

Guidelines for the Appraisal of Water Rights in California

Prepared for
U.S. Fish and Wildlife Service



September 2006

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Prepared in partnership with
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Final Report

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Statement of Qualifications

Steven J. Herzog, MAI

Natural Resource Valuation Specialist

Education

Oregon State University, Master of Science Degree-Forestry, Minor in Statistics

Northern Arizona University, Bachelor of Science Degree-Forestry

Numerous classes from the Appraisal Institute & American Institute of Real Estate Appraisers

Current Position

President and Natural Resource Valuation Specialist,

The Herzog Group, Inc., Modesto, CA,

Affiliations

- ✓ Member of the Appraisal Institute (MAI)
- ✓ Registered Professional Forester in California
- ✓ Certified General Real Estate Appraiser in California and Nevada
- ✓ California Real Estate Broker and Realtor
- ✓ Member of the California Licensed Foresters Association
- ✓ Member of the Society of American Foresters

Appraisals

Water rights, water entitlements, proposed water project, timberland, conservation easements, wetlands, riparian lands, wind energy sites, ranches, office buildings, industrial properties, apartments, retail properties, vacant land (commercial, agricultural, transitional), food processing plants, and residential properties. Expert witness in Federal and Superior Courts, as well as in binding arbitration. Approved with Department of Interior agencies, Forest Service, and the Army Corps of Engineers. Completed assignments for the U.S. Department of Justice.

Publications

"California Water: The New Gold," Appraisal Journal, April 1996

"Wind Energy: Power and Policy," Appraisal Journal, January 1999

Water related valuations and consulting assignments

- Has been involved with valuing water rights since the early 1990s. The assignments have covered a broad spectrum of types of water rights.
- Currently involved in two water right litigation assignments. One will be heard in Superior Court in Northern California; the other is in Southern California and will be heard in the U. S. Court of Federal Claims.
- Has testified in U. S. Court of Federal Claims regarding the value of a water entitlement taken by the United States due to enforcement of the Endangered Species Act.
- Evaluated water right sale proposals for a municipal water agency in Southern California.
- Appraised an entire Central Valley Project irrigation district including a separate valuation of the contractual entitlements.
- Appraised industrial and agricultural surface water rights on the Sacramento River and a tributary.
- Testified in Superior Court regarding the value impact on a ranchette property due to the well yield being lower than what was represented to the buyer by the broker.
- Performed California-wide research and analysis for a private party trying to develop a water project.

Instructor

Presented on water rights valuation at a seminar sponsored by the U. S. Army Corps of Engineers for appraisers and realty specialists (Sacramento, CA, 2000).

Presented on both water rights and timberland valuation at a national conference for the National Park Service (Keystone, CO, 2002).

Presented on water rights valuation at two conferences, one sponsored jointly by the Bureau of Land Management and the Forest Service and the other by only the Forest Service (Folsom, CA, 2003; Sacramento, CA, 2006).

Presented on water rights valuation at a seminar sponsored by the Association of Northern California Assessors (Red Bluff, CA, 2003).

Presented on water rights valuation at the U. S. Court of Federal Claims, 18th Judicial Conference (Philadelphia, PA, 2005).

Presented on water rights valuation at the Water Rights Symposium sponsored by the Centre for Advanced Property Economics (Las Vegas, NV, 2005).

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1	Water Transfer Decision Tree
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Acronyms and Abbreviations

ASFMRA	American Society of Farm Managers and Rural Appraisers
CEQA	California Environmental Quality Act
cfs	Cubic feet per second
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DWR	Department of Water Resources
ETAW	evapotranspiration of applied water
EWA	Environmental Water Account
IRS	Internal Revenue Service
Reclamation	U.S. Bureau of Reclamation
SWP	State Water Project
SWRCB	State Water Resources Control Board
UAS	Uniform Appraisal Standards for Federal Land Acquisition
USPAP	Uniform Standards of Professional Appraisal Practice

Executive Summary

Background

The U.S. Fish & Wildlife Service determined that it would be beneficial to have clear guidelines for federal agencies to follow when appraising California water rights.

CH2M HILL was engaged for this endeavor, and Steven J. Herzog, MAI, was engaged by CH2M HILL as a subcontractor to perform this assignment. Herzog has been actively involved with appraising water rights in California for federal agencies for a number of years and has been published in the *Appraisal Journal* on this topic.

Scope of Work

A list of individuals to be interviewed was compiled through an interactive process involving the National Business Center's Office of Appraisal Services, Department of Interior Agencies in California, CH2M HILL, and Herzog. Knowledgeable federal and state agency staff personnel, as well as individuals with water agencies, irrigation districts and conservation agencies were on the list. Other individuals included private sector appraisers and consultants.

Herzog subsequently undertook the interviewing process as well as other independent research into the issue being addressed. Textbooks, legal reference material, published articles, and internet resources were all reviewed for relevance. California State Water Resources Control Board (SWRCB or Board) and Department of Water Resources (DWR) information was of particular interest. Close attention was paid in writing the guidelines to conformance with the Uniform Appraisal Standards for Federal Land Acquisitions (UAS) and the Uniform Standards of Professional Appraisal Practice (USPAP).

Initial drafts of the guidelines were reviewed by individuals selected by U.S. Fish & Wildlife in consultation with other Department of Interior agencies. Edits were made when appropriate to provide additional information or clarification in the text.

Intended Use and Users

These guidelines are intended to provide direction to appraisers, review appraisers, and realty specialists in situations where federal agencies are acquiring California water rights. The Guidelines summarize and bring together existing and applicable appraisal theory and methodology and communicate how they are to be applied to this property type.

Recommendations as to how the UAS should be interpreted when water rights are being valued are included. Additional comments and suggestions as to how water rights reports may differ from typical land valuation reports are presented as well. Instead of a modification of the UAS, these Guidelines should be considered as a water rights

“companion” to the UAS. Because this is a “companion” to the UAS, no replication of appraisal theory and methodology presented in the UAS is replicated.

Guideline Contents

The guidelines have four primary sections:

I. Description of California Water Rights

The various types of California water rights are presented, described, and defined. The property interest associated with each right is also discussed along with legal references where appropriate. This section provides the information necessary for the appraiser to understand what is being appraised.

II. Appraisal of California Water Rights

How the sales comparison, cost, and income approaches are applied to valuing water rights in general is presented. The specific methodology appropriate for valuing each of the water right types is also reviewed along with a discussion of items to keep in mind during research, inspection, confirmation, and adjustment.

III. Case Studies

This section provides hypothetical appraisal examples intended to serve as models for real life situations.

IV. Addenda

The addendum contains a variety of reference material that provides supplemental information to enhance the reader’s understanding of California water rights and the valuation thereof.

Types of California Water Rights

- Prescriptive
- Pueblo
- Groundwater
- Riparian
- Appropriative (Pre- and Post-1914)
- Contractual Entitlements

Prescriptive water rights are those that are gained by trespass or unauthorized taking that ripen into a title. After title is established, they would be valued on a par with similar water rights that were obtained through more typical legal means.

Pueblo water rights are possessed by municipalities and date back to the Spanish-law pueblo system. It is highly unlikely that these water rights will ever be acquired by any federal agencies; thus, their valuation is not addressed.

Groundwater rights are enjoyed by owners of land overlying the groundwater basin. There are a few adjudicated groundwater basins in the state where a court has determined the entities that are authorized to withdraw water from the underlying aquifer and the quantity to which each party is entitled. In non-adjudicated basins, the overlying landowners can withdraw as much as they can beneficially use on their lands. Just because an overlying landowner is using surface water does not mean that the groundwater rights have been forfeited. The surface water rights can be sold and transferred, and the owner can then replace them with groundwater, provided the groundwater and surface water are not interconnected. Groundwater can be appropriated for use on non-overlying land on the condition that such appropriation does not cause an overdraft situation in the aquifer and the appropriative right is junior to any future overlying landowner's rights. Groundwater can also be transferred for use elsewhere if the equivalent amount of consumptive use on the overlying lands is terminated.

Riparian water rights are part of the bundle of rights associated with land that is adjacent to a body of water. These rights run with the land and cannot be transferred. If the water use on the riparian lands is terminated, the water simply stays in the stream and can be extracted by any downstream water right holder. Riparian rights cannot be expanded to new lands by merging of parcels, but they can be lost through subdivision that severs land from the water body.

Appropriative water rights are present where water is extracted from a body of water and used on land that is not adjacent to the water source. Appropriative rights take two forms, pre-1914 and post-1914.

Pre-1914 rights are based on established use that predates the California law that gave the state the authority to regulate water use. Therefore, pre-1914 water rights are technically outside of the Board's jurisdiction. The Board's approval is not needed for the sale and transfer of pre-1914 rights. If another water right holder thinks their rights are harmed by a transfer of pre-1914 rights, they must seek relief in the courts, not from the Board.

Post-1914 rights are under the Board's jurisdiction and are established by the Board issuing a "License to Divert," which specifies the amount of water, point of diversion, place of use, season of diversion, and purpose of use. These rights can be transferred or modified only with the Board's approval, which could involve a public hearing. The transfer cannot harm another water right holder.

Contractual entitlements to water are not water rights. A water right allows the owner of that right to divert water from its source. Contractual entitlements exist because a water right holder has entered into a contract to deliver water to another party after it is extracted from its source. Examples of this arrangement exist in the State Water Project and Central Valley Project, where the DWR and the Bureau of Reclamation own the water rights to allow diversion from the South Delta and have delivery contracts with irrigation districts south of the Delta.

Appraisal Principles for Water Rights

It is a well established principle in law that water rights are considered to be one of the real property interests in real estate. Water does not become personal property until it is

delivered to a final urban customer, that is, when it comes out of the tap. Water rights used for irrigation are considered appurtenant to the real estate where the water is applied.

Consequently, the appraisal of water rights is generally the appraisal of a partial interest in real estate. As with other partial interest valuations, the most common methodology employed is a *before and after* analysis. Typically, the value of a parcel of land with the water right being exercised on site is compared with the value of the parcel without the water right and the difference in the value estimates is the estimated value of the water right. Care must be exercised to ensure a complete highest and best use analysis is done in both the *before* and *after* conditions.

There are situations, especially when the water right comprises only a small portion of the *larger parcel*, that a *takings plus damages* analysis is warranted. In this situation the estimated contributing value of the water right to the entire larger parcel is estimated with an adjustment for any damage, or benefit, to the remainder. Direct sales of water rights would typically be the comparables utilized in this approach.

In water right valuations, all of the standard approaches – sales comparison, cost, and income – should be considered for use. It is common for the elimination of one or more approaches to value simply because the market participants do not use that technique. This decision process is on a case-by-case basis. Items of comparison between comparables and the subject tend to be unique to water right valuations.

Summary of Water Rights Appraisals

This section summarizes the information that must be gathered during site inspection and subject research. In addition, market data focus and confirmation is addressed. References are also made to locations in the Guidelines where more detailed presentations of appraisal techniques can be found. The sequence of water rights types in this section is as follows:

- Appropriative
- Groundwater
- Riparian
- Contractual entitlement

Appropriative Water Rights

Appropriative water rights are discussed in the following Sections of the report: 1.1.5, 1.2.2, 1.3.5, 2.8.4, 3.2 and 3.3.

Inspection

View and photograph the current point of diversion, including pumping equipment and/or diversion mechanism. Photos should be taken upstream and downstream as well. The global positioning system (GPS) coordinates should be indicated.

View and photograph canals or pipelines used to transport water to the application area. This includes onsite distribution facilities.

What is the current and historical use of the water? If the water is used for irrigation, what crops or mixture of crops have been grown, especially in recent years?

Subject Research

Obtain a copy of the License to Divert if valuing a post-1914 appropriative water right. If the appraisal involves a pre-1914 appropriative water right, then obtain other proof that the water right exists. Legal opinions or appraisal instructions directing the appraiser to make assumptions must be included and presented prominently in the report.

The License to Divert will provide the following information:

- Seniority of the water right
- Point of diversion
- Season of use
- Amount of water authorized to be diverted legally
- Purpose of use – irrigation, industrial, municipal, or other
- Place of use

If dealing with a pre-1914 water right, then the information above must be obtained from sources other than the Board. The primary source should be the owner of the water right. Recorded water right claims for pre-1914 rights cannot be accepted at face value, but may be part of the information research process. The validity of a pre-1914 right should be established before retaining an appraiser. The appraiser can then be instructed to assume that the right is valid.

Historical documentation regarding the amount of water extracted is critical. The source can be reports filed with the Board. These are mandatory for water rights created by a License to Divert. Holders of pre-1914 right are supposed to report as well, but there is no penalty for non-reporting in their case.

There must be an engineer's or hydrologist's report regarding consumptive use on site. This report should present well supported conclusions regarding applied water, evapotranspiration of applied water (ETAW) and what happens to the applied water that is not evaporated or transpired. Published information on ETAW by crop type should be reviewed and compared to the engineer's conclusions as a check on reasonableness. Keep in mind the requirements on the use of reports from other experts in the Uniform Appraisal Standards for Federal Land Acquisition (UAS) (see page 2-5 of this report). The appraiser must be confident that the conclusions are valid and must not merely accept them without question.

Were there any years of non-use? The historical record of reports filed with the Board should be examined, but the engineer/hydrologist's report could cover this as well. A period of five consecutive years of non-use may cause a loss of the water right.

The expectation of receiving water under a water right depends on both the legal seniority and the hydrology of the water source. During dry periods when not all of the water rights can be honored, the most junior rights are directed by the Board to stop diverting so that the senior rights will not be impacted. Research should be done on Board records as to the frequency of past shortfalls in fulfilling all water right holders' demands. In addition, the

Department of Water Resources (DWR) documents stream flows over time on many of the streams in California.

Market Data

Geography: What natural and man-made infrastructure exists that would allow the physical transfer of the point of diversion to a potential buyer? Transactions along this system are the best source of market data. Transactions along other systems can be used provided the overall market condition differences between systems are understood.

Sales, Leases, or Cost Data: The market data pursued depends on the valuation methodology that is considered most appropriate for valuing the subject. If a single season lease is being valued, then obviously those are the best comparables. Pumping cost information may also be required because sellers may be viewing that cost as an important ingredient in the lease price. A permanent sale of a water right requires the broadest collection of market data, which could include water right sales, irrigated land sales, dry land sales, long- and short-term leases, and all costs associated with groundwater development. Decide on the methodology before pursuing market data.

Water Right Transaction Confirmation: For each water right transaction, interview one or more knowledgeable individuals and determine these facts:

1. Property rights conveyed – the nature of the water right involved, including whether transfer is permanent or short-term
2. Price paid
3. Financing terms
4. Conditions of sale – whether it was an arm’s length transaction without any other factors influencing the price
5. Sale date – both contract and close of escrow
6. Buyer
7. Seller
8. Recording instrument and reference number
9. Old and new points of diversion and places of use
10. Season of use
11. What was the reliability of the water right, both from a hydrologic and legal perspective?
12. Historical water use, including amount diverted and consumptively used
13. Intended new use
14. Optimum use (most profitable)
15. How it was transferred – other parties could be involved in exchanging water to facilitate transfer

16. Obstacles that existed to the transfer
17. Cost of the transfer in addition to the price and who paid those costs
18. How was the price arrived at – was it listed for sale, was the seller approached by the buyer, was the price negotiated?

Land Sale Transaction Confirmation: If a *before and after* analysis will be done wherein the values of real estate with and without the water right will be compared, then additional information regarding the characteristics of the land must be gathered, including:

1. Size
2. Soils
3. Crops grown
4. Terrain
5. Development potential
6. Improvements

Obviously, for dry land sales there will be no water right information gathered.

Valuation Principles and Adjustments: Valuation principles are addressed in Section 2 of the Guidelines. The adjustment process, including the items of comparison, is presented in a case study in Section 3. As in all appraisals, adjustments should reflect the market's perspective on value items.

Groundwater Rights

Groundwater rights are discussed in the following Sections of the report: 1.13, 1.2.2, 1.3.3, 2.5, 2.82 and 3.4.

Inspection

View and photograph the current well locations, including pumping equipment. The global positioning system (GPS) coordinates should be indicated.

View and photograph canals or pipelines used to distribute water after it is brought to the surface. If the intention is to pump the water into a waterway, the specific method for doing so should be examined so that any costs associated with it can be considered.

What is the current and historical use of the water? If the water is used for irrigation, what crops or mixture of crops have been grown, especially in recent years?

Subject Research

There will be no License to Divert for groundwater. There may or may not be a requirement that the owner file reports as to volume of water that has been pumped. Some water districts and counties require this while others do not. The owner should be asked for any documentation in this regard. If there is no documentation, then the owner's opinion should be solicited.

The acreage irrigated and crops grown can provide an indication of the volume of water that has been pumped. The situation will be complicated if there is a combination of surface and groundwater used for irrigation. In this case, if the surface water volume applied can be

determined through records, then an estimate of the groundwater volume can be derived through extraction.

Legal opinions or appraisal instructions directing the appraiser to make assumptions must be included and presented prominently in the report.

There must be an engineer's or hydrologist's report regarding consumptive use onsite. This report should present well supported conclusions regarding applied water, ETAW and what happens to the applied water that is not evaporated or transpired. Published information on ETAW by crop type should be reviewed and compared to the engineer's conclusions as a check on reasonableness. Keep in mind the requirements on the use of reports from other experts in the UAS (see Section 2.3 of these Guidelines). The appraiser must be confident that the conclusions are valid and must not merely accept them without question.

Depth to groundwater, depth that water is drawn from, pumping costs, and well yield should all be determined. The cost of installing a new well along with the current depreciation of the well and pump may have to be estimated. Therefore, information as to life expectancy, age, and maintenance should be gathered. Any trends in groundwater levels should be investigated. There may be water district reports on the subject.

Groundwater rights are not lost through non-use.

Market Data

Geography: The same as for appropriative rights – see page ES-6.

Sales, Leases, or Cost Data: The same as for appropriative rights – see page ES-6.

Water Right Transaction Confirmation: The same as for appropriative rights – see pages ES-6 and ES-7.

Land Sale Transaction Confirmation: The same as for appropriative rights – see page ES-7.

Valuation Principles and Adjustments: Valuation principles are addressed in Section 2 of the Guidelines. The adjustment process, including the items of comparison, is presented in case studies in Section 3. As in all appraisals, adjustments should reflect the market's perspective on value items.

Riparian Water Rights

Riparian water rights are discussed in the following Sections of the report: 1.1.4, 1.2.2, 1.3.4, 2.8.3 and 3.5.

Inspection

View and photograph the current diversion locations, including pumping equipment. The global positioning system (GPS) coordinates should be indicated.

View and photograph canals or pipelines used to distribute water after it is extracted from the stream.

What is the current and historical use of the water? If the water is used for irrigation, what crops or mixture of crops, have been grown, especially in recent years?

Subject Research

There will be no License to Divert for riparian water rights. The owner may or may not have filed usage reports with the Board; such reports are voluntary in the case of riparian rights. Other water agencies may require that the owner file reports as to volume of water that has been diverted. The owner should be asked for any documentation in this regard. If there is no documentation, then the owner's opinion should be solicited.

The acreage irrigated and crops grown can provide an indication of the volume of water that has been applied. The situation will be complicated if there is a combination of surface and groundwater used for irrigation. In this case, a best effort will have to be made by whatever means possible to quantify the applied water by source.

Legal opinions or appraisal instructions directing the appraiser to make assumptions must be included and presented prominently in the report.

There must be an engineer's or hydrologist's report regarding consumptive use on site. This report should present well supported conclusions regarding applied water, ETAW and what happens to the applied water that is not evaporated or transpired. Published information on ETAW by crop type should be reviewed and compared to the engineer's conclusions as a check on reasonableness.

If there are existing wells, or the intention of installing wells to continue irrigating, then the engineer must also address the connectivity issue between the groundwater and the surface water.

Keep in mind the requirements on the use of reports from other experts in the UAS (see Section 2.3 of these Guidelines). The appraiser must be confident that the conclusions are valid and must not merely accept them without question.

The salvage value of any irrigation equipment must be estimated along with any current costs associated with irrigation.

Riparian water rights are not lost through non-use. However, if the stream has been adjudicated, then a court will have issued a decree as to how much water each of the water right holders is entitled.

Market Data

Geography: Transactions along the subject's water system are the best source of market data. Transactions along other systems can be used provided the overall market condition differences between systems are understood.

Sales, Leases, or Cost Data: The market data pursued depends on the valuation methodology that is considered most appropriate for valuing the subject. The primary valuation focus will be of riparian land with and without riparian water rights. Sales of non-riparian water rights may be of limited use because the buyer of the riparian right cannot transfer it to another location. However, those sales would indicate the cost of acquiring a substitute water source in the market. The differential in value between irrigated and non-

irrigated land will be critical to the analysis, with other value indicators being supportive in nature.

Water Right Transaction Confirmation: The same as for appropriative rights – see pages ES-6 and ES-7. Keep in mind that sales of transferable water rights are generally not good indicators of the value of riparian rights.

Land Sale Transaction Confirmation: The same as for appropriative rights – see page ES-7.

Valuation Principles and Adjustments: Valuation principles are addressed in Section 2 of the Guidelines. The adjustment process will conform to the presentation associated with the before and after analysis for appropriative water rights, that is, irrigated and non-irrigated lands, and preferably riparian lands. The adjustment process, including the items of comparison, is presented in case studies Section 3. As in all appraisals, adjustments should reflect the market's perspective on value items.

Contractual Entitlements

Contractual entitlements to water are discussed in the following Sections of the report: 1.1.6, 1.2.2, 1.3.6, 2.8.5 and 3.6.

Inspection

View and photograph the current point(s) of delivery to the property, including pumping equipment and/or diversion mechanism. The global positioning system (GPS) coordinates should be indicated.

View and photograph canals or pipelines used to transport water to the application area. This includes onsite distribution facilities.

What is the current and historical use of the water? If the water is used for irrigation, what crops or mixture of crops, have been grown, especially in recent years?

Subject Research

Obtain a copy of the contract that creates the entitlement. There may be more than one related contract, for example, the landowner's contract with the district, and the district's contract with the State Water Project (SWP) or Central Valley Project (CVP). There must also be an understanding of the water right to which the entitlement is tied.

Legal opinions or appraisal instructions directing the appraiser to make assumptions must be included and presented prominently in the report.

The contract(s) will provide indications of the amount of water the landowner is entitled to if it is available. The landowner and the district should be able to provide the amount of water delivered in recent years and the cost of that water. The contract(s) should also indicate the opportunities and obstacles associated with transferring the entitlement to another party for use at another location. Supplemental interviews should take place with the district personnel to ensure a complete understanding of this issue. Not all entitlements have equal delivery reliability. "Exchange contractors," for instance, have a higher percentage of delivery reliability because they gave up (exchanged) actual water rights for contractual entitlements.

The Board is not involved in administering contractual entitlements and will have no records associated with them.

ETAW is not an issue with contractual entitlements because the entire entitlement can be transferred regardless of how much water was used. Entitlements are not lost through non-use.

The groundwater resource must be understood so that a proper highest and best use analysis can be done. Is it feasible to sell the entitlement and continue to irrigate with groundwater?

If any experts are retained to develop opinions that are used in the valuation, keep in mind the requirements on the use of reports from other experts in the UAS (see Section 2.3 of these Guidelines). The appraiser must be confident that the conclusions are valid and must not merely accept them without question.

Market data

Geography: What natural and man-made infrastructure exists that would allow the transfer of the entitlement to other points of diversion for potential buyers? The potential for exchanges to be used to facilitate a transfer should not be overlooked. In exchange situations, third parties can be brought into the transaction that would receive water from one project and release its entitlement to water from another project. Entitlements from the CVP and SWP are sometimes involved. Entitlement sales from within the subject's district are the best source of market data. The next level of expansion for market data search is similar project entitlement sales, that is, CVP entitlement sales from one district compared to CVP entitlement sales in another district. Other project sales (CVP compared with SWP) are less desirable but still usable. Sales of last resort are water right transactions. Every effort should be made to avoid comparing the subject to transactions on the opposite side of the Delta.

Sales, Leases, or Cost Data: What market data is pursued depends on the valuation methodology that is considered most appropriate for valuing the subject. If a single season lease is being valued, then obviously those are the best comparables. Delivery cost information may also be required because sellers may be viewing that cost as an important ingredient in the lease price. If groundwater is available to the seller and the intention is to continue to irrigate with groundwater, then pumping cost information may play a large part in lease price determination.

A permanent sale of an entitlement requires the broadest collection of market data, which could include entitlement sales, irrigated land sales, dry land sales, long- and short-term leases, and all costs associated with groundwater development. Decide on the methodology before pursuing market data.

Water Entitlement Transaction Confirmation: For each water entitlement transaction, interview one or more knowledgeable individuals and determine these facts:

1. Entitlement conveyed – the nature of the contractual entitlement involved, including whether transfer is permanent or short-term
2. Price paid
3. Financing terms

4. Conditions of sale – whether it was an arm’s length transaction without any other factors influencing the price
5. Sale date – both contract and close of escrow
6. Buyer
7. Seller
8. Recording instrument and reference number
9. Old and new points of diversion and places of use
10. What was the reliability of the water right, both from a hydrologic and legal perspective?
11. Historical water use, including amount diverted and consumptively used
12. Intended new use
13. Optimum use (most profitable)
14. How it was transferred – other parties could be involved in exchanging water to facilitate transfer
15. Obstacles that existed to the transfer
16. The cost of the transfer in addition to the price and who paid those costs
17. How was the price arrived at – was it listed for sale, was the seller approached by the buyer, was the price negotiated?

Land Sale Transaction Confirmation: The same as for appropriative rights – see pages ES-7.

Valuation Principles and Adjustments: Valuation principles are addressed in Section 2 of the Guidelines. The adjustment process will conform to the presentation associated with the before and after analysis for appropriative water rights, that is, irrigated and non-irrigated lands. Preferably the irrigated lands would have only contractual entitlements for a source of supply. The adjustment process, including the items of comparison, is presented in case studies in Section 3. As in all appraisals, adjustments should reflect the market’s perspective on value items.

Comments

Even though every effort has been made to make the guidelines as clear and useful as possible, there may be room for improvement. If you have comments or suggestions on ways to enhance future editions of the guidelines, please send them to:

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Sacramento, CA 95825

Summary of California Water Rights

1.1 Types of Water Rights

In California, the different types of water rights include:

1.1.1 Prescriptive

Water use rights gained by trespass or unauthorized taking that ripen into a title, on a par with rights to land gained through adverse possession.¹

1.1.2 Pueblo

A water right possessed by a municipality that, as a successor of a Spanish-law pueblo, is entitled to the beneficial use of all needed, naturally occurring surface and groundwater of the original pueblo watershed.²

1.1.3 Groundwater

The *Dictionary of Real Estate Appraisal*, defines groundwater as “all water that has seeped down beneath the surface of the ground or into the subsoil; water from springs or wells.”³

This is an adequate working definition if the “springs or” is eliminated because once water issues out of a spring it becomes surface water, not groundwater. As is also indicated in the following text, it is not water flowing in an underground channel. Groundwater should be thought of as the water that occupies the space between soil particles beneath the surface of the land. Groundwater is extracted exclusively by means of wells. Whenever groundwater reaches the surface in a natural manner, whether through springs or seepage into a surface water stream channel or lake, it ceases to be groundwater and becomes surface water.

The jurisdiction of the SWRCB [State Water Resources Control Board] to issue permits and licenses for appropriation of underground water is limited by section 1200 of the California Water Code to “subterranean streams flowing through known and definite channels.”

If use of underground water on nonoverlying land is proposed and the source of the water is a subterranean stream flowing in a known and definite channel, an application pursuant to the California Water Code is required. A Statement of Water Diversion and Use should be filed for use of water from a subterranean stream on overlying land (see Statements of Water Diversion and Use section of this [the footnoted] document).

¹ <http://www.swrcb.ca.gov/waterwords.html>, SWRCB web site

² <http://www.swrcb.ca.gov/waterwords.html>, SWRCB web site

³ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 133.

Underground water not flowing in a subterranean stream, such as water percolating through a groundwater basin, is not subject to the SWRCB's jurisdiction. Applications to appropriate such water, regardless of use, should not be submitted. Owners of lands overlying a groundwater basin or other common source of supply have the first right to withdraw water for reasonable beneficial use on their overlying lands, and the right of each owner is equal and correlative to the right of all other owners similarly situated. In case of insufficient water to supply fully the requirements of all, the available supply must be equitably apportioned. In these respects, overlying rights are closely similar to riparian rights pertaining to surface bodies of water.⁴

A subterranean stream flowing in a known and definite channel is a rarity.

1.1.4 Riparian

A working definition of riparian water rights can once again be obtained from the *Dictionary of Real Estate Appraisal*:

The incidental right of the owners of land bordering a lake or stream to the use and enjoyment of the water that flows across their land or is contiguous to it; entitles the user to reasonable use that does not materially diminish the quality or quantity of the water for other owners. The owner's rights are equal, regardless of their location along the stream or the time when each property was purchased.⁵

Some of the aspects of a riparian water right include:

- The right arises from the place of use being lands adjoining the water body from which the water is drawn.
- The water can only be used on these lands.
- If lands are severed from the water body, they lose the riparian right unless it is reserved in the title.
- There is no priority of riparian rights.
- The right is not created by use nor lost through non-use.
- The right cannot be transferred to another parcel of land.
- The right is for the natural flow of the stream, not flow that results from the release of stored or imported water.

⁴ SWRCB, http://www.waterrights.ca.gov/application/forms/infobook.htm#_Toc442697730

⁵ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 250.

1.1.5 Appropriative

Appropriative water rights exist in situations where surface water is transported away from its naturally occurring location and used on lands that are not adjoining the source water body. These water rights generally fall into two categories:

Pre-1914

Appropriative right that pre-dates the SWRCB's existence and authority to regulate the State's water supply.

License (post-1914)

An official document giving permission to engage in a specified activity, such as an appropriation of water.⁶

1.1.6 Contractual Entitlements

Contractual Entitlements are not a water right. A water right is held by the entity that takes water directly from a body of water. A contractual entitlement is created by means of a contract between the appropriative water right holder and another entity that will take delivery of water diverted by means of the water right. State Water Project (SWP) and Central Valley Project (CVP) districts have contracts with Department of Water Resources (DWR) and U.S. Bureau of Reclamation (Reclamation), respectively, which specify the amount of water each district is entitled to if full allocations are available. If less than full allocations are available, then the reduced delivery each district receives is determined by the terms of the contract. The districts generally have contracts with landowners for distribution of water the district receives. Therefore, there is a second tier of contractual entitlements. When there are sub-districts present, there would be three tiers of contractual entitlements, with the last one involving the landowner, the actual user of the water.

1.2 Property Definition

1.2.1 Appraisal Definitions

Appurtenance. Something that has been added or appended to a property and has since become an inherent part of the property; usually passes with the property when title is transferred.⁷

Correlative. In a mutual or complementary relationship.⁸

Improvements. Buildings or other relatively permanent structures or developments located on, or attached to, land.⁹

⁶ <http://www.swrcb.ca.gov/waterwords.html>, SWRCB web site

⁷ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 17.

⁸ Encarta Dictionary, http://encarta.msn.com/dictionary_/correlative.html

⁹ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 142.

Intangible Property (Intangible Assets). Nonphysical assets including, but not limited to, franchises, trademarks, patents, copyrights, goodwill, equities, securities, and contracts, as distinguished from physical assets such as facilities and equipment.¹⁰ (underline emphasis added)

Partial interest. Divided or undivided rights in real estate that represent less than the whole.¹¹

Personal Property. Identifiable tangible objects that are considered by the general public as being personal, for example, furnishings, artwork, antiques, gems and jewelry, collectibles, machinery and equipment; all tangible property that is not classified as real estate.¹²

Personal Property. Consists of every kind of property that is not real property; movable without damage to itself or the real estate; subdivided into tangible and intangible.¹³

Real Estate. An identified parcel or tract of land, including improvements, if any.¹⁴

Real Property. The interests, benefits, and rights inherent in the ownership of real estate.¹⁵

1.2.2 Legal References

Water

Unless otherwise noted, the following excerpts come from Water Rights Laws in the Nineteen Western States, Volumes I and II, written by Wells A. Hutchins and published in 1971 by the U.S. Department of Agriculture.

Water flowing in a natural stream is not the subject of private ownership. Private rights that attach thereto – whether appropriative or riparian – are strictly usufructuary rights to take the water from the stream into physical possession for the purpose of putting it to beneficial use. This, in western water law...is a very old and well-established principle. (page 137, Volume I)

One of the “first principles” of the law of watercourses...is that the running water of a natural stream is, as a *corpus*, the property of no one – variously expressed as being in the “negative community,” “common,” “*publici juris*,” “the property of the public,” or “the property of the State in trust for the people.” (page 140, Volume I)

The foregoing principle, so well settled in the arid and semiarid regions of the country recognizes, of course, that denial of private ownership in the *corpus* of the flowing stream water does not preclude but, on the contrary, is expressly subject to the existence and protection of valid private rights to capture, possess, and beneficially use the public waters [footnote omitted]. (page 141, Volume I)

¹⁰ The Appraisal Foundation, Uniform Standards of Professional Appraisal Practice, 2005 ed., (Washington, DC, 2005) p. 3.

¹¹ Appraisal Institute, The Dictionary of Real Estate Appraisal, 4th ed., (Chicago: Appraisal Institute, 2002), p. 209.

¹² The Appraisal Foundation, Uniform Standards of Professional Appraisal Practice, 2005 ed., (Washington, DC, 2005) p. 4.

¹³ Appraisal Institute, The Dictionary of Real Estate Appraisal, 4th ed., (Chicago: Appraisal Institute, 2002), p. 212.

¹⁴ The Appraisal Foundation, Uniform Standards of Professional Appraisal Practice, 2005 ed., (Washington, DC, 2005) p. 4.

¹⁵ Ibid

The right to take water from a public stream into private possession under either the doctrine of appropriation or the riparian doctrine is a strictly usufructuary right. [footnote omitted] Said the California Supreme Court in the landmark riparian rights case of *Lux v. Haggin*: “As to the *nature* of the right of the riparian owner in the water, by all the modern as well as ancient authorities the right in the water is *usufructuary*, and consists not so much in the fluid itself as in its uses, including the benefits derived from its momentum or impetus.” [footnote omitted] From the earliest times, this usufructuary right, whether riparian or appropriative, has been consistently regarded and protected as property. [footnote omitted] (page 142, Volume I)

...in a series of cases, the California courts have held uniformly that water flowing in a natural channel is real property, a part of the land. [footnote omitted] That water in its natural situation upon the surface of the earth, whether as a flowing stream, as a lake or pond, or as percolations in the soil, is real property, will not be disputed. (page 143, Volume I)

The general rule is that one who diverts water from a natural stream pursuant to a valid right of diversion and use becomes the owner of the particles of water. (page 144, Volume I)

The rule in California is that water in canals and other artificial conduits or reservoirs does not become personalty as soon as it is diverted from its natural channel or situation, but usually retains its character as realty until severance from the artificial conduits is completed by delivery therefrom to the consumer; and that water in use in irrigation is not personal property.

...the California Supreme Court stated that where the right to water in pipes and the pipes themselves constitute an appurtenance to real property, which is usually the case, the water usually retains its character as realty until severance is completed by its delivery from the pipes to the consumer. [footnote omitted]

...Water diverted from a natural source of supply into artificial conduits for the purpose of conducting it to land for irrigation has been uniformly classed in California as real property, and it does not change its character from realty to personalty upon being delivered upon the land for the irrigation thereof. [footnote omitted]

...Water separated from the source or body of which it constitutes a part may be bought and sold like other commodities in the character of personal property, such as when it is supplied through artificial conduits for domestic use. The same reasoning applies to water supplied for industrial use. [footnote omitted] Hence, water delivered to an oil company for use in its drilling operations no more partakes of the characteristics of realty than does domestic water delivered by a municipality to its inhabitants for use within their homes or to an industrial plant for use within its factory. In this case, such water was held to have become severed from the real property on which it was produced, and to have become personalty. (pages 149-150, Volume I)

Water Rights

The previous excerpts refer to the classification of the water itself. The following ones refer to the water rights involved.

Water rights traditionally have been considered as rights in real property. *San Bernardino v. Riverside* (1921) 186 Cal. 7, 13; *San Francisco v. Alameda County* (1936) 5 Cal.2d 243, 245-247. A riparian right is “part and parcel” of riparian land, and the right to the flow is real property. *Title Ins. & Trust Co. v. Miller & Lux* (1920) 183 Cal. 71, 81. Real property remedies are therefore available for riparian rights. *Miller & Lux v. Enterprise Canal & Land Co.* (1915) 169 Cal. 415, 444. An appropriative right is also an interest in real property. *Wright v. Best* (1942) 19 Cal.2d 368, 382. Thus, appropriative rights may be, but are not necessarily appurtenant to the land. If they are appurtenant, the right is incidental to the land. *Wright*, pages 377-378. Percolating water rights are also real property rights. *Stanislaus Water Co. v. Bachman* (1908) 152 Cal. 716, 725. The right to use percolating waters is part and parcel of the land. *Pasadena v. Alhambra* (1949) 33 Cal.2d 908, 925; *Rank v. Krug* (S.D. Cal. 1950) 90 F.Supp. 773, 787.¹⁶

Appropriative

...the appropriative right is a right of beneficial use, a usufruct only, and hence it does not include an ownership of the *corpus* of water while still in the natural source of supply. A necessary result is that (a) ownership of a private appropriative right and (b) ownership of the public water to which the right relates are entirely different things.

...Pragmatically, the important principle is that private ownership of stream water while in its natural environment does not exist; but private rights to extract and use such waters under State supervision and control in the exercise of its police powers – do exist, and they are property rights. (pages 442-443, Volume I)

The appropriative right is a species of property. – At the beginning of the development of water law in California – in the earliest years of statehood – it was established that the right which an appropriator gains is a private property right, subject to ownership and disposition by him as in the case of other kinds of private property (footnote omitted).

This view of the property nature of the appropriative right has been consistently taken by the western courts that have had occasion to pass upon or to discuss it (footnote omitted). (page 151, Volume I)

The appropriative right is real property. – In 1894, the Wyoming Supreme Court said:

Thus it seems that the doctrine is very general in the states of the arid region that a water right becomes appurtenant to the land upon which the water is used, and the ditch, water-pipe, or other conduit for the water, becomes

¹⁶ Littleworth, Arthur L. and Garner, Eric L., *California Water*, Solano Press, Point Arena, California, 1995, p 27

attached to the land either as appurtenant, or incident to the land and necessary to its beneficial enjoyment, and therefore becomes part and parcel of the realty (footnote omitted).

In one of its earliest water rights decisions, the California Supreme Court held that the right of prior appropriation and use of water “has none of the characteristics of mere personalty.”¹⁷ The rule that the appropriative right is an interest in real property is recognized generally throughout the West (footnote omitted). (page 152, Volume I)

Generally Appurtenant, but Severable. Of general application in the West is the rule that an appropriative right becomes appurtenant to the land for the benefit of which the water is applied. ...In most jurisdictions the right may be severed from the land to which it became initially appurtenant and, subject to certain conditions, it may be transferred to and become simultaneously appurtenant to other land. (page 455, Volume I)

Some individual State situations. - ...(2) California. By contrast with the riparian right, the appropriative right is not inseparably annexed to the land as part and parcel of it, but is separable and alienable from the land to which it became initially appurtenant.¹⁸ (page 457, Volume I)

Riparian

That the riparian right is real estate has been acknowledged uniformly by the courts of the West that have had occasion to pass upon or to discuss the property nature of the right.

