock in California for five decades.

The deadlock started to break with adoption of the important water legislation package of 2009.[7] Behind the legislation, however, are stubborn facts that will dictate what we can and cannot do. Rather than bore you with a slide show, you have copies of a Delta Stewardship Council handout, *Facts and Information on California's Water and Environmental Debate.*[8] This relates to much of what I am going to talk about., that helps explain what is going on.

Stubborn Facts[9]: Our water supply and our water use

- Our statewide water supply is under stress and that stress will continue. Our available water supply is increasingly volatile; with more frequent high and low water flows. Climate change is the main cause, and the result is more rain and less snow in the Sierra Nevada Mountains, our natural reservoir. Volatility also means our current water storage and flood control systems are less efficient than the should be.[10] and [11]
- Our total water supply from precipitation and imports has changed little in the last 100+ years; per capita water use is going down, but overall demand continues to grow. [12] Water saved through the new 20% urban conservation law sounds great, until you realize that population and economic growth will overwhelm those savings almost immediately![13]and [14]
- Our current water export system is getting older, and the State Water Project is less reliable [15] and [16]. This is hardly surprising, given a relatively fixed supply of water, increasing (and unrealistic) demands, and a reluctance to pay for maintaining or improving the water delivery system.
- We are overusing our groundwater supply in significant areas of the state. [17] and [18] Storing water in a dam or underground is one of the ways we stretch a finite supply *during dry water years*. Increasingly, however, we are relying on our dams and underground sources for water use in average water years. The Delta Plan draft, as with the Delta Vision Task Force that preceded it, suggests that increasing wet year exports must inevitably lead to reduced exports in dry years, and some average water years as well, if we are to protect/restore the ecosystem.

Stubborn Facts: The Delta ecosystem and unique character

- The protected species in the Delta are in serious decline and have been for almost a century, [19] and [20]. Along with species decline, most Delta wetland habitat has been lost. [21] Since no good deed goes unpunished, sea level rise threatens all habitat restoration projects.
- The amount of water that flows into and through the Delta, heading to the ocean has declined significantly. This is attributable to increased water use upstream in the Delta

Watershed, by in-Delta users, and by water exported from the Delta.[22] Ironically, the proportion of water diverted by those in the Delta Watershed significantly exceeds the amount exported annually from the Delta [23] That means those of us who use water before it reaches the Delta are a big part of the problem.

- Stressors compound the problems of the Delta.[24] Upstream urban pollution, agricultural runoff, the Sacramento Regional Sanitation Plant ammonia discharge, or arguments about striped bass eating salmon, all play a role. The National Research Council warns us that targeting our favorite 'evil stressor' will not likely have an appreciable impact on the Delta. We would do well to acknowledge that all of us, in every part of California, have played a role in the decline of the Delta. All of us have a duty to help solve the problems.
- An inherently flood prone Delta cannot be fully protected against all flood risk. [25] Current federal, state and local disaster and emergency response programs are inadequate.[26] However, there is no such thing as a clear federal or state policy on levee standards. Cost-sharing programs do exist, but the policy rational for those programs is unclear. One thing is sure, increased urban development in the Delta undermines water reliability and ecosystem improvement. Increased urban development also undermines the unique rural character of the Delta[27] and [28]. At a minimum, limiting development on floodplains is essential to the protection of life, property, and state interests in the Delta.[29]

Let me circle back to the National Research Council for what I think are their main points.

- California's water supply is scarce, but we do not talk or act as if that is true.
- California's water supply is not running out, but we cannot guarantee water to everyone for every purpose. In particular, we cannot promise to achieve good results on the cheap.
- The ecosystem of the California Delta is deteriorating. We cannot recover the state of nature that existed in the 1880s, nor can we guarantee preservation of every endangered species.Smart policies, hard work and lots of money can improve the Delta ecosystem, and even make California's water supply more reliable. However, achieving good results require tradeoffs, and there will be positive and negative impacts. The most difficult thing to do is to make clear policy choices, and enforce them. This is the job of policy-makers, not scientists.

What the Delta Stewardship Council is doing

The Delta Stewardship Council, is an independent agency of state government established in 2009, as part of the major water/Delta bill package that included bonds, mandatory urban water conservation, groundwater level monitoring, new fees for water rights violation, and a major change in governance. We have a lot to do, but here are some of the more important things:

1. **The Council will develop, adopt and then implement a Delta Plan, which will have legally enforceable elements.** Our 6th staff draft Delta Plan will be released in mid-May, and the Council will a Plan later this year. The plan goes into effect immediately, subject to the endless lawsuits that all water and ecosystem issues seem to generate.

