NAPA COUNTY

DEPARTMENT OF PUBLIC WORKS

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AREA CODE 707/253-4351

WILLIAM E. BICKELL
Director of Public Works
County Surveyor—County Engineer
Road Commissioner

MEMORANDUM

TO: Board of Supervisors

FROM: Bill Bickell, Director of Public Works

DATE: February 4, 1993

SUBJECT: Report of the Water Advisory Committee

Attached for your review and consideration is a copy of the cover memo and report developed by the Water Advisory Committee as presented to a joint meeting of Board members and Mayors/Vice Mayors on January 25, 1993 at the Yountville Town Hall. At that time the Committee did not give a presentation nor was there an in-depth discussion of the contents of this report. I wish to share this report with you, allow time for you to consider the information contained within and I will schedule a study session at a convenient regularly scheduled Board meeting. We welcome the opportunity to explore recommendations and issues with you at any time. During the study session, we will provide an in depth review of our activities to date and attempt to answer all questions that might arise.

SUGGESTED ACTIONS:

Based on the finding of the Water Advisory Committee (WAC), the conclusions drawn and goals developed, we will suggest that the Board consider the following:

1. Accepting the attached report developed by staff representatives from each of the municipalities, and adopt the goals, conclusions and recommendations contained therein as policy guidance for developing and managing future water supplies.

2. Discuss establishing a mechanism by which these policies can be effectively implemented, that mechanism may include entering into a joint powers agreement for development of additional water supplies; reforming the governing Board of the Napa County Flood Control & Water Conservation District, or other means to insure cooperative planning and implementation.

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NAPA COUNTY

FLOOD CONTROL AND WATER
CONSERVATION DISTRICT

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WILLIAM E. BICKELL
District Engineer

MEMORANDUM

January 19, 1993

TO: Mayors, Vice Mayors and Members of the Board of Supervisors

FROM: Water Advisory Committee

SUBJECT: Report of the Water Advisory Committee (WAC)

The attached Committee Report is being provided to commence the next phase local agencies will consider in planning long term water policy for the Napa Communities. The Committee believes the most important committment that can be made by these agencies is to continue to work cooperatively and dynamically to reach common objectives in developing and maintaining water supplies serving the Napa Communities. This report identifies a phased approach to meeting targeted water supply shortfalls anticipated in the next 30 years.

The attached report has been compiled by the staffs from the community jurisdictions as directed by locally elected officials to advise all of the Napa Communities as to the most feasible methods to insure future water supplies within Napa County. The report relies heavily upon the 1990 Montgomery Water Resources Study and the 1992 Kennedy/Jenks Napa River Diversion Study.

It is suggested that each jurisdiction undertake review and evaluation of this Committee Report, consider the approaches presented and determine how appropriate recommendations can best be implemented.

Background:

A Technical Advisory Committee (TAC) was established in July of 1991 to review and guide the work done on the Napa River Diversion Study by Kennedy/Jenks Consultants. After presentation of their study to the Board and participating City Councils in May

of 1992, the same staff members of the TAC continued to meet and formed the WAC. This group was established to evaluate the merits of a diversion project in conjunction with other water supply alternatives being considered and to provide technical assistance to policy makers from the various Napa Communities.

The WAC met over a dozen times from June 1992 to the present and includes the following individuals:

City of American Canyon	- Steven Kimborough, former Interim City Manager Robert Schwerin III, Operations Superint. Ronald Kiedrowski, City Manager
City of Napa	- Bob Peterson, Manager Water Department Michael O'Bryon, Director of Public Works
Town of Yountville	- Robert Myers, former Town Administrator Walt Graham, Consulting Town Engineer Jan Wellman, Town Administrator
City of St. Helena	- Marty Oldford, Director of Public Works
City of Calistoga	- Wally Kolb, Director of Public Works
Napa County & District	- Ken Johanson, Assistant District Engineer Bob Sorsen, Project Manager District Myke Praul, Assistant Engineer

Conclusions:

The WAC concluded that Napa County will require an additional 10,900 Acre-Feet of additional water supply by the year 2000. This deficiency will increase to 18,600 by 2020 and 23,000 by 2030.