...The right of a proprietor of riparian land in a riparian rights jurisdiction to have the water flow to his land to meet the requirements of his water right as recognized in the jurisdiction is annexed to the soil, not as a mere easement or appurtenance, but as part and parcel of the land itself. (pages 155-156, Volume I)

Groundwater

The right to use percolating water, as well as the *corpus* of the water itself, is real property (footnote omitted). In *Pasadena v. Alhambra*, the California Supreme Court stated that the “overlying right,” or right of the owner of the land to take water from the ground underneath for use on his overlying land, “is based on ownership of the land and is appurtenant thereto (footnote omitted). (pages 669-670, Volume II)

The California Doctrine of Correlative Rights. The doctrine of correlative rights to the use of percolating waters in California accords to each owner of land overlying a common water supply a right to the reasonable beneficial use of the water of that supply on or in connection with his overlying land. Such right of use of each landowner is correlative with similar rights of all other

¹⁷ Hill v. Newman, 5 Cal. 445, 446 (1855). More recently An appropriative right constitutes an interest in realty. Wright v. Best, 19 Cal. (2d) 368, 382, 121 Pac. (2d) 702 (1942).

¹⁸ Wright v. Best, 19 Ca. (2d) 368, 382, 121 Pac. (2d) 702 (1942).

overlying owners. An insufficient supply may be apportioned among them by a court decree. Any surplus may be appropriated for nonoverlying uses. (page 670, Volume II)

Discussion and Conclusions

Percolated Groundwater: Groundwater rights are one of the real property interests in the real estate overlying the groundwater basin. They are correlative with other overlying landowners. If a groundwater basin produces yield in excess of the amount that can be beneficially used by the overlying landowners, then the excess is available for appropriation by other entities.

No license is required from the SWRCB before exercising a groundwater right, and this right is not lost through non-use.

Groundwater and groundwater rights may be available for transfer provided the conditions presented in Section 1.3.3 of this document are met. Research must also be done into the restrictions of local ordinances on this issue before reaching conclusions regarding legality of transfer. Many counties already have such ordinances in place. An increasing number of groundwater basins have groundwater management plans in effect that also could pose restrictions on the groundwater right.

Riparian: Riparian water rights are one of the real property interests in the real estate adjoining the water source. Riparian rights are generally correlative with other riparian rights and are not junior to appropriative rights regardless of date of first use.

No license is required from the SWRCB before exercising a riparian right, and this right is not lost through non-use.

Exceptions to the preceding statements could exist if a water source has been adjudicated.

Unless reserved in the title documents associated with a subdivision of a riparian parcel, any new parcel that no longer has frontage on the water source loses its riparian right. Riparian rights cannot be gained for a non-riparian parcel by merging with a riparian parcel.

Riparian rights cannot be separated from the real estate of which they are a part, and therefore, cannot be transferred.

The Layperson's Guide to Water Rights Law, Water Education Foundation, 2000, makes the following statement about riparian rights:

To allow water to be put to its most reasonable and beneficial use, the courts have permitted riparians to agree not to use water to which they are entitled so others may claim the water under another right. When such an arrangement is made, the riparian right holder usually is compensated in a manner very similar to a sale of the water right. When the purchaser is an appropriator, his priority depends on the date of his appropriation in relation to other appropriators on the waterway.

If this were true, then riparian rights would, for all intents and purposes, be transferable. However, a recent communication with a Department of Water Resources executive staff member who has a long-term involvement in water transfers indicates that there is no legal means for ensuring that other diverters do not capture the unused riparian water.

Appropriative: While the water is in its naturally occurring location, it is not owned by any private party. Upon the exercising of an appropriative water right, the water is diverted from its natural location and becomes owned by the legal diverter. When the intended use of the diverted water is for application to a parcel of land, then the appropriative water right is appurtenant to that parcel. In this case the water is considered part of the real estate from the moment of diversion through the time of final application to the land.

The appropriative right is, however, severable from one parcel and transferable to another. If the appropriative right is by means of a license to divert issued by the SWRCB (i.e., post-1914 right), then the SWRCB must approve all modifications in point of diversion, place of use, and purpose of use. If the right is pre-1914, then the SWRCB is not involved. However, any other water right holder who considers their water right to be harmed by a transfer of pre-1914 water rights can seek relief from the courts.

If an appropriative water right is not intended for application of water to a specific parcel of land, but for municipal and industrial use, then the water becomes personal property when it is delivered to the customer.

Contractual Entitlements: Contractual entitlements are not water rights, but they are linked to a water right. The entity that has an appropriative water right has entered into a contractual agreement with a second entity to deliver up to a certain amount of water, if it is available. The second entity (contractor) then is said to have a contractual entitlement for the specified amount of water. There is usually a point of delivery specified where the water will be delivered. Fixed costs (infrastructure related) and variable costs (operations and energy for pumping related) are associated with the entitlement. Contractual entitlements may cascade down to other contractors further down the delivery system by means of additional contracts.

It is common for a contractual entitlement to be associated with a parcel of land and to transfer with the land. However, it is not part of the real estate and, therefore, not a real property interest in the real estate. By definition, a contractual entitlement is *intangible property*.

Dedicated Instream Water (1707 Water): Section 1707 (a) (1) of the California Water Code states that:

Any person entitled to the use of water, whether based upon an appropriative, riparian, or other right, may petition the board....for a change for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water.

Essentially, the purpose of use of a water right that was being used on a parcel of land can be changed to benefit wildlife. Usually this is done by foregoing the right to divert the water from a stream. This is considered a reasonable and beneficial use, and the ownership of the water right would not be lost through disuse.

It would appear that such a water right has been separated from the real estate to which it was formally an appurtenance. Is it therefore no longer a real property interest in any real estate?

An informal opinion of an attorney with the Board consisted of:

There appears to be no specific prohibition in the Water Code to filing a petition to revert water currently released under section 1707 to a consumptive use. The petitioner would have to file a petition with the Division to change the purpose of use. Also, if the petitioner wished to use the water in a different place of use, this would also have to be included in the petition. Obviously, a California Environmental Quality Act (CEQA) analysis would have to be completed, and, possibly, a water availability analysis as well, if the water were to be diverted for a consumptive use, thus changing the total streamflow regime. The petition would be publicly noticed, with a protest period, etc., just as in any other petition.

One exception to this might be if the applicant had agreed to make specific bypass flows or releases for the purpose of habitat management; maintenance of temperature, dissolved oxygen or other water quality parameters; etc., in order to get the rest of the project approved. In this case, the permittee would probably NOT be able to revert the instream beneficial use water to other purposes. However, these releases/bypasses would also probably not be included as part of a section 1707 agreement, but rather as specific mitigation measures under CEQA, ESA, CESA, etc., incorporated as terms and conditions in the permit.

If the water right, or the associated physical water, had become personal property, none of the restrictions or requirements listed above for using it elsewhere would apply.

Consequently, while it is dedicated to instream use, the water right may not be a real property interest, although it has the potential of being restored to that condition. Any valuation of a 1707 water right would have to examine all of the economic uses to which it could be put, including reversing the dedication, and consider the costs and risks of reversing the dedication.

Because of the expense and risks associated with attempting to reverse an instream dedication, a seller of a water right would not be prudent to initiate the dedication process even if the buyer is a public agency acquiring the right for exactly that purpose. The acquiring agency should be the one that applies for change of purpose after close of escrow in the transaction.

Any private party looking to acquire a water right for economic purposes could be expected to be reluctant to acquire a 1707 water right because of the difficulty of gaining the right to use the water for other purposes. At a minimum the price would be discounted to consider risk and cost of reversing the dedication process.

1.3 Transfers of Water Rights

You can transfer water if it is your water and not somebody else's water, provided the transfer does not injure another water right holder or unreasonably affect instream beneficial uses. – A Guide to Water Transfers

1.3.1 Prescriptive

Once a prescriptive water right has ripened, it would simply be treated as an appropriative right.

1.3.2 Pueblo

Pueblo rights could consist of a combination of surface water rights and groundwater rights. It is highly unlikely that these rights will ever be available for sale or lease, so they will not be discussed further.

1.3.3 Groundwater

Unless groundwater is flowing in a defined channel underground, a rare occurrence, the SWRCB does not issue licenses associated with its extraction. For appraisal purposes, rights to such defined-channel groundwater should be valued in a manner similar to surface water rights.

Landowners have a right to tap into the groundwater under their lands. There are also situations where groundwater may be used on non-overlying lands. Such appropriation of groundwater is conditional upon no overdraft condition being created, and it is also subject to future needs of overlying landowners.

Because of political considerations, it appears highly unlikely that a public agency utilizing these guidelines would be appropriating groundwater rights or acquiring appropriated groundwater rights from another party. Therefore, this situation will not be addressed at this time. It should be noted that appropriation of groundwater is different from acquiring existing groundwater rights for overlying lands, ceasing use on those lands, and transferring the conserved water elsewhere.

There are a few groundwater basins that have been adjudicated where groundwater rights are bought and sold apart from the land. See DWR website:

http://www.dpla2.water.ca.gov/publications/waterfacts/water_facts_3.pdf

In adjudicated basins, the total extractions allowed are generally equal to the total annual yield of the basin. There is frequently a well-defined market for these rights, especially if a growing urban entity has been acquiring them. Transfers can be effected by reducing pumping at one location in the basin and increasing pumping by a like amount at another point.

Transfer of non-adjudicated percolated groundwater is possible under certain conditions. Also, a landowner who has access to both surface water and groundwater can transfer the surface water and replace it with groundwater, again under certain conditions.

The paper, Water Transfer Issues in California: Final Report to the California State Water Resources Control Board by the Water Transfer Group, June 2002, addressed the issue of transfers of percolated groundwater in Section 7. The paper is available at:

[http://www.calwater.ca.gov/Programs/WaterTransfers/adobe_pdf/Final_Report%20 Water Transfer Group.pdf](http://www.calwater.ca.gov/Programs/WaterTransfers/adobe_pdf/Final_Report%20Water%20Transfer%20Group.pdf)

The excerpt immediately following titled “Section 7. Issues Associated with Transfer of Water Percolated Underground” through end of the excerpt on page 1-14 is the entirety of Section 7 from that document and best summarizes the issues and complexities of groundwater transfers. Note the underlying principles of consumptively used water being available for transfer and no harm to other parties.

Section 7. Issues Associated With Transfer of Water Percolated Underground¹⁹

Water Code sections 484 and 1725 specifically identify consumptively used water that is available for transfer to include water that has percolated underground.

484. (a) The temporary transfer of any water or water right that otherwise would have been consumptively used or stored by the transferor in the absence of the temporary transfer, does not in any way prejudice the transferor’s right to the use of the water in the future. (b) *Consumptively used, for purposes of this section, means the amount of water which has been consumed through use by evapotranspiration, has percolated underground, or has been otherwise removed from use in the downstream water supply as a result of direct diversion.*(emphasis added)

1725. A permittee or licensee may temporarily change the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights if the transfer would only involve the amount of water that would have been consumptively used or stored by the permittee or licensee in the absence of the proposed temporary change, would not injure any legal user of the water, and would not unreasonably affect fish, wildlife, or other instream beneficial uses. *For purposes of this article, consumptively used means the amount of water which has been consumed through use by evapotranspiration, has percolated underground, or has been otherwise removed from use in the downstream water supply as a result of direct diversion.* (emphasis added)

Definition of Water That Has Percolated Underground

Both Water Code sections 484 and 1725 define consumptively used water to include water that has percolated underground or has been otherwise removed from use in the downstream water supply. The phrase or has been otherwise removed clarifies that only the portion of the underground percolation that is removed from the downstream supply qualifies as

¹⁹ The sections of this report were drafted by groups of participants, some large and some small. Early in the process, a ground rule was developed: the conclusions and opinions expressed in the report are not endorsed by all participants, nor are they necessarily majority opinion or position. The sections presented in this report nonetheless are useful in outlining various positions and perspectives, some of which evolved after much discussion. Others more closely reflect the perspective of one or a few participants.

consumptive use under the Water Code. The portion of underground percolation that makes its way back to useable water supplies downstream does not qualify as consumptive use as defined in the Water Code. The Water Code definition of what aspects of underground percolation constitute consumptive use is consistent with the technical definition of consumptive use as water lost from the overall water supply system. Further, all water transfers must not cause injury to other legal users of water. The transfer of underground percolation that, absent the transfer, would have ultimately returned to the surface streams or useable groundwater supplies could cause injury to surface water or groundwater users. Therefore, the consumptive use portion of underground percolation is best defined as either:

1. Water that percolates underground from a use and becomes unavailable for other beneficial uses (for example, percolates to a saline sink), or
2. Water that percolates underground from a use and is not relied upon for subsequent use downstream or down gradient.²⁰

In the latter case, an analysis to determine if the transfer would injure any legal user of the water, or unreasonably affect fish, wildlife, or other instream beneficial uses would be required.

Potential Effects of Transferring Percolated Water

Transferring water that would otherwise percolate underground to useable water sources could affect other beneficial uses and legal water users in several ways, including:

1. Directly reducing the volume of water that reenters a downstream surface waterway where the groundwater is hydrologically connected to the surface waterway;
2. Indirectly reducing the volume of water that enters a downstream surface waterway by reducing the hydraulic head which influences the volume and rate of groundwater entering a surface waterway; and
3. Reducing groundwater recharge induced by irrigation practices.

The following factors contribute to the period of time in which a reduction in surface flow, resulting from implementation of a transfer, could be observed:

- Distance to the waterway
- Seasonal hydrologic continuity
- Other groundwater pumping
- Geologic conditions

²⁰ Minimal or insignificant impacts may not be valid grounds to prevent an otherwise beneficial transfer under Article X, section 2 of the California Constitution.

These factors, among numerous other influences, complicate the interaction of groundwater with surface water to the degree that there is no concise way to estimate the effect of transferring percolated groundwater on a general basis. Site-specific evaluations are needed to portray the relationship of this interaction in a specific geographic area.

For example, in areas of the San Joaquin Valley, irrigation water percolates underground, combining with unusable groundwater, which contributes to local high water tables that can damage agricultural productivity. In these areas, reductions in percolation of water beyond the root zone benefits other uses of water. Such reductions in percolated water would be transferable. However, in the Sacramento Valley, most of the water that percolates underground either flows to usable groundwater or makes its way back to the river system. Specific studies would be needed in the Sacramento Valley to identify exceptions, including areas of salt sinks where water percolates underground and is no longer useable.

Effects to Legal Users of Water

Surface Water Users

The transfer of water that, absent the transfer, would have percolated underground and ultimately made its way to usable surface water supplies could constitute an injury to other legal users of water. Downstream water diverters make use of this percolated water in a manner similar to that which would have occurred absent the appropriation of water. Therefore, downstream users could be injured if the underground percolation component of the appropriation was identified and transferred in a manner that precluded its use by the downstream water user.

Groundwater Users

Irrigation practices can induce recharge to a useable groundwater basin greater than that which would have taken place absent the appropriation of water. The transfer or reduction of this artificial recharge could affect other groundwater users. However, this effect may not constitute legal injury because, absent the appropriation, this artificial recharge would not occur. The effect of the reduction or transfer of this artificial percolation on groundwater users should be identified in the appropriate CEQA document and mitigated where feasible. However, these effects may not constitute injury under the Water Code.

The topic of groundwater transfers is also addressed in Chapter 7 of [A Guide to Water Transfers](#) (Draft). This was produced by the Division of Water Rights of the State Water Resources Control Board in July 1999. Available at:

http://www.watertransfers.water.ca.gov/geninfo/geninfo_index.cfm

The following excerpt is taken from that document.

Use of Groundwater in Lieu of Surface Water

In some areas of the State water users have access to both surface water and to usable groundwater. In these areas the use of surface water is often cheaper than pumping groundwater or the water quality of the surface water is better. Therefore, the surface water is often the preferable water source. However, the overall water supply of the system can be expanded if the surface and groundwater supplies are used together or conjunctively. In cases where groundwater is pumped in lieu of surface water, water users forego their surface water so it can be used by others while the original water users pump groundwater. In these cases the surface water is transferred to another user downstream and the transferor is compensated for the extra costs of pumping the groundwater. There can also be impacts to other groundwater users by such a practice that would not occur without the transfer.

The document goes on to emphasize that local groundwater management plans must be considered and that the no-harm principle must apply as well. Transfers of banked groundwater are discussed.

Direct transfers of groundwater are discussed, including the many obstacles that exist to out-of-basin transfers of such water.

Finally, the paper, [Groundwater Substitution Transfers - How to Make Them Work in the Sacramento Valley in 2002](#), Water Transfer Office, California Department of Water Resources, March 2002, addresses groundwater transfers and is quoted below. The document is available at:

http://www.watertransfers.water.ca.gov/docs/Groundwater_Substitution_Transfers_5_23_02.pdf

California law protects the surface water rights of water users who engage in groundwater substitution transfers. Also, overlying users of groundwater, including those with access to surface water, do not lose the right to use their underlying groundwater supplies for reasonable and beneficial use simply because they have access to surface water.

California law protects other existing water users, the environment and (in many cases) the source area economy when water is transferred [footnote omitted]. Groundwater substitution transfers have the potential to cause injury to other local groundwater users due to the additional groundwater pumping needed to allow the surface water transfer to take place. Injury can also occur to downstream water users due to the interaction between the

surface and subsurface components of the water system if all or a portion of the additional pumped groundwater reduces stream flows at a time when it is used by downstream users.

The rationale behind a groundwater substitution transfer is that surface water demands are reduced because a like amount of water from an alternative source, in this case groundwater, is used to meet these demands. The unused surface water is then transferred to other users. Typically, the amount of water credit given such a transfer is the amount of the increased pumping that takes place to support the transfer. This credit assumes there is no interaction between the surface water and the groundwater that is affected by the additional pumping for transfer. If there is interaction, then the extraction of groundwater is not truly an alternative source to the surface water supply and the net surface water flows will not increase as assumed.

...Significant accretions and depletions in surface water flow due to groundwater flow occur along the Sacramento River. Normal groundwater pumping likely affects these flows and such effects are allowable under current California water law. However, if a party wishes to transfer surface water by virtue of the use of an alternative water supply, that party needs to establish that the supply is truly an alternative one to the surface water system during times of importance to downstream water users.

The paper goes on to stipulate what steps must be taken to ensure that the groundwater being substituted for the surface water is from an alternate source. The requirements can be extensive and expensive.

Any agreement for purchasing groundwater directly, or surface water with associated groundwater substitution, should be carefully considered by the buyer. Monitoring costs and potential reductions in water available for transfer because of connectivity between surface water and groundwater could dramatically impact sale price and quantity of water purchased. This could also be a very sensitive issue politically.

The most recent DWR publication that discusses groundwater on both a statewide and on a hydrologic region basis is: California's Groundwater, Bulletin 118, Update 2003. This is available on the web at:

<http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm>

Groundwater Substitution and Transfers

This topic has been addressed at several locations on the previous pages and is summarized here. Groundwater that has been used on overlying land can be transferred for use at another location, including instream, provided that only the amount that has been consumptively used is transferred. If the historical use has been for irrigation, then the amount available for transfer would be the ETAW (evapotranspiration of applied water). The ETAW on overlying land must be reduced by an amount equal to the volume of water transferred. If additional groundwater, over and above the amount conserved, is to be transferred, then it must be proven to come from wells that are not hydrologically connected to surface water (see additional comments on this issue in the next paragraph).

If surface water that has been used on a parcel of land is to be transferred and replaced by groundwater use, then this arrangement is groundwater substitution. Paramount to the legality and approval of such an arrangement is that no other water right holder is damaged by the transfer. The groundwater being developed must be proven to not be interconnected to surface water. Research and monitoring costs could be substantial in such cases. Even if no connectivity exists with surface water, other groundwater users could be harmed by an increase in the depth to groundwater and therefore an increase in pumping costs. Great care should be exercised before entering into agreements to replace surface water with groundwater to avoid situations where far less water is made available at a far greater price than anticipated.

1.3.4 Riparian

As the previous text indicated (see Section 1.2.2), riparian rights are associated with lands that are adjacent to a water source. It should be noted, however, that the water for riparian lands may be extracted on another ownership, generally upstream, and delivered to the uphill portion of the property by means of canals or pipelines from which gravity irrigation could take place. Therefore, a riparian right may have the appearance of an appropriative right because the water is extracted off-site. If the land being irrigated has frontage on the stream from which the water comes, it is probable that a riparian right is being exercised. The exact nature of the water right being valued must be understood. The appraiser should never assume anything about the water right unless directed to do so by the client. Such assumptions must always be presented prominently in the report as Extraordinary Assumptions.

Another situation could arise whereby water is extracted from a tributary stream and used to irrigate land that fronts on the main stream. Even though functionally it is a matter of indifference whether the irrigation water was withdrawn from the tributary or the main-stem, it is probable that the right is appropriative. If that is the case, then an interesting situation exists whereby the holder of the appropriative water right may want to sell it and irrigate directly from the main-stem by means of a riparian right. In that case, downstream water right holders could very well be harmed. Because of the no harm rule, it is unlikely that the transfer would be allowed.

Even if it were allowed, this would not be a situation with which any public agency would want to be involved. The in-stream benefit would be so brief that the cost-benefit ratio would probably not support the expenditure of public money.

Public agencies that have explored the riparian water right issue have sometimes been frustrated because of the fact that the right cannot be separated from the land. Dedicated in-stream water (1707 water) can come from a riparian right (see page 1-9 of these Guidelines).

Other than in-stream dedication, there appear to be only two ways that riparian water rights can be transferred to the benefit of in-stream use. The first, and most obvious, is to purchase the land outright. It would then belong to the agency to manage as it wishes. Any water not used on the property would remain in the stream. This would benefit in-stream needs. However, it would also be available for any downstream appropriator or riparian user because the conserved water would be part of the natural flow of the stream. Therefore, the in-stream benefit may be short-lived apart from diligent enforcement efforts.

The transfer of the riparian water right could also be by means of a conservation easement. The easement could specify certain hydrologic conditions under which the land owner would need to leave the land fallow. The same drawback exists for this approach as for the previous one regarding the inability to keep the water in the stream in the face of downstream water right holders' capacity to extract it. In essence, the economic use of the water would be simply shifted to one or more downstream locations. Again, the cost-benefit ratio would have to be considered.

1.3.5 Appropriative

In California, all appropriative water rights have a priority associated with them. Information from the SWRCB web site indicates that:

Prior to 1872, appropriative water rights could be acquired by simply taking and beneficially using water. The priority of the right was the first substantial act leading toward putting the water to beneficial use provided the appropriation was completed with reasonable diligence; otherwise, priority did not attach until beneficial use of the water commenced.

In 1872, sections 1410 through 1422 of the California Civil Code were enacted. These sections established a permissive procedure for perfecting an appropriation of water. Provisions were made for establishing a priority of right by posting a notice of appropriation at the proposed point of diversion and recording a copy of the notice with the respective County Recorder. If these procedures were not followed, the pre-1914 appropriative right did not attach until water was beneficially used.

After December 19, 1914, the SWRCB had to issue a permit, or license to divert, before a legal appropriation of water could take place. The priority date associated with the water right is the date of the permit.

A license to divert will specify the:

- point of diversion
- time period when diversion can take place
- quantity of water that can be diverted, usually in cubic feet per second
- intended place of use
- intended purpose of use

The licensee is supposed to report to the SWRCB every year how much water was diverted and when the diversion took place. Riparian and pre-1914 water right holders are also supposed to report, but there is no penalty for non-reporting in their cases.

If a water source has greater flows or yields than the amount that has been legally appropriated, then new appropriations may be granted to applicants. When the natural flows are insufficient to fulfill all of the existing appropriations in a particular year, then the most junior (recent) water right holders must refrain from diversion until the rights of the senior holders are fulfilled. Consequently, the more senior the right, the more reliable it is considered.

Pre-1914 water rights are not under the jurisdiction of the SWRCB and, therefore, do not need the Board's approval for transfer. However, the no-harm rule to other water right holders still applies. The injured party would have to seek remedy in the courts, not before the Board.

The Water Transfer Decision Tree, displayed as Figure 1 on page 2-3 of A Guide to Water Transfers and replicated on the following page, shows the process that must be followed for transfers of the various types of water rights involved. Specific sections of the Water Code are referenced.

Short-term transfers (one year or less) are relatively straight-forward and gain rapid approval while long-term or permanent transfers are much more complicated and are subject to greater scrutiny.

The following summary of the Board's requirements for a long-term transfer is taken from Water Acquisition Handbook, the Trust for Public Lands, page 22:

Like short-term transfers, a long-term water transfer involves changing the point of diversion, the place of use, or the intended purpose of the water. The only difference is that the period of change exceeds one year [footnote reference to Water Code Section 1735]. As always, the transfer may not injure any legal user of water or unreasonably affect fish, wildlife, or other instream beneficial uses.

Long-term transfers, unlike short-term transfers, are subject to the requirements of CEQA. Depending on the circumstances, the documentation requirements can range from a simple declaration of "no significant environmental impact" to the development of a full environmental impact report....

In reviewing a proposed long-term transfer, the SWRCB must provide public notice of the proposal and an opportunity for a hearing on it. This process can take months. If the parties involved cannot resolve valid protests to the proposed change through negotiations, then the SWRCB must hold a hearing prior to the approval or denial of the requested transfer. Protests are generally considered valid by the SWRCB if the protesting party can show that there is a possibility of injury to other water rights. The petitioner has to attempt to resolve the protests, and such attempts at resolution are often successful. The assistance of attorneys, engineers, and SWRCB staff can be invaluable during this phase.

The appraiser must understand the hurdles, risks, and costs associated with a proposed transfer of the water right being appraised, and also of any comparable sales used. These items should be kept in mind in adjusting comparable sales to the subject.

Regarding transfers in general, quoting from page 1-1 of A Guide to Water Transfers:

When one stands back from all the existing rules and regulations related to water transfers, a rather simple general rule emerges, You can transfer water if it is your water and not somebody else's water, provided the transfer does

not injure another water right holder or unreasonably affect instream beneficial uses.

One of the fundamental principles involved in determining the amount of water available for transfer is the amount that has been consumptively used in the past, i.e., lost to the system through evaporation, transpiration, or percolated into a salt sink (see page 1-14). The burden is on the party proposing the transfer to present evidence of consumptive use.

1.3.6 Contractual Entitlements

Contractual entitlements are tied by contract to an appropriative water right. Consequently, all of the seniority associated with the water right is passed on to the contractor. The SWP and CVP hold water rights for diversion out of the south Delta and pass on the water through entitlements to contractors south of the Delta. Because of recent developments of a political and legal nature, the SWP and CVP are generally not able to deliver full entitlement amounts to their contractors. Both of these projects also have contractors north of the Delta, and those deliveries tend to be closer to full entitlement amounts.

Chapter 4, Surface Water – Contract Supply, [A Guide to Water Transfers](#), deals with transfers involving CVP and SWP entitlement water, as well as other irrigation districts. Usually, the Board does not have to get involved in transfers between contractors under the same umbrella water right, e.g., one SWP contractor to another, or between farmers within the same irrigation district.

However, the specific contractual entitlement being considered for transfer must be analyzed as to what the opportunities and obstacles are for it. Whether the entitlements are transferable to non-contractors must be investigated on a case-by-case basis. Frequently they either are not, or the other peer contractors must be given a right of first refusal. If a transfer to a non-contractor is allowed, the contractors not involved in the transfer will pay great attention to ensure that their financial position is not impacted negatively by the transfer.

Any assumptions made in this regard must have the client's pre-approval, and the consequences of those assumptions being wrong must be explained in the report.

Figure 1

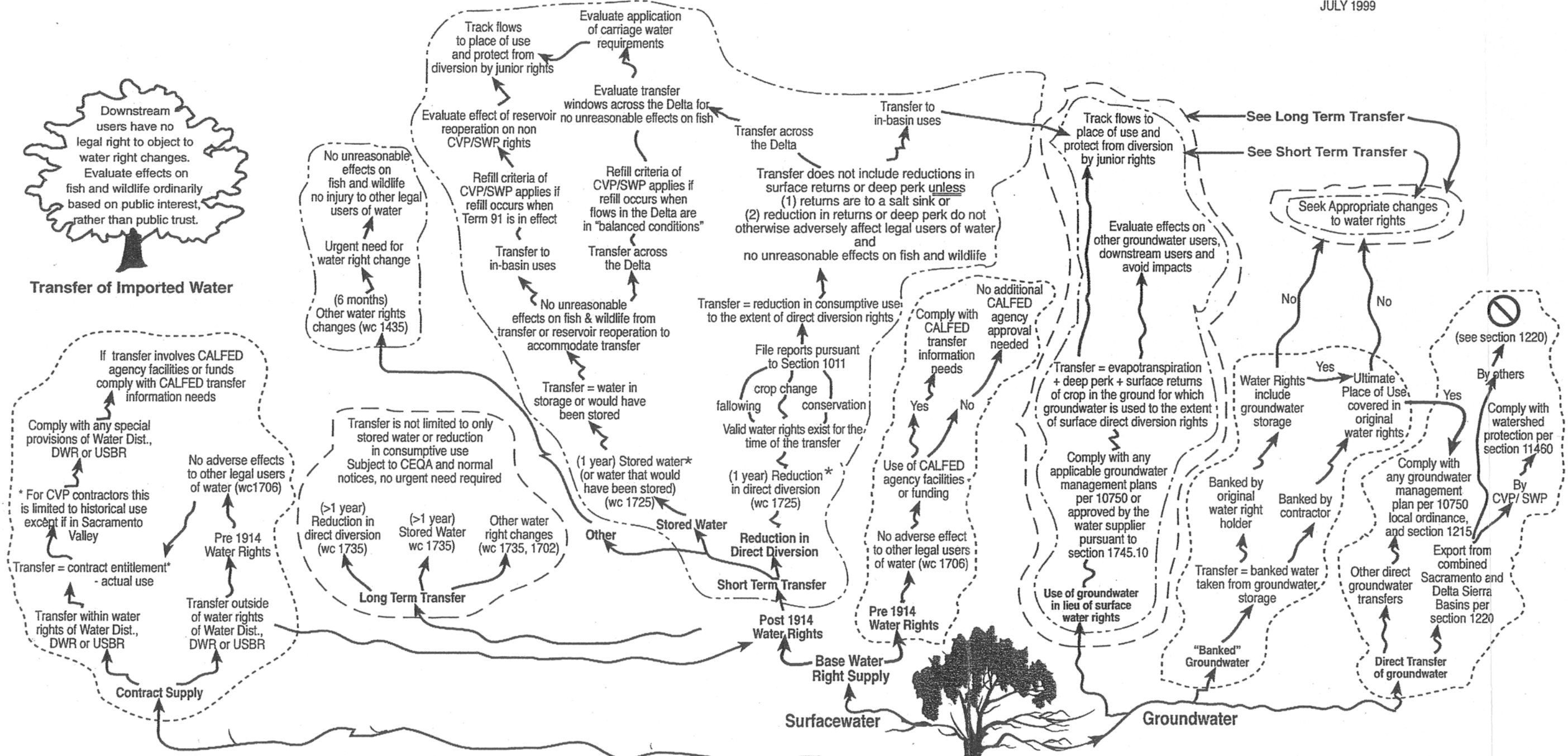
WATER TRANSFER DECISION TREE

STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

JULY 1999

LEGEND

- No SWRCB approval needed
- Expedited processing procedures via the water code
- * Exempt from CEQA
- No special expedited procedures



Appraisal of California Water Rights

2.1 Existing Guidelines

The UAS (Uniform Appraisal Standards for Federal Land Acquisition) and USPAP (Uniform Standards of Professional Appraisal Practice) are the overall guides to appropriate appraisal procedures and methodology. Water right appraisal analysis and report presentation should adhere to the UAS recommended structure detailed on pages 9 through 27 of the UAS.

Recommendations as to how the UAS should be modified or interpreted when water rights are being valued are included in the addenda. Instead of an outright modification of the UAS, this set of guidelines could be considered as a water rights “companion” to the UAS. Additional comments and suggestions as to how water right reports may differ from more typical land valuation reports are presented in the addenda in the section titled “Report Structure.”

Without the legal references and discussion previously presented, one could easily reach the conclusion that water and water rights frequently would be appropriately classified as personal property rather than real property. On the contrary, the courts have consistently held that water rights are appurtenant to the land and should, therefore, be valued as a property interest in real estate. This is true even when the water right can be moved to a different parcel of land, as in the case of appropriative rights. Standard 1 of USPAP then applies for the appraisal and Standard 2 applies for the report.

A unique situation exists when the water right has been dedicated to instream flow, also referred to as 1707 water. This was discussed in Section 1.2.2 of these Guidelines. Even though it appears that a dedication to instream flow for a water right severs it from the real estate to which it was appurtenant, it does not take on the characteristics of personal property. Its economic use would depend upon it being reattached to a parcel of real estate, and it should be valued accordingly. As above, Standard 1 of USPAP then applies for the appraisal and Standard 2 applies for the report.

Contractual entitlements are intangible assets. USPAP Standards 9 and 10 are the guides for the appraisal and report.

Reclamation has existing water right appraisal guidelines. These are rather cursory in nature and are included in the addenda. Nothing in the Reclamation guidelines conflicts with these guidelines.

The American Society of Farm Managers and Rural Appraisers (ASFMRA) presents a course entitled “Resource Valuation.” The appraisal of water rights is one of the topics addressed in this course. A review of the course material indicates that this is a broad overview of water right appraisal principles for the United States but with greater emphasis on the Western U.S. The cost approach is not presented as one of the valuation options. One of the highest and best use options is environmental/governmental, which must be approached

with care because the use to which the government intends to put the property should generally not be an indicator of the highest and best use of it.

No formal guidelines for water right valuations were discovered in interviews with the various water agencies and irrigation districts contacted while performing research for these guidelines.

2.2 Methodology

A clear understanding of the property interest being appraised is foundational to the entire process. Appraising the fee simple estate to a tract of land which has an appurtenant water right means that the water right property interest is included in the entire “bundle of rights” being valued. The other typical ownership positions, such as leasehold and leased fee, can apply in the valuation of tracts of land with appurtenant water rights as well.

If one is appraising only the water rights that are appurtenant to a tract of land, then a *partial interest* in real estate is being valued.

Partial interest. Divided or undivided rights in real estate that represent less than the whole.¹

The following excerpts are taken from the UAS, pages 50 and 51:

In partial acquisitions, these Standards require with the exceptions noted below and in Section B-14, application of the *before and after* method of valuation² in which the appraiser estimates both the market value of the whole property before the government’s acquisition and the market value of the remainder property after the government’s acquisition. [footnote omitted] Requiring this method of valuation allows acquiring agencies, the Department of Justice, and the courts to calculate a reasonable measure of compensation by deducting the appraiser’s estimated remainder or after value from the appraiser’s estimate of the larger parcel’s before value. The result of this method is a figure that automatically includes the value of the land [or water right] actually acquired as well as any severance damages and/or special benefits to the remainder property.

Notwithstanding the foregoing, to assist acquiring agencies in meeting their obligations under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, [footnote omitted] appraisals must contain an allocation of the difference between the before and after value estimates between the contributory value of the land [or water right] acquired and damages to the remainder. (See A-30, “Allocation and Explanation of Damages.”)

¹ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 209.

² Often referred to as the before and after rule, or the federal rule.

In another approach, the appraiser estimates the contributory value of the part of the whole property to be acquired and adds to or subtracts from that figure an allowance for damages and/or special benefits in value to the remainder. [footnote omitted] This method may or may not be more complicated, but it usually is more subject to error and more apt to result in duplication, [footnote omitted] sometimes referred to as *double damages*. When this *taking + damages* method is employed, the value of the part acquired is its value as a part of the whole (i.e., larger parcel), not its value as a separate parcel. Also, if this method of valuation is employed, the appraiser must affirmatively address the issue of possible damages and/or special benefits to the remainder of the larger parcel in the appraisal report. This second taking + damages method should not be used by appraisers without the express written authorization from the acquiring agency, or the Department of Justice trial counsel, to employ it.

However, acquiring agencies should bear in mind that there are situations in which insistence upon strict adherence to the before and after rule would impose costly and sometimes nearly impossible burdens upon appraisers. Examples of such situations, in which this second taking + damages method may be applicable, are minor fee or easement acquisitions (for flowage, wetland or habitat protection, roads, pipelines, transmission lines, etc.) from large ranches, industrial complexes, etc., where the cost of valuing the whole unit before and after the acquisition is simply unwarranted in view of the minor nature of the acquisition. Use of this method, however, is generally limited to those instances wherein there are no damages to the remainder property. In short, where its application would be logical, practical, and capable of understanding, the before and after method of valuation in partial acquisitions is preferred. The taking + damages method shall not be used without concurrence of the client agency.

In certain circumstances, damage to the remainder may be *cured* by remedial action taken by the owner. The *cost to cure*, however, is a proper measure of damage only when it is no greater in amount than the decrease in the market value of the remainder if left as it stood. [footnote omitted] When the cost to cure is less than the severance damages if the cure were not undertaken, the cost to cure is the proper measure of damage, and the government is not obligated to pay in excess of that amount. [footnote omitted] See additional discussion of the cost to cure measure of damage in Section D-4.

The preceding text and guidance is appropriate both in a *takings* and in a *willing seller* situation.

It should be kept in mind that both a *before and after* analysis and a *takings plus damages* analysis measures the impact on the market value of the original bundle of rights caused by the taking or sale of one or more of the rights in the bundle. This estimated impact may or may not coincide with the market value of the rights taken or sold on a stand-alone basis. For instance, a *before and after* analysis may indicate that removing a water right from an irrigated agricultural ownership has an impact on the ownerships market value equivalent to \$1,000 per acre-foot of the water right. Similar water rights may sell in the open market

for the same value. In this case the impact on market value caused by the removal of the water right is the same as the value of the water right on a stand-alone basis. If, however, the same market value impact is indicated as in the previous example but the water right is riparian, there may be no value for this water right on a stand-alone basis because riparian rights cannot be transferred. This approach conforms to the Internal Revenue Service (IRS) tax code for contributions associated with conservation easements. A conservation easement placed on a parcel of land to prevent subdivision may have a significant impact on the market value of that parcel, but the easement itself may have no resale value at all on a stand-alone basis. The IRS uses the terminology “impairment of market value.”

The highest and best use analysis should include sufficient information to reach conclusions regarding whether the water right is worth more on the open market than its contributing value to the larger parcel that it is currently a part of under the existing use. If this situation exists, then the strong potential exists that the highest and best use of the larger parcel is not its historical or current use, but a use transition has taken place. The larger parcel definition is:

The larger parcel, for purposes of these Standards [UAS], is defined as that tract, or those tracts, of land which possess a unity of ownership and have the same, or an integrated, highest and best use. Elements of consideration by the appraiser in making a determination in this regard are contiguity, or proximity, as it bears on the highest and best use of the property, unity of ownership, and unity of highest and best use.³

If the highest and best use analysis indicates that the greatest value is achieved by selling the water right, then the larger parcel may be different than what was initially anticipated. There can be multiple highest and best uses and multiple larger parcels present in an assignment. By application of the previous definition, there can be no fewer larger parcels than there are highest and best uses.

If the water rights being valued comprise only a small portion of the larger parcel, then it is doubtful that a complete *before and after* valuation would be warranted. This may be the situation if a portion of the water rights associated with a large irrigated agricultural ownership were involved. In this case a *taking + damages* approach would generally be warranted. If a *before and after* analysis is used in this situation, it would be limited to that area on which the water had been applied, not the entire ownership. In such cases, as the UAS indicates, the agency should agree to the valuation approach in advance.

At a minimum, even when the *takings + damages* approach is taken, when the water right being valued has a historical use of irrigating agricultural land, general value indicators should be presented for both dry land and irrigated lands. This information will aid in establishing a test of reasonableness for the value conclusions regarding the water right being analyzed.

³ Uniform Appraisal Standards for Federal Land Acquisitions, Interagency Land Acquisition Conference, Washington, D.C. 2000, Appraisal Institute (in cooperation with the U.S. Department of Justice), Chicago, 2000, p. 17, Footnote 47.