2. **The Delta Plan must help achieve the new water/Delta policy of the State, called the Coequal Goals**, which read as follows:

> *"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.* Water Code Sec. 85054

John Laird, our Resources Secretary, is fond of saying that it took him virtually no time to determine that everyone in California supports one of the coequal goals. However, adoption the coequal goals appears to end the old assertion that human uses of water are always more important than environmental considerations in California. They are now equal in status! The key is how to achieve those goals.

3. **State and local agencies must be consistent with the Delta Plan, and if they propose a covered action (a 'plan, program or project'), the Council may hear an appeal challenging the consistency of the proposal.** As you would expect, some state and local agencies are not pleased with this provision of law. Yes, moving water from the Delta, through the Delta and across the Delta may well be a covered action[30]:

However, the new statutes did not authorize the Council to hear and approve or over-rule any and all state or local agency decision. Nor did it remove the existing authority of the Water Board, Departments lof Water Resources and Fish & Game. We are not a super-regulatory agency --- hysterical claims to the contrary. We have authority, but it is focused and limited.

Yes, local land use 'planning and development' that meet the legal test of 'covered actions' must be consistent with the Delta Plan, and are subject to consistency determinations by the Council.[31] Water Code Sec. 85022 and 85056.5

To protect the Delta ecosystem and water quality, our Delta Plan charges the State Water Resources Control Board to adopt updated Delta water flow standards no later than 2014, and Delta Watershed standards by 2018. This will not be easy, but it is essential for both water reliability and for an improved and protected Delta ecosystem. In fairness, the Water Board has been trying to do just this for a long time, in the face of entrenched opposition.

Ironically, successful completion of the Bay-Delta Conservation Plan, the facilities project that is underway to design an improved Delta conveyance system, is dependent on the adoption of updated flow standards. The Delta Stewardship Council supports completion of both BDCP and the Water Board flow standards.

4. **The Delta Plan will require state and local agencies to show their consistency with new state law that calls for '…reduced reliance on the Delta in meeting California's**

future water supply needs…' Because this section is very controversial, let me read you the full statutory language from the 2009 Act:

> *The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.* Water Code Sec. 85021

The draft Delta Plan proposes that agencies with a covered action must show compliance with the new 20% water saving by the year 2020; demonstrate implementation of their Urban and Agricultural Water Management Plans; demonstrate how they will continue to operate if there is a possible interruption of Delta water supplies for a minimum of 18 to 36 months; and, implement a conservation-oriented water rate structure no later than December 2020.

5. **The Council is a potential appellate body with regard to the Bay-Delta Conservation Plan (BDCP),** which is the controversial new water export facility/ecosystem plan currently in its seventh year of existence. The authority granted the Council is to determine if the Department of Fish & Game correctly determined that BDCP met all the requirements of law.[32] Water Code Sec. 85320

   The key statutes here are compliance with the California Environmental Quality Act (CEQA), the state Natural Communities Conservation Planning Act (NCCP) and approval of a Habitat Conservation Plan (HCP) under the Endangered Species Act. At the same time, BDCP is also required by the 2009 state law, to study a large range of facility options, consider water flow criteria, possible sea level rise of up to 55 inches by 2100……..and the list goes on.

   The Council has no authority to amend or change BDCP. Instead, we can say yes, it meets the test of law; no, it does not meet the test of law; or we can ask questions.

6. **The Council supervises the Delta Science Program, and appoints members of the Delta Independent Science Board, which has its own statutory duties**. Generic scientific activity (research, review of programs and plans, seminars and publications, etc.) is about sixty percent of our total spending annually. There are many programs, but our ongoing review of various aspects of BDCP, the Sea Grant Fellowship program, close work with the Interagency Ecological Program, and support for the *San Francisco Estuary and Watershed Science* publication, a web-based, peer reviewed location for scientific information, are key.

7. **The Council will convene and oversee a committee of agencies responsible for implementing the Delta Plan.**[33] We expect this will include state and local agencies, but probably federal agencies as well. This could be described as legal 'hectoring'.