Projections beyond 2030 are quite difficult, but it is generally agreed that somewhere in the order of 30,000 Acre-Feet will be required in the next 50 years. This magnitude of new supply requires development of an action plan by local water supply agencies which must come from the following combination of sources:

- Local Groundwater
- Local Surface Water
- Reclamation
- State Water Project Entitlements
- Outside Water Purchases
- More Efficient Utilization & Conservation

All future water supplies require consideration of reliability, cost, environmental, institutional and legal issues. The process to fully evaluate these parameters will require a conscientious plan on strict time lines for completion. While it is common for us to think of droughts as temporary water shortages, they are part of the normal weather pattern for California and have significant effects on long range water supply planning. It is with that in mind that the WAC established two major goals for a Napa County Water Policy:

- Assure adequate water supply during periods of prolonged periods of below average rainfall which equates to reliability or drought protection;

- Provide a phased approach to increasing future supplies to meet projected shortfalls which provides added flexibility through cooperative planning.

COMMITTEE REPORT

TO: Napa County Board of Supervisors; Directors, Napa County Flood Control & Water Conservation District,(NCFC & WCD); Council Members, Cities of American Canyon, Napa, St.Helena, Calistoga and Town of Yountville

FROM: Water Advisory Committee (WAC)

SUBJECT: Recommendations for a Countywide Policy for Water Supply

The Directors of the NCFC & WCD and Council Members of the various Cities directed staff to meet with local water departments in Napa County for the review and evaluation of water supply studies in order to suggest a countywide water policy and recommendations for future planning activities. The District Engineer has met with the public work directors and water supply staff from the various Cities, which formed this Water Advisory Committee (WAC) to consolidate information and to determine the most reasonable way of meeting projected water supply shortfalls. This report summarizes the activities of the WAC to date and sets forth the following short, mid and long term recommendations for future actions by the District and Cities.

RECOMMENDATIONS:

Based upon the analysis and conclusions reached, the Committee has developed several recommendations for the respective Board/Councils. The Water Advisory Committee recommends that a three phased approach to meeting the targeted shortfalls be taken.

Short Term Strategies (1992 to 2000)

1. Develop a minimum of 10,900 AF of new, highly reliable water supplies by focusing on the following sources:

   a. Groundwater. Perform studies as needed to determine more accurate yield information in targeted sub-basins. Investigate the feasibility of a Countywide Groundwater Recharge and Management Program.

b. Reclamation. Support and cooperate with the Napa Sanitation District in the development of a customer base and master plan to provide reclaimed water as an economical source of supply on a larger scale . Establish development policies that require the use of reclaimed water where feasible.

c. Water transfers through NBA. Continue to pursue the purchase of permanent water rights and/or mid or long term drought protection agreements with other entities, using the NBA for wheeling (the physical moving of the water supply). Although these supplies are not considered very reliable during drought conditions, they have the potential to be consummated in the short term. A larger quantity may be needed to offset the lower reliability. As more reliable supplies come on line it may be possible to sell these water rights to others.

d. Milliken watershed. Perform a feasibility and yield analysis study to determine the possible benefits of year round operation of the treatment plant or other, more optimum utilization of the water rights. Fund and construct improvements as warranted.

2. Complete all preliminary steps necessary to be able to construct the Napa River diversion facilities and raise Conn Dam by the year 2005.

a. This involves applying to the State for water rights, preparing a detailed operations plan, financing plan, environmental impact report, preliminary design and construction drawings.

b. It is important that the process begin early because many of the steps are time-consuming and will be dealing with some very substantive issues that could jeopardize the project. It is critical that these issues surface early so that there is time to either deal with them or turn our attention to another option. For example, the water rights process may take 8-10 years. The financing plan may recommend partnership arrangements that could require a number of years to develop.

3. Each water agency should determine its water supply needs and the extent to which it will want to participate in the Napa River Division project.

4. Complete current study being conducted for the Cities of Napa, American Canyon and Vallejo to determine the feasibility of providing additional NBA storage in a reservoir in the Jamieson Canyon area to better utilize water bank, carryover and unscheduled NBA water when available.

5. Provide funding to purchase land in the Carneros area for possible future construction of a Carneros area reservoir site. The land could be leased until needed. The purchase would preserve the ability to develop a reservoir on one of the few sizeable sites remaining in the Valley. It would also make it more difficult for another agency outside Napa County from gaining control of the potential reservoir site.

6. Continue support of the Department of Water Resources in it's attempt to fully develop the State Water Project, and continue to monitor Statewide water marketing attempts.

7. Review the existing policy making structure relative to water supply issues and determine if alternatives should be developed to better address them.

8. Establish negotiations with the State of California pertaining to the utilization of unused yield available from Rector Reservoir.