In all situations, the three standard approaches to arriving at an opinion of value still apply – the sales comparison approach, the cost approach and the income capitalization approach. When water rights are being valued on a *takings + damages* basis, the comparison factors applied to market data and the subject are somewhat different than in situations where land and improvements are being valued.

2.3 Consultant's Reports

It is common for the appraiser to require the assistance of another expert to complete the appraisal assignment. The services of hydrologists, engineers, well drilling contractors, salvage specialists and others may provide assistance. Section D-4 (page 81) of the UAS must be kept in mind when using consultant's reports. The appraiser cannot merely accept their conclusions, but has a responsibility to develop a confidence level that the consultant's conclusions are reasonable before incorporating them into the analysis.

2.4 Sales Comparison Approach

2.4.1 Summary

In the sales comparison approach, the appraiser develops an opinion of value by analyzing similar properties and comparing these properties with the subject property.

...an opinion of market value is developed by comparing properties similar to the subject property that have recently sold, are listed for sale, or are under contract.

...A major premise of the sales comparison approach is that the market value of a property is related to the prices of comparable, competitive properties.

Comparative analysis of properties and transactions focuses on similarities and differences that affect value, which may include variations in the following:

- Property rights appraised
- Size
- The motivations of buyers and sellers
- Location
- Financing terms
- Physical features
- Market conditions at the time of sale
- Economic characteristics if the properties produce income.⁴

When truly comparable properties are available, this approach generally results in the most reliable indicator of value.

Also refer to comments and analytical techniques in Sections A-15 and A-17 of the UAS.

⁴ The Appraisal of Real Estate, Twelfth Edition, The Appraisal Institute, Chicago, 2001, p. 417.

2.4.2 Application

The following text is taken from the UAS, page 19, with suggested modifications made for water rights valuations on a *takings + damages* basis:

A-15. Water Rights Valuation. The appraiser shall estimate the value of the water rights for their most optimum use, as if available for such use. In doing so, the appraiser's opinion of value shall be supported by confirmed sales of comparable or nearly comparable water rights⁵ having like optimum uses. Differences shall be weighed and explained to show how they indicate the value of the water rights being appraised. Items of comparison shall include property rights conveyed, financing terms, conditions of sale, market conditions, location, physical characteristics, history of use, seniority of water right, delivery reliability, season of use, and intended use of the buyer. The appraiser shall provide adequate information concerning each comparable sale used and the comparative analysis to enable the reader of the report to follow the appraiser's logic.⁶

A highest and best use conclusion and an identification of the *larger parcel* are always required. A water right itself cannot be the *larger parcel*. The larger parcel will always be the land to which the water right is appurtenant. The highest and best use must also always be for the land. A highest and best use conclusion could be, "sell the appropriative water right for urban use and convert the land to dry land grazing."

Property rights conveyed should be similar if at all possible. For example, using a contractual entitlement sale as a comparable for appraising an appropriative right is problematic because an intangible asset is being compared to a property right.

Any financing terms involved in water rights sales must be carefully considered. Many of the buyers of water rights and contractual entitlements are public entities such as urban water districts. These buyers may be deciding on a purchase price based on an availability of funds at rates below those available to a private party.

Location considerations are very important. Ideally, the comparables will come from the same watershed. At the very least, sales from south of the Delta should not be used as comparables for appraising a water right north of the Delta, and vice versa. This is true because of the dramatic differences that exists in demand and supply of water between the north and the south of the state, combined with the obstacles and uncertainties associated with moving water through the Delta.

⁵ For a discussion of what legally constitutes a comparable sale and the admissibility of comparable sales information, see Section B-4 of these Standards.

⁶ For a discussion of comparable sales documentation and information required and the requirements for comparison, see Section A-17 of these Standards.

Water quality considerations fall into the category of physical characteristics. Any buyer that is interested in treating the water for urban consumption is very interested in higher quality water to minimize treatment costs. Low salt content and the absence of other dissolved solids, minerals, and chemicals makes for higher quality water. Irrigators concerned about long term build up of salts and other substances in the soil may also pay a premium for high quality water.

Seniority of the water right and delivery reliability may be directly linked. However, reliability could also be impacted by local hydrological conditions.

A water right that has a season of use in the winter when there tends to be an abundant amount of water available could be expected to be worth significantly less than a water right that has summer season of use but is similar in other aspects.

The history of use must be presented, as well as the intended use of the buyer, on all comparable sales. If the buyer's intended use is different than the historical use, (such as agriculture to urban, then that could indicate a change in the optimum use of water in the market area. However, such an indicator must also be viewed in the light of the demographic, land use, and water use trends in the area before reaching conclusions. The potential also exists that past urban buyers now have their projected needs satisfied and are no longer in the market.

The suggested adjustment items and the sequence of adjustments recommended for the various types of water rights that exist can be found in Section 3 of these Guidelines.

2.5 Cost Approach

2.5.1 Summary

The cost approach is based on the understanding that market participants relate value to cost. In the cost approach, the value of a property is derived by adding the estimated value of the land to the current cost of construction a reproduction or replacement for the improvements and then subtracting the amount of depreciation (i.e., deterioration and obsolescence) in the structures from all causes. Entrepreneurial profit and/or incentive may be included in the value indication. This approach is particularly useful in valuing new or nearly new improvements and properties that are not frequently exchanged in the market.⁷

Obviously, the cost approach has more frequently been applied in valuing land with structures on them rather than in valuing water rights. Nevertheless, water rights are usually an "improvement" to the land and there are situations where the cost approach is applicable in estimating the value of water rights.

⁷ The Appraisal of Real Estate, Twelfth Edition, The Appraisal Institute, Chicago, 2001, p. 63

As in the case of typical real estate appraisals, the cost approach is generally not as well received as the sales comparison approach, but it can provide important supplemental information. There are occasions when it may be the only approach applicable due to the absence of similar market sales.

Unless there are unique circumstances that cause the client to direct that a *reproduction* cost approach be taken, *replacement* cost would always be used.

It is important to keep in mind the following from Section A-16 of the UAS:

...Entrepreneur's profit, as an element of reproduction or replacement cost, must be considered and discussed, and if applicable, should be derived from market data whenever possible. If the appraiser will place considerable weight on this approach to value in reaching a final value estimate, consideration should be given to retaining the services of a contractor or professional cost estimator to assist in developing the reproduction or replacement cost estimate.

Refer to Section A-16 of the UAS in its entirety for more on the cost approach.

2.5.2 Application

If the potential of replacing surface water with groundwater exists, then the cost of developing the groundwater resource can be considered a "replacement cost" for the surface water. If one is to take this approach, knowledge must be gained regarding:

- the legal restrictions associated with groundwater use;
- the depth to usable groundwater and how much it varies from season to season;
- typical drawdown during pumping;
- if there is a trend evident in the level of groundwater over recent years;
- pumps and fuel that are common in the area and associated costs both initially and of operation, generally on a per acre-foot basis;
- life expectancy of pumps and well casings; and
- amortization rate appropriate for use in estimating depreciation.

One or more local experts may be required to develop credible information. These experts could include local well drillers, irrigation districts, and farm organizations. The Department of Water Resources may have information regarding groundwater conditions. Every 5 years the DWR publishes Bulletin 160 listing regional groundwater conditions as well as other useful information. Bulletin 118, *California's Groundwater*, was updated in 2003 and is also an important reference.

There is another potential water source that could supply replacement cost information, i.e. desalination. The cost of this process appears to have decreased significantly in recent years. It is still generally one of the most expensive options available. However, there are some urban agencies along the Pacific Ocean that are incorporating desalination into their overall water supply. It is conceivable that in the future, desalination plants could move inland and

be used to deal with high salt concentrations of surface waters in the Central Valley. This would in effect be a new water source that could be sold in the market. Until that time, desalination costs would only be relevant in highly select situations where such development was proven to be feasible. Salt disposal costs would also have to be considered.

The costs associated with conservation measures can provide indicators of water value. Such activities could include canal lining and modification to irrigation methods.

The costs public agencies are prepared to spend on enhancing project yield through constructing reservoirs or improving flows in rivers and channels could also be relevant, though non-market goals of such agencies must always be understood before this information is used.

Entrepreneurial profit should be included in any final cost estimate, because an alternate supply would be developed by someone only if it were a profitable endeavor.

2.6 Income Approach

2.6.1 Summary

The following overview pertains to the income capitalization approach:

Income-producing real estate is typically purchased as an investment, and from an investor's point of view earning power is the critical element affecting property value. One basic investment premise holds that the higher the earnings, the higher the value, provided the amount of risk remains constant. An investor who purchases income-producing real estate is essentially trading present dollars for the expectation of receiving future dollars. The income capitalization approach to value consists of methods, techniques, and mathematical procedures that an appraiser uses to analyze a property's capacity to generate benefits (i.e., usually the monetary benefits of income and reversion) and convert these benefits into an indication of present value.⁸

The following UAS extraction comes from pages 43 and 44 of Section B-7. Income Capitalization Approach:

In using the income capitalization approach, care should be taken to consider only income that the property itself will produce—not income produced from a business enterprise conducted on the property. When the public requires the land upon which a business is located, the business is not taken and the value estimate developed by the appraiser should include no incremental value for loss of the business or its profits. [footnote omitted] Accordingly, the rule against admitting evidence of profits or income, either past or future, from a business conducted on the property condemned has been applied to farmlands as well as to other lands. [footnote omitted] It is

⁸ The Appraisal of Real Estate, Twelfth Edition, The Appraisal Institute, Chicago, 2001, p. 471.

not improper, however, to consider the uses to which a property can be put, including the character and extent of the business carried on, as distinguished from the profits from that business, the facilities for doing the business, and location of the property as a point commanding trade from the surrounding area, or otherwise. [footnote omitted] Therefore, when valuing property that typically sells on the basis of income production, it is appropriate to consider the amount of business conducted on the site. For instance, one common unit of comparison in valuing service stations is price per gallon of gasoline pumped; for taverns a unit of comparison is often price per keg of beer sold; and for funeral home the price per case. Also, of course, many commercial properties will be rented based on a percentage of the gross sales of the business located on the property. In these situations, business volumes may be considered but with the sole reference to the market value of the land. [footnote omitted]

The income to be capitalized in the income capitalization approach is the market or economic rent of the property being appraised. The appraiser should not consider the fact that a property may be under lease to a third party, except to the extent that the rent specified in the lease may be indicative of the property's market rent. The value to be estimated is the market value of the property as a whole, not the value of the various interests into which it may have been carved. This topic is discussed in greater detail in Section B-19.

The following UAS extraction comes from pages 57 and 58 of Section B-15:

B-15. Noncompensability of Consequential Damages. It is a firmly established principle of federal law that certain damages which may occur by reason of a government acquisition of land are not compensable and, therefore, must be disregarded by appraisers when estimating market value for such acquisitions. Such damages are classified as *consequential* or *incidental* damages. “[T]he Fifth Amendment does not require any award for consequential damages arising from a condemnation.” [footnote omitted]

Loss of business and relocation expenses has been determined to be consequential, and therefore noncompensable. [footnote omitted] Other damages classified as consequential include: damage to business, loss of or damage to goodwill, future loss of profits, expenses of moving removable fixtures and personal property, depreciation in value of furniture and removable equipment, frustration of plans, frustration of contractual expectations, loss of customers, and the expense of having to readjust manufacturing operations. [footnote omitted]

The basic federal law in this respect has been stated by the Supreme Court as follows:

The sovereign ordinarily takes the fee. The rule in such a case is that compensation for that interest does not include future loss of profits, the expense of moving removable fixtures and personal property from the

premises, the loss of good-will which inheres in the location of the land, or other like consequential losses which would ensue the sale of the property to someone other than the sovereign. No doubt all these elements would be considered by an owner in determining whether, and at what price, to sell. No doubt, therefore, if the owner is to be made whole for the loss consequent on the sovereign's seizure of his property, these elements should properly be considered. But the courts have generally held that they are not to be reckoned as part of the compensation for the fee taken by the government. We are not to be taken as departing from the rule they have laid down, which we think sound. Even where state constitutions command that compensation be made for property "taken or damaged" for public use, as many do, it has generally been held that that which is taken or damaged is the group of rights which the so-called owner exercises in his dominion of the physical thing, and that damage to those rights of ownership does not include losses to his business or other consequential damage. [Footnotes omitted.]

The Court went on to state, at page 382:

Whatever of property the citizen has the government may take. When it takes the property, that is, the fee, the lease, whatever he may own, terminating altogether his interest, under the established law it must pay him for what is taken, not more; and he must stand whatever indirect or remote injuries are properly comprehended within the meaning of "consequential damage" as that conception has been defined in such cases. Even so the consequences often are harsh. For these, whatever remedy may exist lies with Congress.⁹

The Supreme Court later gave further guidance with respect to noncompensable consequential damages by stating:

Since "market value" does not fluctuate with the needs of the condemnor or condemnee but with general demand for the property, evidence of loss of profits, damages to good will, the expense of relocation and other consequential losses are refused in condemnation proceedings. [footnote omitted]

In the absence of a statutory mandate, the United States must pay only for what it takes, not for opportunities that the owner may lose. [footnote omitted] It is critically important that appraisers objectively estimate market value, without attempting to include any consequential damages in those estimates. To do so would not result in an accurate reflection of market value and, in addition, could result in double recovery of damages reimbursable under the Uniform Act.

⁹ Congress did, in fact, subsequently enact the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, P. L. 91-646, as amended, 42 U.S.C. §4601, et seq, which provides for extensive recovery for replacement housing, moving expenses, and relocation advisory services. However, the reimbursement of these consequential damages fall under the Uniform Act and is outside of the scope of the appraiser's assignment, which is limited to the estimation of market value.

2.6.2 Application

It is clear from the preceding text that using foregone net business income from a farming operation (farm budget analysis) incurred by foregoing the application of irrigation water is not an acceptable method of estimating the value of water. This is so because the overall net income from a farming operation involves all of the factors of production, including the efforts of the farmer, to produce the income. The income is not exclusively associated with the water.

An analysis focused on foregone net income from agricultural production may serve as an indicator of the upper limit on the value of the water and may be useful in that regard, but should not be the primary value indicator.

Some individuals advocate a “residual farm budget analysis” where all non-water production costs are subtracted from the gross farm income to obtain the portion of the income attributable to water. This figure would indicate an annual lease rate for the water or it could be capitalized if a water right was being valued. This process is even more complex than estimating the overall net income to the farm. The accuracy of the result depends on the appraiser’s ability to accurately estimate all of the non-water production costs.

A better indication of the contributing value of the water can be obtained by comparing the income from leasing non-irrigated land with the income from leasing irrigated land. In this manner, the value contribution of the water is isolated from the other agents of production. If water is purchased for only a portion of the growing season, then a pro-rating analysis could be done.

Another indicator of the annual value of water comes directly from annual (short-term) water sales. Such transactions are frequently referred to as water leases.

One of the first public agency efforts at acquiring a large amount of water through single season sales was the State of California’s Drought Water Bank activities in 1991. The State offered \$125 per acre-foot of water to sellers north of the Delta. The sources of the water came from land fallowing, groundwater pumping, and storage releases. The State then transported it through the Delta and charged buyers \$175 per acre-foot at the pumps in the South Delta. The State acquired significantly more water than it sold. Subsequent north-of-the-Delta prices were at \$50 per acre-foot with land fallowing not being an option. In subsequent years, the Bank initiated option agreements wherein potential sellers received a \$5 per acre-foot option price. If the State exercised its option, then it paid an additional \$30 to \$40 per acre-foot to receive the water. When the drought ended, the Drought Water Bank ceased its activity.

In recent years the DWR has initiated a “Dry Year Option Water Purchase Program” as well as an “Environmental Water Account” (EWA). The EWA utilizes money from Cal-Fed. For 2005, the option price was \$10 per acre-foot and the call price is based on the hydrologic year type. A “wet” year price is \$25 while a “critically dry” year price is \$125. The agreement terms are located in the addenda. There is an effort to establish a longer-term agreement between DWR and the sellers.

These programs are tending to set the market for short-term sales north of the Delta. The Dry Year Option Water Purchase Program will also tend to set the upper end of the market for short-term sales south of the Delta by the price paid at the pumps. Wheeling costs would be added on to the pump price.

The income from these purchase programs will vary by year type and not all potential sellers will be able to avail themselves of this sale opportunity. Some of the sellers have been large irrigation districts which tend to be more efficient for DWR to work with, compared to numerous small land owners. Research would have to be done on a case by case basis for each appraisal.

However, it would be wrong to apply the call price every year in a valuation. At a minimum, the hydrologic variability has to be considered. Any “front loading” in a discounted cash flow would also be inappropriate. An analysis that projects income from the call price for the first 5 years followed by 5 years of option price will yield a much higher conclusion than the reverse approach. A discounted cash flow analysis based on annual water sales should develop a value range based on best case and worst case scenarios which consider the hydrologic record for California.

Without a doubt, the best indicator of the annual value of a water right comes from the lease rate differential between irrigated lands and dry lands where similar water rights are involved compared with the subject lands.

It should also be kept in mind that the approaches to value are supposed to reflect the perspectives of buyers and sellers. The income approach is generally applied in situations where the property being appraised is viewed as an investment vehicle. If that is not the case, the income approach and its conclusion should be used with caution. An argument in favor of using it, even when the water right is clearly not an investment vehicle, is as a check on reasonableness on the conclusions from the other approaches. Frequently, market data is so sparse that every avenue for analysis must be used.

2.7 Public Interest Value

The Dictionary of Real Estate Appraisal defines public interest value as:

A general term covering a family of value concepts that relate the highest and best use of property to noneconomic uses such as conservation and preservation. The term originated in the 1970s in federal legislation involving public-private land exchanges deemed to be in the public interest and tax write-offs for certain donations or dedications of private lands for public purposes.¹⁰

¹⁰ Appraisal Institute, The Dictionary of Real Estate Appraisal, 4th ed., (Chicago: Appraisal Institute, 2002), p. 225

In recent years, there have been a significant number of published articles on both sides of the issue of whether or not “public interest value” ought to be included in the appraised value. That is, are there instances where the value conclusion should be a composite of economic and noneconomic values? This question could arise when the economic value of a property derives from its agricultural production potential but it is also critical habitat to some endangered species or provides general habitat benefits to fish and wildlife. Given how important water is to many threatened and endangered species, this question can be expected to arise frequently when appraising water rights.

The following is extracted from the UAS, Section B-3, pages 34-35:

A proposed highest and best use cannot be the use for which the government is acquiring the property (e.g., missile test range, habitat conservation, airfield, park), unless there is a prospect and competitive demand for that use by others than the government: [footnote omitted]

The Supreme Court has recognized the existence of a “principle which excludes enhancement of value resulting from the government’s special or extraordinary demand for the property.”...The focal point of the “special or extraordinary” standard is that values resulting from the urgency or uniqueness of the government’s need for the property or from the uniqueness of the use to which the property will be put do not reflect what a willing buyer would pay to a willing seller.... [I]t is clear that government projects may render property valuable for a unique purpose. Value for such a purpose, if considered, would cause “the market to be an unfair indication of value,” because there is no market apart from the government’s demand. [footnote omitted]

Likewise, “[t]he benefit a real estate development produces for a community or the amenity contribution provided by a planned project (i.e., the public space in a park-like area) is not considered in the appraiser’s analysis of highest and best use. Highest and best use is driven by economic considerations and market forces, not by public interest.” [footnote omitted] Therefore, “a non-economic highest and best use is not a proper basis for the estimate of market value [thus] a highest and best use of conservation, preservation, or other use that requires the property to be withheld from economic production in perpetuity, is not a valid use upon which to estimate market value.” [footnote omitted]

The Department of Justice’s “view is that an appraisal premised on a highest and best use of ‘preservation,’ ‘conservation,’ ‘natural lands’ and the like is not an appraisal of ‘fair market value’ and is unacceptable for both direct purchase and eminent domain acquisitions. That view is largely based on the principles of eminent domain law from which we conclude that a non-economic use is not a proper basis for assessing fair market value, that a value premised on a highest and best use of ‘preservation’ or the like does not represent a ‘market’ value, and certainly does not represent a ‘fair’ value.” [footnote omitted] Therefore, the Department of Justice will not

approve any appraisal report for federal acquisition purposes wherein the value estimate is based upon an uneconomic highest and best use. Nor will it approve any appraisal report that incorporates a definition of highest and best use that includes the concept of non-economic uses. (See A-14, "Analysis of Highest and Best Use.")

Based on the preceding statements, there can be little doubt that an appraisal that conforms to the UAS cannot incorporate public interest value into its ultimate value conclusions.

If public interest value does exist for a property over and above market value, then alternate valuation techniques and funding sources may be needed to appraise and pay for such properties. The methodology for actually placing a dollar figure on public interest value is still in its infancy. The question comes down to, "How much is an additional salmon or Delta smelt worth to society?" In truth, the estimation of the public interest value of a property is far beyond the ability of most appraisers, and the USPAP Competency Rule would and should be applied.

If a property is critical to acquire for the good of society, then special action may be required by congress to allocate the money necessary over and above the market value of the property.

These guidelines do not incorporate any public interest value in the derivation of market value.

The next section gives an overview of typical approaches taken in analyzing a project that is being considered by the federal government. Such analyses are frequently performed in support of the expenditure of public money. In those situations, all aspects of public benefit, or public interest value, can be included. This section is included for informational purposes only and was provided by CH2M HILL, a company with significant amount of experience in performing cost/benefit analyses.

2.7.1 Social Values in Water Right Appraisal and Economic Analysis

The federal government acquires real property for environmental or social uses to address needs that would not be otherwise addressed by private market transactions. An example of this is the acquisition of land or easements to preserve unique or scenic lands, such as national parks. Another example is the acquisition of water to enhance endangered species habitats or to meet water quality standards. In these cases, the real property is not used for economic purposes, but used to preserve or protect environmental resources for society's benefit.

In the appraisal process established by the UAS, highest and best use is determined by economic considerations and market forces, and, therefore, non-market values, like social values, are not accounted for in appraisals. Environmental or governmental uses of water are generally not used to produce goods that are bought and sold in markets and, as such, do not have prices associated with them. Without market prices, the UAS appraisal process cannot attribute a value to water used for environmental purposes or for public benefit. This creates a conundrum because one of the many roles of government is to protect society's interest and, as such, the methodologies used to evaluate public projects allow the inclusion of non-market values.

Many economic analysis methodologies required by the federal government for project evaluation include social value. Water rights acquisitions by the U.S. Fish and Wildlife Service and Reclamation would be evaluated in accordance with the U.S. Water Resources Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (Principles & Guidelines)*. *Principles & Guidelines* provides instructions for the formulation and evaluation of water and related land resources implementation studies. The primary and required analysis is to determine a project's contribution to National Economic Development (NED). Page iv of *Principles & Guidelines* defines NED as¹¹:

Contributions to national economic development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the Nation. Contributions to NED include increases in the net value of those goods and services that are marketed, and also of those that may not be marketed.

Principles & Guidelines provides three techniques on page 68 that can be used to estimate non-market values for NED analysis, particularly those associated with water supply benefits to recreation (e.g., swimming and fishing at a reservoir) and the environment (e.g., increased flows in rivers that lower water temperatures to benefit fish habitats in warm weather or reduce salinity in estuaries during low flow periods). These techniques are:

- (1) Travel cost method. The basic premise of the travel cost method is that per capita use of a recreation site will decrease as out-of-pocket and time costs of traveling to the site increase, other variables being constant. TCM consists of deriving a demand curve by using the variable costs of travel and the value of time as proxies for price. This method may be applied to a site-specific study or a regional model.
- (2) Contingent valuation method. The contingent valuation method estimates NED benefits by directly asking individual households their willingness to pay for changes in recreation opportunities at a given site. Individual values may be aggregated by summing willingness to pay for all users in the study area. This method may be applied to a site-specific study or a regional model.
- (3) Unit day value. The unit day value method relies on expert or informed opinion and judgment to estimate the average willingness to pay of recreation users. By applying a carefully thought-out and adjusted unit day value to estimated use, an approximation is obtained that may be used as an estimate of project recreation benefits.

¹¹ U.S. Water Resources Council. 1983. *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. March 10. Available at www.iwr.usace.army.mil/iwr/pdf/p&g.pdf.

Supplemental and optional analyses are also outlined in *Principles & Guidelines* with respect to project implementation studies. They include analysis of regional economic impacts, environmental quality impacts (ecological, cultural, and aesthetic), and other social impacts (urban and community, health and safety). The above non-market techniques may also be used for these analyses.

A 1992 memorandum issued by the Office of Management and Budget (OMB) titled Circular No. A-94 "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" provides guidance for performing the following analyses in Section 4 Scope¹²:

1. Benefit-cost or cost-effectiveness analysis of Federal programs or policies.
2. Regulatory impact analysis.
3. Analysis of decisions whether to lease or purchase.
4. Asset valuation and sale analysis.

Benefit-cost analysis (BCA) is recommended by OMB as the primary economic analysis technique to be used for formal economic evaluation of government programs and projects. Cost-effectiveness analysis can be used when the benefits from all project alternatives are the same or when a policy mandates that certain levels of benefits must be provided. Cost-effectiveness analysis is less comprehensive than BCA, but is often applied to evaluation projects that provide an essential commodity or service to the public. Examples are water supply and national security.

Circular A-94 applies to all agencies of the Executive Branch of the federal government and requires the agencies to monetize positive and negative impacts to the extent possible or identify them in other units (Section 5 General Principles):

1. A comprehensive enumeration of the different types of benefits and costs, monetized or not, can be helpful in identifying the full range of program effects.
2. Quantifying benefits and costs is worthwhile, even when it is not feasible to assign monetary values; physical measurements may be possible and useful.

OMB provides explanation as to how market transactions can fail to capture all components of social value, and, when they do, alternative methods must be employed to estimate the total value of a project or program (Section 6 Identifying and Measuring Benefits and Costs):

6. Identifying and Measuring Benefits and Costs. Analyses should include comprehensive estimates of the expected benefits and costs to society based on established definitions and practices for program and policy evaluation. Social net benefits, and not the benefits and costs to the Federal Government, should be the basis for evaluating government programs or policies that have effects on private citizens or other levels of government. Social benefits and costs can differ from private benefits and costs as measured in the marketplace because of imperfections arising from: (i) external economies or diseconomies where actions by one party impose benefits or costs on other groups that are not compensated in the market place; (ii) monopoly power

¹² Office of Management and Budget. 1992. Circular No. A-94 Revised Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. October 29. Available at www.whitehouse.gov/omb/circulars/a094/a094.html.

that distorts the relationship between marginal costs and market prices; and (iii) taxes or subsidies.

a. Identifying Benefits and Costs. Both intangible and tangible benefits and costs should be recognized. The relevant cost concept is broader than private-sector production and compliance costs or government cash expenditures. Costs should reflect the opportunity cost of any resources used, measured by the return to those resources in their most productive application elsewhere....

b. Measuring Benefits and Costs. The principle of *willingness-to-pay* provides an aggregate measure of what individuals are willing to forego to obtain a given benefit. Market prices provide an invaluable starting point for measuring willingness-to-pay, but prices sometimes do not adequately reflect the true value of a good to society. Externalities, monopoly power, and taxes or subsidies can distort market prices.

Taxes, for example, usually create an *excess burden* that represents a net loss to society. (The appropriate method for recognizing this excess burden in public investment analyses is discussed in Section 11.) In other cases, market prices do not exist for a relevant benefit or cost. When market prices are distorted or unavailable, other methods of valuing benefits may have to be employed. Measures derived from actual market behavior are preferred when they are available....

In the case of water rights acquisition, the Department of Justice requires market-based appraisals, while *Principles & Guidelines* and Circular A-94, which govern the project evaluation processes of federal projects and programs, require the inclusion of positive and negative non-market values. To comply with both sets of requirements and the federal government's responsibility to protect the public interest, close coordination is necessary between water rights appraisers and economists. Both the fair market value of a water right, as well as its social and non-market value, should be documented for each proposed water rights acquisition. This provides comprehensive information to agency personnel and to Congress for the purposes of budget requests and justification.

In the long run, it may be necessary for agencies involved in acquiring water for environmental purposes and for meeting federal legislative requirements such as the National Environmental Policy Act (NEPA) and the Central Valley Project Improvement Act (CVPIA) to provide policies and guidance to coordinate and accommodate both types of values for program and project evaluations.

2.8 Application of Methodology

2.8.1 Research and Inspection

A complete inspection of the current point of diversion, if dealing with surface rights as well as the on-site distribution infrastructure, should be done. The appraisal report must describe the historical use of the water right. The lands to which irrigation water has been applied, the delivery system, the season of use, and the crops grown must all be described.

Periods of non-use of the water right should be identified. Any reports that have been filed with the Board in recent years (5 years minimum) as to the amount of water diverted should be reviewed.

A copy of the License to Divert, issued by the Board, should be reviewed and included in the report. This will only apply to surface water rights that are post-1914. Pre-1914 water rights must be documented by whatever means are available. Any legal opinions provided to the appraiser regarding the validity of the water right should also be included.

If the historical use of the water right is irrigation, then an engineer's report that reaches conclusions regarding consumptive use must be available to the appraiser. This report should deal with the amount of applied water, evaporation and transpiration of applied water, what happens to the water that percolates into the soil, and the amount of surface run-off (tailwater). Non-agricultural uses, such as industrial use, will also have a consumptive use history that must be addressed.

Published information that would provide an estimate of the consumptive use should be referenced. If the water that percolates into the ground goes to a salt-sink, then it is being "consumed" as well and may be available for transfer. If it recharges a usable groundwater basin, then it may not be available for transfer (see page 1-14).

The reliability of the water supply must be addressed and will require research into the local hydrology and the seniority of the water right.

The natural and man-made infrastructure that exists that would allow the physical transfer to a potential buyer must also be addressed. This is fundamentally important in identifying potential buyers.

In analyzing the subject, one of the primary questions to answer is, "How would a transfer take place?" In researching comparable sales, the question is, "How did a transfer take place?" In order to be confident in the appropriate use of a sale or lease in the valuation of the subject, a knowledgeable individual must be interviewed. An understanding of the water right that was sold or leased and the factors that entered into the price paid must be obtained before meaningful comparisons can be made to the subject.

Physical inspection of either the historical point of diversion and place of use or the proposed diversion point and place of use is not important for the *sales*. This is a deviation from the UAS requirement of physically inspecting all of the sales used in a typical land valuation. What is important is that the appraiser gains an understanding of how the transfer took place. This may require a physical inspection or it may not. If, based on past experience, the appraiser already has an understanding of the waterways involved and

man-made infrastructure used for the transfer, then little is gained by making the appraiser view the old and new diversion points and places of use. As a matter of fact, forcing the appraiser to do so could increase the cost of the appraisal dramatically given the wide geographical area over which comparables may exist for any water right valuation.

2.8.2 Groundwater Rights

If a groundwater basin has been adjudicated, then the rights of the overlying landowners have been quantified. The sum of the allocated rights equals the long-term annual yield of the basin in the court's judgment.

It is common in this situation for any urban entity in the basin to purchase these groundwater rights from the historical agricultural water users. In many cases, the market is well established. Upon sale of the right, a change in point of use is effected by simply terminating the extraction at the old location and increasing it elsewhere in the basin. This could involve drilling a new well, or it may be as simple as increasing the rate or duration of pumping at a different well in the basin.

A before and after valuation of the water right for its agricultural use, compared with prices being paid for just the water right should show if there is a premium being paid in the market over and above its use value for agriculture. Any additional costs that the buyer paid, such as drilling a new well or installing pipelines, should be researched and considered.

If an adjudicated water right is being valued, then a copy of the court decree should be obtained that should quantify the right of the current owner and any restrictions that could be relevant.

In non-adjudicated situations, overlying landowners have correlative rights to the groundwater underneath their lands. If the long-term annual yield of a groundwater basin exceeds the needs of the overlying landowners, then the additional yield may be available for appropriation. Any such appropriation could be reduced if overlying landowners' needs increase or if adjudication takes place.

Groundwater has been sold on a short-term basis in the past. Many groundwater sales took place during the early years of the Drought Water Bank. EWA purchases in recent years have involved groundwater sales. Currently, groundwater sales can only take place to the State if there is relative certainty that the groundwater is disconnected from the surface water in the area. Otherwise, holders of surface water rights could be negatively impacted by the sales of groundwater. The State has detailed the requirements for groundwater to be considered as a new source of water, not simply the same source extracted at a different location. Before any valuation of groundwater is commenced, the client should have ascertained that the groundwater being purchased is disconnected from surface water.

In recent years, the EWA purchases have tended to set the market for annual sales. A property owner who has wells that have been previously approved for water sales to EWA will be in a superior position to an owner who is simply proposing to engage in such sales because of the costs associated with meeting the requirements of proof of no impact on surface water supplies.

The willingness of property owners to sell groundwater at historical prices may depend on the market for crops that would otherwise be produced. If water sales took place during a period of depressed produce prices, then they may serve only to set the lower end of the value range for the groundwater if the produce market has improved.

The soil production capacity of the land could impact the owner's willingness to sell as well. An owner of land with poor soils may be willing to sell for lower prices than the owner of land with better soils. Even though the projected net income from a farming operation cannot be the basis of estimating the value of water, the water value may correlate to (track) expected net income.

Depth to groundwater can vary dramatically from one location to another even though the distance between the well sites may not be far. Of course, the deeper the groundwater, the more expensive it is to extract. A groundwater right which can be accessed with a 100-foot lift could be expected to be more valuable than one that requires a 400-foot lift, all other things being equal.

The quality of groundwater is also significant. In an area of perched water tables, sitting on top of impervious clay layers, the water may be unsuitable for irrigation or any other purpose. High salt or selenium concentrations may severely limit groundwater usability. Before comparisons can be made, sufficient knowledge must be gained regarding the subject's and the comparable's water quality.

Typically, the groundwater right runs with the land and is sold with the land. *Before and after* valuations would be the best approach in most groundwater right valuations. If there is evidence that land is being purchased with the intent of exporting the water, great care must be exercised in the selection of comparables with particular attention paid to similarity of highest and best use issues. Many counties have restrictions on groundwater export, and there may also be groundwater management plans in place which pose restrictions.

If one believes it is appropriate to use a surface water right as a comparable in estimating the value of a groundwater right, and there are no restrictions on the sale and export of the groundwater right, several things must be kept in mind. Assuming the well is deep enough, groundwater tends to be 100 percent reliable, though there are exceptions. A surface water rights' reliability will depend on hydrology, seniority, and legal season of use. Endangered species may impact surface water diversions. Pumping costs associated with surface water are usually significantly less than with groundwater. There may also be water quality differences.

2.8.3 Riparian Rights

Many of the comments regarding groundwater rights apply to riparian rights because they too run with the land.

Unlike groundwater rights, there are no situations where riparian rights can be appropriated (though they can be dedicated to in-stream flow). Clearly, the best valuation approach in determining the contributing value of the riparian right is the *before and after* approach. Since the riparian right can not be transferred, there may be no value for this right on a stand-alone basis.

In estimating the *after* value of land without the riparian right, it must be kept in mind that the aesthetic value of being next to a watercourse would still exist even when the riparian water right is lost. If dry land sales away from a watercourse were used as comparables, then a danger of undervaluing the property in the *after* condition would exist. This would lead to an overvaluation of the water right.

If comparison is made to irrigated lands that have appropriative rights, then a variety of factors would have to be considered and potentially adjusted for. The cost and reliability of water delivery, and whether or not transferable water rights are contributing value over and above their use value for irrigated agricultural production, would be significant items that may require adjustments.

2.8.4 Appropriative Rights

The vast majority of appropriative water rights are associated with surface water. There are a few instances where groundwater exists essentially in an underground stream, and other cases where percolated groundwater can be appropriated, but these are rare exceptions.

The primary valuation factors in appraising an appropriative water right include:

- Seniority,
- Amount of water that can be legally diverted,
- Season of use,
- Consumptive use,
- Reliability associated with hydrologic conditions, and
- Highest and best use or optimum use

Comparable sales of land with water rights should have a similar highest and best use. If direct comparison is made with water right sales, then the sales and the subject should have similar optimum uses. It is completely inappropriate to use comparable sales where the buyer was an urban entity for appraising a water right where such buyers are not a factor in the market, either because urban demand does not exist or delivery of the water would not be physically possible or financially feasible.

All adjustments should be made from the “market’s” perspective, not that of the specific buyer or seller. The only exception to this may be when a single buyer dominates the market and effectively sets the price.

When a market area is transitioning from strictly agricultural use to one where urban buyers exist, the *before and after* valuation approach for irrigation will yield a “use” value for agriculture which will tend to set the lower end of the value range for the right being appraised. Special care must be exercised in performing the highest and best use analysis in transitioning markets to insure that “market value” is being estimated by considering all potential uses for the property being appraised, including sale of the water right to an urban entity.

Superior seniority and dry-season legal diversions can have significant positive value implications for a water right. Consumptive use will be the foundation for the amount of water that can be transferred without harming other water right users.

In some cases, the amount of water that can be legally diverted is much higher than the consumptive use that has taken place. There may be some positive value impact from this, but it will be very hard to prove and quantify. First and foremost, the subject and all sales must be compared on a consumptive use basis, not the amount of water that could be diverted.

The highest and best use analysis must take all restrictions regarding water transfers into consideration. These restrictions include both legal and physical ones. The Delta poses an enormous obstacle for private party water transfers. Therefore, every effort should be made to not use comparables from one side of the Delta for appraising a water right on the other side. This is especially dangerous when appraising a water right north of the Delta because of the great potential of overestimating its value if comparables from south of the Delta are used.

2.8.5 Contractual Entitlements

A contract for water delivery is an intangible asset. Transfers of contractual entitlements are not constrained to the amount of water that has been consumptively used; the entire amount of the entitlement can be transferred for delivery at another location.

Transfers within an irrigation district are usually quite straightforward and require only the cooperation of the district. Transfers between districts require the cooperation of both districts. Frequently, transfers that take place involve lands within two districts that have the same owner. The landowner is simply repositioning the water use from one land to another with the only financial obligation associated with the differential in delivery and administrative costs. This is not a sale situation.

The two largest water projects in the state are the CVP and the SWP. Short-term transfers between contractors (districts) within each system are relatively straightforward. The SWP currently requires that if a district is not going to use its allocation completely for that year, the excess goes into a turn-back pool where it is available for other SWP contractors to purchase. The CVP does not have such a system, but districts within the CVP can arrange for reallocation between themselves with the operational branch of the CVP kept informed. Central Valley Project Improvement Act (CVPIA) transfer guidelines apply specifically Section 3405 (a) of the Act which is included in the addenda.

Outright sales of contractual entitlements have taken place from one CVP contractor to another and from one SWP contractor to another, but not to outside entities. Such outside-buyer proposed sales have been strongly resisted with no expectation of change in that regard. Because of the limited buyer-seller pool, contractual entitlement sales in these projects should be used with caution. Also, the buyer may incur additional infrastructure expenses in order to take delivery of additional entitlement water. The buyer also absorbs all annual project expenses that the seller had other than energy costs for delivery to the old location.

The CVP and the SWP do actively facilitate short-term transfers between projects in cases that involve substitution. As an example, the SWP may deliver water to a CVP contractor at one location while another CVP contractor allows an equal amount of their entitlement to be put into the SWP system at another location. The interconnectivity of the water delivery infrastructure south of the Delta allows for such substitution transfers to take place.

In valuing contractual entitlements, the reliability of delivery is a very significant item. Delivery expectation prior to the drought of the late 1980s and early 1990s was 100 percent delivery in all years. Now, even in wet years, the delivery will rarely be 100 percent. Therefore, the prices being paid for entitlement are significantly higher when applied to the actual water received. For example, if \$1,000 per acre-foot of contractual entitlement is paid and delivery is expected to average 50 percent, then the price of actual water received is \$2,000 per acre-foot.

In addition, the buyer must absorb all the indebtedness for project construction that the buyer had. This figure must be confirmed with a participant, but it could be \$50 to \$100 per acre-foot of entitlement every year. Obviously, the less water that is delivered, the higher the per acre-foot fixed costs.