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Recently, I re-read a short essay by John Hart, titled: *The Once and Future Delta: Mending the Broken Heart of California.* Hart is an intelligent and fluid writer about the intersection of modern society and our natural environment. He sounds much like the authors of the recent National Research Council report.

If I could order the talented people who appear before the Council to articulate their private thoughts in public, I would hope some of them might say something like John Hart:

> *At a recent hearing, a resident complained: "You are deconstructing the Delta as Delta people know it." But human memories are short. The history of the modern Delta belies the image of the region as a static landscape. Reclamation was a battle with many setbacks, almost given up for lost in the 1870s. In the 1880s the 'crisis' was the clogging of channels by hydraulic mining debris. In the 1920s, salinity was on the march. A brief calm at mid-century gave way to the ever-spiraling tension over water exports and ecosystem decline. The Delta seems always to have been in crisis, under intensive study, and at the intersection of hostile interests.*
>
> *The Sacramento-San Joaquin River Delta is not going to disappear under the waves. Even if some fields become marshes, streamside forests, or open waters, the essence of the region --- a honeycomb of farmlands and waters patterned by dikes --- will probably be unchanged for centuries to come. But with luck --- and political will, and good science, and a lot of money --- the Delta might also become again what it has not been for decades: a functioning, changeful part of the greatest estuary on the Pacific coast of the Americas."*[34]

Few of us write as well as John Hart. All of us, however, talk about public policy and we should be willing to tell the world --- and our clients, member, fellow resident --- what they need to know, not what they want to hear.

In a better world, environmentalists would talk like John Hart, and water users would talk like the National Research Council.

If that starts to happen, maybe we will survive as a society.

[5] *Sustainable Water and Environmental Management in the California Bay-Delta*, National Research Council, The National Academies, Washington, DC: The National Academies Press, 2012, http://www.nap.edu/catalog.php?record_id=13394#toc

[2] *The Great Thirst: Californians and Water, 1770s-1990s* by Norris Hundley, Jr. (1992), University of California Press, Berkeley, CA.

[3] Ibid., p. 251.

[4] Ibid., p. 277.

[5]http://ballotpedia.org/wiki/index.php/California_Proposition_9,_the_Peripheral_Canal_Act_%28June_1982%29.

[6] *The Great Thirst: Californians and Water, 1770s-1990s* by Norris Hundley, Jr. (1992), University of California Press, Berkeley, CA. Hundley's description included his dismay over poor farm labor working conditions. Important as this issue is, it has yet to drive the historic battle over human water use and our natural environment, and was deleted from the quotation. See p. xvii.

[7] The 2009 water bill package included five (5) individual pieces of legislation: on governance, including creation of the Delta Stewardship Council; authorizing a $11.2 billion bond; requiring groundwater elevation monitoring; mandating urban water conservation of 20% by the year 2020, and imposing financial penalties for violations of water right enforcement rules. Links to the bills are at http://deltacouncil.ca.gov/sites/default/files/documents/files/dsc_legislative_booklet_0.pdf.

[8] Farber, Aaron, *Facts and Information on California's Water and Environmental Debates* (2012) Delta Stewardship Council, http://deltacouncil.ca.gov/sites/default/files/documents/files/dsc_facts-info_CA_water-environmental_debates_043012.pdf. Hereafter, *Facts and Information*.

[9] "Facts are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passion, they cannot alter the state of facts and evidence." John Adams, (November 27, 1770), quoted in *The Trial of the British Soldiers of the 29th Regiment of Foot, for the Murder of Crispus Attucks, Samuel Gray, Samuel Maverick, James Caldwell, and Patrick Carr, on Monday Evening, March 5, 1770.* (Boston: William Emmons: 1824), 117. http://www.loc.gov/law/help/rare-books/pdf/john_adams_1824_version.pdf.