Mid-term Strategies (2000 to 2020)

1. Develop a minimum of 7,700 acre feet of additional, highly reliable water supplies by constructing the Napa River diversion facilities and raising Conn Dam. Timing of the project should be in accordance with the financing plan. Construction of the project early in the time period will result in more water supplies than the County Communities will need initially. This would give these communities the ability to be a net exporter of water until about the year 2020, at which time it is anticipated the communities would need the full supply. The sale of this water would assist in paying for the project.

2. Continue to expand the use of reclaimed water in accordance with the Master Plans of the various sewer agencies in the County.

3. Investigate the feasibility of enlarging Bell Canyon Reservoir.

4. Continue support of the State Water Project and determine if conditions have changed regarding the 45% unfilled entitlement figure. WAC feels that the need for water in Southern California may become so critical as to eventually force a political solution that will bring at least some of that entitlement to us. This possibility is too speculative to be counted on for drought planning purposes. It is sufficient at this point to simply keep an eye on it.

Long-term Strategies (2020 to 2050)

1. Develop new, highly reliable water supplies as needed to meet drought protection and future agricultural and municiple needs.

2. Replace less reliable supplies with more reliable supplies.

3. Pursue the feasibility of a diversion/storage facility on the Carneros region site.

4. Continue support of the State Water Project.

BACKGROUND:

The 1991 Montgomery report identified certain water supply shortfalls in the year 2020. Those shortfalls have been reviewed and refined by the WAC. That review shows that the major water supply deficiency in 2020 will be in the Municipal & Industrial areas closely followed by Agriculture & Rural Residential. In 2030, shortfalls will increase as projections of State Water Project deliveries decrease. Continued shortfalls will occur well into the year 2050 - the fiscal life of the State Water Project. Solutions to future water supply deficiencies must address both M & I and Agriculture & Rural Residential.

Municipal & Industrial:

The term "Municipal and Industrial" (or M & I) use is standard phraseology in water circles for urban water demand, as contrasted to agricultural demand. In Napa County, the water supplies that have been developed by each of our cities and towns are considered to be M & I supplies.

The current 6 year drought has caused each water agency to reevaluate the reliability of its water supplies. Firm yield is a term that refers to the amount of water that can be used each year consistently without running short during drought periods. The drought has shown us that the firm yield of our existing supplies is far lower than we once thought. For example, the firm yield of Lake Hennessey was thought to be 10,000 acre-feet before the drought. It has been re-evaluated to be 5000 acre-feet. Likewise, before the drought no one questioned the ability of the State Water Project to provide us with our current entitlements, even though we all knew that they wouldn't be able to in the future. It was quite an impact when the State cut our entitlement to 20% in 1991.

The WAC believes that the reliability of our existing M & I supplies must be considered in determining our current and future needs. Each Napa community should go through the exercise of gaining a clear understanding of the vulnerability of its current supplies and then set tentative goals for the community relative to where it wants to be when the next drought hits. For example, a goal might be: our community should not have to suffer more than a 10% shortage of water during a drought similar to the one we are currently in. Staff can then determine strategies and associated costs for reaching the goal. This level of conservation equates to a 20% reduction in shortfalls as presented in Table #1, attachment #1.

The WAC believes that most agencies will want to improve their water supply situation and that the most cost effective solutions may very well be achieved through a cooperative effort among all interested agencies in one or more water supply projects. New water supplies will be expensive and it will be well worth the effort of all agencies to give serious consideration to joint projects in order to keep the costs down.

In projecting the drought shortfalls of each Napa Community for this report, the firm yields of existing supplies were compared to projected normal demands. Normal demands have a 10% permanent conservation figure factored in to them as a result of measures taken during this drought. The target values assume that as a whole, all county water users can be called upon to conserve an additional 10% in a drought. This does not preclude each agency from determining its own goal. It simply provides a point from which to start to review the overall magnitude of the water supply problem of the County as a whole.

Agricultural & Rural Residential:

Most of these water users are vineyards, wineries, and residences with a combination of uses that lie outside the jurisdictional boundaries of water service areas. A minor amount of water is supplied to these users by water service districts but it is interruptible at various times. Groundwater and river/stream diversions are the primary source of water for these users. The major portion of this use, agriculture and commercial (wineries), is during the irrigation and frost/heat protection months and as such is not a constant demand during the year. Domestic and livestock uses are much more evenly distributed monthly. All uses need a high degree of reliability and tend to require onsite storage sufficient to meet the demand. Storage is provided, in the case of diversions, by onsite reservoirs and in the case of groundwater by the local aquifer.