Case Studies

3.1 Overview

In every appraisal involving water rights, the subject property inspection and associated research should take place according to the description presented in Section 2.8.

After an understanding of the subject water rights is gained, including what transfer opportunities and obstacles exist, then the appraiser is in a position to decide on the appropriate methodology. Though all three of the approaches to value should be considered, there is no question that the preferred approach is the sales comparison approach, provided that there are a sufficient number of comparable sales available that are similar enough to the subject to provide confidence in the conclusions reached after the adjustment process. If the sales market data is relatively strong and provides the best insight into the motivations of the buyers and sellers in the subject market, then one or both of the other approaches to value may not be necessary.

3.1.1 Sales Comparison Approach

For a summary of the sales comparison approach methodology in general, see Section 2.4.

If a *before and after* valuation is being pursued, then land sales with and without comparable water rights or contractual entitlements must be developed. If a *taking plus damages* valuation is pursued, then sales of similar water rights or entitlements must be pursued as comparables. Even if a *taking plus damages* valuation approach is taken, if the historical use of the water right or entitlement was agricultural, it would still be advisable to develop a “ball park” estimate of what the price differential is between irrigated and non-irrigated land in the vicinity of the subject as a test of reasonableness.

Adjustments

Water right sales description and adjustments to sales based on comparison with the subject should include:

- Property rights conveyed
- Financing terms
- Conditions of sale
- Market conditions (date of sale)
- Physical characteristics
 - Location
 - Volume of water diverted and consumptive use
 - Quality
 - Delivery reliability (hydrology)

- Legal characteristics
 - Seniority of water right
 - Delivery reliability
 - Season of use
- History of use
- Intended use of the buyer
- Optimum use
- Other

The sale price should be adjusted for property rights conveyed, financing terms, and conditions of sale and market conditions before moving on to the other adjustments. If the sale involved land with water rights, then obviously land related factors should be incorporated as well. These factors include size, soils, crops grown, terrain, development potential, and improvements.

It is typical that both quantitative and qualitative adjustments are required. In the qualitative process one must avoid the temptation to simply add up the pluses and minuses to obtain an indication of superiority or inferiority. For instance, delivery reliability may be far more important than some other item of comparison. Weighting of qualitative comparisons must be part of the adjustment process and should be explained in the discussion associated with the adjustments.

Land sales where only a small portion of the sale price is attributable to the water rights involved generally cannot be given significant weight in any value conclusion regarding the water right. The reason this information is not significantly useful is that in the *before and after* analysis the value of the water right is arrived at by subtracting the dry land value from the irrigated land value. In this process, small changes in the estimated per acre value of the dry land have huge implications on the estimated value of the water right. For example, consider a property of 2,000 acres that sold for \$2,000,000. The irrigated area was 100 acres, and the water available for transfer is 250 acre-feet. The range in value for completely non-irrigated similar properties is \$700 to \$900 per acre. Selecting \$700 per acre yields a land value estimate of \$1,400,000 and a water rights value of \$600,000. This, divided by 250 acre-feet, yields a per acre-foot estimate of \$2,400. If a land value of \$900 is used, then by the same process, the per acre-foot value estimate is \$800.

The only exception to the concerns about such comparables may be where the buyer or seller indicates that they assigned a specific value to the water right as part of their decision process.

3.1.2 Cost Approach

For a summary of the cost approach methodology in general, see Section 2.5. The cost approach has little usefulness in a *before and after* analysis, it is most helpful in situations where alternate opportunities exist for obtaining water as a replacement for the water right being valued. Such a situation may exist where a surface water right is being appraised and the owner has access to groundwater. The cost of well drilling, maintenance, and operation could be an indicator of the value of the surface water right.

Indicators could also include what others in the area are spending to either conserve water (such as through modified irrigation techniques) or to develop additional supplies.

3.1.3 Income Approach

For a summary of the income approach methodology in general, see Section 2.6. The income approach can have a variety of applications. It can provide an indicator of value in the *before and after* approach if properties are purchased for investment purposes and if lease rates for irrigated and non-irrigated lands are available. Appropriate capitalization rates should be extracted from the market whenever possible. When direct short-term sales of water to either public or private entities are common or can reasonably be expected, then income from such sales can be incorporated into the analysis. Such sales usually occur at irregular times during hydrologically dry periods.

The following case studies are hypothetical in nature, and are designed to guide the appraiser when dealing with similar real-life situations.

3.2 Appropriative Water Rights – “Before and After” Analysis

3.2.1 Subject Property

Appropriative water right on a stream in Northern California that is tributary to the Sacramento River. The license to divert date is 1924, and the allowable use is irrigation. The season of use is from April 1 to September 30. The volume of water that can be diverted is 5 cubic feet per second (cfs). The maximum diversion is 5 cfs x 60 sec/min x 60 min/hour x 24 hours/day x 183 days = 79,056,000 cubic feet. Dividing this by 43,560 square feet per acre yields 1,814.88 acre-feet.

Historical diversions, especially in recent years, have averaged around 1,000 acre-feet total. The crops grown have included alfalfa and corn. Total area irrigated is 250 acres, encompassing the entire property. A consumptive use study by a hydrologist has concluded that the ETAW (evapotranspiration of applied water) is 2.5 acre-feet per acre per year. Because of the relationship of the subject to the stream, it is probable that any wells that would be used on the subject would essentially be taking the water from the stream.

In the following section the value of the water right is discussed.

Initial Analysis

Total water available for transfer:

TABLE 3-1
Example of Total Water Available for Transfer (Appropriative Surface Water Rights)

Item	Water Volume (acre-feet)	Area (acres)	Water Volume (acre-feet per acre)
Legal Diversion	1,815	250	7.3
Average Diversion	1,000	250	4.0
Applied Water	1,000	250	4.0
ETAW	625	250	2.5

The ETAW is the amount of water that could be transferred from the property without harming any other downstream water right holder. The 1.5 acre-feet per acre of applied water that is not available for transfer is either flowing back into the stream as tailwater or is percolating into the ground and recharging the groundwater. Because of the dependence of downstream users on upstream tailwater return flows, such water is not available for transfer. Because of the apparent connectivity of the surface water and groundwater in this case, the percolating water is not available for transfer. It would not be an option for the landowner to transfer the surface water right and irrigate with groundwater. This is true because of the impact on downstream water right holders i.e., less water available to them because of the transfer.

If the percolating groundwater were finding its way to a salt-sink and becoming unavailable to the system, then the potential would exist that water saved from that fate would be available for transfer. See Section 1.3.3 for other situations where applied water that percolates into the ground may be transferred. The services of a hydrologist or engineer should be employed in such situations to quantify the water involved and to help with the understanding of how a modification of irrigation techniques may free up water for transfer.

Initial Conclusion

It appears that the landowner could transfer the water right, or a portion thereof, if he engages in the appropriate amount of land fallowing to stop the on-site consumptive use of an amount of water equal to what is transferred. The landowner could not transfer the surface water right and change to irrigating with groundwater.

3.2.2 Methodology and Desired Market Data

Assuming the entire water right is going to be transferred, this situation lends itself quite well to a *before and after* analysis employing the sales comparison approach. The income approach could be employed if there are investors in the market who acquire properties and lease them out. Required inputs for the income approach would be lease rates for both dry and irrigated lands as well as capitalization rates. There is no role in the *before and after* analysis for the cost approach when there is no apparent substitute water source (see Sections 2.5, 3.1.2 and 3.3.2 for additional comments on the cost approach).

3.2.3 Sales Comparison Approach

For the *before* analysis, the desired comparable sales would be similarly located lands with similar water rights. If a sufficient number of sales of such properties cannot be found, then all irrigated land sales of similar size regardless of the source of water can be used. Adjustments would have to be made for dissimilarities in the water rights.

The *after* analysis should include similarly located lands that are not irrigated and do not have the potential for being irrigated in a financially feasible manner. There could be significant differences between non-irrigated and irrigated lands other than just water. Frequently, the non-irrigated properties are hilly uplands away from water features, compared with the mildly sloping irrigated lands that may be in a river valley. If any irrigation equipment contributed value in the *before* valuation, its salvage value should be included in the *after* analysis. Of course the ideal sales would be sales of the same property

before and after its water rights was sold. Such paired sales are currently a rarity, but they may become more common as time passes.

The sales and the subject should have the same highest and best use in the *before* analysis, and the same should be true in the *after* analysis. Since, at a minimum, the highest and best use of the subject will change from irrigated to non-irrigated, two completely different sets of comparables will be required.

A property that has a surface water right and also the ability to irrigate from a groundwater source, that is not interconnected with any surface water, may have a different highest and best use in both the *before* and *after* condition compared with a similar property that does not have the groundwater replacement option. The *before* highest and best use for such a property has to take into consideration the complete bundle of rights for the property, including both the surface and groundwater rights. The *after* use may be continued irrigation with groundwater rather than non-irrigated land use.

In valuing such a property, the ideal comparables for the *before* valuation would have a similar situation with surface and groundwater rights. The *after* comparables would be irrigated with groundwater. A *takings plus damages* analysis would also be advisable.

Market Transactions

All of the transactions in the following table are for land sales with water rights and are suitable for estimating the subject in the before or “as is” condition.

TABLE 3-2
Example of Information Collected on Comparable Sales

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$1,700,000	\$275,000	\$1,575,000
Property rights	Fee simple	Fee simple	Fee simple	Leased Fee
Financing terms	Cash basis	Conventional	Seller carry	Seller Carry
Conditions of sale	Per Market Value definition	Arms length	Motivated seller	Lessee purchase
Sale date	State effective date of valuation	Close of escrow date	Close of escrow date	Close of escrow date
Physical land				
Location	XYZ basin	XYZ basin	ABC basin	Sacramento River
Size (acres)	250	1,000	200	500
Soil quality	Good	Average	Average	Good
Area irrigated	250 acres	400 acres	150 acres	490 acres
Crops grown	Alfalfa and corn	Pasture & small grains	Pasture	Alfalfa and corn
Terrain	Mild slope	Mild to moderate	Mild to moderate	Mild slope
Development Potential	3 parcels possible	9 parcels possible	1 parcel – no subdivision	6 parcels possible

TABLE 3-2
Example of Information Collected on Comparable Sales

Improvements	Irrigation ditches and roads	Irrigation ditches, roads, house, and barn	Irrigation ditches and roads	Irrigation ditches, roads, house, and shed
Physical water				
Water diverted	1,000 acre-feet	1,500 acre-feet	300 acre-feet	2,000 acre-feet
Consumptive use (ETAW)	625 acre-feet	1,000 acre-feet	200 acre-feet	1,000 acre-feet
Quality	Good	Good	Good	Good
Delivery reliability (hydrology)	Excellent	Excellent	Reduced summer flows	Excellent
Legal				
Seniority	1924 license	Pre-1914	Pre-1914	1940 license
Season of use	April thru Sept	Year around	Year around	April thru Sept
History of use	Irrigation	Irrigation	Irrigation	Irrigation
Intended use of water	In stream	Continued irrigation	Continued irrigation	Continued irrigation
Optimum use of water	Agricultural	Agricultural	Agricultural	Ag with possible future urban
Other				

You may not know the ETAW on the sales as precisely as you do for the subject.

Adjustment Grid

TABLE 3-3
Example of Adjustments to Comparable Sales Information

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$1,700,000	\$275,000	\$1,575,000
Property rights	Fee simple	Similar	Similar	Inferior
Adjustment		=	=	+ \$200,000
Adjusted price		\$1,700,000	\$275,000	\$1,775,000
Financing terms	Cash basis	Conventional	Seller carry below market	Seller Carry at market
Adjustment		=	+ \$25,000	=
Adjusted price		\$1,700,000	\$300,000	\$1,775,000
Conditions of sale	Per Market Value definition	Arms length	Motivated seller	Lessee purchase
Adjustment		=	+ \$25,000	=
Adjusted price		\$1,700,000	\$325,000	\$1,775,000

TABLE 3-3
Example of Adjustments to Comparable Sales Information

Factors	Subject	Sale 1	Sale 2	Sale 3
Market conditions	Current	Similar	Inferior	Similar
Adjustment		=	+ \$30,000	=
Adjusted price		\$1,700,000	\$355,000	\$1,775,000
Land				
Location	XYZ basin	Similar	Inferior—remote	Superior
Adjustment		=	+	-
Size (acres)	250	1,000	200	500
Adjustment		+	=	=
Soil quality	Good	Average	Average	Good
Adjustment		+	+	=
Area Irrigated	100%	40%	75%	98%
Adjustment		+	+	=
Crops grown	Alfalfa and corn	Pasture, small grains, and winter grazing	Pasture and winter grazing	Alfalfa and corn
Adjustment		+	+	=
Terrain	Mild slope	Mild to moderate	Mild to moderate	Mild slope
Adjustment		+	+	=
Development Potential	3 parcels possible	9 parcels possible	1 parcel – no subdivision	6 parcels possible
Adjustment		+	+	=
Improvements	Irrigation ditches and roads	Similar plus house and barn	Similar	Similar plus house and shed
Adjustment		- \$100,000	=	- \$75,000
Physical water				
Applied water per irrigated acre	4.0 acre-feet	3.75 acre-feet	2.0 acre-feet	4.08 acre-feet
Adjustment		=	+	=
Quality	Good	Good	Good	Good
Adjustment		=	=	=
Delivery reliability (hydrology)	Excellent	Excellent	Reduced summer flows	Excellent
Adjustment		=	+	=
Legal				
Seniority	1924 license	Slightly superior	Slightly superior	Slightly inferior

TABLE 3-3
Example of Adjustments to Comparable Sales Information

Factors	Subject	Sale 1	Sale 2	Sale 3
Adjustment		-	-	+
Season of use	April thru Sept	Year around	Year around	April thru Sept
Adjustment		-	-	=
Optimum use of water	Agricultural	Agricultural	Agricultural	Possible urban in future
Adjustment		=	=	-
Total Quantitative Adjustments		- \$100,000	0	- \$75,000
Adjusted Price		\$1,600,000	\$355,000	\$1,700,000
Adjusted Price per Acre		\$1,600	\$1,775	\$3,400
Total Qualitative Comparison		Very inferior	Very inferior	Slightly Superior

Sale 1 is very similar to the subject in most ways. It has some improvements present, but the primary difference is the percentage of the property that is irrigated. Only 400 of the 1,000 acres are irrigated compared with the subject's 100 percent irrigated condition.

The potential exists to take an alternate approach to simply making a qualitative adjustment for this differential. Since both *before* and *after* analyses are being done, non-irrigated comparables that would be presented later in the report could be used to estimate the value of the non-irrigated portions of the sales. For instance, for Sale 1 the dry land estimated value might be \$1,000 per acre. Multiplying that figure times the 600 acres that are not irrigated would yield a negative adjustment of \$600,000. The final quantitatively adjusted price for this comparable would then be \$1,000,000 for the 400 irrigated acres or \$2,500 per acre. The "very inferior" total qualitative comparison would then be only "inferior" and the subject's value would be bracketed more closely quantitatively. If this approach is taken, the dry-land value per acre estimate/adjustment must be for the sale being adjusted, which may or may not be the same as the dry-land value for the subject.

Sale 2 is clearly an inferior, marginal property in most regards, with a remote location. This is the type of property that would typically be acquired to expand an existing ownership. The seller was in financial straights, offered the property at a discount, and carried below market financing. The property sold at a time when the market in general was soft and prices have firmed up since. All of these items require individual adjustments, but care must be exercised to avoid duplicate adjustments for the same item. These guidelines assume the appraiser has had training and experience in making adjustments to real estate sales in general in these common areas.

Again, less than 100 percent of the property was irrigated. On a per acre basis, there was only half the water available and its reliability was questionable later in the summer. The seniority of the water right was superior to the subject from a legal perspective, but hydrology may override the legal aspects for this water right. Conversion to urban use at any point is highly unlikely because this property is so far from an urban buyer and the amount of water is not sufficient to attract the interest of an urban entity. Overall, this sale is a very poor indicator of value, but it is not uncommon to have to incorporate such properties into an analysis.

Sale 3 needed some initial adjustments for the property rights sold being leased fee as opposed to fee simple. This may be the case if the property were leased at a below market rate. Even though the lessee purchased it, the interest sold for market value and the seller carrying the financing did not impact the sale price. The percentage of the property irrigated is very similar to the subject. All things considered, this would be a very good comparable and clearly merit the most weight in the reconciliation.

Development potential considers numerous items including location, access, lot size allowed by zoning, the demand for such properties, and the resulting holding period. It involves far more than just the number of lots that can be created.

Most potential urban buyers are not interested in acquiring relatively small amounts of water, particularly from sources far upstream from their diversion point. Long-term transfers require a substantial cost for the approval process. Such costs include environmental studies and documentation, legal costs, and Board hearings. For small amounts of water, by the time the process is complete, the cost per acre-foot could be prohibitive. Because of Sale 3's location on the Sacramento River, it may be of interest in the future to some urban entity. However, the amount of water involved is still quite small.

Based on the information presented in this hypothetical analysis, it appears that the range in value for the subject is \$2,500 to \$3,400 with \$3,000 per acre being a reasonable reconciliation for the *before* condition.

The *after* valuation would take a similar approach except that the comparables should be non-irrigated land sales. Any salvage value of irrigation equipment that was included in the *before* value conclusion should be added to the dry land *after* value. An adjustment grid will not be presented, but the same process would be applied in adjusting the sales. For illustration purposes, the assumption will be made that the value per acre in the *after* condition is \$1,000 per acre. The value differential is then $\$3,000 - \$1,000 = \$2,000$ per acre. The total differential is then $\$2,000 \times 250 \text{ acres} = \$500,000$. Since there are 625 acre-feet that can be transferred, the value per acre-foot is arrived at by dividing \$500,000 by 625 acre-feet which equals \$800 per acre foot.

Valuing properties that have urban influences present or that have sufficient water resources to attract urban buyers complicates the process, but the methodology is the same. Remember that the highest and best use of the subject and the comparables must be similar for the conclusions to be valid.

3.2.4 Income Approach

The potential exists for the income approach to be used in a *before and after* analysis. However, the appraiser should recognize that most agricultural properties are not purchased as investments where the buyer intends to lease the land out and arrived at the purchase price by comparison to other investment opportunities. It is common for agricultural lease rates, combined with sale prices, to indicate capitalization rates that are quite low by typical investment standards. Frequently, the buyers may be motivated by factors that are not purely financial in nature.

This, and the more complex analysis involved, tends to lessen the reliability of the conclusions from the income approach compared to those from the sales comparison approach.

If one believes that an income approach reflects the decision process of buyers and sellers in the market in which the subject exists, then it would be applied in a *before and after* analysis in the following manner.

Lease comparables would have to be identified, researched, and adjusted to derive an estimate of the subject's lease rate in the *before* (irrigated) condition. The adjustment process would be similar to that presented for comparable sales in Section 3.2.3 of these Guidelines with obvious modifications.

Sale comparables that were either leased at the time of sale or were going to be offered for lease by the buyer would also have to be identified and researched. Net income to the landowner must be estimated for these sales. The best sources of the net income figure are the buyers and sellers. The net income for each sale is then divided by the sale price to obtain an indication of the overall capitalization rate. From this pool of market data, a capitalization rate is selected for application to the subject's estimated net income. Dividing the net income by the capitalization rate yields a market value estimate in the *before* condition.

The same process is used to estimate the market value of the subject in the *after* (non-irrigated) condition. Of course, market lease data should be for similar dry land properties, as should the sales used to develop capitalization rates. Any salvage value of irrigation equipment should be included in the value in the *after* condition value. The differential in market values is then calculated. The value per acre-foot is estimated by dividing the market value differential by the number of acre-feet that could be transferred, which is the amount of water that is the ETAW.

If the capitalization rate indicated for both the *before* and *after* conditions is the same, then the differential in estimated net incomes between the two conditions could be capitalized directly in a single step. If this is done, then any salvage value of irrigation equipment should be deducted from the results of the capitalization process.

It cannot be emphasized enough how critical the capitalization rate is to the conclusions. Consider a situation where the typical investment capitalization rate for commercial properties is 10 percent, and the capitalization rate indicated by the agricultural sales is 4 percent. Suppose the differential in the net incomes discussed previously is \$100 per

acre. Capitalizing \$100 by 10 percent yields \$1,000; while capitalizing \$100 by 4 percent yields \$2,500, or 250 percent of the \$1,000 figure.

Which is correct? The answer to that question lies in the answer to the broader question as to whether the property involved is being treated as an investment with the purchase price based upon its income stream. Keep in mind that properties can be purchased as investments with much of the expected return coming from appreciation over the holding period. In these situations, using the capitalization rate based upon the net income stream alone would be inappropriate and would result in an overvaluation of the water right. In another situation, a buyer's primary motivation is to be a ranch owner and the income stream is secondary in importance. The income approach should not use such sales as the source of capitalization rate data.

Without a doubt, the market is the preferred source of capitalization rates. There are other sources of investment related rates of returns available that can provide support. These include publications by the Federal Reserve and the Appraisal Institute's website (<http://www.appraisalinstitute.org/>). The Members Only section of that website has the "Korpacz Real Estate Investor Survey" that gives investment returns on several different types of commercial property. This publication is also available by subscription from Price Waterhouse Coopers. Other information sources are undoubtedly available. The appraiser who is going to apply the income capitalization approach to valuing water rights should be aware of the capitalization rates across the market and select the appropriate rate accordingly.

If income from water sales to such entities as the EWA are going to be included in the *before* income stream, then several items need to be kept in mind. First and foremost, such sales are irregular and related to hydrologic needs. Typically, agreements are reached with potential sellers early in the season and an option payment is made. This is generally a relatively small amount such as \$5 per acre-foot. If the buyer exercises the option, then the option payment is credited toward the final purchase price.

Hydrologic variability must be incorporated into the analysis. It would be wrong to assume that water sales would occur every year. It should also be kept in mind that not every water right holder who wants to participate in this program is allowed to. The income from any water sales must also be tempered by lost income from land leasing income. It may be very difficult to find tenants who are willing to enter into lease agreements where there is any uncertainty regarding whether the tenant will have irrigated or non-irrigated land to work with.

All things considered, it is far more likely that the tenant would be the one selling the water at his or her discretion, rather than the landowner. Consequently, the income from water sales should not be incorporated at all into the landowner's income stream. However, if the tenant did have such an option, then they may be willing to pay more in an annual lease rate compared to a similar property that did not have a location where annual water sales were probable. This should be taken into consideration in concluding to the market rent for the subject.

Under no circumstances should the income approach use the income stream from a farming operation as the basis of value estimates. This issue is addressed in Section 2.6.1.

This treatment of the income capitalization approach is relatively cursory. The reader is encouraged to review the text in “The Appraisal of Rural Property”¹ beginning on pages 183 and 255 that relate to the income approach. The entirety of this book should be familiar to anyone appraising rural property.

3.3 Appropriative Water Rights – Taking Plus Damages

3.3.1 Sales Comparison Approach

If the *takings plus damages* approach is taken, then sales of similar water rights need to be developed for comparison to the subject. In this approach, it is critical that the potential new use of the subject water rights is similar to the optimum use for the water rights in the sales. Probably the most frequent cause of over-estimation of water rights value is a violation of this rule. Using sales of water rights to urban entities as comparables for estimating the value of a water right that would not be purchased by any urban entity for the foreseeable future is clearly inappropriate. Such comparables serve, at best, to set the upper limit on what the subject water right may be worth.

Water rights that probably are of no interest to urban buyers include situations in which the amount of water is too small to justify the expense of taking the transfer through the approval process, and situations where there is no existing physical means for taking delivery of the water. Infrastructure installation or modification is an extremely expensive undertaking that would only be considered by a very motivated buyer and involve a great deal of water.

If urban entities are going to be presented as potential buyers of a water right being appraised, then executives within those entities should be interviewed as part of the research associated with the appraisal to identify their current and long-term needs as well as the other options they are considering.

Since sales to urban entities tend to set the upper limit on value and also gain the most media attention, water right holders may come to believe that their water rights have the same value even when their water right is quite different from the one acquired by the urban buyer. Dramatic differences may exist in location, legal status, and volume, or any combination thereof. Consequently, one of the appraiser’s tasks may be expectation management in dealing with the water right holder.

Market Transactions

All of the transactions below are water rights and are suitable for estimating the value of the subject as a partial property interest in real estate.

¹ The Appraisal of Rural Property, Second Edition (the American Society of Farm Managers and Rural Appraisers, and the Appraisal Institute, 2000).

TABLE 3-4
Example of Information Collected on Comparable Sales for Partial Property Interest

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$800,000	\$80,000	\$15,000,000
Property rights	Surface water right	Surface water right	Surface water right	Surface water right
Financing terms	Cash basis	Cash to seller	Cash to seller	Cash to seller
Conditions of sale	Per market value definition	Arms length	Arms length	Arms length
Sale date	State effective date of valuation	Close of escrow date	Close of escrow date	Close of escrow Date
Physical water				
Diversion point	Stream X	Stream Y	Stream Z	Sacramento River
Water diverted	1,000 acre-feet	1,500 acre-feet	300 acre-feet	15,000 acre-feet
Consumptive use (ETAW)	625 acre-feet	1,000 acre-feet	200 acre-feet	10,000 acre-feet
Quality	Good	Good	Good	Good
Delivery reliability (hydrology)	Excellent	Excellent	Reduced summer flows	Excellent
Legal				
Seniority	1924 license	Pre-1914	Pre-1914	1928 license
Delivery reliability	Very Good	Excellent	Excellent	Very Good
Season of use	April thru Sept	Year around	Year around	April thru Sept
History of use	Irrigation	Irrigation	Irrigation	Irrigation
Intended use of water	In stream	Continued irrigation	Continued irrigation	Urban
Optimum use of water	Agricultural	Agricultural	Agricultural	Urban
Other				

Adjustment Grid

TABLE 3-5
Example of Adjustment to Comparable Sales for Partial Property Interest

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$800,000	\$80,000	\$15,000,000
Property rights	Partial interest in real estate	Similar	Similar	Similar
Adjustment		=	=	=
Adjusted price		\$800,000	\$80,000	\$15,000,000

TABLE 3-5
Example of Adjustment to Comparable Sales for Partial Property Interest

Factors	Subject	Sale 1	Sale 2	Sale 3
Financing terms	Cash basis	Cash to seller	Cash to seller	Cash to seller
Adjustment		=	=	=
Adjusted price		\$800,000	\$80,000	\$15,000,000
Conditions of sale	Per market value definition	Arms length	Arms length	Arms length
Adjustment		=	=	=
Adjusted price		\$800,000	\$80,000	\$15,000,000
Market conditions	Current	Similar	Similar	Similar
Adjustment		=	=	=
Adjusted price		\$800,000	\$80,000	\$15,000,000
Physical water				
Volume	625 acre-feet	1,000 acre-feet	200 acre-feet	10,000 acre-feet
Adjustment		=	=	-
Quality	Good	Good	Good	Good
Adjustment		=	=	=
Delivery reliability (hydrology)	Excellent	Excellent	Reduced summer flows	Excellent
Adjustment		=	+	=
Legal				
Seniority	1924 license	Slightly superior	Slightly superior	Slightly inferior
Adjustment		-	-	+
Delivery reliability	Very good	Excellent	Excellent	Very good
Adjustment		=	=	=
Season of use	April thru Sept	Year around	Year around	April thru Sept
Adjustment		-	-	=
Optimum use of water	Agricultural	Agricultural	Agricultural	Urban
Adjustment		=	=	-
Total Quantitative Adjustments		0	0	0
Adjusted Price		\$800,000	\$80,000	\$15,000,000
Adjusted Price per Acre-foot		\$800	\$400	\$1,500
Total Qualitative Comparison		Similar	Very inferior	Very superior

Each sale is of an appropriative surface water right, which is a partial interest in real estate. Sales 1 and 2 are pre-1914 rights. The subject and Sale 3 have relatively senior licenses to divert. Very senior licenses and pre-1914 rights where the hydrology generally supports full delivery to the senior water right holders are very similar.

Sales 1 and 2 may have been purchased by another agricultural operator who needed more water for irrigation and was downstream from the seller. Neither of these would have been of interest to an urban buyer because of the small amount of water involved and the location.

Sale 2 has reduced summer flows due to hydrology.

Care should be exercised to not adjust for legal "seniority" and legal "delivery reliability" for the same reason, otherwise there is double adjusting. For this set of comparables legal "delivery reliability" could be eliminated as an adjustment category. This is more significant when contractual entitlements are being included. In that case there is both the seniority of the master water right and delivery reliability for reasons other than seniority involved.

Urban buyers may be more interested in a year around season of use as opposed to a restricted window to allow them greater flexibility in coordination of their various water resources. For all buyers, the warmest time of the year is of greatest interest since this is when the most consumption of water takes place.

Sale 3 had an urban entity as the buyer and the quantity of water was significantly greater than the subject. When adjusting for quantity of water and for optimum use, make sure to avoid double adjusting for a single reason. Typically, the greater the amount of an item, the lower is the unit value. However, urban entities will have a hurdle amount above which they are interested and below which they are not. Whether a single adjustment or two adjustments are made, make sure that the net effect is appropriate. If there were an agricultural buyer for Sale 3, possibly the adjustment for volume would be positive, i.e., the per unit value would be lower because of a greater quantity.

Since Sale 3's water has a different optimum use than the subject, its adjusted price only serves to set the upper end of the range for the subject and should not be given significant weight in the reconciliation.

Sale 1 is obviously most like the subject, with Sale 2 being inferior. Reconciliation to \$800 per acre-foot would be appropriate for the subject.

As a check on reasonableness, the general values of irrigated and non-irrigated lands in the area of the subject should be researched along with the ETAW that is typical. If the ETAW is 2 acre-feet per acre, then there should be approximately a \$1,600 (2 acre-feet x \$800 per acre-foot) value differential between irrigated and non-irrigated land in the area.

Since this is a *takings plus damages* valuation approach, consideration must be given to any negative impact on the value of the remaining bundle of property rights that the water rights are being separated from. Any *damages* would be in addition to the value impact of converting irrigated land to non-irrigated land. Any resulting damages should be added to the previous conclusion regarding the water right value in reaching a final value conclusion.

3.3.2 Cost Approach

The role of the cost approach in any water right valuation is to indicate what water would cost to obtain from a different source than the one being valued (i.e. replacement cost). If it is a surface water right being valued, then generally the cost approach would focus on the cost of a groundwater replacement, if that option exists.

Other indicators may be obtained from what private and public entities are spending to either conserve water or develop alternate sources. Information about federal and state expenditures in these efforts have to be used with caution simply because they may have mandates that are unrelated to the market value of the water their efforts yield.

In this particular hypothetical example, no obvious alternate source of water exists; therefore, the cost approach is not appropriate.

If no reasonable and feasible alternative water source option exists, then the cost approach need not be pursued since its conclusions will be meaningless. The cost approach will have credibility if there is evidence in the market of private parties pursuing the plan that is the basis of the cost approach. Speculative or unproven water development plans should be avoided.

3.3.3 Income Approach

In a *takings plus damages* analysis, the income approach can be used if there is market data available for water right leases. Recent long-term leases would be the best, but short-term leases can be used as well. Once again, an adjustment grid should be presented similar to the previous one that compared sales of water rights. Obviously, the lessees of the comparable water rights should be similar to the probable lessees of the subject water rights. If an urban lessee would not be interested in the subject water rights, then any comparables that were leased to urban entities should be avoided or recognized as setting the upper end of the range of value. The hydrologic conditions that existed for short-term leases must also be compared to the current ones. Water is worth more in dry years than in wet ones.

Another item of consideration is, "How did the seller free up the water?" If the water was released from storage, there may be no significant consequences associated with the transfer. Transferring surface water and replacing it with groundwater would have pumping costs, including pumping equipment depreciation, incurred by the seller. If productive land was fallowed, the seller's foregone income (cost) could be much more significant. In a competitive market, the seller who can deliver the water with the least consequential cost is in a position to offer the water at the lowest price.

Again, a capitalization rate is needed to convert income into a net present value. If at all possible, this rate is best extracted from the market in which the subject exists. At this point in time, capitalization rates derived from sales of water rights that were purchased as investments are a scarce commodity. The comments regarding investment capitalization rates presented in Sections 2.6 and 3.1.3 of these Guidelines should be kept in mind.

3.4 Groundwater Rights

If groundwater rights are being valued, and these rights have historically been used for irrigation purposes, then the *before and after* approach is preferred. In the *after* condition there would be no potential to continue to irrigate the land. Obviously, you can not sell your groundwater rights and continue to use them to irrigate.

Theoretically, one could also perform a *takings plus damages* analysis, but unless the subject is in an adjudicated groundwater basin, the number of groundwater right sales currently available is small indeed. Sales of surface water rights, though not ideal, can be used as comparables provided appropriate adjustments are made.

In either case, the same techniques presented for appropriative surface water rights valuation would be employed for groundwater rights.

An adjustment category for groundwater rights should be depth to groundwater which impacts the cost of the water, both from a well drilling standpoint and from a pumping cost perspective. Existing wells, capacity, and condition should be taken into consideration in the adjustment process.

3.5 Riparian Rights

A *before and after* approach could be taken in developing an estimate of the contributing value of a riparian water right to the real estate it is associated with. The value conclusion would be an appropriate indicator of the value of a conservation easement on the property that denied continued water use. However, since a riparian right can not be “transferred” to another property, the value conclusion would not be an indicator of the value of the right on a stand-alone basis. Any downstream appropriator could legally extract the additional water that was allowed to remain in the stream. The value conclusion would be an indication of the value of the riparian right to the seller.

3.6 Contractual Entitlements

As previously discussed, contractual entitlements are not water rights. They pertain to the distribution of water extracted under a water right. Therefore, contractual entitlements are not a property interest but rather an intangible asset. Consequently, USPAP Standards 9 and 10 apply to the appraisal and report (see pages 70 through 79 of USPAP 2006).

The appraiser should be familiar with these USPAP requirements prior to proceeding with the appraisal. These Standards recognize the uniqueness of intangible assets and that valuation techniques may not necessarily conform to those for real estate appraisals. However, when contractual entitlements to water are being valued, similar techniques should be employed to those already discussed for valuing water rights.

The SWP can be used as an example in understanding the structure of contractual entitlements with implications as to where comparable sales should come from. The DWR has water rights resulting from a license to divert water, issued by the SWRCB, from the south Delta. The SWP contractors (irrigation districts and water districts) have contracts

with DWR for water deliveries up to an amount specified in the individual contracts, if the water is available. If there is more than the specified amount available, then DWR may make such water available for purchase by the contractors.

The contractors have a financial obligation to pay both fixed and variable costs of the SWP. The fixed costs are independent of how much water the contractors receive, while the variable costs (primarily for power) tend to correlate to the amount of water received. There was one year when the contractors received no water, but still had to pay the fixed costs.

The districts, in turn, have contracts with individual farmers within their service area for delivery of water received from the SWP. Therefore, the districts have contractual entitlements and the farmers have contractual entitlements, but the farmers are not direct contractors with the SWP.

A similar structure exists with the CVP and some of the large irrigation districts that are not part of either one of these systems. One of the important points to keep in mind is that the end user of the water has a contractual entitlement, not a water right. Generally, the contract involved imposes limitations on what the farmer can do with the entitlement. Selling to an entity that is not another contractor within the district is rarely a possibility.

Irrigation districts are highly protective of their water rights and are generally opposed to any action taken by individuals within the district that could impact other district contractors without district approval. There was at least one occasion several years ago where a farmer with contractual entitlements tried to sell the entitlement to a different water agency without the approval of the irrigation district where his land was located and with whom he had a contract for water delivery. After a protracted legal and public relations battle, the proposed sale fell through. As a result, it became clear that any sales of contractual entitlement would take place from district to district, not from farmer to district. Therefore, any negotiations for purchases of contractual entitlements being considered must involve the executive officers of the district if they are to have any chance of success. If the district agrees to such a sale, then it will likely come up with its own method of selecting which landowners are to participate in the sale. Land retirement due to drainage issues may be an ongoing situation where land and entitlements are acquired by federal agencies.

3.6.1 Contractual Entitlements – “Before and After” Analysis

Subject Property

Contractual entitlement to CVP water. The property receiving the water is located in an irrigation district in the San Joaquin Valley, south of the Delta. The district has a contract with Reclamation for water delivery, and the landowner has a contract with the district. Reclamation’s water rights date from 1961 and the point of diversion is at the pumps in the south Delta. The water is extracted from the Delta and pumped into the Delta-Mendota Canal which transports the water to the district’s delivery point.

The property owner’s contractual entitlement is for 1,800 acre-feet of water per year and the property owner has historically taken delivery of all of the available water. Prior to the drought in the late 1980s, it was rare to not receive delivery of 100 percent of the complete

entitlement. In recent years, however, the delivery amount has been quite variable. General expectations are that the average delivery amount will be 65 percent of entitlement amount for all CVP contractors.

The water has been used to irrigate 450 acres of the 500 total acres in the ownership. The remaining 50 acres have never been irrigated and this land is considered “wasteland” with no significant agricultural production potential.

There are no structures on the property. The terrain is mildly sloping and irrigation water is delivered through unlined ditches. Depth to groundwater is believed to be 600 feet, but no wells have ever been drilled on-site. The soil is considered good with good production of field crops having been experienced in the past.

A federal agency approached the district to see if a contractual entitlement may be available for purchase. The district inquired of its members if anyone was interested in selling. This particular landowner expressed an interest if the price was right. Other district members will only agree to the sale if there is a restriction on replacement irrigation with groundwater not being an option. Therefore, the land would have to be fallowed. The owner would convert the land to winter grazing.

Initial Analysis

An investigation indicates that both the district’s and the landowner’s contracts for water delivery are valid. Reclamation would agree to transfer delivery to a federal agency for wildlife habitat enhancement purposes. The total amount of entitlement that is available for transfer is 1,800 acre-feet. Note that in the case of entitlements, ETAW is not relevant, i.e., the total entitlement amount can be transferred regardless of how much has either been delivered or consumed on-site in the past. This is true because no other water right holder can be damaged as a result of the transfer.

Initial Conclusions

Since the district has no problem with the sale from a willing seller and the water could be used for in-stream purposes at a desired location, the federal agency considers the transaction worth pursuing and orders an appraisal.

Methodology and Desired Market Data

The contributing value of the contractual entitlement can be estimated through a *before and after* analysis. Consequently, land sales where the water source is CVP entitlements, as near as possible to the subject are the preferred comparables for the *before* approach. The *after* approach needs non-irrigated land sales with a similar highest and best use as the subject lands without entitlements.

Comments regarding the roles of the cost approach and the income approach are similar to those for the appraisal of appropriative water rights presented in Section 3.3.2.

The following pages present hypothetical contractual entitlement sales with land and the adjustment process for valuing a contractual entitlement by the sales comparison approach.

Market Transactions

All of the transactions below involve contractual entitlements and are suitable for estimating the value of a contractual entitlement. Most permanent sales of contractual entitlements include the land historically associated with the water delivered under the entitlement.