[10] Cayan, D. R., E. P. Maurer, M. Dettinger, M. Tyree, K. Hayhoe. 2007. *Climate Change Scenarios for California*. October. http://meteora.ucsd.edu/cap/pdffiles/scenarios_climaticchange_071406.pdf

[11] Moser S., F. Franco, S. Pittiglio, W. Chou, D. Cayan. 2009. *The Future is Now: An Update on Climate Change Science Impacts and Response Options for California.* May. California Energy Commission. http://www.energy.ca.gov/2008publications/CEC-500-2008-071/CEC-500-2008-071.PDF

[12] California receives about 97 percent of its total water supply from rain and snow. Water managers prefer to see most of the water in the form of snow, which is natural water storage, but climate change is leading to more rain. At the same time, records of precipitation (rain and snow) going back to 1890 show only a very slight increase in overall moisture coming into the state. Data compiled by Jim Goodridge, state climatologist, formerly of California Department of Water Resources and updated by Michael Anderson, DWR state climatologist, Division of Flood Management, Hydrology and Flood Operations Office, Hydrology Branch. Department of Water Resources. 2006. *California Climate Change: A Historical Perspective.* http://www.water.ca.gov/climatechange/docs/200610_ClimateChangeHistorical_CALFEDScience_manderso.pdf. See also, *Facts and Information*, p. 2,

[13] *Facts and Information.* see p. 24.

[14] *Facts and Information.* see p. 8. California's urban water use varies dramatically throughout the state: high in the deserts, but almost as high in the inland regions of northern and central California. Some areas along the ocean benefit from a lower temperature, and in key urban areas like San Francisco, relatively fewer homes with large irrigated lawns or gardens. Agricultural water use statewide has declined slightly in recent decades. Numerous studies have suggested that substantial savings from water conservation, recycling, reclaimed water and other similar actions are possible. Urban conservation appears to have the greatest potential, although agricultural conservation will be needed as well. Public Policy Institute of California. February 2011. *Managing California's*

Water: From Conflict to Reconciliation. Sacramento, CA. http://www.ppic.org/content/pubs/report/R_211EHR.pdf, see Figure 2-8 and 2-0, pp. 89-90. California Department of Water Resources. *California Water Plan: Update 2009*. Pp. 18-19. http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/highlights_cwp2009_spread.pdf

[15] Since 2000, the Department of Water Resources has issued four (4) reports on the reliability of the State Water Project. They show that long-term reliability has declined from 75% in 2002 to 63% in 2009. California Department of Water Resources: Bay Delta Office. http://baydeltaoffice.water.ca.gov/swpreliability/SWPReliability02_final.pdf

[16] California Department of Water Resources: Bay Delta Office. 2010. *State Water Project Reliability Report 2009*, and previous years. http://baydeltaoffice.water.ca.gov/swpreliability/Reliability2010final101210.pdf

[17] In dry years, California gets as much as 40 percent of its total water supply from groundwater. Even in wet years, some groundwater basins continue to decline. In the Tulare Basin, the groundwater overdraft is estimated to 1.4 million acre-feet of water per year. At some point, this overdraft has to end, and you should expect those areas to demand surface water as a replacement. Substantial evidence suggests that many of our rivers and streams are 'oversubscribed', and it is hard to imagine where replacement water will come from. Public Policy Institute of California. February 2011. *Managing California's Water: From Conflict to Reconciliation.* Sacramento, CA. http://www.ppic.org/content/pubs/report/R_211EHR.pdf, p. 158. Also see Faunt, C.C., ed., 2009, *Groundwater Availability of the Central Valley Aquifer, California*: U.S. Geological Survey Professional Paper 1766, 225 p. http://pubs.usgs.gov/pp/1766/PP_1766.pdf.

[18] See footnote 7 and Famiglietti J.S., M. Lo, S. L. Ho, J. Bethune, K. J. Anderson, T. H. Syed, S. C. Swenson, C. R. de Linage, M. Rodell. 2011. *Satellites measure recent rates of groundwater depletion in California's Central Valley*. Geophysical Research Letters, Vol. 38. http://www.agu.org/pubs/crossref/2011/2010GL046442.shtml

[19] The cause is attributable to changes in water flow patterns, loss of habitat and a host of more specific features, currently called 'stressors'. Healey, M.C., M.D. Dettinger, and R.B. Norgaard, eds. 2008. *The State of Bay-Delta Science, 2008.* Sacramento, CA: CALFED Science Program. 174 pp. http://www.science.calwater.ca.gov/pdf/publications/sbds/sbds_final_update_122408.pdf

[20] See footnote 9 and Moyle P. B., J. V. E. Katz, and R. M. Quinones. 2010. Rapid decline of California's native inland fishes: *A Status assessment. Center for Watershed Sciences and Department of Wildlife, Fish, and Conservation Biology*, UC Davis, http://californiawaterblog.files.wordpress.com/2011/09/moyleetal2011.pdf