While the upper Napa Valley has an extremely reliable groundwater basin (static water levels respond quickly to rainstorms), certain areas within the County suffer from declining groundwater levels. Wells that supply water to rural residential users are typically shallow, older wells which tend to be effected more by fluctuating water levels. Groundwater has long been viewed as the only reasonable, economical and reliable source of supply for agriculture.

In the process of developing projected water needs, the Montgomery report made certain demand assumptions for vineyards that can be challenged. The rate of new planting, the rate of replanting, the density and yield of existing acreages and the water application rate for irrigation and frost/heat protection are

ever changing and therefore somewhat elusive. Past studies have validated the fact that if water is available, it will get applied to the vines. If not, then other varieties of grapes and growing techniques will be developed that need less water. We do know that the initial planting of the vines requires substantially more water during the first few years than needed to support the vines on a long term basis. We also know that densities of vines per acre are increasing. With the current replanting due to the phyloxera outbreak, the WAC believed it important to assume that substantial quantities of water will be needed in the future to support Napa County's most valuable industry. Projections of the growth of the wine industry can be found in the Napa County Wine Industry Growth Master Environmental Assessment, 1990-2010, Section III Industry Projections and the Napa County General Plan.

Based upon these projections, and the demand information presented in the Montgomery report, the additional water requirement for agriculture and rural residential in the year 2020 is estimated to be 9,400 Acre-Feet and in the year 2030, 12,000 Acre-Feet (see attachment #1, Table #1).

Increased utilization of groundwater as a source of supply can have severe detrimental effects on the rural residential community. In response to this, the Napa County Planning Commission adopted a policy requiring every applicant for a use permit or parcel division utilizing groundwater as their source of supply, to submit a "Water Availability Analysis" which essentially evaluates potential effects of the project on the local aquifer. Agricultural users not tied to a use permit process, are not required to provide this analysis.

The Montgomery report recommends increased utilization of groundwater as a source of supply. To further this concept, each water agency within Napa County is looking to further utilize groundwater and, as such, more information is needed to determine the effect of this pumping on the groundwater subbasins within the County.

In addition to utilizing groundwater to meet these needs, increased private river/stream diversions will also provide another source of supply. The 1992 Kennedy/Jenks diversion report provides some convincing information about the potential to more fully utilize the Napa River as an M & I source and through a program of conjunctive use, could provide substantial benefit to the agricultural and rural residential needs. Conjunctive use is defined in the water supply area as the cooperative joining together of two or more entities to increase the safe yield of a common source of supply. For example, the development of well fields by local water agencies can, when used in conjunction with an effective groundwater management program, result in greater

yield from local aquifers. This use of groundwater for M & I users would be temporary and replaced by other surface sources as they come on line. Groundwater would then be available in the future for Agricultural & Rural Residential users. The information in the Kennedy/Jenks report and communications with other potential water supply sources have been closely reviewed by the WAC in an attempt to fully evaluate the various water supply alternatives.

GOALS OF THE WATER ADVISORY COMMITTEE:

Water Resource Planning for Napa Communities must be a dynamic process involving all water supply interests. There is a very important timing element to meeting future water needs as well as the need to plan for future periods of below average rainfall. It is important to realize that California will always have these periods and to insure continuous water supply we must plan accordingly. The Water Advisory Committee sought to achieve two major goals in planning for future water sources:

Assure adequate water supply during prolonged periods of below average rainfall (Reliability or Drought Protection), and

Provide a phased approach to increasing future supplies to meet projected shortfalls (added Flexibility through Conjunctive Use)

The Water Advisory Committee then set out to meet these goals by reviewing and analyzing all information gathered during the last few years and developed the following specific conclusions from that information.

ANALYSIS AND CONCLUSIONS OF THE WAC:

The Committee concluded that, due to the State Department of Water Resources inability to construct statewide water supply facilities integral to the State Water Project, Napa County can reasonably expect to only receive 55% of its full entitlement in the year 2021. This 45% reduction in entitlement will continue for the short and mid term periods and could conceivably continue to the end of the economic life of the State Project, 2050. All efforts to "fill" the North Bay Aqueduct through the State Water Project will be long and arduous. Such efforts will require State and local policy making bodies to support some or all of the following projects: The Los Banos Grande Reservoir, enlargement of the Clifton Forebay, a thru-Delta facility, environmental studies to quantify Delta and Bay flow requirements, the purchase by the State of the Federally owned Central Valley Project, continued support of the activities of the State Water Contractors Association, and the support of Department of Water Resource controlled water marketing. Efforts by the State to "fill" the pipe and meet their contractual entitlements must rely on either construction of some or all of these facilities or, water marketing. The hurdles to construction of additional facilities include environmental, financial and institutional constraints and appear almost insurmountable. Water marketing, while appearing attractive to environmental interests, contains many second and third impacts which must be fully evaluated. Open market bidding on water rights may also drive prices up leaving smaller, northern California agencies outbid by larger southern California interests.