TABLE 3-6
Example of Information Collected on Comparable Sales for Contractual Entitlements

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$2,500,000	\$1,500,000	\$1,350,000
Property rights	Fee simple plus contractual entitlement	Fee simple plus contractual entitlement	Fee simple plus contractual entitlement	Fee simple plus contractual entitlement
Financing terms	Cash basis	Cash to seller	Cash to seller	Cash to seller
Conditions of sale	Per Market Value definition	Arms length	Arms length	Arms length
Sale date	State effective date of valuation	Close of escrow date	Close of escrow date	Close of escrow Date
Physical land				
Location	CVP irrigation district south of Delta	CVP irrigation district south of Delta	CVP irrigation district south of Delta	CVP irrigation district south of Delta
Size (acres)	500	1,000	800	500
Soil quality	Good	Average – poor drainage	Average – poor drainage	Good
Area irrigated	450 acres	800 acres	750 acres	490 acres
Crops grown	Field crops	Field crops	Field crops	Field crops
Terrain	Nearly level	Nearly level	Nearly level	Nearly level
Development Potential	None	None	None	None
Improvements	Irrigation ditches and roads	Irrigation ditches, roads, house, and outbuildings	Irrigation ditches and roads	Irrigation ditches, roads, house, and outbuildings
Physical water				
Applied water	1,800 acre-feet	2,400 acre-feet	2,250 acre-feet	1,960 acre-feet
Quality	Average	Average	Average	Average
Delivery reliability (hydrology)	Average	Average	Average	Average
Other water sources	None	None	None	Wells

TABLE 3-6
Example of Information Collected on Comparable Sales for Contractual Entitlements

Factors	Subject	Sale 1	Sale 2	Sale 3
Legal				
Entitlement amount	1,800 acre-feet	3,000 acre-feet	2,250 acre-feet	1,960 acre-feet
Entitlement amount per irrig. acre	4.0 acre-feet	3.75 acre-feet	3.13 acre-feet	4.0 acre-feet
Delivery reliability	65 percent	65 percent	65 percent	65 percent
Season of use	Year around	Year around	Year around	Year around
History of use	Irrigation	Irrigation	Irrigation	Irrigation
Intended use of water	In stream	Transfer to urban	Land retirement with district to retain entitlement	Continued irrigation
Optimum use of water	Agricultural with possible future urban	Urban	Agricultural with possible future urban	Agricultural with possible future urban
Other				

All of the sales involved privately owned land plus contractual entitlements resulting from contracts for water delivery with irrigation districts. The irrigation districts are all CVP contractors. The sales are all recent with no significant changes in the market since they closed.

All of the properties have relatively remote locations with no development potential. Non-irrigated land in the area tends to be of little economic use with some winter grazing potential. There is generally a good reason why such land has not been converted to irrigated land. It may have poor soil quality, a shallow perched water table, or any number of other problems. The subject has approximately 50 acres of such land.

Sales 1 and 2 have shallow perched water tables and salts present in the soils. This requires careful management of applied water to keep the water table and associated salts below the root zone. The non-irrigated portions of these properties have no agricultural potential due to high salt concentrations at the surface.

The subject and Sale 3 have deep soils and no drainage problems. Sale 3 has a deep well present that could irrigate 200 acres if needed. The depth to groundwater is approximately 600 feet, making this water significantly more expensive than CVP water, but could be used in an emergency situation to save crops. Growing crops with only well water would not be financially feasible.

Sales 1 and 3 have some structures present that contribute value for agricultural purposes. The houses are typical caretaker residences.

Sale 1 was purchased by an urban entity that is also a CVP contractor. The buyer has to pay the municipal and industrial CVP rate for all the water acquired plus all costs of transfer approval. The offer from the buyer was unsolicited.

Sale 2 was purchased by a federal agency as part of the retirement program associated with dealing with drainage impacted lands. After the purchase is completed, the federal agency and the irrigation district will work out terms by which the contractual entitlement stays with the district for use elsewhere, and the federal agency will own the land.

Sale 3 was purchased for continued agricultural use.

The delivery reliability of the CVP water is considered by the buyers and sellers to be approximately 65 percent. Even though this is through a combination of all restrictions, it is considered to be primarily legal. Prior to the drought in the late 1980s and early 1990s, it was typical for 100 percent deliveries to take place regardless of precipitation. However, because of water quality concerns, primarily due to endangered species needs, it is the legal restrictions that impact delivery amounts.

There are special requirements that must be met when using sales to a public agency as comparable sales in an appraisal. Section D-9 of the UAS, pages 88 to 93, should be reviewed and adhered to before using sales to a public agency. The assumption is made in this case that the price paid for this property reflected its value in the private market.

The requirements of UAS in Section D-9 are summarized as follows:

- Sales to the government should be immediately viewed as *suspect*.
- Sales to the government should not be used as comparable sales unless there is such a paucity of private market data as to make a reliable estimate of market value impossible without the use of government purchases.
- The appraiser must undertake whatever research is required to ascertain whether or not there were non-market influences on the sale price. Review of appraisals and legislation, acquiring agency documents, and confirmation with the buyer and seller are all important.
- Factors such as interest acquired, highest and best use, and any assumptions or conditions that impacted the appraised value and/or sale price must be discovered.

In essence, the appraiser must become completely knowledgeable about the transaction and the political environment in which it took place before incorporating it into an analysis where the market value of another property is being estimated. A complete reading of the referenced section of the UAS is mandatory before utilizing sales to government entities as comparables.

Adjustment Grid

TABLE 3-7
Example of Adjustments to Comparable Sales Information for Contractual Entitlements

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$2,500,000	\$1,500,000	\$1,350,000
Property rights	Fee simple plus contractual entitlement	Similar	Similar	Similar
Adjustment		=	=	=
Adjusted price		\$2,500,000	\$1,500,000	\$1,350,000
Financing terms	Cash basis	Cash to seller	Cash to seller	Cash to seller
Adjustment		=	=	=
Adjusted price		\$2,500,000	\$1,500,000	\$1,350,000
Conditions of sale	Per Market Value definition	Arms length	Arms length	Arms length
Adjustment		=	=	=
Adjusted price		\$2,500,000	\$1,500,000	\$1,350,000
Market conditions	Current	Similar	Similar	Similar
Adjustment		=	=	=
Adjusted price		\$2,500,000	\$1,500,000	\$1,350,000
Land				
Location	Specific CVP district	Similar	Similar	Similar
Adjustment		=	=	=
Size (acres)	500	1,000	800	500
Adjustment		=	=	=
Soil quality	Good	Inferior	Inferior	Similar
Adjustment		+	+	=
Area Irrigated	90%	80%	94%	98%
Adjustment		+	=	-
Crops grown	Field crops	Field crops	Field crops	Field crops
Adjustment		=	=	=
Terrain	Nearly level	Similar	Similar	Similar
Adjustment		=	=	=
Development Potential	None	Similar	Similar	Similar
Adjustment		=	=	=

TABLE 3-7
Example of Adjustments to Comparable Sales Information for Contractual Entitlements

Factors	Subject	Sale 1	Sale 2	Sale 3
Improvements	Irrigation ditches and roads	Similar plus house and outbuildings	Similar	Similar plus house and outbuildings
Adjustment		- \$50,000	=	- \$75,000
Physical water				
Quality	Average	Similar	Similar	Similar
Adjustment		=	=	=
Delivery reliability (hydrology)	Average	Similar	Similar	Similar
Adjustment		=	=	=
Other water sources	None	Similar	Similar	Well
Adjustment		=	=	-
Legal				
Entitlement amount	1,800 acre-feet	3,000 acre-feet	2,500 acre-feet	1,960 acre-feet
Entitlement amount per irrigated acre	4.0 acre-feet	3.75 acre-feet	3.13 acre-feet	4.0 acre-feet
Adjustment		+	+	=
Delivery reliability	65%	Similar	Similar	Similar
Adjustment		=	=	=
Season of use	Year around	Similar	Similar	Similar
Adjustment		=	=	=
History of use	Irrigation	Similar	Similar	Similar
Intended use	In stream	Transfer to urban	Land retirement with district to retain entitlement	Continued irrigation
Optimum use of water	Ag with possible future urban	Urban, superior	Similar	Similar
Adjustment		-	=	=
Total Quantitative Adjustments		- \$50,000	0	- \$75,000
Adjusted Price		\$2,450,000	\$1,500,000	\$1,275,000
Adjusted Price per Acre		\$2,450	\$1,875	\$2,550
Total Qualitative Comparison		Superior	Inferior	Superior

Comments

As an agricultural property, Sale 1 appears to be inferior to the subject due to perched water table and a lower percentage of total property irrigated. The buyer was an urban entity that made an unsolicited offer to purchase the property, with the knowledge of the district's board of directors. The buyer was also a CVP contractor interested in acquiring the entitlement. In all probability, the offer was intentionally above the price that the seller could have received from an agricultural purchaser – something that should be confirmed with the buyer. Consequently, the premium paid as an enticement to sell makes this property superior to the subject. Of course, if one or more urban agencies are actively pursuing additional acquisitions, and the nature of the subject is such that it would be attractive for purchase by those urban buyers, then the same premium may be applicable to the subject. This is a highest and best use issue.

Sale 2 was purchased by a public agency as part of a land retirement program for what appears to have been market price for agricultural land in the area. How the water and land are intended to be separated after the sale does not matter as long as the sale price was not impacted. The property is inferior due to the perched water table and a lower per acre contractual entitlement amount.

Sale 3 is superior due to a greater percentage of total area irrigated and the presence of a well which provides a measure of security to the property owner.

A reconciliation somewhere around \$2,000 per acre for the subject appears to be appropriate. The total value for the 500 acres would then be \$1,000,000 in the *before* analysis.

For illustration purposes, the assumption will be made that the *after* value is \$200 per acre for the subject. The total value would then be \$100,000.

The value differential is \$1,000,000 minus \$100,000 which equals \$900,000. Dividing this figure by the contractual entitlement amount of 1,800 acre-feet yields a value per acre-foot of \$500. For comparison purposes, the buyer of Sale 1 paid \$2,500,000 to acquire 3,000 acre-feet of entitlement. This is a price per acre-foot of \$833. Any income from resale of the land would obviously reduce the price per acre-foot paid.

Whenever comparing entitlement amounts to actual water yield from a water right, the entitlement should be adjusted for expected yield. An entitlement for 1,000 acre-feet with an expected delivery of 65 percent is equivalent to 650 acre-feet of actual water. The entitlement will undoubtedly yield less during dry years, making it even more inferior to a senior water right that also has good hydrology.

If a contractual entitlement sold for \$1,000 per acre-foot with a 65 percent yield, then the price per acre-foot of expected water would be \$1,000 divided by 0.65 = \$1,538. If the buyer assumed additional project costs when acquiring the entitlement, those must be factored in as well.

3.6.2 Contractual Entitlements – Taking Plus Damages

It is rare for contractual entitlements to sell apart from the land that they are associated with. This is true simply because most of the agricultural entitlements are used on lands that are desert in their natural state. There is rarely a significant alternate economic use.

There have been entire CVP and SWP districts that have been sold. The buyer in these sales was another district within the same system. The land and entitlements were sold together. The intent of the buyer, almost always an urban agency, was to eventually shift water use to a new location and to idle the land.

Some of the higher profile entitlement sales that did not involve sale of the land as well resulted from the Monterey Agreement. The SWP contractors got together to work out a variety of issues. One of the results of their negotiations was that the Kern County Water Agencies would make 130,000 acre-feet of SWP entitlement available for purchase by SWP urban contractors. The historical use of the entitlements had been for irrigation. Though there were attempts to sell some of this entitlement to non-SWP contractors, no such sales were ever allowed. Reportedly, DWR is not interested in establishing new SWP contractors, which is what such sales, in essence, would do.

The buyers of SWP entitlements absorb all of the fixed costs that were associated with the seller's entitlements. In this way, other SWP are not damaged financially by having to absorb more of these costs. In addition the buyer has to pay the variable costs associated with delivery to the new location.

Such sales can be analyzed to develop an indicator of how much the buyer paid for the water anticipated from these entitlements. There were some buyers who had to also expand existing infrastructure in order to receive delivery of the water. When working with these sales, one should always keep in mind that the buyer and seller pools were limited to SWP contractors. The prices were in the range of \$1,000 to \$1,600 per acre-foot of entitlement, not including the fixed costs assumed by the buyer. The most recent, and I believe last, sale in this category sold for a reported price of \$3,000 per acre-foot of entitlement.

In those situations where the buyer had to spend additional money to actually take delivery of the water, it is important to keep the location of the subject in mind. A San Francisco Bay Area buyer may purchase an SWP entitlement in the Central Valley, pay for the entitlement, and assume the associated fixed costs. The buyer may then spend several million dollars of infrastructure expansion to take delivery of the water at the new point of diversion. The total amount paid by the buyer for purchase and infrastructure is an indicator of what water is worth at the buyer's location, not at the seller's. The indicator of value at the seller's location does not include infrastructure expansion costs incurred by the buyer. Therefore, if the entitlement being valued is in the Bay Area, include infrastructure costs; if it is in the Central Valley, do not include those costs in the adjustment process.

CVP entitlement sales have lower fixed costs, but an urban buyer has to pay the municipal and industrial rate for delivered water charged by Reclamation.

The suitability of such entitlement sales as comparables is highly questionable when appraising a water right that is relatively small by comparison to the thousands of acre feet involved in these transactions. Their use is of even greater concern when there is no potential that an urban buyer would be interested in acquiring the water right being appraised.

If one is appraising contractual entitlements on a *taking plus damages* basis, then the same process would be gone through as the example just completed; however, all references to land would be eliminated. Conclusions would be for contractual entitlement value per acre-foot, not value per acre of land. A blank adjustment grid is presented on the following page that displays the adjustment categories appropriate for appraising contractual entitlements on a stand-alone basis.

The grid is for the sales comparison approach. If the cost and income approaches are pursued, similar comments pertain to contractual entitlements as those presented for appraising water rights.

Adjustment Grid for Contractual Entitlement Valuation

TABLE 3-8
Example of Adjustments to Comparable Sales Information for Stand Alone Contractual Entitlements

Factors	Subject	Sale 1	Sale 2	Sale 3
Sale price	n/a	\$	\$	\$
Intangible Asset	Contractual entitlement			
Adjustment				
Adjusted price		\$	\$	\$
Financing terms	Cash basis			
Adjustment				
Adjusted price		\$	\$	\$
Conditions of sale	Per market value definition			
Adjustment				
Adjusted price		\$	\$	\$
Market conditions	Current			
Adjustment				
Adjusted price		\$	\$	\$
Physical water				
Location				
Adjustment				
Quality				
Adjustment				
Delivery reliability (hydrology)				
Adjustment				
Legal				
Entitlement amount				
Adjustment				

TABLE 3-8

Example of Adjustments to Comparable Sales Information for Stand Alone Contractual Entitlements

Factors	Subject	Sale 1	Sale 2	Sale 3
Delivery reliability				
Adjustment				
Season of use				
Adjustment				
History of use				
Intended use				
Optimum use of water				
Adjustment				
Total Quantitative Adjustments				
Adjusted Price		\$	\$	\$
Adjusted Price per Acre-foot		\$	\$	\$
Total Qualitative Comparison				

ADDENDUM 1

Definitions

Definitions

Appraisal-Related Definitions

Appraisal. (noun) The act or process of developing an opinion of value; an opinion of value. (adjective) Of or pertaining to appraising and related functions such as appraisal practice or appraisal services.¹

Appraiser. One who is expected to perform valuation services competently and in a manner that is independent, impartial, and objective.²

Appraiser's Peers. Other appraisers who have expertise and competency in a similar type of assignment.³

Appurtenance. Something that has been added or appended to a property and has since become an inherent part of the property; usually passes with the property when title is transferred.⁴

Assumption. That which is taken to be true.⁵

Business Enterprise Value (BEV). A term applied to the concept of the value contribution of the total intangible assets of a continuing business enterprise such as marketing and management skill, an assembled work force, working capital, trade names, franchises, patents, trademarks, contracts, leases, and operating agreements. *See also* capitalized economic profit; going-concern value.⁶

Cash Equivalence. A price expressed in terms of cash, as distinguished from a price expressed totally or partly in terms of the face amounts of notes or other securities that cannot be sold at their face amounts.⁷

Extraordinary Assumption. An assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinions or conclusions.⁸

Farm Budget. The plan for the financial organization and operation of a farm for a specified period of time; includes a detailed statement of anticipated gross income, expenses, and net income.⁹

¹ The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2006 ed., (Washington, DC, 2006) p. 1

² Ibid

³ Ibid, p. 2

⁴ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 17.

⁵ The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2006 ed., (Washington, DC, 2006) p. 2.

⁶ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 37.

⁷ Ibid, p. 43.

⁸ The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2006 ed., (Washington, DC, 2006) p. 3

⁹ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 109.

Fee Simple Estate. Absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat.¹⁰

Highest & Best Use.

Dictionary of Real Estate Appraisal

The reasonably probable and legal use of vacant land or an improved property, which is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity.¹¹

Uniform Appraisal Standards (2000)

Before it can be concluded that any use for the property is its highest and best use, that use must be physically possible, legally permissible, financially feasible, and must result in the highest value. Each of these four criteria must be addressed in the appraisal report.¹²

The highest and most profitable use for which the property is adaptable and needed or likely to be needed in the reasonably near future. [Olson v. United States, 292 U.S. 246, 255 (1934). See also Boom Company v. Patterson, 98 U.S. 403, 408 (1878).]¹³

...if the property is clearly adaptable to a use other than the existing use, its marketable potential for such use should be considered to the extent that potential affects market value. [Olson v. United States, 292 U.S. 246, 255 (1934).] But, market value cannot be predicated upon potential uses that are speculative and conjectural; ...¹⁴

Hypothetical Condition. That which is contrary to what exists but is supposed for the purpose of analysis.¹⁵

Improvements. Buildings or other relatively permanent structures or developments located on, or attached to, land.¹⁶

¹⁰ Ibid, p. 113.

¹¹ Ibid, p. 135.

¹² *Uniform Appraisal Standards for Federal Land Acquisitions*, Interagency Land Acquisition Conference, Washington, D.C. 2000, Appraisal Institute (in cooperation with the U.S. Department of Justice), Chicago, 2000, p. 17.

¹³ Ibid, p. 34.

¹⁴ Ibid

¹⁵ The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2006 ed., (Washington, DC, 2006) p. 3.

¹⁶ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 142.

Intangible Property (Intangible Assets). Nonphysical assets including, but not limited to, franchises, trademarks, patents, copyrights, goodwill, equities, securities, and contracts, as distinguished from physical assets such as facilities and equipment.¹⁷

Intangible Value. A value that cannot be imputed to any part of the physical property, e.g., the excess value attributable to a favorable lease or mortgage, the value attributable to goodwill.¹⁸

Larger Parcel. The larger parcel, for purposes of these Standards [USFLA], is defined as that tract, or those tracts, of land which possess a unity of ownership and have the same, or an integrated, highest and best use. Elements of consideration by the appraiser in making a determination in this regard are contiguity, or proximity, as it bears on the highest and best use of the property, unity of ownership, and unity of highest and best use.¹⁹

Market Value. Market value is the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would have sold on the effective date of the appraisal, after a reasonable exposure time on the open competitive market, from a willing and reasonably knowledgeable seller to a willing and reasonably knowledgeable buyer, with neither acting under any compulsion to buy or sell, giving due consideration to all available economic uses of the property at the time of the appraisal.²⁰

Partial Interest. Divided or undivided rights in real estate that represent less than the whole.²¹

Personal Property. Identifiable tangible objects that are considered by the general public as being “personal,” for example, furnishings, artwork, antiques, gems and jewelry, collectibles, machinery and equipment; all tangible property that is not classified as real estate.²²

Personal Property. Consists of every kind of property that is not real property; movable without damage to itself or the real estate; subdivided into tangible and intangible.²³

Real Estate. An identified parcel or tract of land, including improvements, if any.²⁴

Real Property. The interests, benefits, and rights inherent in the ownership of real estate.²⁵

¹⁷ The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2006 ed., (Washington, DC, 2006) p. 3.

¹⁸ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 148.

¹⁹ *Uniform Appraisal Standards for Federal Land Acquisitions*, Interagency Land Acquisition Conference, Washington, D.C. 2000, Appraisal Institute (in cooperation with the U.S. Department of Justice), Chicago, 2000, p. 17, Footnote 47.

²⁰ *Ibid*, p. 30.

²¹ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 209.

²² The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2006 ed., (Washington, DC, 2006) p. 4.

²³ Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 4th ed., (Chicago: Appraisal Institute, 2002), p. 212.

²⁴ The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2005 ed., (Washington, DC, 2005) p. 4.

²⁵ *Ibid*

Usufruct. The right to use and enjoy the fruits or profits of something belonging to another.²⁶

(Note: Water rights are frequently referred to as *usufructuary* – a right to use the water, not a right to own it.)

Value in Use. The value a specific property has to a specific person or specific firm as opposed to the value to persons or the market in general. Special-purpose properties such as churches, schools, and public buildings, which are seldom bought and sold in the open market, can be valued on the basis of value in use. The value in use to a specific person may include a sentimental value component. The value in use to a specific firm may be the value of the plant as part of an integrated multiplant operation.²⁷

²⁶ Appraisal Institute, *The Dictionary of Real Estate Appraisal, 4th ed.*, (Chicago: Appraisal Institute, 2002), p. 303

²⁷ Ibid, p. 306.

Water Terms and Definitions

(Source: Unless otherwise noted, California State Water Resources Control Board Web Site <http://www.swrcb.ca.gov/waterwords.html> and California Department of Water Resource Bulletin 160-98 – California Water Plan Update)

Term	Definition
Acre Foot (af)	The amount of water required to cover an acre that is one foot deep. A family of five uses about one acre foot of water per year (325,861 gallons).
Adjudication	A determination of water rights for an entire stream or groundwater basin. Adjudication sets priorities of rights during shortages.
Aquifer	Any underground formation that stores, transmits, and yields water to wells and springs.
Applied Water Demand	The quantity of water delivered to the intake to a city water system or factory, the farm headgate, or other point of measurement, or a marsh or wetland, either directly or by incidental drainage flows. For instream use, it is the portion of the stream flow dedicated to instream use or reserved under the federal or State legislation.
Beneficial use of water	Water used for the following purposes: domestic (homes, human consumption, etc.), irrigation (crops, lawns), power (hydroelectric), municipal (water supply of a city or town), mining (hydraulic, drilling), industrial (commerce, trade, industry), fish and wildlife preservation, aquaculture (raising fish, etc. for commercial purposes), recreational (boating, swimming), stockwatering (for commercial livestock), water quality, frost protection (misting or spraying crops to prevent frost damage), heat control (water crops to prevent heat damage), groundwater recharge, agriculture, etc.
Central Valley Project (CVP)	A system of dams, reservoirs and conveyance systems operated by the U.S. Bureau of Reclamation. Begins at Shasta Dam on the Sacramento River and ends at the Kern River near Bakersfield. Water is used for agricultural irrigation, flood control, water supply, power production, fish and wildlife, recreation, etc.
Confined aquifer	A water-bearing subsurface stratum that is bounded above and below by formations of impermeable, or relatively impermeable, soil or rock.
Conjunctive use	The operation of a groundwater basin in combination with a surface water storage and conveyance system. Water is stored in the groundwater basin for later use by intentionally recharging the basin during years of above-average water supply.
Corcoran Clay	A thick, impermeable layer of clay that lies under much of the San Joaquin Valley. This clay layer separates the groundwater basin into two distinct aquifers. One region, referred to as the “unconfined” aquifer, lies above the Corcoran Clay. The other region, referred to as the “confined” aquifer, lies entirely below the Corcoran Clay. (<i>Water Supply Report 1992</i> , Kern County Water Agency, December 1993)
Cubic feet per second (cfs)	The rate of flow passing any point equal to the volume of one cubic foot of water every second. One cfs is equal to 7.48 gallons per second; 448.8 gallons per minute; 646,317 gallons per day.
Decision 1485 operating criteria	Standards for operating the CVP and SWP under Water Right Decision 1485 for the Sacramento-San Joaquin Delta and Suisun Marsh, adopted by the State Water Resources Control Board, August 1978.
Deep percolation	Percolation of (irrigation) water through the ground and beyond the lower limit of the root zone of plants into groundwater.
Dependable supply	The annual average quantity of water that can be delivered during a drought period.

Term	Definition
Environmental Protection Agency (EPA)	Federal regulatory agency responsible for protecting environmental quality throughout the nation; acts in oversight role to state agencies that carry out federal laws.
Estuary	Water at the mouth of a stream that serves as mixing zones for fresh and ocean waters during a major portion of the year. Estuarine waters generally extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters. (Basically, where a freshwater river meets the sea.)
Evapo-transpiration (ET)	The quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces.
Evapo-transpiration of applied water (ETAW)	The portion of the total evapotranspiration which is provided by irrigation and landscape watering.
Firm yield	The maximum annual supply of a water development project under drought conditions, for some specified level of demands.
Fish and Game, Department of (DF&G)	State agency responsible for protecting fish and wildlife. Programs include investigations of toxic pollution problems, enforcement of fish and game pollution control laws, and assisting State and Regional Water Boards in monitoring programs.
Groundwater	Water that occurs beneath the land surface and fills the pore spaces of the alluvium, soil, or rock formation in which it is situated.
Groundwater basin	A groundwater reservoir, defined by an overlying land surface and the underlying aquifers that contain water stored in the reservoir. In some cases, the boundaries of successively deeper aquifers may differ and make it difficult to define the limits of the basin.
Groundwater overdraft	The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions.
Groundwater recharge	The natural or intentional infiltration of surface water into the zone of saturation (that is, groundwater).
Hydrogeology	The geology of groundwater, with particular emphasis on the chemical composition and movement of the water
Instream use	Use of water within its natural watercourse as specified in an agreement, water rights permit, etc. For example, the use of water for navigation, recreation, fish and wildlife, aesthetics, and scenic enjoyment.
Irrecoverable losses	The water lost to a salt sink or water lost by evaporation or evapotranspiration from a conveyance facility or drainage canal, or in fringe areas of cultivated fields.
Land subsidence	The lowering of the natural land surface due to groundwater (or oil and gas) extraction.
License	An official document giving permission to engage in a specified activity, such as an appropriation of water.
MWD	Metropolitan Water District of Southern California.
Net water demand (net water use)	The amount of water needed in a water service area to meet all requirements. It is the sum of evapotranspiration of applied water in an area, the irrecoverable losses from the distribution system, and the outflow leaving the service area; it does not include reuse of water within a service area.
Perched groundwater	Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater.

Term	Definition
Prescriptive rights	Water use rights gained by trespass or unauthorized taking that ripen into a title —on a par with rights to land gained through adverse possession.
Pueblo rights	A water right possessed by a municipality that, as a successor of a Spanish-law pueblo, is entitled to the beneficial use of all needed, naturally occurring surface and groundwater of the original pueblo watershed.
Pump lift	The distance between the groundwater table and the overlying land surface.
Recharge basin	A surface facility constructed to infiltrate surface water into a groundwater basin.
Regional Water Quality Control Boards (RWQCB)	Nine Water Boards located throughout California that are responsible for enforcing water quality standards within their boundaries.
Riparian rights	Comes with ownership of land adjacent to a water source, groundwater rights are held by those owning land over a groundwater basin.
Safe yield	The maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect. (DWR Bulletin 118-80, <i>Groundwater Basins in California</i>)
Saturated zone	An underground zone in which all openings in and between natural geologic materials are filled with water.
Service area	The geographic area served by a water agency.
State Water Project (SWP)	A system of large dams, reservoirs, and a major aqueduct, which begins at the Oroville Dam on the Feather River and ends at Lake Perris in Southern California. Water is used for agriculture, domestic and industrial uses, flood control, hydropower and recreation. A coordinated operation agreement between the State and federal governments provides for release from the State Water Project and the Central Valley Project to maintain water quality and control salinity in the Sacramento-San Joaquin Delta.
State Water Resources Control Board (SWRCB)	The State Board responsible for protecting and preserving water quality and water rights in California.
Tailwater	Applied irrigation water that runs off the end of a field. Tailwater is not necessarily lost; it can be collected and reused on the same or adjacent fields.
Threatened Species	Under the Endangered Species Act, animal populations may be determined to be either threatened or endangered. Populations listed as threatened are less severely depleted than populations classed as endangered.
Unconfined aquifer	A groundwater bearing strata that is not constrained at its upper surface by an impervious or semi-impervious unit, such as a regional clay. (<i>Water Supply Report 1992, Kern County Water Agency, December 1993</i>)
Water Quality Control Plan	Defines beneficial water uses, establishes water quality objectives to protect those uses, identifies water quality threats, and outlines corrective measures. It is used to develop discharge limits and guide Regional Board decisions on specific cases. There is a plan for each of California's 16 major watersheds.
Water Resources, Department of (DWR)	State agency that constructs and operates the State Water Project, provides statewide water resources planning, regulates dam safety, and controls floods.
Water year	A continuous 12-month period for which hydrologic records are compiled and summarized. Different agencies may use different calendar periods for their water years. (<i>Note: In California, it usually begins on October 1 and ends September 30 of the following year.</i>)

SWP Water Definitions

Except for the definition of “surplus water,” the following definitions are taken from contracts between the State of California Department of Water Resources and the State Water Contractors.

Term	Definition
Annual entitlement	The amount of project water to be made available to a contractor during the respective year, at the delivery structures provided for such contractor under the terms of its contract with the State.
Municipal use	All those uses of water common to the municipal water supply of a city, town, or other similar population group, including uses for domestic purposes; uses for the purposes of commerce, trade, or industry; and any other use incidental thereto for any beneficial purpose.
Agricultural use	Any use of water primarily in the production of plant crops or livestock for market, including any use incidental thereto for domestic or stockwatering purposes.
12 (d) water	Delivery of Water not Delivered in Accordance With Schedule If in any year the State, as a result of causes beyond its control, is unable to deliver any portion of the Agency’s annual entitlement for such year under Table A of this contract as provided for in the delivery schedule established for that year, the Agency may elect to receive the amount of water which otherwise would have been delivered to it during such period at other times during the year or succeeding years, to the extent that such water is then available and such election is consistent with the State’s overall delivery ability, considering the then current delivery schedules of all contractors.
Unscheduled water	Water available in the Delta as determined by the State at various times during the year when scheduled project demands are being delivered and project storage requirements for both project water deliveries and water to meet Delta water quality requirements established by the SWRCB are being met.
Surplus water	Water in excess of that required to meet all entitlement demands, reservoir storage goals, water quality requirements, and other SWP requirements (such as recreational water), which can be delivered to contractors when SWP capability is available. Surplus water may be released from storage and scheduled in advance for use by contractors. <i>(This definition comes from page 25 of Bulletin 132-90, State of California Department of Water Resources, September 1990)</i>

CVP Water Definitions

Term	Definition
Class I Water	(Friant Division Only) Firm supply of water for certain contractors who have no other surface water supply. That supply of water stored in or flowing through Millerton Lake that will be available for delivery from Millerton Lake and the F-K and Madera Canals. It is a dependable water supply during each year. [800,000 acre-feet]
Class II Water	(Friant Division Only) Undependable water. Supplied when available. That supply of water that can be made available subject to the contingencies for delivery from Millerton Lake and the F-K and Madera Canals in addition to the supply of Class I Water. Because of its uncertainty as to availability and time of occurrence, such water will be undependable characterized and will be furnished only if, as, and when it can be made available as determined by the Contracting Officer. [1,400,000 acre-feet]

Term	Definition
Section 215 Water	A supply of irrigation water made available to the Contractor pursuant to Section 215 of the Reclamation Reform Act (RRA) of October 12, 1982 (96 Stat. 1263), as amended. This supply of water is temporary, not to exceed one year, and is made possible as a result of (1) an unusually large supply not otherwise storable for project purposes or (2) infrequent and otherwise unmanaged flood flows of short duration.

Conversion Factors

The following information was taken from pages 389 and 390 of the Appraisal Institute's *The Dictionary of Real Estate Appraisal, 4th ed.*, (Chicago: Appraisal Institute, 2002).

Conversion Factors for Measurement of Irrigation Water

1 second foot	1 cubic foot per second 450 gallons per minute About 1 acre-inch per hour
1 cubic foot of water	7.48 gallons

Water Measures

1 cubic foot	7.4805 gallons 62.42 pounds
1 gallon	8.355 pounds
1 cubic foot per second	50 miner's inches in Idaho, Kansas, Nebraska, New Mexico, and Southern California
1 cubic foot per second	40 miner's inches in Arizona, Montana, Oregon, and Northern California

ADDENDUM 2

Bibliography

ADDENDUM 2

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- Information to Parties Interested In Making Water Available to the Environmental Water Account or the State's 2002 Dry Year Water Purchase Program
- Groundwater Substitution Transfers – How to Make Them Work in the Sacramento Valley in 2002
- Water Transfers Based on Crop Shifting and Crop Idling – How to Make Them Work in the Sacramento Valley in 2002

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Web Sites

Department of Water Resources

<http://www.dwr.water.ca.gov/>

Department of Water Resources – Water Transfers

<http://www.watertransfers.water.ca.gov/>

The Sacramento Valley Water Management Agreement

<http://www.watertransfers.water.ca.gov/docs/SactoValley.pdf>

Groundwater Substitution Transfers – How to Make Them Work in the Sacramento Valley in 2002

http://www.watertransfers.water.ca.gov/docs/Groundwater_Substitution_Transfers_5_23_02.pdf

Department of Water Resources

Division of Operations and Maintenance, Operations Control Office

<http://www.woco.water.ca.gov/indexo.html>

Department of Water Resources

Adjudicated groundwater basins

http://www.dpla2.water.ca.gov/publications/waterfacts/water_facts_3.pdf

California Bay-Delta Authority

Water Transfer Issues report location

http://www.calwater.ca.gov/Programs/WaterTransfers/adobe_pdf/Final_Report%20Water_Transfer_Group.pdf

California Water Districts and Associations

<http://www.lib.berkeley.edu/WRCA/district.html>

Water Education Foundation

<http://www.water-ed.org/>

State Water Resources Control Board

<http://www.swrcb.ca.gov/>

Water Strategist

<http://www.waterstrategist.com/>

Association of California Water Agencies

<http://www.acwanet.com/>

California Farm Bureau Federation

<http://www.cfbf.com/>

California Farm Water Coalition

<http://www.cfwc.com/>

Department of Water Resources
Division of Flood Management
California Data Exchange Center
<http://cdec.water.ca.gov/>

California Bay-Delta Authority
<http://calwater.ca.gov/>

California Groundwater Association
<http://www.groundh2o.org/>

U.S. Bureau of Reclamation
<http://www.usbr.gov/>

California Law (water law is one of the selection options at the site)
<http://www.leginfo.ca.gov/calaw.html>

California Groundwater Bulletin 118
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<http://ontap.ca.gov/>

U.S. Geological Survey
<http://www.usgs.gov/>

U.S. Fish and Wildlife Service
<http://www.fws.gov/>

California Department of Fish and Game
<http://www.dfg.ca.gov/>

National Marine Fisheries Service
<http://www.nmfs.noaa.gov/>

ADDENDUM 3

**State Water Resources Control Board
(SWRCB) Information**

State Water Resources Control Board (SWRCB) Information

The following information comes from the SWRCB web site referenced below.

http://www.waterrights.ca.gov/application/forms/infobook.htm#_Toc442697730

General Information Pertaining to Water Rights

The following general information pertaining to water rights is offered for the guidance and assistance of those who may be interested. While believed to be correct, the information is by no means complete. For additional information, see the California Water Code and case law.

Those to whom this general information is of particular importance or who propose to apply it to specific cases should seek the advice of an attorney or engineer, depending on the kind of information needed.

Appropriative Rights Initiated Prior to December 19, 1914

Prior to 1872, appropriative water rights could be acquired by simply taking and beneficially using water. The priority of the right was the first substantial act leading toward putting the water to beneficial use provided the appropriation was completed with reasonable diligence; otherwise, priority did not attach until beneficial use of the water commenced.

In 1872, sections 1410 through 1422 of the California Civil Code were enacted. These sections established a permissive procedure for perfecting an appropriation of water. Provisions were made for establishing a priority of right by posting a notice of appropriation at the proposed point of diversion and recording a copy of the notice with the respective County Recorder. If these procedures were not followed, the pre-1914 appropriative right did not attach until water was beneficially used.

Once acquired, an appropriative right can be maintained only by continuous beneficial use of water. Regardless of the amount claimed in the original notice of appropriation or at the time diversion and use first began, the amount which now can be rightfully claimed under an appropriative right initiated prior to December 19, 1914 therefore has, in general, become fixed by actual beneficial use as to both amount and season of diversion. The conditions under which an appropriative right may be forfeited in

whole or in part are set forth under the heading “Loss of Appropriate Rights”.

Successful assertion of an appropriative right which was initiated prior to December 19, 1914, where the validity of the right is disputed, requires evidence of both the original appropriation and the subsequent maintenance of the right by continuous and diligent application of water to beneficial use (see California Water Code section 1202(b)). Frequently such evidence consists of oral testimony of persons who have actual knowledge of the relevant facts. As the years pass, such testimony, dependent upon the recollection of individuals, may become difficult or impossible to secure. At least a partial remedy for this situation may be found in the procedure for perpetuation of testimony set forth in section 2017 of the California Code of Civil Procedure.

A record of water use under “pre-1914 Appropriative Rights” should be established by filing a Statement of Water Diversion and Use with the SWRCB.

Appropriative Rights Initiated Subsequent to December 19, 1914

The two methods of appropriation existing prior to December 19, 1914, the effective date of the California Water Commission Act, no longer are available for appropriating water from surface streams, other surface bodies of water, or from subterranean streams flowing in known and definite channels. An appropriation of such water now requires compliance with the provisions of Division 2, Part 2 of the California Water Code.

The steps which now must be taken in order to initiate and acquire an appropriative water right are described under the heading “General Information Pertaining to Applications for Permits to Appropriate Unappropriated Water”.

Loss of Appropriative Rights

By Abandonment—To constitute abandonment of an appropriative right, there must be concurrence of act and intent, the relinquishment of possession, and the intent not to resume it for a beneficial use, so that abandonment is always voluntary, and a question of fact (1 Wiel, 3d ed., 604, 605).

By Nonuse—Nonuse is distinguished from abandonment. Nonuse means failure to put water to beneficial use for a period of years. The courts have held that pre-1914 rights can be lost as the result of five years’ nonuse (Smith v. Hawkins 42 P. 454).

California Water Code section 1241 provides for loss of appropriative rights after five years' nonuse. This section applies only to an appropriative right acquired after December 19, 1914.

Riparian Rights

No California statute defines riparian rights, but a modification of the common law doctrine of riparian rights has been established in this State by decisions of the courts and confirmed by the provisions of section 3, Article XIV of the California Constitution (see California Water Code sections 100, 101). Lands within the watershed of a natural watercourse, which are traversed thereby or border thereon, with the exceptions and limitations hereinafter, indicated, may be riparian. Each owner thereof may have a right, which is correlative with the right of each other riparian owner to share in the reasonable beneficial use of the natural flow of water, which passes his land. No permit is required for such use. The State Water Resources Control Board's (SWRCB) policy is to consider natural flow as not including return flows derived from use of groundwater, water seasonally stored and later released, or water diverted from another watershed. In administering the California Water Code, the SWRCB is governed by the following considerations relative to the doctrine of riparian rights as applied to this State:

1. The riparian right exists by reason of ownership of land abutting upon a stream or body of water and affords no basis of right to use water upon nonriparian land. (Rancho Santa Margarita v. Vail, 11 Cal. 2d 501, 81 P. 2d 533)
2. In order to divert water under claim of riparian right, the diverter must use the water on riparian land but need not own the land at the point of diversion. That is, such diverter may divert at a point upstream from his land so long as permission is granted to use that point of diversion, and intervening land owners between the point of diversion and the place of use are not adversely affected by such practices. (Turner v. James Canal Co., 155 Cal. 82, 99 P. 520 (1909))
3. A parcel of land loses its riparian right when severed from land bordering the stream by conveyance unless the right is reserved for the severed parcel. The riparian right also may be destroyed when purportedly transferred apart from the land by grant, contract, or condemnation. Once lost, it cannot be restored.
4. As between riparian owners, priority of use establishes no priority of right; i.e., one cannot claim superior right merely because water was used first. (Pabst v. Finmand, 190 Cal. 124, 211 P. 11 (1922))
5. The riparian right is neither created by use nor lost by nonuse.