[21] *"The Delta, prior to the advent of European immigrants, was a vast wetlands, with seasonally flooded lands and upland lands. It hosted a vast array of water and terrestrial species. Commencing in 1850, when California joined the Union, the physical configuration of the Delta has been almost totally altered. Wetlands have virtually disappeared, replaced first by farms and in later decades by urban development, largely on the fringes of the Delta."* Moyle, P. B., J. R. Lund, W.A. Bennett, W. E. Fleenor. 2010. *Habitat Variability and Complexity in the Upper San Francisco Estuary*. Center for Watershed Sciences, University of California, Davis. San Francisco Estuary and Watershed Science, 8(3). http://escholarship.ucop.edu/uc/item/0kf0d32x#page-1. See also, Delta Protection Commission. *2010. Sacramento San Joaquin Delta Primary Zone Study*. December. http://www.delta.ca.gov/res/docs/PZ%20Final%20Report.pdf.

[22] State Water Resources Control Board, 2010. *Final Report on Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*. http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf. Fleenor, W. E., W. Bennett, P. Moyle, J. Lund. On Developing Prescriptions for Freshwater Flows to Sustain Desirable Fishes in the Sacramento-San Joaquin Delta. (2010) Center for Watershed Sciences, University of California, Davis. http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_spprtinfo/fleenor_etal_2010.pdf. See *Facts and Information*, pp. 8-15

[23] National Research Council, 2011, *A Review of the Use of Science and Adaptive Management in California's Bay Delta Conservation Plan*. http://www.nap.edu/catalog.php?record_id=13148#description. Also see *Facts and Information*, p. 14

"11.4 MAF are diverted upstream of the Delta for agricultural (83.8%), urban (15.0%), and environmental (1.2%) uses. Diversions from the Delta itself average 6.35 MAF, a little more than a third of all diversions in the Sacramento-San Joaquin system."Lund, J., E. Hanak, W. Fleenor, W. Bennett, R. Howitt, J. Mount, P. Moyle. 2008. *Comparing Futures for the Sacramento-San Joaquin Del*ta. Sacramento, CA, http://www.ppic.org/content/pubs/report/R_207JLChapter6R.pdf

[24] A host of additional factors also negatively affects the ecosystem: e.g., pollution, urban and agricultural runoff and non-native invasive species --- collectively called 'stressors'. To cap the problem, significant parts of the Delta

have subsided over the decades, leaving some islands as much as 20 feet below current water levels. California Department of Water Resources. 1995. *Delta Atlas*. http://baydeltaoffice.water.ca.gov/DeltaAtlas/index.cfm

[25] California Public Resources Code 29704. http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=29001-30000&file=29700-29716

[26] Delta Stewardship Council. 2010. *Emergency Management White Paper*. ES-3. http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta_Emergency_Management_White_Paper_2011_11_08.pdf

[27] Delta Stewardship Council. 2010. *Delta as a Place: White Paper.* Adapted from the California Department of Conservation. 2004. *Farmland Mapping and Monitoring Program*. http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta_Land_Use_Socioeconomics_White_Paper_2011_11_08.pdf

[28]. Medellin-Azuara, J., E. Hanak, R. Howitt, J. Lund. 2012. *Transitions for the Delta Economy.* Public Policy Institute of California. Sacramento, CA; U.S. Department of Agriculture. *1960-2007. Census of California Agriculture*. http://www.agcensus.usda.gov/Publications/Historical_Publications/index.asp

[29] Delta Stewardship Council. 2010. *Flood Risk White Paper*. ES-3. http://deltacouncil.ca.gov/sites/default/files/documents/files/Flood_Risk_White_Paper_2011_10_18.pdf

[30] See, Fifth Staff Draft Delta Plan, http://www.deltacouncil.ca.gov/sites/default/files/documents/files/Fifth_Staff_Draft_Delta_Plan_080211.pdf, particularly Chapters 4 and 5.

[31] CA Water Code Sec. 85022 and 85056.5.

[32] CA Water Code Sec. 85320 (e)

[33] CA Water Code Sec. 85204.

[34] *The Once and Future Delta: Mending the Broken Heart of California* (2010) John Hart, Bay Nature Magazine, http://baynature.org/articles/apr-jun-2010/the-once-and-future-delta/once-future-delta.