The Committee further concluded that additional information pertaining to the quantities of groundwater and divertible surface water are necessary to fully evaluate the local water supply potentials. Groundwater has been identified as a very desirable and immediate source of water supply but the short and long term effects of such development need to be evaluated. Surface water diversions were studied by the Kennedy/Jenks Napa River Diversion Report and the Committee confirms that excess winter flows are available for diversion to offstream locations.

The WAC also concluded that current and projected water shortfalls are time dependent and greatly controlled by periods of below average rainfall. While shortfalls currently exist in certain users categories, they will change over the next 40 to 50 years as will the period of hydrologic record. Current and future supplies, which are both reliable and flexible, need to be pursued with joint consideration by each water agency within the County.

Water shortfalls need to be categorized as short term, middle term and long term with corresponding supply alternatives. To fully accomplish that potential, it is necessary to promote cooperation between local agencies in the area of conjunctive use. Where shortfalls exist for one user, a particular surplus supply might be diverted from another user on a temporary basis, and later be replaced by a newly developed source as discussed earlier.

The Advisory Committee utilized water need projections from the Montgomery report supplemented with additional information developed during 1991 to obtain figures for projected shortfalls in the years 1991, 2020 and 2030. The Montgomery report gives shortfall figures based upon "normal" years or years of average rainfall. The Committee developed additional shortfalls based upon historical production records for the year 1991. We know that 1991 water demand numbers reflect the effects of 5 years of below average rainfall and, as such, the figures are taken to be the "worst case" scenario for future water shortfall projections. These values are compared to what the County's projected shortfall would be during a normal rainfall year. This then gives us a range of values to plan water needs and is presented in Table #1, attachment #1.

It was then assumed that the mandatory and voluntary water rationing all Napa communities invoked in 1991/1992 was marginally acceptable. The approximate average cutbacks were 30%. The Montgomery report assumes a 10% permanent reduction in individual water use due to State and local water conservation measures. Therefore, to obtain a projected water shortfall, the Committee assumed that an additional 10% reduction from "normal" consumption for all user groups would be acceptable for short periods of time. The "targeted" shortfalls used for planning future water needs were obtained by taking the assumed drought condition or "worst case" scenario and reducing the projected shortfall by 20%. This analysis also assumes that, in a period of sustained below average rainfall, it is expected that the State Water Project would reduce entitlements to 20% thus causing a shortage in water supply. The resulting shortfall, reduced for 20% conservation effort, became the "targeted shortfalls" or additional need for 1991, 2020, and 2030 are shown in Table #1, column #3, #5, and #7.

Examination of these values shows a shortfall to Municipal & Industrial users in 2020 of 11,100 Acre-feet and the year 2030 of 13,500 Acre-feet. Agriculture & Rural Residential show a 2020 shortfall of 7,520 Acre-feet and the year 2030 of 9,600 Acre-feet. The total projected shortfalls for 2020 is 18,600 Acre-feet and for 2030 is 23,000 Acre-feet.

ALTERNATIVE WATER SUPPLY SOURCES:

The Water Advisory Committee then sought to evaluate all reasonable additional water supply sources based upon the conclusions, goals and targeted shortfalls as established. Identifying alternatives resulted from information contained in the Montgomery report, Kennedy/Jenks report and continued communications with Solano County and other outside water agencies. Table #2 lists these alternatives and separates them into two categories; those that utilize the North Bay Aqueduct (NBA) and those that don't. The following seven alternatives are ones that attempt to "fill the pipe" and include the following:

SWP/NBA (45%) - Given the assumption that the State will only supply 55% of the 2021 entitlement of 25,000 Acre-feet, this alternative assumes that the State will construct additional facilities that will eventually deliver Napa full contracted entitlement. Napa is already subscribed to this supply but has no real control over its future.

Yuba County Water - The City of Napa has for the last few years, entered into short term (annual) contracts with Yuba County to purchase and release given amounts of water to the Delta which is then collected at the intake for the NBA facility. This alternative assumes, as above, 45% capacity available in the NBA facilities. It is not likely to involve permanent water rights but could become long term.