6. If there is insufficient water for the reasonable beneficial requirements of all riparian owners, they must share the available supply. Apportionment is governed by various factors, including each owner's reasonable requirements and uses. In the absence of mutual agreement, recourse to judicial determination may be necessary.
7. As between riparian owners, one of them may take the whole supply if necessary for strictly domestic use; that is, for so-called "natural uses arising out of the necessities of life on the riparian land, such as household use, drinking, watering domestic animals." (1 Wiel, 3d ed., *Water Rights in the Western States*, page 795; Deetz v. Carter, 232 Cal. App. 2d 851; but see Prather v. Hoberg, 24 Cal. 2d 549, 150 P. 2d 405, re an equitable apportionment where the use is commercialized as for resort purposes and therefore is not strictly domestic.)
8. The riparian owner is subject to the doctrine of reasonable use, which limits all rights to the use of water to, that quantity reasonably required for beneficial use and prohibits waste or unreasonable use or unreasonable methods of use or diversion. (Sec. 3, Art. XIV, Const. of Cal.; Peabody v. City of Vallejo, 2 Cal. 2d 351, 40 Pac. 2d 486; *Tulare Irr. Dist. et al v. Lindsay Strathmore Irr. Dist.*, 3 Cal. 2d 489, 45 Pac. 2d 972; Rancho Santa Margarita v. Vail, 11 Cal. 2d 501, 81 P. 2d 533)
9. A riparian right may be impaired or lost through prescription. Refer to the following section, "PRESCRIPTION".
10. The riparian right attaching to a particular parcel of land is subject to appropriative rights established by diversion upon vacant public domain before the first valid steps were taken to acquire said parcel of land from the United States, whether diversion was made at points upstream or downstream.
11. The riparian right cannot be transferred for use upon another parcel of land.
12. The riparian right does not apply to foreign water; i.e., water originating in a different watershed cannot be used under claim of riparian right. (*E. Clemens Horst Co. v. New Blue Point Mining Co.*, 177 Cal. 631, 171 P. 417; *Crane v. Stevinson*, 5 Cal. 2d 387, 54 P. 2d 1100; Rancho Santa Margarita v. Vail, 11 Cal. 2d 501, 81 P. 2d 533)
13. Water cannot be stored and withheld for a deferred use (other than regulatory storage) under claim of riparian right. (*Seneca Consol. Gold Mines Co. v. Great Western Power Co.*, 209 cal. 206, 287 pac. 93; *Colorado Power Co. v. Pac. Gas and Electric Co.*, 218 cal. 559, 24 p. 2d 495; *Moore v. California Oregon Power Co.*, 22 cal. 2d 725, 140 p. 2d 798)
14. A record of water use under riparian claim should be established by filing a Statement of Water Diversion and Use with the SWRCB.

Prescription

A right secured by appropriation does not depend upon use for any given length of time. It is complete immediately upon full beneficial use being made of water pursuant to a permit. The right, however, is subordinate and subject to all prior vested rights, whether appropriative or riparian. This limitation may be removed under certain circumstances by continuous use adverse to prior rights for five years and failure of the owners of the prior rights to file legal action to protect themselves during that time. Their cause of action then becomes barred by the statute of limitations. The right of the subsequent appropriator thereafter no longer is subject to the prior vested rights. This result is called a prescriptive right to the use of water.

In order for an appropriative or riparian claim to ripen into a prescriptive right as against the owner of a riparian or a prior appropriative right, the use must be continuous and uninterrupted for a period of five years. During all of such time, the use must be open and notorious, exclusive, under claim of right, hostile and adverse to the title of the prior owner, and an invasion of the prior owner's right. The prior right owner must have had an opportunity to prevent the adverse use by legal action, and such taxes as are assessed must be paid. Absence of any of these conditions is fatal to the acquisition of a prescriptive water right.

Water users ordinarily have no concern with the use of water by others after it has passed their land or point of diversion. The upstream users thus have no legal right to prevent downstream use. A well-established rule is that a prescriptive water right ordinarily cannot be acquired against an upstream user.

A right cannot be acquired by prescription to use a greater quantity of water than reasonably is necessary for the beneficial purpose served, regardless of the amount actually used, in accordance with the constitutional amendment of 1928 (art. XIV, sec. 3).

Since enactment of the California Water Commission Act on December 19, 1914, a right to appropriate or use water (other than as a riparian or overlying owner, or appropriator of percolating groundwater, or stockpounds that comply with article 2.5, commencing with section 1226 of chapter 1 of part 2 of division 2 of the California Water Code), cannot have been secured without first obtaining a permit from the State (see California Water Code section 1225 and Crane v. Stevinson, 5 cal. 2d 387, 54 p. 2d 1100). Although one who now uses water without a permit for a sufficient period of time may, under certain circumstances foreclose objection by those who have been adversely affected, such user thereby does not acquire a right to prevent diversions by others which deplete the supply of water available. California courts have not been called upon to determine this precise question. In view of the uncertainty in this respect and because a prescriptive right can be finally determined only by a court of competent

jurisdiction, the policy of the SWRCB is to disregard a claim to water subject to the permit procedure which is based only upon use initiated subsequent to 1914 unless such use is supported by a permit.

In PecDle v. Shirokow (1980) 26 cal. 3d 301, the California Supreme Court addressed the question of whether a person who does not hold a water right permit or license may establish a prescriptive water right to divert and use water. The Court held that the water appropriation procedure established by statute constitutes the exclusive method of acquiring a right to appropriate or use water, which is subject to appropriation. Since Shirokow was using water and held no permit or license authorizing an appropriation of water, the Court concluded that such use of water was improper. In addition, the Court held that the State's governmental interest in regulating the use of public water is a public right, which cannot be lost through prescription.

Vested Appropriative and Riparian Rights Not Affected by Filing an Application

An existing valid riparian or appropriative right will be neither strengthened nor impaired by a permit to appropriate water issued to the owner of such right (see Barr v. Branstetter, 42 cal. app. 725, 184 p. 409). An application to appropriate water may be filed by such owner, however, in the following instances: (1) to initiate a right to additional unused water where water is available for further appropriation in excess of that covered by the existing right; and (2) to establish a new right to water already in use by applicant where the validity of the existing right has not been adjudicated or is in doubt. In either event, the priority of the right acquired by beneficial use under the permit will be the date of filing the application—the priority will not relate back to the time of the first use under a former claim.

The California Code of Regulations, title 23~ section 731, requires an applicant for a permit to list all claims to existing rights for the use of all or part of the water sought by the application. A permit, if issued, will limit the water to be appropriated so that existing rights, combined with the permit will not yield a right to use an unreasonable quantity of water. Subsections (c), (d), and (e) of section 731 contain penalties for anyone who transfers an existing right before, or does not claim an existing right until, a permit or license is issued. This provision is in recognition of the fact that a permit should be issued only for unappropriated water, and that water which is being used pursuant to an existing right is not unappropriated, whether the right is being exercised by the applicant or by another person.

Disputes Over the Use of Water

The right to use water is a property right and may be protected against infringement in the same manner as any other property right; i.e., by appropriate court action. (*emphasis added*) The SWRCB does not have the authority to determine the validity of vested rights other than appropriative rights initiated December 19, 1914 or later. The SWRCB, however, may assist the courts in such determination as described in the following paragraphs entitled, "Determination of Existing Rights". The SWRCB will investigate and take appropriate action on a written complaint received alleging (1) a violation of the conditions of a permit or license issued by the SWRCB, (2) waste or unreasonable use of water, (3) illegal diversion or use, or (4) unreasonable effects on public trust or public interest uses of the water. (See title 23, chapter 3, subchapter 2, articles 18 and 22 of the California Code of Regulations; California Water Code section 275 et. seq.; and California Water Code section 1050 et. seq.)

When a complaint of an illegal diversion or use is filed, the SWRCB will take action under section 1052 of the California Water Code. Subsection (a) provides that "The diversion or use of water subject to this division other than as authorized in this division is a trespass." Subsection (d) provides, in part, that "Any person or entity committing a trespass as defined in this section may be liable for a sum not to exceed five hundred dollars (\$500) for each day in which the trespass occurs. The Attorney General, upon request of the SWRCB, shall petition the superior court to impose, assess, and recover any sums pursuant to this subdivision. "SWRCB policy is to initiate court action only in a clear instance of unlawful use of water. Where there is a bona fide dispute as to the facts, or where circumstances indicate adjudication is required, action by the SWRCB under section 1052 generally is not considered appropriate.

Public Trust

With its roots in Roman law, the doctrine of public trust holds that certain resources are the property of all. In its modern form, the public trust doctrine holds that a state, as sovereign, takes title to tidelands and the beds of nontidal navigable waters at the time the state is admitted to the Union. Holding these lands and the waters above them in trust, the state's duty is to exercise continued supervision over the trust for the benefit of the people. Entities acquiring rights, for example in navigable streams, lakes, marshlands and tidelands, generally hold those rights subject to the trust and can assert no vested right in a manner harmful to the public trust. In other words, rights acquired in public trust resources cannot be placed entirely beyond the direction and control of the state.

The scope of the public trust doctrine continues to evolve as popular perceptions of the values and uses of waterways change. The public trust

was traditionally defined to protect navigation, commerce, and fisheries; but recently it has been held to include the right to fish, hunt, bathe, swim, boat, recreate, navigate, and use the bottom of navigable waters for anchoring, standing, or other purposes.

In this century, the California courts have interpreted the legal term “navigable” very broadly to include recreational rafting and kayaking which can take place in very shallow water. Within the last decade, the California Supreme Court has recognized that uses of public trust resources include the preservation of the land, especially tideland, in its natural state to serve as ecological units for scientific study, as open space, and as habitat for birds and aquatic life. In administering the public trust, the courts have allowed the state to favor one use over another.

In its presently-developed form, the public trust doctrine requires the courts and the SWRCB to perform a balancing test to weigh the potential value to society against the impact on trust resources of a proposed or existing diversion. The action which will feasibly protect public trust values must be implemented.

On February 17, 1983, the California Supreme Court filed its decision in National Audubon Society v. Superior Court of Alpine County, 33 Cal. 3d 419, 189 Cal. Rptr. 346 (1983). The Court merged the public trust doctrine with the California water rights system. The Court also held that all uses of water, including public trust uses, must conform to the standard of reasonable use. The Court further held that the SWRCB has a duty to consider public trust values before it approves water right applications. Finally, the Court held that the SWRCB has a continuing duty to supervise the taking and use of appropriated water.

Determination of Existing Rights

Court Reference. When a suit is brought by private parties in any court of competent jurisdiction in this State for determination of water rights, sections 2000 and 2001 of the California Water Code provide that the case, at the discretion of the court, may be referred to the SWRCB, as referee, for investigation. All rights of whatever character may be included under this procedure.

Statutory Adjudication. Section 2525 of the California Water Code provides for the initiation of proceedings for the determination of all rights to the water of any stream, lake, or other body of water except percolating underground water. A petition signed by one or more claimants of the right to the use of water from the source involved must be filed with the SWRCB. The procedures outlined in sections 2500 through 2900 of the California Water Code must be followed.

If a determination is undertaken under either the court reference or statutory procedure, the SWRCB thoroughly investigates the stream system

and water rights involved. In general, such investigation will include measurements of the water supply and of all diversions from the stream system, a survey of all diversion systems and areas irrigated therefrom, and a determination of the duty of water for irrigation and other uses.

After due notice to all parties, the SWRCB prepares findings which are submitted to the court. The court itself hears those who may be dissatisfied with these findings and enters a decree establishing the various rights involved.

The court also sets forth the relative priority, amount, purpose of use, season of diversion, point of diversion, and place of use of each right. Appeals from such decree may be taken in the same manner and with the same effect as in other civil cases.

By virtue of the above procedures, the SWRCB may supplement with effective and expeditious methods the work of the courts in determining water rights. These procedures lead to a complete and final determination of all the water rights involved, and, should necessity arise, a watermaster may be appointed to administer the stream and insure distribution of the water as decreed.

A copy of the SWRCB's publication, "Regulations and Information Pertaining to Determination of Rights to the Use of Water in California" may be obtained on request.

Appropriation of Undergroundwater

The jurisdiction of the SWRCB to issue permits and licenses for appropriation of underground water is limited by section 1200 of the California Water Code to "subterranean streams flowing through known and definite channels".

If use of underground water on nonoverlying land is proposed and the source of the water is a subterranean stream flowing in a known and definite channel, an application pursuant to the California Water Code is required. A Statement of Water Diversion and Use should be filed for use of water from a subterranean stream on overlying land (see Statements of Water Diversion and Use section of this document).

Underground water not flowing in a subterranean stream, such as water percolating through a groundwater basin, is not subject to the SWRCB's jurisdiction. Applications to appropriate such water, regardless of use, should not be submitted. Owners of lands overlying a groundwater basin or other common source of supply have the first right to withdraw water for reasonable beneficial use on their overlying lands, and the right of each owner is equal and correlative to the right of all other owners similarly situated. In case of insufficient water to supply fully the requirements of all, the available supply must be equitably apportioned. In these respects,

overlying rights are closely similar to riparian rights pertaining to surface bodies of water.

Subject to future requirements on overlying lands, surplus water which may be withdrawn without creating an overdraft on the groundwater supply may be appropriated for use on nonoverlying lands. Such appropriation is accomplished simply by use—no permit is required. An application filed to appropriate underground water subsequently may be rejected if the water it seeks to appropriate is not flowing through a known and definite channel.

Division 2 of Part 5 of the California Water Code, commencing with section 4999, requires every person who extracts groundwater within the counties of Riverside, San Bernardino, Los Angeles, and Ventura in excess of 25 acre-feet per annum (with certain exceptions) to file a notice with the SWRCB on forms provided by the SWRCB. Copies of the SWRCB's rules, together with further information concerning this requirement, may be obtained on request.

Every person who intends to dig, bore, drill, deepen, or re-perforate a water well must file a notice of intent with the California Department of Water Resources. The notice must be filed on forms furnished by the Department and must contain information required by the Department. A report of completion also must be filed with the Department on forms furnished by the Department and containing information required by it (California Water Code sections 13750, 13751). These requirements also apply to any person who converts, for use as a water well, any oil or gas well originally constructed under the jurisdiction of the California Department of Conservation pursuant to the provisions of Article 4, Chapter 1, Division 3 of the California Public Resources Code. Further information or forms may be obtained from the California Department of Water Resources, Division of Planning, Post Office Box 942836, Sacramento, CA 942360001.

Spring Water

Courts have held that water in springs and standing pools which have no natural outlet belong to the owner of the land on which these sources are located (see *State v. Hansen*, 189 Cal. App. 2d 604). Such water may be used without obtaining a permit.

If a spring contributes to a flowing stream, either by surface or subterranean means, the doctrine of correlative rights applies between the owner of the spring and those riparian to the stream. The right of the owner of a spring likewise is correlative with the right of those using groundwater which supplies the spring. A Statement of Water Diversion and Use should be filed for such use.

No Assistance Rendered in Securing Right of Access to Point of Diversion or Right-of-Way

The SWRCB will not assist in the matter of securing right of access to the stream or other source of supply, or in securing rights-of-way for ditches and conduit lines. In accepting an application or in issuing a permit, the SWRCB does not affirm that the applicant or permittee has right of access to the source of supply or necessary rights-of-way. The SWRCB will accept an application for filing before right of access has been secured. The SWRCB, however, may refuse to approve the application when the applicant apparently will be unable to secure right of access (see Title 23 of the California Code of Regulations, sections 775, 776, and 777).

Patents and Homesteads

All patents granted or homesteads allowed by the U. S. Bureau of Land Management shall be subject to any vested and accrued water rights as may have been recognized and acknowledged by the local customs, laws, and decisions of courts (30 USCA 278, 287).

Supervision Over Dams

Division 3 of the California Water Code, commencing with section 6000 et seq., requires that construction or enlargement of any dam over a certain height and storage capacity shall not be commenced without written approval of the plans and specifications by the California Department of Water Resources. The California Department of Water Resources ordinarily will require a statement that the SWRCB is satisfied as to the adequacy of the water right.

Dams subject to supervision are as follows:

1. Dams which are 25 feet or more in height from downstream toe to spillway level provided they store more than 15 acre-feet of water.
2. Dams which store 50 acre-feet or more of water provided they are more than 6 feet in height from downstream toe to spillway crest.

Further information concerning construction or enlargement of any dam may be obtained from the California Department of Water Resources, Division of Safety of Dams, Post Office Box 942836, Sacramento, CA 94236-0001.

Further information concerning construction or enlargement of any dam may be obtained from the California Department of Water Resources, Division of Safety of Dams, Post Office Box 942836, Sacramento, CA 94236-0001.

Provisions Of Fish and Game Code

The owner of a dam is required to allow sufficient water to pass downstream at all times in order to keep fish below in good condition (section 5937, Article 2, Chapter 3, Part 1, Division 6 of the California Fish and Game Code). For purposes of Article 2, “dam” includes all artificial obstructions. Further information relating to the requirements of the California Department of Fish and Game may be obtained from local game wardens or from the California Department of Fish and Game, 1416 Ninth Street, Sacramento, CA 95814.

Statements of Water Diversions and Use

All diverters of surface water, with certain exceptions, are required to file a Statement of Water Diversion and Use with the SWRCB (see Division 2 of Part 5.1 of the California Water Code). The requirement applies to water diverted under claim of riparian right and to appropriations initiated prior to December 19, 1914, the effective date of the California Water Commission Act. Forms may be obtained from the Division of Water Rights, Post Office Box 2000, Sacramento, CA 95812-2000. One purpose of filing Statements of Water Diversion and Use is to make a public record of all surface diversions not already on file with or known to the SWRCB. The following types of diversions are excluded from the requirement:

1. From a spring which does not flow off the property on which it is located.
2. Covered by an application, permit, or license to appropriate water on file with the SWRCB.
3. Included in a notice filed under the recordation of groundwater extractions law (Division 2 of Part 5 of the California Water Code) in the counties of Riverside, San Bernardino, Los Angeles, and Ventura.
4. Regulated by a watermaster appointed by the California Department of Water Resources.
5. Reported by the California Department of Water Resources in its hydrologic data bulletins.
6. Included in the consumptive use data for the delta lowlands published by the California Department of Water Resources in its hydrologic data bulletins.
7. Included in annual reports filed with a court or the SWRCB by a watermaster appointed by a court or pursuant to statute to administer a final judgment determining rights to water, which reports identify the persons who have diverted water and give the general place of use and the quantity of water which has been diverted from each source.

8. For use in compliance with the provisions of Article 2.5 (commencing with section 1226) of Chapter 1 of Part 2 of Division 2 of the California Water Code concerning stockponds.

A statement should be completed for diversions during a calendar year and should be filed before July 1 of the following year. Supplemental statements are required at three-year intervals thereafter.

Stockpond Rights

The stockpond program was 'sunset' by the Legislature as of December 31, 1997.

Under certain conditions, the owners of stockponds having a capacity of not more than 10 acre-feet as of January 1, 1975 which were constructed prior to 1969 have a valid water right. Prior to January 1, 1975, a right for seasonal storage of water in a reservoir of any kind could be obtained only by appropriating the water through the application-permit-license procedure, and this is still the only way to obtain a water right for stockponds constructed after January 1, 1969 or which are larger than 10 acre-feet. Claims of rights for such stockponds and applications for this certification should be filed with the SWRCB. The priority of the right will be subject to other stockpond water rights on which certificates have been issued by the SWRCB with an earlier priority, to appropriative water rights with an earlier priority, and to riparian rights. The priority of the right will be the date the claim is filed. Ponds which were the subject of water right litigation between private parties prior to January 1, 1974 are excluded.

Before a certificate of validity of the stockpond right is issued, the SWRCB will verify the location of the pond, its capacity, and that it is used primarily for stockwatering purposes. In some cases, a field investigation is necessary. The original certificate will be filed with the SWRCB and will be available for public inspection. A copy of the certificate will be mailed to the owner of the stockpond. So that the records may be reasonably current, a statement of continued existence of the pond and its use for stockwatering will be solicited from the owner as determined by the SWRCB (currently every 10 years). If the water has ceased to be used primarily for stockwatering, the SWRCB may revoke the certificate after notice and an opportunity for hearing.

A reasonably accurate estimate of the capacity of a stockpond of 10 acre-feet or less can be computed by use of the "one-third rule" as follows:

Stockpond capacity in acre-feet = $1/3$ height of dam to spillway crest, in feet, multiplied by the surface area of pond when full, in acres.

General Information Pertaining to Applications for Permits to Appropriate Unappropriated Water

The following information describes the statutory procedure for acquiring appropriative water rights. It is intended as a guide for persons who propose to take water from a surface or underground source or who are uncertain as to the validity of their present taking. Those who are not already familiar with the procedure should carefully read this information.

Who Should File an Application

Since December 19, 1914, the appropriation of water in surface streams and other surface bodies of water and in subterranean streams flowing through known and definite channels has been governed by the California Water Commission Act (Statutes 1913, Chapter 586) now contained in the provisions of the California Water Code.

New legislation, effective January 1, 1989, modified the California Water Code to provide two methods of appropriating water through the California State Water Resources Control SWRCB. Provisions were added to the law for registering small domestic use appropriations, rather than applying for a water right permit under the existing process.

Small domestic use includes normal domestic use, plus incidental stockwatering of domestic animals and incidental irrigation of one-half acre or less of lawn, garden, and pasture at any single establishment, not exceeding 4,500 gallons per day by direct diversion or 10 acre-feet per annum by storage, the latter including incidental aesthetic, recreational, or fish and wildlife enhancement purposes. Refer to the SWRCB's booklet, "How to File an Application/Registration to Appropriate Water in California" for specific information on filing for a permit or for registering a small domestic use appropriation.

Anyone who intends to divert water from surface waters or subterranean streams flowing in known and definite channels, either (1) directly to use on land which is not riparian to the source, (2) to storage in a reservoir for later use on either riparian or nonriparian land, or (3) for direct use of water which would not naturally be in the source, should apply with the SWRCB for a permit or small domestic use registration as the first step toward securing an appropriative water right. Persons diverting water under riparian or pre-1914 claims of right, with certain exceptions, are required to file a Statement of Water Diversion and Use with the SWRCB.

Who Should Not File an Application

Underground water is not subject to the permit procedure unless it is the underflow of a surface stream or otherwise is flowing in a subterranean stream with a known and definite channel. One who proposes to pump groundwater (with the exceptions noted) should not file an application. Anyone who pumps groundwater in the counties of Riverside, San Bernardino, Los Angeles, and Ventura, with certain exceptions is required to file a notice with the SWRCB (see section 4999 of Division 2 of the California Water Code).

A permit is not required for the proper exercise of a riparian right. Diverters of surface water, with certain exceptions, are required to file a Statement of Water Diversion and Use with the SWRCB.

Purpose of Filing

The purpose of filing an application for a permit is to secure a right to the use of unappropriated water; i.e. water that is available and is not already in use under prior and existing rights. The purpose of filing also is to establish a record of the right sought under the application so that its status in relation to other rights may be determined more readily. One who takes and uses water without possession of a valid right or first obtaining a permit does so at their own risk and is subject to possible court action to enjoin his use.

An application should not be filed in order to adjust a dispute which has arisen over water. Permits issued by the SWRCB cannot serve to ratify or confirm existing rights claimed by the applicant.

When to File

An application should be filed well in advance of construction of diversion works. An application, however, should not be filed until a definite plan has been formulated for construction of a project for use of water within a reasonable time in the future. What is reasonable depends on the size of the project and the circumstances of each case. In every case, the applicant should be prepared to commence construction work within the time ordered by the SWRCB and thereafter to complete construction and use of water with diligence. For most privately-owned projects designed to serve the individual needs of the applicant, the SWRCB will require actual construction to commence within a few months after issuance of permit. The filing of an application cannot serve to reserve water for an indefinite future use. Requests for undue delay in final disposition of an application will be denied.

Unappropriated Water and Responsibilities of Permittees

All applications are for permits to appropriate unappropriated water, and all permits are issued subject to vested rights. In order for the SWRCB to approve an application, unappropriated water must be available to supply the applicant. Water in many streams already has been fully appropriated during the dry seasons of the year. If there is doubt whether unappropriated water is available, the SWRCB's staff should be consulted before an application is filed.

The flow of water in most streams is variable and cannot be predicted with accuracy. Approval of an application and issuance of a permit thus does not guarantee that unappropriated water will be available at all times in the full amount specified in the permit. In some cases, there may be times during the authorized diversion season when no unappropriated water will be available. The holder of a permit should be prepared to accept responsibility for diverting only to the extent and at such times as will not

impair the prior rights of others, regardless of the amount or season named in the permit. The holder of the permit likewise must defend the right if it is attacked by others. A water right is a property right, and the owner has the same obligation to defend it against encroachment as in the case of any other kind of property.

Outline of Essential Steps

The California Water Code and the regulations adopted pursuant thereto prescribe a definite procedure for the initiation and consummation of rights to appropriate water by permit. The essential steps are as follows:

Appropriation by Permit:

1. An application is filed with SWRCB on forms provided. If the application is not complete, failure to complete it within the time allowed by the SWRCB will result in cancellation.
2. Notice of application is issued by the SWRCB and is posted or published by the applicant, depending on the size of the project.
3. If protests are received which cannot otherwise be adjusted, a hearing or an investigation under a proceeding in lieu of hearing is held. At the discretion of the SWRCB, a hearing also may be held on an unprotested application.
4. The application is reviewed and analyzed for possible environmental impacts as required by the California Environmental Quality Act of 1970.

5. If an application is approved and permit fees paid, a permit is issued. A reasonable time is allowed within which to begin construction of the diversion works, complete the construction, and make full beneficial use of the water. These times may be extended upon request if there are good reasons for doing so. Failure to comply with the time requirements or other-permit terms will be investigated by the SWRCB, and findings against the permittee may result in revocation of the permit.

All permits are issued SUBJECT TO PRIOR RIGHTS, and the permittee is required to respect all prior rights when diverting under the permit.

6. When construction and use of water are complete to the full extent contemplated, an inspection is made for possible issuance of a license. To the extent that beneficial use of the water has been made, as to both amount and season as specified in the terms and conditions of permit, a license may be issued.

A license has no time limit and continues as long as proper use is made for the water and required reports are submitted.

Statutes provide that, under certain conditions, a license may be lost through a five-year period of nonuse.

Appropriation by Registration:

1. Forms to file for appropriation of water by registration are provided by the SWRCB.
2. The Environmental Services Supervisor for the California Department of Fish and Game region in which the diversion will be located (map, address, and telephone number are included on the form) is contacted to discuss the proposed project and to obtain answers to the questions contained on the Fish and Game Information form.
3. Registration forms are filed with both the State Water Resources Control SWRCB and the regional office of the California Department of Fish and Game.
4. If the registration is complete, fees have been paid, and written approval has been received from both the SWRCB and the California Department of Fish and Game, construction of the project may begin and diversion of water made.
5. If the forms are not complete, failure to complete them within the time allowed by the SWRCB will result in the return of all materials and fees.

Preparation of Applications

The SWRCB publishes a pamphlet entitled, "How to File an Application/Registration to Appropriate Water in Californians which will be of assistance in completing the blanks of an application form. When an application fails to comply with provisions of the California Water Code, the application will not be accepted for filing.

Changes in Ownership

The SWRCB must be able to communicate with a registrant, applicant, permittee, or licensee. Any changes in ownership or address therefore should be submitted promptly to the SWRCB.

The SWRCB will not settle contests as to ownership but will accept any ownership claim, which is asserted unless the owner of record or an asserted successor objects. In case of contest the SWRCB's record will not be changed until the matter is settled by agreement or by a court decision.

The Water Transfers quote was taken from the following SWRCB web site:

http://www.waterrights.ca.gov/html/wr_process.htm#WaterTransfers

Water Transfers

In recent years, temporary transfers of water from one water user to another have been used increasingly as a way of meeting statewide water demands, particularly in drought years. Temporary transfers of post 1914 water rights are initiated by petition to the State Board. If the Board finds the proposed transfer will not injure any other legal user of water and will not unreasonably affect fish, wildlife or other instream users, then the transfer is approved. If the Board cannot make the required findings within 60 days, a hearing is held prior to Board action on the proposed transfer. Temporary transfers are defined to be for a period of one year or less. A similar review and approval process applies to long-term transfers in excess of one year.

The California Water Code is also available on the web site:

<http://www.leginfo.ca.gov/calaw.html>

This web site lists 29 State codes, with Water Law being one of them. The Water Code is accessed by selecting the appropriate checkbox, and then selecting the "search" button at the bottom of the page. A table of contents appears with links to each particular section. "Division 2" begins with Section 1000 and is most relevant to the matter at hand.

The Water Code can also be accessed at the SWRCB web site:

http://www.SWRCB.ca.gov/water_laws/index.html

Click on the link “California Water Code.”

Though water rights appraisers need to be familiar with the process of transferring water rights, they should not be the ones who investigate the validity of a water right or identify any unusual obstacles that might exist in a public agency’s acquisition of any water right. These matters should be the domain of a water rights attorney, either on staff or retained by the agency. Water rights should also be investigated before the appraisal is ever ordered.

ADDENDUM 4

**The 2005 Dry Year Option Water Purchase
Program: Background and Agreement Terms**

The 2005 Dry Year Option Water Purchase Program: Background and Agreement Terms

Background

1. The Department of Water Resources (DWR) will conduct a 2005 Dry Year Water Purchase Program, as well as their annual Environmental Water Account (EWA) Program, and serve as a clearinghouse for both buyers and sellers. The Dry Year Program will be open to all interested California water agencies. DWR recognizes the importance of local leadership in making decisions to better manage the State's water resources. Accordingly, DWR will work cooperatively with local water associations, their member agencies, and other leaders in the Sacramento Valley and other regions to assist local interests in the management of their resources in a manner that fully meets local objectives.
2. DWR will represent the interests of all parts of the State, including those areas needing additional supplies and those that can make supplies available. DWR will coordinate the activities of the Dry Year Water Purchase Program with other local, State, and federal actions to purchase water in 2005. State Water Project contractors will assist DWR in developing water purchase agreements.
3. DWR, water sellers, and water buyers will respect the right of individual local water districts to determine the best way to make water available for local, regional and statewide use. Local agencies will be responsible for complying with all applicable laws, including local ordinances, and in seeking necessary approvals from DWR, U.S. Bureau of Reclamation, State Water Resources Control Board (SWRCB), and other relevant government entities.
4. Water management strategies will comply with State Law and prevent injury to other legal users of water, prevent unreasonable effects to fish or wildlife, and prevent unreasonable economic impacts to the overall economy of the county from which the water is transferred. If the water is made available by crop idling, the amount of idled land must not exceed 20 percent of the cropland that would have been planted and harvested in 2005.
5. Actions to develop water supplies will undergo appropriate environmental review and should be designed to not interfere with ongoing environmental protection and restoration programs or cause significant impact to fish and wildlife.

Programmatic Terms for all Agreements

6. Buyer will pay seller a \$10 per acre-foot initial option payment for each acre-foot made available, within 30 days of executing the contract.
7. Buyer will call on the transfer water no later than May 1, 2005.

8. The exact location where the water will be measured for transfer to DWR will be determined on a case-by-case basis, through negotiations between the individual sellers and DWR. The buyers will incur an estimated 20 percent carriage water loss for any transfer water pumped at Banks Pumping Plant for delivery to their service area.
9. Seller agrees to make all water under the contract available to buyer if buyer calls on the transfer water. The contract shall include provisions for penalties if water under option is not made available,
10. The contract between seller and DWR may be for both the Dry Year Program and EWA program at the seller's option.

Specific Terms for Crop Idling and Crop Substitution Agreements

11. Buyer will pay seller an additional \$10 per acre-foot incremental option payment on March 15, 2005, and April 15, 2005, if buyer has not yet called on the transfer water, but wants to maintain the option past these dates.
12. If buyer calls on the transfer water at the time the year is classified as Dry or a wetter year type, seller will receive a total payment of \$100 per acre-foot for the transfer water. The previous option payments made under Terms 6 and 11 will be credited towards the total payment of \$100 per acre-foot Year type is based on the 40-30-30 Sacramento River Index in SWRCB Decision-1641.
13. If buyer calls on the transfer water at the time the year is classified as Critically Dry, seller will receive a total payment of \$125 per acre-foot for the transfer water. The previous option payments made under Terms 6 and 11 will be credited towards the total payment of \$125 per acre-foot

Specific Terms for Groundwater Substitution Agreements

14. The buyer's payments will be based on the Sacramento Valley Water Management Program (shown in the table below) for whichever year type classification is in place at the time the transfer water is called. Year type is based on the 40-30-30 Sacramento River Index in SWRCB Decision-1641. The previous option payment made under Term 6 will be credited towards the total payment for the transfer water.

Year Type	Price per Acre-Foot
Wet	\$25
Above Normal	\$60
Below Normal	\$75
Dry	\$100
Critically Dry	\$125

Specific Terms for Reservoir Reoperation Agreements

15. To be developed on a case-by-case basis.

ADDENDUM 5

**Agreement for 2004 Services for the
Environmental Water Account Under the
California Bay-Delta Authority**

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

AGREEMENT BETWEEN
THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF CALIFORNIA
AND KERN COUNTY WATER AGENCY
FOR 2004 SERVICES FOR THE ENVIRONMENTAL WATER ACCOUNT
UNDER THE CALIFORNIA BAY-DELTA AUTHORITY

This Agreement is made as of this 8 day of June, 2004, pursuant to the provisions of the California Water Resources Development Bond Act, the Central Valley Project Act and other applicable laws of the State of California, between the Department of Water Resources of the State of California (Department), and Kern County Water Agency (Agency), each existing and acting pursuant to the laws of the State of California.

RECITALS:

- A. The Department is engaged in the operation of, and is a participating agency in the Federal-State California Bay-Delta Authority's Environmental Water Account (EWA).
- B. The Department operates and maintains the State Water Resources Development System, known as the State Water Project (SWP), pursuant to the laws of the State of California, involving the development and conveyance of water supplies to water supply agencies throughout the State of California, including the Agency.
- C. The Agency operates and maintains a major water system serving the Kern County region of California, partly relying on water from the SWP and the Central Valley Project to provide that service.

- D. The Kern Water Bank, the Pioneer Recharge and Recovery Project, the Berrenda Mesa Project and the Buena Vista Water Storage Program provide for water recharge, water extraction, and water supply for the primary benefit of certain lands and people in Kern County and Kings County. These operations have resulted in the storage of water from various sources that is proposed for sale through the Agency to the Department pursuant to this Agreement.
- E. The Agency, for purposes of this Agreement, will act on behalf of various agencies which have stored or banked water in groundwater facilities in Kern County that is proposed for sale to the Department pursuant to this Agreement.
- F. The CALFED Program resulted in Federal and State agreement to implement the EWA, a cooperative management program intended to provide protection to the fish of the Bay-Delta estuary through environmentally beneficial changes and increased flexibility in the operations of the SWP and CVP, at no uncompensated water cost to the Projects' water users.
- G. The Department and the Agency desire to enter into this Agreement to transfer water to the EWA to assist in fishery protection and restoration/recovery needs as described in the August 28, 2000, CALFED Record of Decision and the EWA Operating Principles Agreement.
- H. The Department finds that implementation of this Agreement will not materially impair the Agency's capacity to make payments to the Department as provided in its Water Supply Contract with the Department.
- I. This Agreement is entered into pursuant to the provisions of the existing EWA Operating Principles Agreement.

- J. The Department and the United States Bureau of Reclamation Bureau jointly prepared an Environmental Impact Statement/Environmental Impact Report, (EIS/EIR) in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). That document addresses the implementation of EWA through Stage 1 (2007). Impacts to the environment resulting from EWA-related water transactions of different types, including the one for which this Agreement has been prepared, were discussed and analyzed in that EIS/EIR. The findings of the EIS/EIR were that the project this Agreement contemplates will not significantly impact any aspect of the environment. The EIS/EIR has been certified and Findings and a Notice of Determination approved and filed with the State Clearinghouse on March 22, 2004, in accordance with CEQA procedures (State Clearinghouse Number 2001072046).

AGREEMENT

The Department and the Agency agree as follows:

1. DEFINITIONS

- (a) "Agency" means the Kern County Water Agency acting on behalf of the Participants for purposes of this Agreement.
- (b) "EWA" means the Environmental Water Account established by the CALFED Agencies pursuant to the August 28, 2000 CALFED Bay-Delta Program Programmatic Record of Decision, and currently operated under the California Bay-Delta Authority.

- (c) "EWA Operating Principles Agreement" means the Environmental Water Account Operating Principles Agreement dated August 28, 2000, which is Attachment No. 2 to the CALFED Record of Decision.
- (d) "Kern Fan Project" means the following groundwater storage and recharge facilities located in Kern County: Kern Water Bank, Pioneer Recharge and Recovery Project, Berrenda Mesa Project and Buena Vista Water Storage Program.
- (e) "Participants" means those entities that have stored water in the Kern Fan Project, that have given the Agency through agreement or other legal means the authority to act on their behalf for purposes of this Agreement, and that have provided to the Department satisfactory evidence of Agency's authority to act on behalf of the Participants.
- (f) "Parties" means the Department and the Agency.
- (g) "Purchase Water" means water that the Participants stored within Kern Fan Project groundwater banking facilities and that remains in storage as of the effective date of this Agreement, and that will be made available to the Department on behalf of EWA by exchange of Agency's 2004 Table A Allocation or Article 21 water for groundwater pumped and used in the Agency service area, or by reclassification of previously banked water as Agency's banked 2004 Table A Allocation water pursuant to Article 11 of this Agreement. Purchase Water includes both a minimum commitment amount and an optional purchase amount.

- (h) "Water Supply Contract" means the contract for a water supply between the Department and the Agency dated November 15, 1963, as amended.
- (i) To the extent applicable, the definitions in the Water Supply Contract are incorporated herein.

2. TERM

This Agreement shall become effective upon execution by the Parties and shall terminate when all obligations under this Agreement have been satisfied.

3. NO IMPACT ON WATER SUPPLY CONTRACT

Except as expressly provided herein, this Agreement does not supersede the Water Supply Contract and the terms and conditions of the Water Supply Contract remain in effect and apply to this Agreement.

4. NO IMPACT ON OTHER SWP CONTRACTORS

This Agreement will not cause adverse impacts on allocation or delivery of project water (including Article 21 water), pursuant to the SWP long-term Contract, to other SWP contractors, nor to SWP operations or facilities. The Agency agrees that Agency's 2004 Table A Allocation water delivery schedule will be prepared and submitted based on conditions existing without this Agreement. The Agency agrees not to increase Agency's SWP delivery request to the Department and agrees not to sell Agency's 2004 Table A Allocation water, 2004 Turn Back Pool Water or 2004 Article 21 water to EWA, as a result of entering into this Agreement.

5. STATE FUNDING CONTINGENCY

The Department's obligations under the EWA Operating Principles Agreement and this Agreement are contingent upon appropriation or allotment of funds, other than

SWP funds, to pay for the cost of the EWA program and this Agreement. Similarly, Agency obligations under this Agreement are contingent upon the Department obtaining appropriation or allotment of funds for this purpose. By signing the Agreement, the Department declares that sufficient State funds are available for the State's share of the cost of this Agreement.

6. NON-SWP FUNDS

Costs of the EWA are to be paid by non-SWP funds. The Department will develop estimates of the cost to the SWP for operating the EWA program, including power costs, and will recover such incremental costs through funding from the California Bay-Delta Authority, or other non-SWP funds, such that the Agency and the other SWP contractors do not incur increased costs because of the EWA program.

7. DISPUTE RESOLUTION

In the event of a dispute regarding interpretation or implementation of this Agreement, or if the Parties are unable to agree upon a matter as to which their agreement is provided for hereunder, the Director of the Department of Water Resources and the General Manager of the Agency shall endeavor to resolve the dispute by meeting within 30 days after the request of a Party. Nothing in this Article 7 limits legal or equitable remedies otherwise available to the Parties.

8. ENVIRONMENTAL COMPLIANCE

The Department shall be the lead agency for purposes of compliance with the California Environmental Quality Act (CEQA).

