This email is a solicitation of your interest and availability for a rather rapid development effort. If you would like to be part of this effort please reply with a list of your availabilities in the remainder of the month.

This email continues a discussion from several weeks ago where I suggested a need for more detailed information on what water supply and water quality targets the DNCT Gaming Effort should address. Grace Chan responded to that email and conversations with Dave Schuster and Dan Nelson have given me encouragement that we may be able to progress beyond the kinds of '400 TAF' positions that have so far represented water supply goals.

I am hopeful that we can develop a set of water supply targets and priorities that will reflect the water supply needs at a level of detail comparable to that which we have for biological resources.

> An example of the value of higher levels of detail in targets. For biological resources we have a series of priorities which have enabled the DNCT Gaming effort to identify which tools are most useful for various purposes and to assess how hydrological variability interacts with those tools. For example in drier years, we have generally found that water transfers can be used to back water up into Shasta in years when Shasta's carryover storage is projected to drop below 1.9. The water in Shasta can then be used to improve temperature conditions for Winter-run while it is being held and better water flow conditions for fall-run spawning when it is released in the Fall. The water can then be stored in San Luis to be transferred in exchange for a reduction in delta export rates when the salmon smolts are on their way through the delta in the winter or spring. Thus, under limiting hydrologies, it appears possible to achieve a high degree of improved biological protection by facilitating shifts in storage and export conditions from month to month. In wetter conditions, on the other hand, the DNCT gaming has often found that targeted levels of biological protection are often more difficult to meet because all facilities are in use in all months and there is greatly restricted access to storage or pumping capacity.

Grace Chan's summary of MWD's hopes raises a number of questions but does not provide much information to base our gaming effort around. She reports " [In] CALFED Stage 1, MWD is still looking for 1.8 MAF in wet years, 1.35 MAF on average,1.0 MAF for 1928-34 dry period, and 0.65 MAF in critical dry year. These demand numbers were developed before MWD member agencies require a blending salinity target to support their local recycling and groundwater programs. To meet blending targets, MWD would need on average an additional 200,000 AF if TDS is between 200 and 250 mg/l and 400,000 AF if TDS is between 250 and 300 mg/l."

This kind of summary of hoped-for outcome, like the CVP users demand for 200-400 TAF, provides little guidance to the game. If we can assume that no side is going to get everything they would like, it is then up to the game to pursue each user's need in each user's order of priority. The better we can understand the priorities of each user, the more likely we are to bring the DNCT to a satisfactory conclusion. To get a better understanding of priorities and how they might interact with other users, I pose a series of sample questions below. As before, I do not expect single, authoritative answers to these questions; I am describing my areas of ignorance of issues surrounding water supply and water quality that might lead to more active management by all parties in the gaming effort.

1. What San Joaquin River flows, in which month, represent times when deliveries to Westlands are augmented by the James Bypass? Can we fit this into delta modeling so

that environmental conditions in wet years better represent expected reality? Failure to do this requires unnecessary work for the EWA and may hide a way to generate water into the EWA at times of no impact on water users.

2. Are there wet years when reduced local demands, filled storage sites, or deliveries from other sources reduces MWD's need from the delta? If so, how can we fit this into delta modeling?

3. Are there dry and critically dry years when unimpaired flows and reservoir storage levels make increased deliveries an unsuitable target?

4. If degradations of water quality increase MWD's volumetric demand does an improvement reduce their needs by a similar amount? Can we use occasional regional exchanges that improve water quality to substitute for some quantity of water out of the delta. Using Grace's statements it appears that access to water with TDS less than 100 could free up enough water to satisfy the CVP target volume in drier years. Is that correct?

5. What is the best way to represent the shortages experienced by Westlands? Should we try to reduce the number of years when deliveries are less than 60%? Should we aim for raising the average over a multi-year period? All other things being equal, we would likely have very different impacts on water quality and fish if we tried to achieve four years at 75% vs two year at 50% and two years at 100%.

6. How does groundwater enter the gaming? Should we assume that groundwater is available in earlier years of a dry period and not in later years? How do different assumptions about groundwater availability affect delta operations and modeling?

Just as food for thought I have attached data on CVP deliveries from the base case DNCT has been using that includes the Accord, full b(2), and the Trinity. The data are presented as annual deliveries, percent of demand, a running average over 10 years of the percent of demand and the number of years in each ten year period when deliveries were greater than 60%. Clearly the choice of measure of success can greatly change what we would try to accomplish in any given year in the game. I suspect CalFed could, within stage I, develop a strategy that (a) increases the deliveries in years when deliveries are less than 40% of demand or (b) increases the number of years when deliveries are at least 60% or (c) facilitates transfers that bring deliveries up to 100% in many years or (d) ensures that average deliveries across any 10 year period are at least 65% or (e) works toward ensuring that any 10 year period contains 5 years with more than 75% deliveries. What should the measure of success be? Is there a high priority to ensure a minimum in all years and a second priority to achieve a higher minimum level in other years?

We already are seeing that some manipulations to protect fish result in benefits to water supply and water quality. If we can look at a year and identify the highest priority fish, WQ, and water supply needs we may be able to maximize benefits across uses.

YEAR	cvpdel	cvp%	cum%	yrs>60
1922	2953	89		
1923	2608	79		
1924	1247	38		
1925	2202	67		
1926	2071	63		
1927	2692	82		
1928	2546	77		
1929	1900	58		
1930	2082	63		
1931	1334	40	66	7
1932	1665	50	62	6
1933	1142	35	57	5
1934	1437	44	58	5
1935	2240	68	58	5
1936	2615	79	60	5
1937	2504	76	59	5
1938	3171	96	61	5
1939	2449	74	63	6
1940	2537	77	64	6
1941	2962	90	69	7
1942	2847	86	72	8
1943	2571	78	77	9
1944	2397	73	80	10
1945	2487	75	80	10
1946	2734	83	81	10
1947	2462	75	81	10
1948	2399	73	78	10
1949	2528	77	79	10
1950	2389	72	78	10
1951	2559	78	77	10
1952	3179	96	78	10
1953	2788	84	79	10
1954	2673	81	79	10
1955	2432	74	79	10
1956	2758	84	79	10
1957	2565	78	80	10
1958	2747	83	81	10
1959	2569	78	81	10
1960	2378	72	81	10
1961	2374	72	80	10
1962	2584	78	78	10
1963	2788	84	78	10
1964	2330	71	77	10
1965	2446	74	77	10
1966	2628	80	77	10
1967	2998	91	78	10
1968	2635	80	78	10
1969	3167	96	80	10
1970	2652	80	81	10
1971	2716	82	82	10
1972	2542	77	82	10
1973	2567	78	81	10
1974	2737	83	82	10

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1975	2781	84	83	10
1976	1910	58	81	9
1977	1146	35	75	8
1978	2896	88	76	8
1979	2651	80	75	8
1980	2517	76	74	8
1981	2557	77	74	8
1982	2755	83	74	8
1983	3202	97	76	8
1984	2717	82	76	8
1985	2520	76	75	8
1986	2203	67	76	9
1987	2174	66	79	10
1988	1892	57	76	9
1989	2003	61	74	9
1990	1718	52	72	8
1991	992	30	67	7
1992	1297	39	63	6
1993	2756	84	61	6
1994	2352	71	60	6
AVG:	2411	73	74	9
MIN:	992	30	57	5
MAX:	3202	97	83	10