Glenn-Colusa Plan - This alternative involves conjunctive use with Yolo and Solano Counties the details of which are contained in the Borcalli report. It also assumes the 45% capacity of the NBA is available and results in the sale of permanent water rights.

Lake Berryessa Plan - The County of Napa agreement for the sale of Monticello Dam to Solano County contains a provision for Solano County to provide Napa County with 2,000 AF of water. This water could be delivered a number of ways but would probably involve the NBA as stated above.

Delivery of this water is conditioned on Congressional passage of the sale of the dam facilities to the Solano Water Agency.

SWP Unscheduled - The State Water Project has available at certain times of the year, excess water that can be delivered to Napa thru the NBA facilities. This seasonal water is usually available in early spring.

SWP Water Bank - Last year due to the drought, the Department of Water Resources purchased additional water from various sources and made it available to State Water Contractors thru their existing facilities. Continuation of this program is uncertain at this time but is likely to occur during drought periods.

Waikea - A private farm group in the Redding area possesses pre-1914 water rights and have offered them for sale on the open market. This alternative would require them to release, or not divert, their water from the Sacramento River and in turn Napa would intake this water at its NBA facilities which are assumed not to be at capacity.

The second set of alternatives in Table #2 represent locally developed sources which do not rely upon the NBA facilities to deliver water to Napa County. They are;

NSD Reclamation - The Napa Sanitation District has plans to upgrade their facility to produce Title 22 water which can be applied to turf and agricultural areas. The District anticipates this water to be available about 1995. One interesting option of this alternative may be to recharge groundwater basins with reclaimed water.

Milliken Upgrade - The City of Napa believes that additional water may be available from Milliken Reservoir with certain improvements made to the treatment plant. A reservoir operation/yield

study will be required to determine the feasibility of this alternative. Utilization of unused flows might also support a groundwater recharge program for the Milliken basin.

Well Fields - This alternative combines privately and municipally owned wells that would put to use the full safe yield from the upper Napa Valley and other subbasins. Such plans should fully evaluate the impact on the Napa Valley's entire groundwater basin and its ability to to be recharged.

Napa River Diversion - This alternative is as described in the Kennedy/Jenks report and would involve the diversion of excess winter flows of the Napa River to an enlarged Lake Hennessey.

Enlarge Bell Canyon - Both the Montgomery and the Kennedy/Jenks report believe that Bell Canyon Reservoir could be increased and provide an additional amount of water. A feasibility level report would be required to further evaluate this alternative.

Rector - The State of California owns Rector as the source of supply to the Vet's Home and the State Hospital. Through negotiations with the Town of Yountville or the City of Napa, there may be water available for other users.

The bottom row of Table #2 gives information on our current situation with the State Water Project and its delivery through the NBA. It is included for informational purposes and is not an alternative.

The balance of Table #2 is an evaluation matrix, developed by the WAC, of the above alternatives. Each alternative was evaluated based on six separate parameters, each given a different weighted value as follows:

- Reliability	30%
- Cost	25%
- Water Quality	20%
- Environmental/Institutional	15%
- Flexibility	5%
- Other Benefits	5%

Reliability refers to the expected quantity of water received from a source in drought years. The reliability number is stated in percent and relates to the percentage of years during which the full amount of water listed would be available. The lower the reliability factor, the less likely Napa Communities are of getting the full amount of water from that source during a period of below average rainfall.

Cost attempts to include all cost to develop the source of raw water and does not include treatment, pumping or distribution costs. For example, the cost for developing well fields includes the cost to purchase the land (or water rights), the cost of drilling the well and the cost of maintaining the facilities. Cost for Waikea Water, for another example, includes the purchase of the water right from the seller and transportation costs thru the NBA. It does not include costs for construction of the NBA or its maintenance which will have to be born even if this alternative was not selected.

Water Quality evaluates the source of supply to determine the quality of the source relative to the other alternatives. This factor is important in that it effects treatment costs, as well as, future problems that may result from the increasing Federal and State reporting and monitoring requirements. For example, the water we receive from the Delta has been used upstream by several entities before it reaches the NBA intake. It also comes from a very large watershed which may contain thousands of sources of contaminants. Treatment of this water and monitoring or control of the contaminants can be costly and may eventually reduce reliability. Water from the Milliken watershed, for example, does not have near the same concerns.