9. OTHER APPROVALS

The Parties will cooperate in obtaining any other necessary approvals to implement this Agreement. Each Party shall bear its own costs for engineering and technical expenses, legal fees and expenses related to obtaining approval(s) for the transfer or exchange of water, pursuant to this Agreement.

10. GOVERNING LAW

This Agreement shall be interpreted in accordance with the applicable laws of the State of California.

11. 2004 PURCHASE AND DELIVERY OF WATER

- (a) Based on the SWP allocation, announced following the May 1, 2004 snow survey (hereafter referred to as "May 2004 SWP Allocation"), Agency shall make Purchase Water available for delivery in accordance with this Article in the amount and at the price set forth in Exhibit A. Exhibit A lists both a minimum commitment amount and an optional purchase amount which varies, depending upon the May 2004 SWP Allocation.
- (b) The Department, on behalf of the EWA, agrees to purchase the entire minimum commitment amount as listed in Exhibit A based upon the May 2004 SWP Allocation at the price listed in Exhibit A.
- (c) The Department, on behalf of the EWA, agrees to pay a non-refundable option fee of forty (40) dollars per acre-foot for the entire optional purchase amount listed in Exhibit A for the May 2004 Allocation. If the Department, on behalf of the EWA, elects to exercise the option to purchase all or any part of the optional purchase water, it may do so by notifying Agency in writing, by

FAX or by email within 5 working days of the announcement of the May 2004 SWP Allocation. The price for the water the Department elects to purchase under this provision shall be the price listed in Exhibit A, less any option fee paid for that water.

- (d) By April 15, 2004, the Agency shall provide to the Department the following information about the Purchase Water: 1) the name of the Participant who stored water in a groundwater bank and the name of the groundwater bank; 2) the year in which each Participant stored water and the quantity stored in each groundwater bank; 3) the type of water stored, e.g., SWP Table A Allocation, Friant-Kern Flood Water, Kern River Water Rights/Flood Water, etc.; and 4) the name of the Participant that has ownership of the stored water, if different from the Participant that originally stored the water.
- (e) If the Department increases the SWP 2004 allocation after the initial May 2004 SWP Allocation is announced, or if the Department does not elect to purchase the entire optional purchase amount listed in Exhibit A within 5 days of the May 2004 Allocation, the Department may request to exercise its option to purchase the remainder or any portion of the remainder of the optional purchase amount, and/or request an increase in the amount of Purchase Water to be acquired and delivered by Agency. Agency shall approve or disapprove such request within 10 days following receipt of the request in writing.

- (f) If the Department decreases the SWP 2004 allocation after the initial May 2004 Allocation is announced, the Agency or the Department, on behalf of the EWA, may request a decrease in the amount of Purchase Water, except that any Purchase Water already delivered to the Department will remain in the ownership and control of the Department as an asset of the EWA.
- (g) The Agency may notify the Department in writing on the 1st of each month beginning June 1, 2004, of the availability of additional purchase Water over and above the amounts required to be made available in accordance with Exhibit A. Such notice will include the information provided in Article 11(d) of this Agreement. The Department will respond to the Agency within 30 days of receipt of the Agency's notice as to the quantity (if any) of additional Purchase Water the Department requests the Agency to deliver. The price of additional Purchase Water shall be in accordance with the price shown in Exhibit A based on the SWP Allocation at the time the Department requests the water.
- (h) The Agency shall deliver Purchase Water to the Department at O'Neill Forebay, by exchange for the Agency's SWP 2004 Table A Allocation or Article 21 water that would otherwise be delivered for use within the Agency. Purchase Water will be delivered at mutually agreeable times and at rates of delivery in accordance with Article 12 of the Agency's Water Supply Contract, at which time the water shall become EWA water. The Agency will

make all reasonable efforts to deliver Purchase Water after high point in San Luis Reservoir and prior to low point in San Luis Reservoir. If EWA needs to repay the Bureau for curtailments in export pumping, and the Department files a petition with the State Water Resources Control Board to change the place of use of any Purchase Water after it is delivered to EWA for such repayment, the Agency agrees that it will not object to or protest any such petition.

- (l) The Agency agrees that Purchase Water will be made available and delivered to the Department by exchange of SWP 2004 Table A Allocation or Article 21 water pursuant to this Agreement after or as such water has been replaced by (1) groundwater pumped and used in Agency service areas in lieu of scheduled SWP 2004 Table A Allocation Water or (2) by reclassification of previously banked water as banked SWP 2004 Table A Allocation or Article 21 water, if the Agency would otherwise store such 2004 SWP water in the groundwater basin. Any such reclassification of previously banked water shall be accomplished in accordance with applicable state law and water rights. Agency shall submit to the Department confirming documentation of the groundwater accounting by January 30, 2005.

12. CHARGES

For Purchase Water delivered by exchange for Agency's 2004 SWP water, the Agency shall pay to the Department the SWP charges associated with the delivery of Purchase Water from the Delta to O'Neill Forebay. Agency shall pay the Department for the variable operation, maintenance, power,

and replacement components of the Transportation Charge of the Water Supply Contract related to conveyance of 2004 SWP water to O'Neill Forebay for the year of delivery. Agency shall be obligated for all payments under its long-term Water Supply Contract with the Department, including the Off-Aqueduct Power Facilities Charges for the year of delivery. Any storage or conveyance costs or losses and any liability associated with the Purchase Water, once delivered to the Department at O'Neill Forebay, shall be the responsibility of the EWA.

- (b) If necessary, portions of Purchase Water may be recovered through groundwater pumping and introduced into the California Aqueduct for delivery back in the Agency's service area in lieu of scheduled 2004 SWP Table A Allocation Water, provided that an agreement between the Department and the Agency for introduction of local water and flood water into the California aqueduct is executed beforehand and the operation is carried out in accordance with the terms and conditions laid out in that Agreement. Such an operation shall not be subject to conveyance charges for the water introduced into the Aqueduct.

13. PAYMENTS AND INVOICING

- (a) Within ten working days after announcement of the May 2004 SWP Allocation, Agency shall invoice the Department for the forty (40) dollar per acre-foot option fee described in Article 11(c) above.

- (b) The Department shall pay the Agency for delivery of Purchase Water pursuant to Article 11 of this Agreement at the price set forth in Exhibit A. The purchase price for optional purchase water shall be reduced by any option fees paid for that water. The Agency shall invoice the Department on a monthly basis, by the fifteenth of each month, for the quantity of Purchase Water made available during the preceding month.
- (c) Two copies of each invoice bearing the Agreement Number and the Agency's Taxpayer Identification Number shall be submitted to the Department at following address:
- Mr. Dan Flory, Chief
State Water Project Analysis Office
Department of Water Resources
Post Office Box 942836
Sacramento, California 94236-0001
- (d) One additional copy of each invoice shall be sent simultaneously to the Department's Accounting Office at the following address:
- DWR Accounting Office, Contracts Payable Unit
Post Office Box 942836
Sacramento, California 94236-0001
- (e) The Department shall pay the Agency following receipt of the Agency's invoices prepared in accordance with this Article 13 within sixty (60) days of receipt of an invoice from Agency.

14. FORCE MAJEURE

Any flood, earthquake, failure of the California Aqueduct, acts of God (other than drought), court decision, or any other events beyond the reasonable control of the

Department or the Agency constitute a force majeure event and would allow suspension of performance for the duration of the force majeure event.

15. NOTICES

Any notice, demand or request made in connection with this Agreement shall be in writing and shall be deemed properly served if delivered in person or on the third day after mailing, if mailed by first class mail, postage prepaid, to the addresses specified below:

To the Department: Mr. Dan Flory, Chief
 State Water Project Analysis Office
 Department of Water Resources
 Post Office Box 942836
 Sacramento, California 94236-0001
 Fax: (916) 653-9628
 E-Mail: dflory@water.ca.gov

To Agency: Mr. Thomas N. Clark
 General Manager
 Kern County Water Agency
 Post Office Box 58
 Bakersfield, California 93302-0058
 Fax: (661) 634-1438
 E-Mail: tnclark@kcwa.com

16. WATER RIGHTS

No Party hereto shall assert that any activity under this Agreement shall affect the validity of any existing water rights held by any Party.

17. CONTRACT NOT A PRECEDENT

The Parties intend that the provisions of this Agreement shall not bind the Parties as to the provisions of any future agreement between them. This Agreement was developed specifically for the EWA and the specified Agreement term.

18. MODIFICATION

This Agreement may be modified only upon mutual written consent of the Parties.

19. NO THIRD-PARTY BENEFICIARIES

No third-party beneficiaries are intended or created by this Agreement.

20. ASSIGNMENT

This Agreement is not assignable either in whole or in part, except upon mutual written consent of the Parties.

21. COMPLETE CONTRACT

Other than as specified herein, no document or communications passing between the Parties to this Agreement shall be deemed as part of this Agreement. The Parties may amend this Agreement in writing.

22. WAIVER

The waiver, at any time, by either Party of its right with respect to default or other matter arising in connection with this Agreement, shall not be deemed a waiver by that Party with respect to any subsequent default or matter.

23. TIME

Time is of the essence in this Agreement.

24. LIABILITY

The Agency shall hold the Department, its officers, agents, or employees harmless and indemnify them for damages of any nature whatsoever arising out of this Agreement.

25. SIGNATURE CLAUSE


The signatories represent that they have been appropriately authorized to enter into this Agreement on behalf of the Party for which they sign.

26. RESOLUTION

The Agency must provide the Department with a copy of a resolution, order, motion, or ordinance of the local governing body which, by law, has authority to enter into this Agreement, authorizing execution of this Agreement.


IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the date first written above.

Approved as to legal form
and sufficiency:




Chief Counsel
Department of Water Resources

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

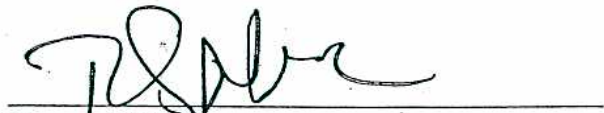


Director



General Counsel

KERN COUNTY WATER AGENCY



General Manager

EXHIBIT A

May 2004 SWP Allocation	Minimum Commitment	Optional Purchase	Price
(%)	(af)	(af)	(\$/af)
54	0	0	0
55	0	20,000	200.00
56	0	24,000	200.00
57	0	28,000	200.00
58	0	32,000	200.00
59	0	36,000	200.00
60	0	40,000	200.00
61	0	42,000	198.00
62	0	44,000	196.00
63	0	46,000	194.00
64	0	48,000	192.00
65	35,000	49,000	190.00
66	41,000	47,000	188.00
67	47,000	45,000	186.00
68	53,000	44,000	184.00
69	59,000	42,000	182.00
70	65,000	15,000	180.00
71	65,000	26,000	179.50
72	65,000	37,000	179.00
73	65,000	48,000	178.50
74	65,000	59,000	178.00
75	65,000	60,000	177.50
76	65,000	60,000	177.00
77	65,000	60,000	176.50
78	65,000	60,000	176.00
79	65,000	60,000	175.50
80	65,000	50,000	175.00
81	65,000	50,000	174.50
82	65,000	50,000	174.00
83	65,000	50,000	173.50
84	65,000	50,000	173.00
85	65,000	50,000	172.50
86	65,000	50,000	172.00
87	65,000	50,000	171.50
88	65,000	50,000	171.00
89	65,000	50,000	170.50

EXHIBIT A (CONTINUED)

2004 SWP Allocation	Minimum Commitment	Optional Purchase	Price
(%)	(af)	(af)	(\$/af)
90	65,000	50,000	170.00
91	65,000	50,000	169.00
92	65,000	50,000	168.00
93	65,000	50,000	167.00
94	65,000	50,000	166.00
95	65,000	50,000	165.00
96	65,000	50,000	164.00
97	65,000	50,000	163.00
98	65,000	50,000	162.00
99	65,000	50,000	161.00
100	65,000	50,000	160.00

ADDENDUM 6

**Uniform Appraisal Standards for Federal
Land Acquisitions (UAS) References**

Uniform Appraisal Standards for Federal Land Acquisitions (UAS) References

The UAS was searched for references to water, water rights and irrigation. Those sections where these references occur, that are considered significant for the valuation of water rights, are quoted in full or in part. In addition, other sections of the UAS that are particularly applicable to water right valuations are commented upon and sometimes quoted. All underlines in the primary quoted text are Herzog's insertions, and strikeouts of the quoted text are also Herzog's. All direct extractions from the UAS are in quotation marks and indented.

Unless otherwise noted, wherever the term "water right(s)" appears, it should be taken to mean all forms of ownership interest in water that may be separated from real estate. The primary water right that cannot be separated from real estate is riparian. Unless specific reference is made to riparian water rights, they are not the water rights being discussed.

Appropriative rights used for irrigation are considered to be appurtenant to the real estate where the water application takes place, therefore, they are a real property right. Such rights can, however, be transferred from one parcel to another. Appropriative rights that are utilized for municipal and industrial purposes result in the actual water becoming personal property when it is delivered to the customer.

Contractual entitlements are not water rights; they are intangible assets.

It is absolutely critical for the appraiser and the agency to understand and clearly define the interest being appraised at the beginning of the assignment. If the water right is appurtenant to real estate, then it is included in the *bundle of rights* associated with a particular parcel of land and a *partial acquisition* is being made (See Section B-11). If the water rights are an integral and important part of the value of the ownership, then a *before and after* approach will be required. This would be the case in appraising the water rights associated with 40 acres of irrigated land. If, on the other hand, one is appraising the water rights associated with 40 acres of irrigated land which is part of a 5,000 acre ranch with 1,000 irrigated acres, it is probable that a *takings + damages* approach would be more reasonable. The cost and effort of appraising the whole property with and without the water right would not be warranted. In this latter situation, the water right would be valued on a stand-alone basis with damages to the remainder being analyzed as well.

Any time that a *before and after* approach is taken, then the UAS can be applied without modification provided that the appraiser insures that all aspects of the water right is taken into consideration both *before and after*. In a *takings + damages* approach, the value of the water right on a *stand-alone* basis would be estimated with any damages to the remainder, if any, being added. Even when the water right is being valued on a *stand-alone* basis, the principles of highest and best use and "larger parcel" apply to the real estate of which the water right is a part.

Part I – Introduction

Sections A-1 through A-10 describe the presentation and contents of the Introduction section of an appraisal report. All of these apply to a water rights valuation. Special attention should be given to Section A-10, Summary of Appraisal Problems. The first reference in the UAS to water rights appears in the final paragraph of that section.

A-10. Summary of Appraisal Problems.

“This section gives the appraiser the opportunity to acquaint the reader of the appraisal report with the specific appraisal problems, if any, which have been encountered by the appraiser and that will be discussed in detail in the body of the appraisal report. Appraisers are encouraged to take advantage of it. If the property under appraisal is a single-family residence, the whole of which is being acquired, in an area of plentiful market data, the appraiser will usually only report that no special appraisal problems were encountered. However, federal land acquisitions are seldom that simple.

In considering subjects to be discussed in this section of the report, appraisers should review the subjects discussed in Section B of these Standards, which cover many of the specialized, sometimes complex, appraisal problems often encountered in preparing appraisal reports for federal [land-property](#) acquisition purposes. The appraiser should briefly describe the principal problems presented in estimating the market value of the property under appraisal and describe the estate to be taken. In the case of a partial acquisition, the appraiser should describe the principal differences in the property between the before and after situations, including a brief description of the government’s project and any changes in the highest and best use of the subject property.

If the parcel under appraisal includes **water rights**, minerals, or suspected mineral values, fixture values, growing crops, or timber values, the treatment of their contributory value should be discussed, including the methodology employed to avoid the forbidden *summation* or *cumulative* appraisal.²⁶ If the valuation of the property required the use of any consulting reports, the appraiser should describe such reports, the method of utilization thereof, and the weight or reliance placed thereon.” (*end of excerpt*)

The “forbidden *summation* or *cumulative* appraisal” can occur when appraising a whole property that has two or more real property components to it that could be separated from each other and individually marketed (see Section B-13). It is not wrong to develop market values for each component. It is wrong to simply add up the individual conclusions and present the sum as the market value of the whole. The value of the whole must reflect the perspective of the private buyers and sellers in the market – when buying and selling the whole. Usually, the market will not take a summation approach but will apply a discount to the sum of the pieces.

²⁶ See Section B-13, “The Unit Rule,” in these Standards.

In the case of valuing water rights or contractual entitlements to water that have an historical use of irrigation for agricultural production, care should be exercised on a several issues. Unless there is evidence from the market of similar properties being purchased primarily for their water right, then there would be no reason to value the whole by separating its components and then combining them. The whole should be valued by directly comparing the subject to other irrigated parcels.

If the highest and best use of the land is transitioning from irrigated agriculture to urban use of the water and non-irrigated use of the land, then it is possible that the value of the water rights alone could exceed the value of the irrigated land. However, evidence should exist in the market of the transition before the appraiser is justified in concluding to a water rights value that is equal to or above the value of irrigated land. See Section B-9 regarding conjectural and speculative evidence.

Demand and supply must be considered, as well as all costs associated with obtaining a change in point of diversion and purpose of use.

Part II – Factual Data

A-11. Legal Description. In addition to the legal description of the land to which the water right is attached, it is important to identify the water right being valued and its validity. This should be done before any appraisal begins. Reaching conclusions about the validity of the water right, and its effective date of origin, is the responsibility of the agency interested in acquiring that water right. Appraisers generally do not have the expertise to perform this task with a high degree of certainty. The validity of the right being appraised will be an Extraordinary Assumption of the appraisal. Therefore, the agency should confirm the validity of the water right prior to engaging the appraiser. An alternative would be to have this research be part of the appraisal process with the appraiser engaging a sub-contracting attorney to perform this research. If this approach were taken, then the assignment should be “phased” with the water right research being Phase I and the appraisal being Phase II.

If the water right is a result of a permit issued by the State Water Resources Control Board (Board) then there will be a “License to Divert” that identifies the date of the license, amount of water that can be extracted, the point of diversion, the purpose of use and the season of use. All of these items are significant in that they help to identify the obstacles and opportunities that a buyer of that water right is faced with.

If the water right is pre-1914 appropriative, then there will not be a License to Divert since the water right pre-dates the Board. The owner should have documentation that proves the water right. It would be advisable for a water rights attorney on staff with the acquiring agency to confirm the validity of the water right. A document recorded with the county is not sufficient proof, in and of itself, of the validity of the water right. There must be evidence of the actual exercising of that right through the years.

If the water right is a riparian right, then it can not be separated from the land in California.

If it is a groundwater right, there will not be a License to Divert but there should be a use history that the property owner can provide. Groundwater rights are usually associated with overlying lands, but there can be appropriated groundwater as well. Any related groundwater management units, and associated restrictions, should be researched.

If it is a contractual entitlement to water, then the party benefiting from that entitlement is not the holder of the primary water right. Frequently, this is the situation in an irrigation district. The district may have appropriative rights with contractual agreements to deliver water, upon certain conditions, to an irrigator within the district. The irrigator may not have the right to transfer the contractual entitlement to another party without the district's permission. The district itself may obtain the water through contractual entitlements, which is the case in both the Central Valley Project and the State Water Project.

Adjudicated water rights will have a court decree reference with rights to specific amounts of water allocated among a group of water users. Point of diversion, period of use and purpose of use may also be stipulated. A copy of the decree should be obtained by the public agency and reviewed by staff attorneys prior to engaging the appraiser. The decree and the attorney's written opinion regarding the water right being appraised should be provided to the appraiser and included in the addenda of the appraisal. Both surface and groundwater rights can be adjudicated.

A-12. Area, City and Neighborhood Data.

“This data (mostly social and economic) must be kept to an absolute minimum and should only include such information that directly affects the appraised property, together with the appraiser's conclusions as to significant trends.”

When appraising water rights, it is critical that the appraiser accurately describes the market in which the right exists, as well as trends in that market. This is also an opportunity for the appraiser to convince the reader that the appraiser has a sufficient level of competency to value this type of property. The extent of the area/market described should encompass not only the subject property but also the region from which comparable sales will be utilized. The foundation for the highest and best use conclusions and future adjustments made to comparable sales is laid in this section of the report. It would be appropriate to re-label this section “Area Data and Market Trends” for water rights appraisals. Value ranges for irrigated agricultural lands should be included as well as water costs from various sources in the area of the subject.

A-13. Property Data.

- A. Site.** The current point of diversion should be described in this section.
- B. Improvements.** The UAS indicates that “irrigation systems” and “domestic and private water systems” should be described. A brief description of the existing infrastructure facilitating the application of the water at its historical location of use is appropriate. However, unless those systems are being included in the

valuation, possibly when both land and water rights are being acquired, the description should be very brief. If the water right is exercised by delivery through an off-site infrastructure to the current place of use, i.e. “upstream” from the place of use, then that infrastructure should be described in detail along with any costs associated with infrastructure use. This is especially important if any buyer of the water rights will have continuing financial responsibility for maintenance costs for this infrastructure, even if it is no longer used for delivery to the new point of diversion.

- C. **Fixtures.** Not applicable.
- D. **Use history.** A detailed description of the historical use of the water is important along with the source of the information presented. It should be kept in mind that a period of non-use of five years or longer can cause a loss of the water right based on California law. The “consumptive use” that has occurred historically associated with this water right, especially in recent years, must be understood. Most appraisers can only deal in general terms with this by referencing evapotranspiration of applied water by crop type from published tables. It is frequently required that either qualified agency personnel or a private consultant do sufficient analyses to reach conclusions about the consumptive use associated with the water right.
- E. **Sales history.** If the water right or the land and water right combined have been sold, then this information should be presented according to UAS requirements. Market offerings made by the owner to sell the water rights, or offers made to the owner by others to buy the water rights should be reported upon.
- F. **Rental History.** Water leasing does take place, and if the water right has been leased in the past, that information should be presented. Market offerings made by the owner to lease the water rights, or offers made to the owner by others to lease the water rights should be reported upon.
- G. **Assessed Value and Annual Tax Load.** A water right does not have an Assessor’s parcel number or any assessed value. The water right most commonly impacts the assessed value of a parcel of real estate because of value enhancement.
- H. **Zoning and Other Land Use Restrictions.** A water right is not “zoned,” but it can be subject to a wide range of restrictions on use. As indicated earlier, a License to Divert will detail certain restrictions. An overriding principal in all water right transfers is the “no harm” rule, i.e. no other water right holder can be damaged by a proposed water right transfer. Consequently, it is usually only the consumptive use that has historically occurred that will be available for transfer, not the “face value” of the water right.

Part III – Data Analysis and Conclusion

The UAS presents Data Analysis and Conclusions before acquisition in Part III and after acquisition in Part V. If there is a situation where *before and after* valuations are required, then the valuation methodology presented in the UAS should be adhered to while considering the unique factors of water rights appraisals addressed in these guidelines. If the water right is being valued on a stand-alone basis, then the “after” analysis would not be required. The following edits pertain to the stand-alone valuation.

“A-14. Analysis of Highest and Best Use. The appraiser’s determination of highest and best use is one of the most important elements of the entire appraisal process.⁴⁵ Therefore, the appraiser must apply his or her skill with great care and clearly justify the highest and best use conclusion in the appraisal report.

The highest and best use of the land, as if vacant, and including the water right is first estimated. If the land is improved, the highest and best use of the property, as improved, is then estimated. In some cases, the highest and best use of property cannot be reliably estimated without extensive marketability and/or feasibility studies, which in complex cases may call for the assistance of special consultants.⁴⁶ Before it can be concluded that any use for the property is its highest and best use, that use must be physically possible, legally permissible, financially feasible, and must result in the highest value. Each of these four criteria must be addressed in the appraisal report.

If the appraiser concludes a highest and best use that will require a rezoning of the property or modification in point of diversion and/or purpose of use of the water right, the probability of that rezoning or modification must be thoroughly investigated, analyzed and reported. Likewise, if the appraiser’s highest and best use conclusions will require other forms of government approval, the probability of obtaining those approvals must be investigated, analyzed, and reported. The extent of the investigation and analysis required by the appraiser to meet the requirements of this standard will be found in Section D-6.

Essential in the appraiser’s conclusion of highest and best use is the determination of the *larger parcel*.⁴⁷ The appraiser must make a larger parcel determination in every appraisal conducted under these Standards, even in the case of a minor partial acquisition where the client agency has determined a complete before and after appraisal is not necessary. The appraiser’s analysis that led to the larger parcel determination and the determination itself must both be reported.⁴⁸ Because the ultimate determination of highest and best use is the appraiser’s to make, and that determination cannot be made until after considerable investigation and analysis has

45 See Section B-3.

46 See Section D-4. See also Section D-3.

47 The larger parcel, for purposes of these Standards, is defined as that tract, or those tracts, of land which possess a unity of ownership and have the same, or an integrated, highest and best use. Elements of consideration by the appraiser in making a determination in this regard are contiguity, or proximity, as it bears on the highest and best use of the property, unity of ownership, and unity of highest and best use.

48 The legal basis and reasoning for this specific Standard may be found in Section B-11.

been completed, the appraiser's conclusion as to the larger parcel is sometimes different from the specific parcel he or she was requested to appraise by the agency. In such an instance, the appraiser shall inform the agency of his or her determination of the larger parcel and the agency shall amend the appraisal assignment accordingly.

Appraisers must bear in mind that the determination of the larger parcel is required in every appraisal assignment; irrespective of whether the agency has designated an acquisition a *total acquisition* or a *partial acquisition*. This is so because, from a practical standpoint, whether an acquisition is a total or partial acquisition cannot be determined until such time as the appraiser has made a determination of the highest and best use, and the larger parcel. By applying the rules for larger parcel determination, as described in Section B-11, it is possible that two physically separate tracts may constitute a single larger parcel, or conversely, a single physical tract may constitute multiple larger parcels. This can be important not only in consideration of damages and special benefits, but also in the appraiser's selection and comparative analysis of comparable sales.⁴⁹

In light of the discussion in Section B-11 regarding the larger parcel, it is recommended that the appraiser begin an analysis of the *unity of ownership* test with the premise that, in making their larger parcel determination, it is allowable to consider all lands that are under the beneficial control of a single individual or entity, even though title is not identical in all areas of the tract(s). If the appraiser then concludes that the larger parcel constitutes lands that are under the beneficial control of a single entity, but title is not identical, the appraiser's larger parcel determination, together with the facts upon which it is based, should be submitted to agency, or Department of Justice, legal counsel for review before the appraiser proceeds. Based on applicable case law and the facts of the case, legal counsel can then determine whether, as a matter of law, the unity of ownership test of the larger parcel is present, and provide written legal instructions to the appraiser accordingly.

Appraisers conducting appraisals for federal land exchanges, or in connection with inverse condemnation claims, should be aware that the tests applied in larger parcel determination may be different than that suggested above. For a discussion of those potential differences, appraisers should refer to Section D-7 regarding federal land exchange appraisals and to Section D-8 regarding inverse condemnation appraisals.

The use to which the government will put the property after it has been acquired is, as a general rule, an improper highest and best use.⁵⁰ It is the value of the land acquired which is to be estimated, not the value of the land to the government. If it is solely the government's need that creates a market for the land, this special need

49 For instance, if an appraiser determined that the larger parcel was a ten-acre tract out of a total ownership of 200 acres, the unit (e.g., per sq. ft.; per acre) value may well be different for the smaller tract, and the appraiser would utilize comparable sales similar in size to the 10 acre larger parcel, rather than sales similar in size to the entire 200 acre ownership.

50 See Section B-3 for the legal basis of this statement.

must be excluded from consideration by the appraiser.⁵¹ Only on the rare occasion that a private demand for the land exists, for the same use for which it is being acquired by the government, is it proper for the appraiser to conclude that the highest and best use of the property is that use for which it is being acquired by the government.

The appraiser's estimate of highest and best use must be an *economic* use. A noneconomic highest and best use, such as *conservation, natural lands, preservation*, or any use that requires the property to be withheld from economic production in perpetuity, is not a valid use upon which to estimate market value.⁵² Therefore, any appraisal based on such a non-economic highest and best use will not be approved for federal land acquisition purposes. Similarly, an appraiser's use of any definition of highest and best use that incorporates non-economic considerations (e.g., value to the public, value to the government, or community development goals) will subject the appraiser's report to disapproval for use for federal land acquisition purposes."

"A-15. Land Valuation. The appraiser shall estimate the value of the land for its highest and best use, as if vacant and available for such use. In doing so, the appraiser's opinion of value shall be supported by confirmed sales of comparable or nearly comparable lands⁵³ having like optimum uses. Differences shall be weighed and explained to show how they indicate the value of the land being appraised. Items of comparison shall include property rights conveyed, financing terms, conditions of sale, market conditions, location, and physical characteristic. The appraiser shall provide adequate information concerning each comparable sale used and the comparative analysis to enable the reader of the report to follow the appraiser's logic.⁵⁴"

The above is only the first paragraph of Section A-15. The rest of the text deals with the *development approach* to land valuation which is not relevant.

Sections A-14 and A-15 are particularly relevant to water rights appraisals with locations that are disconnected from the water delivery infrastructure from which potential urban buyers draw their water supplies. If delivery to an urban entity is either not physically possible or not financially feasible due to the infrastructure (e.g. pipeline construction) costs, then the highest and best use cannot involve the sale of the water right to an urban entity. Therefore, water rights sales to urban entities are not appropriate comparable transactions to use in the valuation.

51 bid.

52 See Section B-3 for the legal basis and reasoning for this standard.

53 For a discussion of what legally constitutes a comparable sale and the admissibility of comparable sales information, see Section B-4 of these Standards.

54 For a discussion of comparable sales documentation and information required and the requirements for comparison, see Section A-17 of these Standards.

From a wildlife perspective, the need for water in a refuge or stream may be equally critical in two separate locations, one where there are a variety of economic uses for water (including urban purchase) and another where only irrigation is an economic use for water. Even though the wildlife need is the same, the water value will probably not be.

A-16. Value Estimate by the Cost Approach.

“...Entrepreneur’s profit, as an element of reproduction or replacement cost, must be considered and discussed, and if applicable, should be derived from market data whenever possible. If the appraiser will place considerable weight on this approach to value in reaching a final value estimate, consideration should be given to retaining the services of a contractor or professional cost estimator to assist in developing the reproduction or replacement cost estimate.”

The rest of the section is applicable mainly to improvements to land such as structures.

If the potential of replacing surface water with groundwater exists, then the cost of developing the groundwater resource can be considered a “replacement cost” for the surface water. If one is to take this approach, knowledge must be gained regarding:

- the legal restrictions associated with groundwater use;
- the depth to usable groundwater and how much it varies from season to season;
- typical drawdown during pumping;
- if there is a trend evident in the level of groundwater over recent years;
- pumps and fuel that are common in the area and associated costs both initially and of operation, generally on a per acre-foot basis;
- life expectancy of pumps and well casings; and
- amortization rate appropriate for use in estimating depreciation.

One or more local experts may be required to develop credible information. These experts could include local well drillers, irrigation districts and farm organizations. The Department of Water Resources may have information regarding groundwater conditions. Every five years the DWR publishes Bulletin 160 which gives regional groundwater conditions as well as other useful information. Bulletin 118, *California’s Groundwater*, was updated in 2003 and is also an important reference.

There is another potential water source that could supply replacement cost information, i.e. desalination. The cost of this process appears to be decreasing significantly in recent years. It is still generally one of the most expensive options available. However, there are some urban agencies along the Pacific Ocean that are incorporating desalination into their overall water supply. It is conceivable that in the future desalination plants could move inland and be used to deal with high salt concentrations of surface waters in the Central Valley. This would in effect be a new water source that could be sold in the market. Until that time, desalination costs would only be relevant in highly select situations where such development were proven to be feasible. Salt disposal costs would also have to be considered.

Entrepreneurial profit should be included in any final cost estimate, because an alternate supply would be developed by someone only if it were a profitable endeavor.

As in the case of typical real estate appraisals, the cost approach is generally not as well received as the sales comparison approach, but it can provide important supplemental information. There are occasions when it may be the only approach applicable due to the absence of similar market sales.

“A-17. Value Estimate by the Sales Comparison Approach. Since any recent and unforced sale of the property under appraisal can be the best evidence of its value,⁶² any such sale is treated as a *comparable sale* in this approach to value. It shall be analyzed like any other comparable sale and given appropriate weight by the appraiser in concluding a final estimate of value of the property. As noted in Section A-13e of these Standards, an unsupported claim that a sale of the subject property was a *forced* sale or not indicative of its value is unacceptable.

All comparable sales used shall be confirmed by the buyer, seller, broker or other person having knowledge of the price, terms, and conditions of sale.⁶³ When a comparable sale is of questionable nature and/or admissibility (e.g., sales to a government entity) special care must be taken in the verification of the circumstances of the sale.⁶⁴ A narrative comparative analysis of each comparable sale shall be made explaining how the sale relates to the property under appraisal in respect to those features which have an effect on market value.

In selecting the comparable sales to be used in valuing a given property, it is fundamental that all sales have the same economic highest and best use as the property under appraisal and that the greatest weight be given to the properties most comparable to the property under appraisal. In this regard, appraisers must recognize that, when valuing a property with a highest and best use for some form of development that will require rezoning or extensive permitting, sales of similar properties may require extensive analysis and adjustment before they can be deemed economically comparable. The analysis and adjustment of such sales is discussed in Section D-9 of these Standards.

Each appraisal must contain a sufficient description of the comparable sales used so that it is possible for the reader to understand the conclusions drawn by the appraiser from the comparable sales data. ~~Photographs of the comparable sales are valuable visual aids that indicate the comparability of the property recently sold with the property under appraisal. Such photographs must accompany each~~

62 See Section B-5 of these Standards.

63 These Standards require that sales verification be conducted by competent and reliable personnel, and if the case goes into condemnation, the sale must be personally verified by the appraiser who will testify. However, appraisers should recognize that some agencies may require in their appraisal contracts that initial verification be made by the appraiser who will sign the appraisal report.

64 For a description of the verification process required by these Standards for such sales see Section D-9.

~~appraisal report not only to aid the reviewing appraiser but also for the agency's records and for later use in possible condemnation trials. In addition to the identification of the property, every photograph should show the date taken and the name of the person taking the photograph.~~

The preferred method of adjusting comparable sales is through the use of quantitative adjustments whenever adequate market data exists to support them: “[q]uantitative adjustments are developed as either dollar or percentage amounts. Factors that cannot be quantified are dealt with in qualitative analysis.”⁶⁵ Only when adequate market data does not exist with which to support quantitative adjustments should the appraiser resort to qualitative adjustments (i.e., inferior, superior).⁶⁶ Appraisers must bear in mind that quantitative and qualitative adjustments are not mutually exclusive methodologies. Because one factor of adjustment cannot be quantified by market data does not mean that all adjustments to a sale property must be qualitative. All factors that can be quantified should be adjusted accordingly. When quantitative and qualitative adjustments are both used in the adjustment process, all quantitative adjustments should be made first.⁶⁷ When using quantitative adjustments, appraisers must recognize that not all factors are suitable for percentage adjustments. Percentage and dollar adjustments may, and often should, be combined.⁶⁸ Each item of adjustment must carefully be analyzed to determine whether a percentage or dollar adjustment is appropriate.

When appraisers must resort to qualitative adjustments, they must recognize that this form of comparative analysis will often require more extensive discussion of the appraiser's reasoning. This methodology may also require the presentation of a greater number of comparable sales. It is essential, of course, that the appraiser specifically state whether each comparable sale is generally either overall superior or inferior to the property under appraisal. To develop a valid indication of value of the property under appraisal by the use of qualitative analysis, it is essential that the comparable sales utilized include both sales that are overall superior and overall inferior to the property being appraised. If this is not done, the appraiser will have merely demonstrated that the property is worth more than a certain amount (if all of the sales are inferior to the subject property) or less than a certain amount (if all of the sales are superior to the subject property).

65 The Appraisal of Real Estate, 11th ed. (Chicago: Appraisal Institute, 1996), 414.

66 The decision whether to use quantitative or qualitative adjustments should be based on the question of availability of data to support quantitative adjustments. Using qualitative adjustments for the purpose of obscuring the appraiser's complete reasoning and analysis from opposing parties in litigation is an unacceptable practice and, in the view of the Department of Justice, is contrary to the intent of Rule 26(a)(2)(B) of the Federal Rules of Civil Procedure.

67 The Appraisal of Real Estate, 11th ed. (Chicago: Appraisal Institute, 1996), 440.

68 For instance, a percentage adjustment for market conditions (time) may be appropriate, but an adjustment for the fact that the property under appraisal ~~(delete: is 300' from a sewer connection)~~ needed a pipeline constructed to allow the buyer to take delivery and all of the comparable sales ~~(delete: are connected to sewer)~~ did not, should often be made in a lump sum dollar amount to reflect the cost to cure the subject property's comparative deficiency. If a percentage adjustment were applied to the price per unit (e.g., per acre-foot ~~(delete: , per sq. ft.)~~) of each comparable, the adjustment to each of the comparables would vary, depending on the price per unit of the comparable, and might have no relationship to the cost to cure subject's deficiency.

In developing a final value estimate by the sales comparison approach, the appraiser shall explain the comparative weight given to each comparable sale, no matter whether quantitative or qualitative adjustments, or a combination thereof, are used. A comparative adjustment chart, or graph, is recommended and may assist the appraiser in explaining his or her analysis in this regard.

Documentation of each comparable sale shall include the name of the buyer and seller, date of sale, legal and water right description,⁶⁹ type of sale instrument, document recording information, price, terms of sale, location, zoning, present use, and highest and best use, ~~and a brief physical description of the property. A plot plan, or sketch, of each comparable property should be included, not only to facilitate the reader's understanding of the relationship between the sale property and the subject property, but also to locate the sale property in the field.~~ This information may be summarized for each sale on a *comparable sales form* and included in this section or in the addenda of the report. ~~As noted, a photograph of each comparable sale shall also be included.~~ A comparable sales map, showing the relative location of the comparable sales to the property under appraisal⁷⁰ shall be included, either in this section or in the addenda of the report. Inclusion of a copy of the transfer document (e.g., deed, contract) in the report is neither required nor desirable, unless there is something in the document that is unusual or particularly revealing.

The definition of market value used in these Standards requires that the estimate of value be made in terms of cash or its equivalent.⁷¹ Therefore, the appraiser must make a diligent investigation to determine the financial terms of each comparable sale. When comparing the sale to the property being appraised, the appraiser shall analyze and make appropriate adjustments to any comparable sale that included favorable or unfavorable financing terms as of the date of sale. Such adjustment must reflect the difference between what the comparable sold for with the favorable or unfavorable financing and the price at which it would have sold for cash or its equivalent.

While cash equivalency of favorable or unfavorable financing can be estimated by discounting the contractual terms at current market or yield rates for the same type of property and loan term over the expected holding period of the property, the preferred method of estimating a proper cash equivalency adjustment is by the analysis of actual market data, if such data is available.”

If a *before and after* analysis is being done where sales of land with and without water rights are being compared to the subject, then the UAS requirements regarding sale documentation and inspection must be adhered to. If water rights are being valued on a *stand-alone* basis, where the purchasers in the sales were motivated by the acquisition of the

69 This may be abbreviated if lengthy (~~delete~~; or reference may be made to a tax parcel number).

70 It is important that the locations of the comparable sales and the subject property are shown on the same map so that a reader of the report, not familiar with the area, can understand the relative proximity of the properties and locate them in the field.

71 See Section B-2 of these Standards.

water right, then physically viewing the historical place of use contributes little to the analysis and could cause substantially higher fees. The appraiser must, however, understand all aspects of the water right purchased, including how the transfer was legally and physically accomplished.

A-18. Value Estimate by the Income Capitalization Approach.

Valuing water rights by the income capitalization approach would be a rare event. If the situation calls for it, then all of the items addressed in this section of the UAS are relevant. Care must be taken to insure that only the income from the water rights themselves are being included in the valuation, not the income from crops grown or some other business enterprise for which water is only one of the inputs. See the definition of Business Enterprise Value. See Section B-7 of the UAS for further discussion on this issue.