Environmental parameters to evaluate include: concerns for salmon spawning, the loss of Delta smelt at the NBA intake, potential loss of fresh water shrimp, possible loss of wildlife habitat, effects of groundwater pumping or river diversions and aesthetics. Institutional parameters are included with this category since so many constraints to development of water supplies are controlled by State or Federal agencies embroiled in environmental issues. For example, the issue of loss of Delta smelt during pumping periods from the Delta is an environmental issue that may cause DWR to not allow diversion pumping from Contractor facilities during certain periods of the year. While this is an environmental issue, it can become an institutional constraint placed on Napa Communities by DWR. Another example of an institutional parameter is various jurisdictions within the County which control the various facilities. It may prove to be unfeasible to provide certain sources of water to certain users.

Flexibility parameters take into account the ability of an alternative to supply various users at a variety of times. For example, groundwater can be pumped in most areas of the County at any time of year by any user group. Development of well fields therefore have the highest level of flexibility. Other alternatives utilizing the SWP/NBA as the source, have much less flexibility because they can only originate at one point, at certain times and be delivered to the County at one point in the system. Groundwater, on the other hand, can at times be an unreliable resource. During the period of 1976-77, several wells in the Valley went dry. The reliability of well water as a source of supply can be periodic. This makes the need to manage the resource very important.

The other benefits category attempts to take into account all other parameters otherwise unevaluated. An example is the additional recreational benefits that diverting water to Lake Hennessey have. Another such benefit is the utilization of reclaimed water which helps to finance the Napa Sanitation District's plant which is required by Federal and State standards.

All evaluation parameters within a certain category require the ranking between 0 and 10 relative to the other alternatives. Where there is essentially no difference between two alternatives, they can receive the same ranking score. The ranking number is then multiplied by the weighing factor (enumerated above) to obtain a weighted score for that parameter and that alternative. The scores are then added to get a total score (see column #11 of Table #2, attachment #2) which can be a maximum of 10. The Committee acknowledges that the consideration and ranking of many evaluation parameters is subjective in nature. Different people may rank these parameters differently but it is felt that, given the goals established earlier, the variation would not be significant. Once again, the planning of future water resources is a dynamic process which will require constant monitoring and updating.

The four alternatives that scored highest from this analysis, have been shaded in column #12, Table #2. They are:

ALTERNATIVE:	SCORE:	YIELD(cumulative)
Well Fields	9.10	6,100
Milliken Upgrade	8.85	8,100
NSD-Reclamation	8.00	11,100
Napa River Diversion	7.65	23,300

It is important to note that the estimated yield of water from these four sources is 23,300 Acre-feet compared to a targeted shortfall in the year 2020 of 18,600. The estimated time frame for completion of these four alternatives is the year 2020 which would indicate a water surplus of 4,700 Acre-Feet in 2020 and declining

to about a 0 shortfall in 2030. Napa communities would, during this period, be in a position to market this surplus on a short term basis at some point past 2020. The recommended river diversion project, as stated in the Kennedy/Jenks report, is staged to provide 9,000 Acre-Feet initially and 12,200 ultimately with the raising of the dam. The diversion project ranks high in flexibility for this reason.

If the State is able to improve on its contract entitlements, Napa communities would be able to adjust the completion schedule of one of the local projects to accommodate meeting the shortfall. Should the State be successful, or the efforts by Napa communities, to "fill the pipe", the total amount of water planned for is 34,550. This should be very close to our targeted amount in 2050 (the economic life of the SWP/NBA). The Committee concluded, with the probability that the water market will only become more intense in the future and because Napa Communities will have more flexibility in our sources, our communities will always be able to market any surplus water.

WATERALT.MP

ATTACHMENT #1

TABLE #1

AGENCY	SHORTFALLS							
	19 91		20 00		20 20		20 30	
	Drought	Normal	Drought	Normal	Drought	Normal	Drought	Normal
CITY OF NAPA	7,800	3,550	8,800	3,225	11,300	2,350	13,500	4,510
CITY OF AMERICAN CANYON	626	0	1,153	0	1,216	0	1,460	360
TOWN OF YOUNTVILLE	0	0	90	0	200	125	392	317
CITY OF ST. HELENA	0	0	11	11	192	192	391	391
CITY OF CALISTOGA	589	414	625	443	940	765	1,115	1,690
SUBTOTAL	9,015	3,964	10,679	3,679	13,848	3,432	16,858	7,268
AGRICULTURE & RURAL RES.	0	0	2,917	2,917	9,400	9,400	12,000	12,000
TOTAL NAPA COUNTY	9,015	3,964	13,596	6,596	23,248	12,832	28,858	19,268
TARGETED SHORTFALLS	7,200		10,900		18,600		23,000	
COLUMN NUMBER #1	#2	#3	#4	#5	#6	#7	#8	#9

ATTACHMENT #2

TABLE #2

POTENTIAL SUPPLY ALTERNATIVES	YIELD Ac-ft/yr	COST per AC-FT	RELIA. in % of yield	Reliability ranking x 30%	Cost ranking x 25%	Water Quality ranking x 20%	Environmental & Institutional ranking x 15%	Flexibility ranking x 5%	Other Benefits ranking x 5%	SCORE max. of 10	ALTERNATIVES
SWP/NBA (45%)	11,250	$185	35	3 x 30% = 0.9	5 x 25% = 1.25	5 x 20% = 1.0	4 x 15% = 0.6	5 x 5% = 0.25	5 x 5% = 0.25	4.25	SWP/NBA (45%)
Yuba County Water	11,250	$200	75	8 x 30% = 2.4	4 x 25% = 1.0	5 x 20% = 1.0	5 x 15% = 0.75	5 x 5% = 0.25	3 x 5% = 0.15	5.55	Yuba County Water
Glen-Colusa Plan	10,000	$100	75	8 x 30% = 2.4	9 x 25% = 2.25	5 x 20% = 1.0	4 x 15% = 0.6	4 x 5% = 0.20	3 x 5% = 0.15	6.60	Glen-Colusa Plan
Lake Berryessa Plan	2,000	$100	75	8 X 30% = 2.5	9 x 25% = 2.25	5 x 20% = 1.0	4 x 15% = 0.6	6 x 5% = 0.30	5 x 5% = 0.25	6.90	Lake Berryessa Pla
SWP - Unscheduled	1,000	$50	10	2 x 30% = 0.6	10 x 25% = 2.5	5 x 20% = 1.0	4 x 15% = 0.6	4 x 5% = 0.20	7 x 5% = 0.35	5.25	SWP-Unscheduled
SWP - Water Bank	1,000	$100	0	0 x 30% = 0	9 x 25% = 2.25	5 x 20% = 1.0	5 x 15% = 0.75	3 x 5% = 0.15	5 x 5% = 0.25	4.40	SWP-Water Bank
Waikea	3,000	$120	80	9 x 30% = 2.7	8 x 25% = 2.0	5 x 20% = 1.0	5 x 15% = 0.75	5 x 5% = 0.25	6 x 5% = 0.3	7.00	Waikea
NSD - Reclamation	3,000	$100*	95	10 x 30% = 3.	9 x 25% = 2.25	5 x 20% = 1.0	7 x 15% = 1.05	4 x 5% = 0.20	10 x 5% = 0.5	8.00	NSD-Reclamation
Milliken Upgrade	2,000	$100	80	9 x 30% = 2.7	9 x 25% = 2.25	9 x 20% = 1.8	8 x 15% = 1.2	10 x 5% = 0.5	8 x 5% = 0.40	8.85	Milliken Upgrade
Well Fields	6,100	$150	95	10 x 30% = 3.	8 x 25% = 2.0	10 x 20% = 2.0	9 x 15% = 1.35	10 x 5% = 0.5	5 x 5% = 0.25	9.10	Well Fields
Napa River Diversion	12,200	$670	95	10 x 30% = 3.	4 x 25% = 1.0	8 x 20% = 1.6	7 x 15% = 1.05	10 x 5% = 0.5	10 x 5% = 0.5	7.65	Napa River Diversio
Enlarge Bell Canyon	1,000	$1,800	95	10 x 30% = 3.	2 x 25% = 0.5	9 x 20% = 1.8	7 x 15% = 1.05	10 x 5% = 0.5	8 x 5% = 0.40	7.25	Enlarge Bell Canyo
Rector	200	$250	80	9 x 30% = 2.7	6 x 25% = 1.5	9 x 20% = 1.8	3 X 15% = 0.45	2 X 5% = 0.10	7 x 5% = 0.35	6.90	Rector
SWP/NBA (55%)	13,750	$430	65	4 X 30% = 1.2	5 x 25% = 1.25	5 x 20% = 1.0	8 x 15% = 1.2	5 x 5% = 0.25	5 x 5% = 0.25	5.15	SWP/NBA (55%)
#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12

* cost is assumed equal to other raw water sources