Using a foregone-net-income approach for valuing water is particularly tempting in an annual leasing situation or even a lease involving only a portion of the growing season. A farmer may take the position that if he has use of the water he will farm his land and will probably produce income within a specified range. Therefore, he will not sell the water for less than the expected income.

However, a private buyer of the water who intended a similar use of the water would be faced with a financially infeasible situation if he purchased that same water. The reason being that there would be no opportunity for profit since the price of the water already had the projected profit included.

If the buyer had a dissimilar use in mind such as growing a crop with higher profit margins, or was an urban entity that was evaluating the purchase on some other basis than income, then it may be feasible for the buyer to pay the seller's profit based price.

As inconvenient as it may be, there is no escaping the fact that market value of a real property interest can not be based on the net income derived from a business enterprise wherein the property being appraised is only one of the agents of production. If such entities have entered the market, then their sales transactions may be appropriate for use in establishing the annual value of the water, but that is different than a “farm budget” net income analysis.

Another income situation may exist for a water right being valued. The Environmental Water Account and Dry Year Purchase Programs by various entities may provide annual water sale opportunities. Whatever actual or potential sales that take place in these programs must be viewed in light of the risk associated with the income generated. Typically, the buyer pays an option price every year to those sellers that have entered into contractual relationships with them. At the buyer’s discretion, usually based upon hydrologic conditions, the seller may exercise a purchase option. The initial option price is credited toward the final sale price. Hydrologic risks as well as the termination of the programs must be taken into consideration if this income is to be the basis of a water right valuation.

The most straightforward and appropriate income based valuation of water rights lies in examining the differential between the lease rates for dry land versus irrigated land. This would be suitable for establishing an annual water right lease rate. If this annual rate is to be the basis of developing a present net value conclusion, then obviously the selection of a discount rate becomes critical which must also include consideration of variability in the annual lease rate.

A-19. Correlation and Final Value Estimate.

“The appraiser shall explain the reasoning applied to arrive at the final opinion of value and how the results of each approach to value were weighed in that opinion, and the reliability of each approach to value for solving the particular appraisal problem.

The appraiser shall also state his or her final estimate of value of all of the property under appraisal as a single amount, including the contributory value of fixtures, timber, minerals, and **water rights**, if any. The appraiser must avoid making a summation appraisal.⁷⁵ The appraiser is solely responsible for the final estimate of value. If that value estimate includes elements of value which were based on estimates developed by others (e.g., timber cruisers, mineral appraisers), the appraiser cannot merely assume their accuracy. The reasonableness of the subsidiary estimates must be confirmed in accordance with Section D-4 of these Standards.”

⁷⁵ See Sections B-13 and D-4 of these Standards

Parts IV, V and VI

These sections apply when a “before and after” analysis is required in the case of a partial taking. If that situation does arise, then the principles in these sections should be adhered to with appropriate modification for water rights valuation.

Part VII – Exhibits and Addenda

Modifications or omissions of the items referenced are fairly obvious, e.g. floor plan.

A-38. Other Pertinent Exhibits.

“These would include, for example, any written instructions given the appraiser by the agency or its legal counsel, any specialist reports (such as timber appraisals, environmental studies, mineral or **water rights studies** or appraisals, reproduction cost estimates, cost to cure estimates, fixture valuations), any pertinent title documents (such as leases or easements), and any charts or illustrations that may have been referenced in the body of the report.”

It is absolutely critical that any written instructions and legal opinions provided to the appraiser be included with the report. Clarity must exist as to what the Extraordinary Assumptions and Hypothetical Conditions of the report were. Remember, an appraiser may not modify the assignment by means of Extraordinary Assumptions or Hypothetical Conditions.

Any conclusions reached by the appraiser regarding the validity of the water rights or the quantity of water associated with the water right must be well supported. In order to utilize a specialist’s report, the appraiser must be convinced of its validity. See Section D-4.

B-3. Highest and Best Use.

This section presents fundamental principles that must be applied in valuing water rights. Whenever “land” is encountered in the text, “water rights” can be effectively substituted.

B-14. The Commerce, or “Navigational Servitude.”

Water rights are not specifically mentioned in this section, however, riparian lands are. If an appraisal involves riparian lands, then this section should be reviewed for applicability. The appraiser should always request a legal opinion before proceeding with an appraisal based on his or her own conclusion that this section applies to the situation at hand.

B-18. Price Paid by a Governmental Entity for Similar Property.

Before utilizing a comparable water rights sale where a government agency was a participant, this section and Section D-9 should be reviewed and adhered to.

B-23. Zoning and Permits.

Water rights are not zoned. Water rights do typically have restrictions on how and where they can be exercised. When considering the information and direction in this important section, “zoning,” or “zoning restrictions,” and “zoning regulations” should simply be replaced by “legal restrictions.”

ADDENDUM 7

Report Structure

Report Structure

The report presentation indicated below is taken directly from the Uniform Appraisal Standards for Federal Land Acquisitions, pages 9 to 27. Comments are inserted to alert the appraiser to certain aspects of the report under any particular heading. **Significant additional comments are presented in the previous section of the addenda – “UAS References.”**

Introduction

1. Title Page
2. Letter of Transmittal
3. Table of Contents
4. Appraiser’s Certification
5. Summary of Salient Facts and Conclusions

Include Extraordinary Assumptions and Hypothetical Conditions

6. Photographs of Subject Property

Pictures associated with historical use including water extraction and distribution facilities, as well as land where water was applied.

7. Statement of Assumptions and Limiting Conditions

Any Extraordinary Assumptions and Hypothetical Conditions should be displayed prominently in this section as well as wherever value conclusions are presented. The assignment cannot be changed by the appraiser through Extraordinary Assumptions and Hypothetical Conditions. The client must communicate these to the appraiser in writing.

8. Scope of the Appraisal
9. Purpose of the Appraisal
10. Summary of Appraisal Problems

Factual Data – Before Acquisition

11. Legal Description

For land and water right or entitlement. Most preliminary title reports exclude water rights from the items covered by title insurance. Other documentation should be reviewed carefully and discussed here. Any Extraordinary Assumptions and Hypothetical Conditions must be directed by the client and presented.

12. Area, City, and Neighborhood Data

These sections should not be generic, but must present relevant information regarding the markets for the interests being appraised. Market trends for water rights and potential buyers of the water right should be discussed in this section.

13. Property Data

- a. Site**
- b. Improvements**

A water right can be considered as an improvement to the land because it is appurtenant to it.

- c. Fixtures**
- d. Use History**
- e. Sales History**
- f. Rental History**
- g. Assessed Value and Annual Tax Load**
- h. Zoning and Other Land Use Restrictions**

The process involved in transferring a water right, including obstacles and opportunities for the subject, should be addressed. As in cases with zoning change, if a transfer is going to be the basis of valuation, then the probability of approval of the transfer must be addressed and risk of failure incorporated into the analysis.

Data Analysis and Conclusions – Before Acquisition

- 14. Analysis of Highest and Best Use**
- 15. Land Valuation**
- 16. Value Estimate by the Cost Approach**
- 17. Value Estimate by the Sales Comparison Approach**
- 18. Value Estimate by the Income Capitalization Approach**
- 19. Correlation and Final Value Estimate**

Factual Data – After Acquisition

- 20. Legal Description**
- 21. Neighborhood Factors**
- 22. Property Data**
 - a. Site**
 - b. Improvements**
 - c. Fixtures**
 - d. History**
 - e. Assessed Value and Annual Tax Load**
 - f. Zoning and Other Land Use Restrictions**

Data Analysis and Conclusions – After Acquisition

- 23. Analysis of Highest and Best Use**

- 24. Land Valuation**
- 25. Value Estimate by the Cost Approach**
- 26. Value Estimate by the Sales Comparison Approach**
- 27. Value Estimate by the Income Capitalization Approach**
- 28. Correlation and Final Value Estimate**

Acquisition Analysis

- 29. Recapitulation**
- 30. Allocation and Explanation of Damages**
- 31. Explanation of Special Benefits**

Exhibits and Addenda

- 32. Location Map**
- 33. Comparable Data Maps**
- 34. Detail of Comparative Data**
- 35. Plot Plan**
- 36. Floor Plan**
- 37. Title Evidence Report**
- 38. Other Pertinent Exhibits**
- 39. Qualifications of Appraiser**

ADDENDUM 8

California Water

California Water

This section of the report presents an overview of the history and infrastructure of California water. It is intended to help the reader understand the overall situation as it relates to the subject.

California Water

The vast majority of California is technically either semi-arid or a desert. In “normal” years, the Coast Range in the northern portion of the state has significant precipitation, as does the Sierra-Nevada Range that runs north and south along the state’s eastern edge. Most of the rest of the state gets rainfall amounts generally in the range of 10 to 20 inches annually. Precipitation that falls on the interior of Northern and Central California feeds the drainage systems of the Sacramento and San Joaquin Rivers. Both of these rivers flow into the Sacramento-San Joaquin Delta. The water in the Delta flows into Suisun Bay, and then into San Pablo and San Francisco Bays. The Delta is influenced by the tides, with salt and fresh water mixing either in the Delta or Suisun Bay depending upon the volume of the outflow. California’s river system and water project facilities are displayed on the following page (Exhibit A9-1).

Two-thirds of Californians get all or part of their drinking water from the Delta by virtue of local, state, or federal water projects that pump Delta water to the San Francisco Bay area, as well as central and southern California. Most of the cities in Northern California rely to a large extent on the Sacramento River for their water supply.

In a normal precipitation year, approximately half of the state’s available surface water (35 million acre-feet) is collected in 1,313 local, state and federal reservoirs. This water is called “developed water” because it is managed, stored, diverted from rivers, or otherwise developed for human consumptive or environmental use.

Another source of water other than surface runoff from rainfall is groundwater. A large percentage of the state’s water supply in a normal year comes from groundwater, but groundwater usage can increase during drought years. There are some potential problems associated with using groundwater. Anytime more water is extracted from a groundwater basin than is replenished on a long-term basis, that basin is in an “overdraft” situation. Problems associated with long-term overdraft include lowered water tables with resulting higher pumping costs, salt water intrusion if the basin is near an ocean or bay, and subsidence. Subsidence occurs when water is extracted from a basin and the earth compresses, or collapses, and fills the void left by the removal of the water. When this happens, the storage capacity of the basin is lost and cannot be recovered.

Agriculture

California agriculture is estimated to use approximately 80 percent of the developed water for irrigation. Most of the land suitable and available for irrigated crop production has already been developed for that purpose.

The Projects

While approximately 75 percent of the water usage occurs in the southern portion of the state, 75 percent of the precipitation in California falls in the northern portion of the state. Obviously, a significant water transportation and storage system must be in place to maintain this population/precipitation situation. The two main water projects in the state consist of the CVP (Central Valley Project) and SWP (State Water Project), which will be discussed in greater detail in the following paragraphs. As part of their operations, both of these projects extract water from the Delta for delivery to the end users south of the Delta. The Delta is the hub of California's water system.

The U.S. Bureau of Reclamation administers the system of dams, canals, pumping stations and hydroelectric power plants that comprise the CVP. The California Department of Water Resources (DWR) administers the SWP.

There have been smaller, though still significant, water projects developed by other public entities. Examples of these are San Francisco's development of Hetch-Hetchy; MWD's (Metropolitan Water District) construction of the Colorado aqueduct; and Los Angeles' acquisition of Owens Valley's water rights and construction of the Los Angeles Aqueduct. Numerous other smaller projects exist throughout the state that have been predominantly developed by local water districts.

Central Valley Project: The CVP became operational in the early 1950s with its first water rights permit issued in 1958, while its principal permits were issued in 1961. Lake Shasta on the Sacramento River, Folsom Reservoir on the American River, New Melones Reservoir on the Stanislaus River, and Friant Dam on the San Joaquin River are some of the largest water capture and storage facilities comprising the CVP, though there are many others as well.

The CVP shares the San Luis Reservoir with the SWP. The reservoir is located south of the Delta and is primarily a storage facility. It is positioned in an area that receives approximately 10-15 inches of rain per year, with a very limited watershed, so it does not capture much water on its own. It has been the historical practice of the CVP and SWP to try to fill San Luis during the winter and spring with water extracted from the Delta. This stored water is then used to supplement Delta deliveries during the summer and fall to the San Joaquin Valley and Southern California.

The distribution system for delivery of the CVP's captured water includes hundreds of miles of canals. The primary use of the delivered water of the CVP is agricultural, specifically irrigating cropland and orchards. Some municipalities receive their water from the CVP as well. Total deliveries of the CVP prior to the drought were approximately eight million acre-feet per year throughout the state. Much of this water is provided to users north of the Delta. South of the Delta, the CVP supplies its contractors by extracting



EXHIBIT A9-1
 California River Systems and Water Project Facilities
 (Source: California Water Plan Update, Volume 1, Bulletin 160-93, Page 2)

water from the Delta at its Tracy Pumping Plant, which pumps water into the Delta-Mendota Canal. Also, several of the rivers flowing from the Sierra into the San Joaquin Valley have dams and reservoirs that are part of the CVP system. The primary canal that delivers water from these facilities to the end users is the Friant-Kern Canal.

State Water Project: The SWP became operational in 1967. The main reservoir in Northern California for the SWP is Lake Oroville on the Feather River, which is tributary to the Sacramento River. There are several other smaller reservoirs in the SWP system, but overall it is significantly smaller than the CVP system. Approximately 60 percent of the water delivered by the SWP is for urban uses, and the other 40 percent for agricultural uses. Much of the agricultural uses are in the Feather River area north of the Delta. The SWP Delta extraction facility, the H.O. Banks Pumping Plant, is located near the CVP's pumps. As indicated previously, the SWP and CVP share San Luis Reservoir.

The Relationship of the Delta and the Projects: The Sacramento River provides most of the water to the Delta, and enters the Delta from the north. The extraction facilities for the SWP and CVP projects are located in the south Delta near the city of Tracy. Approximately 15 to 20 percent of Sacramento River water flows toward the pumps naturally through Georgiana Slough. The Bureau of Reclamation constructed and operates the Delta Cross Channel to facilitate larger amounts of Sacramento River water reaching the pumps. This Cross Channel is closed when the flow volume down the Sacramento is large enough to prompt concerns of flooding or when out-migrating salmon are present. When the Cross Channel is open, it allows an additional 15 to 20 percent of Sacramento River water to flow into the central Delta.

“Reverse flows” occur when the pumps at the projects are extracting so much water that the flow in the San Joaquin River and interior Delta is toward the pumps and not toward Suisun Bay. Basically, anytime the pumps are extracting more water than is coming down the San Joaquin River, reverse flows occur. Pumping capacities in the south Delta in the mid-1990s were as follows: CVP 4,600 cfs (cubic feet per second); SWP 10,300 cfs; and Contra Costa 285 cfs. (One thousand cubic feet per second flowing for a full year would result in the movement of approximately 724,000 acre-feet total.)

In summary, a complex system of federal, state, and local water projects exists in California. One of the primary purposes of the larger projects is to move water from where it naturally occurs to where the demand for it exists. This means moving water from the north of the state to the south of the state. The main obstacle in this system is the Delta and its water quality and habitat requirements. Both the CVP and the SWP are constrained as to timing and amount of extractions from the Delta because of the Delta requirements. The CVP's Friant system deliveries to the Southern San Joaquin Valley do not come out of the Delta, but the SWP has no alternate source of surface water for its contractors south of the Delta.

ADDENDUM 9

Regional and Area Data

Regional and Area Data

Regional and area maps are displayed at the end of this addendum. Factors pertaining to the markets most relevant to the subject are presented below.

DWR designated the general area of the subject as being the Tulare Lake Region (see following maps). The following paragraphs describing this region are taken from DWR's Bulletin 160-93, *The California Water Plan Update, Volume 2*, beginning on page 179.

The Tulare Lake Region includes the southern San Joaquin Valley from the southern limit of the San Joaquin River watershed to the crest of the Tehachapi Mountains. It stretches from the Sierra Nevada Crest in the east to the Coast Range in the west. Many small agricultural communities dot the eastern side of the valley, and the rapidly growing cities of Fresno and Bakersfield anchor the region, which encompasses almost 10 percent of the State's total land area....

Four main geographical areas make up this mostly agricultural region: the western side of the San Joaquin Valley floor, the Sierra Nevada foothills on the region's eastern side, the central San Joaquin Valley floor, and the Kern Valley floor. The major rivers in the region, the Kings, Kaweah, Tule, and Kern, begin in the Sierras and generally flow east to west into the San Joaquin Valley. They are sustained by snow melt from the upper mountain elevations. The Kern River follows a more north-south alignment for much of its path. All of the rivers terminate on the valley floor in lakes or sinks: water does not find its way to the ocean from the basin, as it once did under natural conditions, except in extremely wet years. There is also a considerably large drainage area on the west and south sides of the valley, but scant rainfall has not produced water development there.

The region's climate varies between valley and foothill areas. The valley areas experience mild springs and hot, dry summers. Winters are typically cold with some temperatures below freezing, but snowfall is rare. In some parts of the valley, thick tule fog is common at times during the winter. Climate in the foothills is typical of mountainous foothill areas where winters and springs are cold and where snowfall occurs at higher elevations.

Most of the region's winter and spring runoff is stored for later use in the summer for supplying the drier valley floor areas. In most years, imported water from northern California supplements local supplies to meet the region's large agricultural water demand.

Population

Population in the region increased substantially in the 1980s, led by 50- to 60-percent growth in the Fresno, Bakersfield, and Visalia-Tulare urban areas. Fresno's population, which had one of the highest growth rates among large metropolitan areas in the United States during the 1980s, grew by more than 60 percent – from 217,000 in 1980 to 354,000 in 1990. A high birth rate contributed to this growth and relatively low-cost housing encouraged immigration from out-of-state as well as from the San Francisco Bay and Los Angeles areas....

Land Use

...Irrigated agriculture accounts for more than 3 million acres of the private land, while urban areas take up 176,300 acres. Other agricultural lands and areas with native vegetation cover an additional 1,400,000 acres. The principal crops grown in the region are cotton, grapes, and deciduous fruits. Substantial acreages of almonds and pistachios are also grown, as well as increasing acreages of truck crops, such as tomatoes and corn....

Water Supply

The main local surface water supplies in the Tulare Lake Region come from Sierra Nevada rivers. Imported water is by way of the federal Central Valley Project's Delta-Mendota Canal and Friant-Kern Canal, and the State Water Project's California Aqueduct, which enters the region as part of the Joint-Use Facilities with the CVP's San Luis Unit. Groundwater pumping meets the remaining water demands....

Supply with Existing Facilities and Water Management Programs

Local surface supplies on the western side of the region come from the Kings, Tule, Kaweah, and Kern Rivers. Excess flows from the Kings River flow through Fresno Slough to the Mendota Pool. Local supplies from snowmelt and runoff in Sierra Nevada systems are more plentiful than imported sources in the central portion and eastern edge of the valley, but not as reliable throughout the year....

Valley Area

...The SWP, through San Luis Reservoir and the California Aqueduct, provides an average of about 1,200,000 af of surface water yearly to the region. The U.S. Bureau of Reclamation supplies an average of 2,700,000 af during normal years from the CVP via Mendota Pool, the Friant-Kern

Canal, and the San Luis Canal of the CVP/SWP San Luis Joint-Use Facilities. The Friant-Kern canal receives water from Millerton Lake on the San Joaquin River; Mendota Pool and the California Aqueduct receive water from the Sacramento-San Joaquin Delta.

TABLE TL-3
Water Supplies with Existing Facilities and Programs
(Decision 1485 Operating Criteria for Delta Supplies)
(thousands of acre-feet)

Supply	1990	
	<i>average</i>	<i>drought</i>
Surface		
Local	2,398	1,239
CVP	2,705	1,288
Other federal	243	0
SWP	1,225	846
Groundwater	915	3,773
Overdraft	650	650
Total	8,136	7,796

(Only a portion of the table is replicated above. The omitted sections deal with future projections)

The valley floor overlies mostly one large groundwater basin that consists of alluvial sediments. In the western half to three quarters, the Corcoran clay layer, which generally lies at depths of 300 to 900 feet, divides the groundwater basin into two aquifers. South of the Kern River, the Corcoran horizon drops below well depths but other clay layers provide some confinement. On the eastern side of the valley, both north and south of the Kern County line, older formations are tapped by wells that usually exceed 2,000 feet in depth. A small groundwater subbasin, with little hydraulic connection to the main aquifers, exists on the western side of Fresno, Kings, and Kern counties from Coalinga to Lost Hills. Two other small subbasins in Kern County are separated from the main basin by the White Wolf and Edison faults. Productive aquifers with good quality water are the general rule, except in the Tulare Lake area where lakebed clays yield little water, along the extreme eastern edge of the region where shallow depth to granite limits aquifer yields, and along the western side where water quality is poor.

...The City of Bakersfield operates a 2,800-acre recharge facility southwest of Bakersfield where the city and some local water agencies recharge surplus Kern River and occasionally, SWP and Friant-Kern Canal water; this water then is 'banked' and withdrawn in drier years. The recharge facility is one of the largest single recharge areas in California, and during wet years, more than 100,000 af of water may be recharged.

Continuing on from The California Water Plan Update, Volume 2, from page 186.

Agricultural Water Use

Irrigated agriculture accounts for more than 95 percent of the 1990 level water use in the Tulare Lake Region. Many different crops are grown throughout the region. In the future, however, urbanization, increasingly high costs for water, and the reliability of water supplies could reduce the variety and acreages of crops and thus, ultimately, agricultural water use....

Climate, water supply, and salt buildup in the soils may limit the crops that can be grown profitably throughout the region. Most good irrigable land with access to dependable imported or local surface water has been developed. Crop acreages have generally declined in the region over the last decade, due to the limited availability of surface water and a drop in agricultural demand due to the sluggish economy. Cotton acreages, for example, declined from 1989 to 1992. Its price dropped from about 75 cents per pound in the late 1980s to about 50 cents per pound in 1992. In addition to decreased demand for cotton, the drought reduced SWP deliveries along the western side of the region....

TABLE TL-7
1990 Evapotranspiration of Applied Water by Crop

Irrigated Crop	Total Acres (1,000)	Total ETAW (1,000 AF)	ETAW * (AF per acre)
Grain	297	294	1.05
Rice	1	3	3.00
Cotton	1,029	2,569	2.50
Sugar Beets	35	91	2.60
Corn	100	199	1.99
Other Field	135	262	1.94
Alfalfa	345	1,045	3.03
Pasture	44	141	3.20
Tomatoes	107	245	2.29
Other Truck	204	275	1.35
Almonds/pistachios	164	392	2.39
Other deciduous	177	470	2.66
Vineyard	393	817	2.08
Citrus/olives	181	344	1.90
Total	3,212	7,147	2.23

*This column has been calculated from the information provided and does not appear in the original text.

Agricultural Drainage

On the western side of the valley, where groundwater quality is marginal to unusable for agriculture, farmers use good quality surface water to irrigate crops. This irrigation causes the shallow aquifer to fill, resulting in drainage problems. The high water table is exacerbated by clay-rich soils that slow drainage in some areas. Poor-quality groundwater in the unconfined aquifer in Westlands Water District is increasing by about 110,000 af per year. In Kern County, west of the California Aqueduct, the few available wells also show rising water levels. This marginal to poor quality groundwater has reached plant root zones in many areas along the western side and must be removed by drains if agriculture is to continue in these areas.

Additional regional water supply descriptive information comes from Bulletin 160-98, *The California Water Plan Update, Volume 2*, Department of Water Resources, 1998, the five-year update to the previously quoted Bulletin 160-93. The following quote is taken from page 8-44, where the Tulare Lake Region is being discussed:

The majority of the region's SWP supply is contracted to Kern County Water Agency. KCWA's SWP supply is distributed to fourteen of its member agencies; the largest entitlements go to Wheeler Ridge-Maricopa Water Storage District, Berrenda Mesa Water District, Belridge Water Storage District, and Lost Hills Water District. Since these four districts have limited (or no) groundwater supply, each relies almost entirely on SWP supplies to meet its water demands. Most other KCWA member agencies have Kern River, Friant-Kern Canal, Cross Valley Canal, or groundwater supplies available. Part of the City of Bakersfield's water supplies come from the SWP via KCWA.

The Friant-Kern Canal conveys CVP supply to 24 long-term contractors in the region. Among the largest contractors for Friant-Kern supply are Arvin-Edison Water Storage District, Lower Tule River Irrigation District, and Delano-Earlimart Irrigation District. The San Luis Canal also distributes CVP supply, most of which goes to Westlands Water District. With an allocation of 1,150 taf/yr, Westlands Water District is CVP's largest contractor. Westlands supplies primarily agricultural users; however, about 5.5 taf/yr is supplied to urban users such as Lemoore Naval Air Station. (Even with a full CVP contract supply, Westlands purchases about 200 taf/yr from other sources to meet its growers' normal crop needs.)

Arvin-Edison Water Storage District and KCWA entered into agreements in 1974 for participation in the Cross Valley Canal. AEWSD also entered into water exchange agreements with ten agencies in the Friant-Kern Canal service area. The exchange water is delivered through the California Aqueduct and the Cross Valley Canal to AEWSD facilities. AEWSD receives 128 taf annually of exchange water and makes available to exchange entities the first 174 taf of its Class I and Class II CVP entitlements from the Friant-Kern Canal.

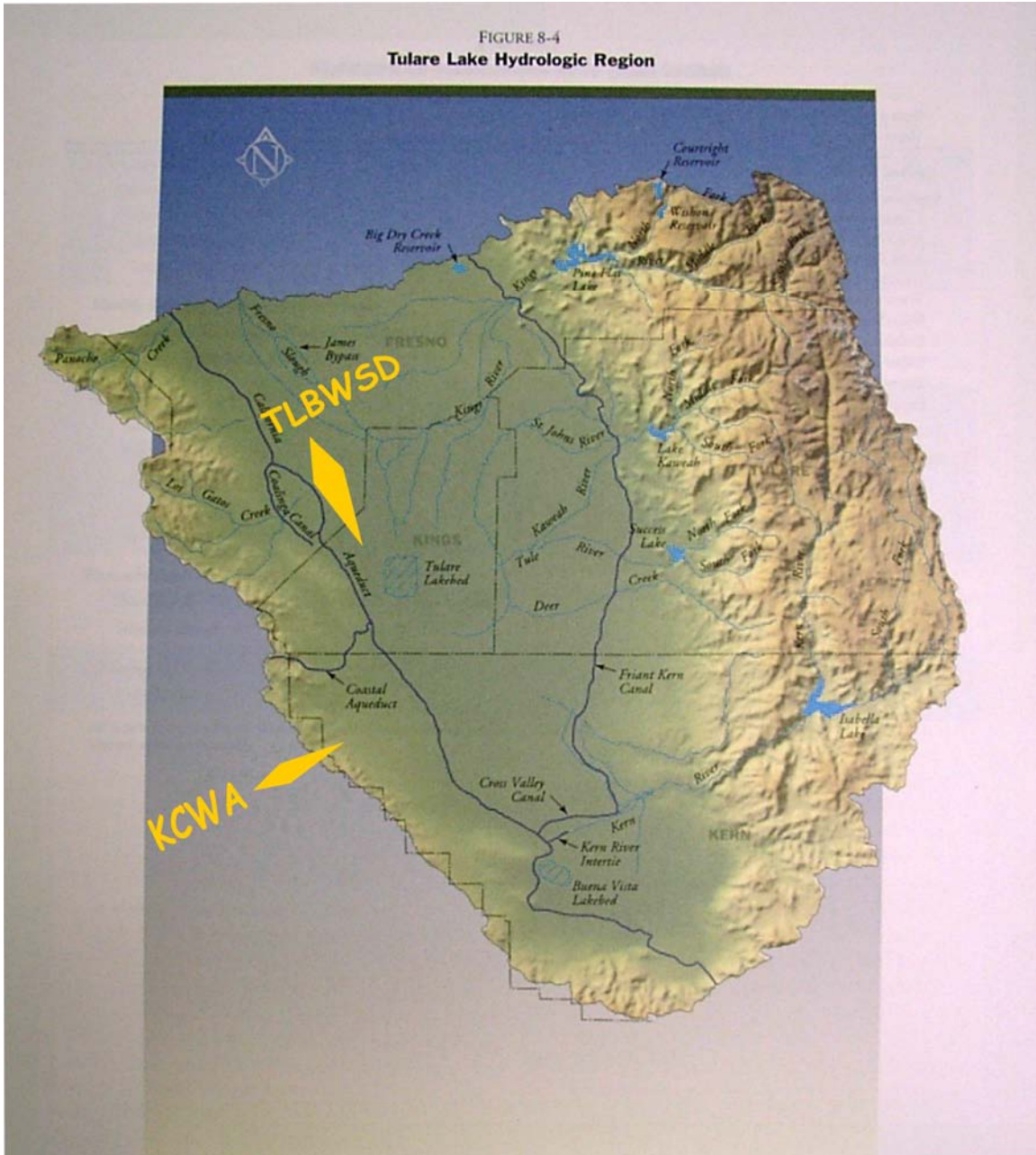
Regional Map

(Source: *The California Water Plan Update, Volume 1, Bulletin 160-98, Page 1-9*)



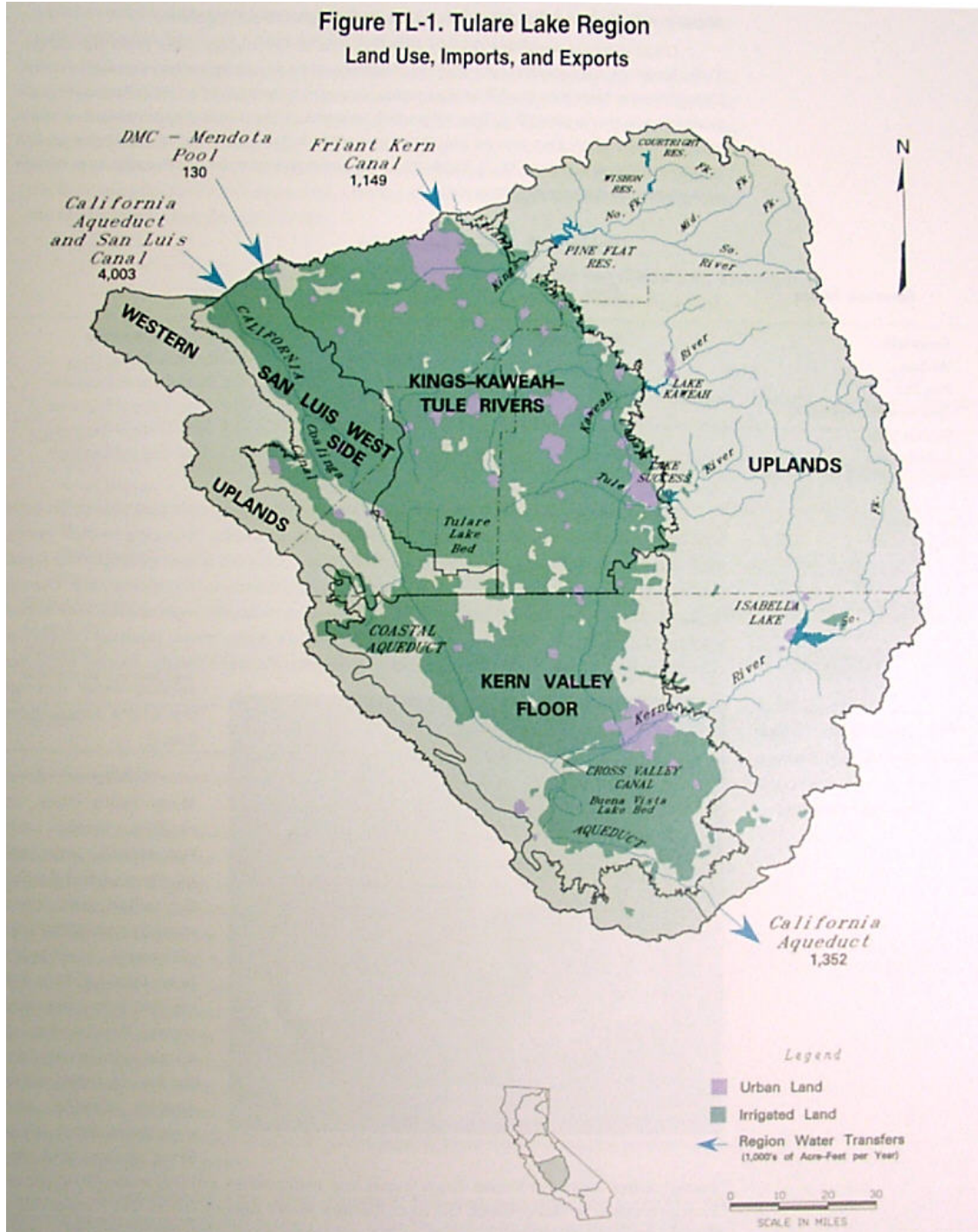
Area Map

(Source: The California Water Plan Update, Volume 2, Bulletin 160-98, Page 8-42)



Tulare Lake Region

(Source: *The California Water Plan Update, Volume 2, Bulletin 160-93, Page 181*)



ADDENDUM 10

Drought Water Bank

Drought Water Bank

1991

A report titled *The 1991 Drought Water Bank* was produced by the California DWR in January of 1992. The introductory remarks describe a critical time in California regarding water deliveries, causing the governor to establish a Drought Action Team. One of the recommendations of this team was the creation of the Drought Water Bank (DWB). The following is taken from page 2 of the report.

The Department of Water Resources was responsible for organizing and implementing the Water Bank. Its primary role was to purchase water from willing sellers and sell it to entities with critical needs....The Water Purchase Committee and government agencies at all levels worked with DWR to negotiate contracts, provide centralized control of water transfers, and coordinate distribution.

Sellers made water available to the Bank by: fallowing farmland (not planting or irrigating a crop) and transferring conserved irrigation water to the Bank, using groundwater instead of surface water, or transferring water stored in local reservoirs to the Bank. Within a month and a half, over 300 contracts were under way. No precedent existed for such an endeavor; consequently, procedures and guidelines were developed as the program progressed.

Water purchases totaled 820,805 acre-feet. About 41 percent of this came from sellers in the Delta, with approximately the same amount coming from the Yuba and Feather Rivers area. Over half of the water was freed up by fallowing land, approximately one-third came from groundwater, and the rest came from stored water. A total of slightly over 166,000 acres of land were fallowed. The types of crop grown prior to fallowing included corn (59,276 acres), wheat (43,584 acres), pasture (16,187 acres) and alfalfa (10,219 acres). These crops accounted for 78 percent of the total acreage fallowed.

There were no sellers south of the Delta, and the price paid to the sellers was \$125 per acre-foot. In explaining how that price was arrived at, the report says on page 5:

...At the start of the Water Bank program, purchases focused on water from fallowed farmland, a primary factor in arriving at a price. The intent was to offer a price that would yield a net income to the farmer similar to what the farmer would have earned from farming plus an additional amount to encourage the farmer to enter into a contract with a new and untried Water Bank.

After taking a detailed look at farm budgets, talking to potential sellers and buyers, and getting advice from agricultural economists and others knowledgeable about crop water use, the price was set at \$125 per

acre-foot...Late in the year, the SWP negotiated contracts for the purchase of 10,000 acre-feet at \$50 per acre-foot and 10,000 acre-feet at \$30 per acre-foot. The price reduction reflected the more favorable water supply and demand conditions. Among the factors contributing to the improved conditions were the ample March rains, a mild summer, and the remarkable success of the Water Bank and urban water conservation measures.

Regarding the selling price (page 9 of the document):

The price for water from the Bank was set at \$175 an acre-foot for water delivered as far as the SWP Delta Pumping Plant. This price covered: The purchase price (\$125 an acre-foot); outflow requirements to move the water through the Delta, which reduced the net amount of water available for delivery; and the costs of monitoring and contract administration. Additional costs were charged for conveying the water to the places of use...The SWP contractors who received water from the Bank paid primarily for the energy required to pump the water to the contractor's area.

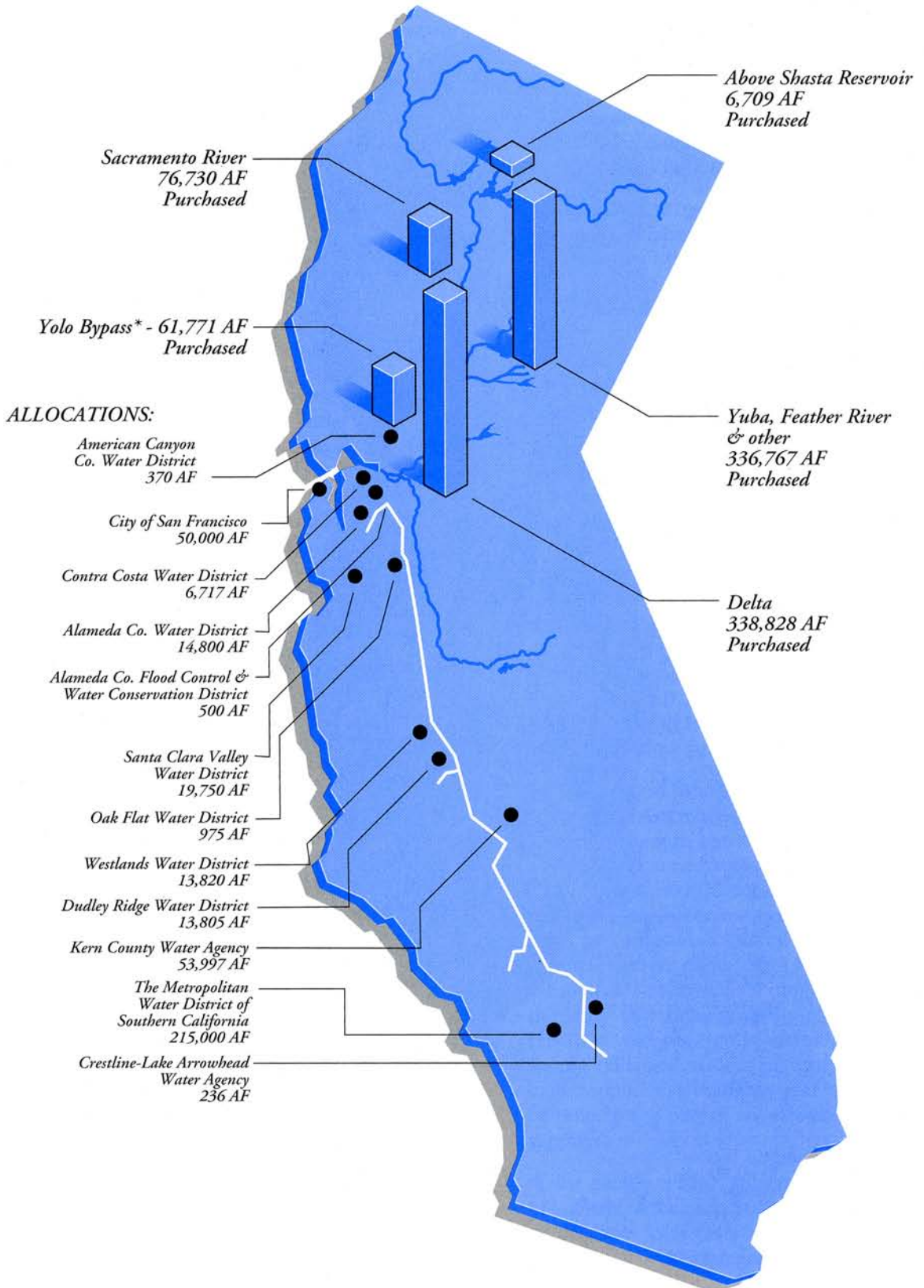
As of December 4, 1991, less than 400,000 acre-feet had been allocated to buyers. Since Bank purchases were not directly linked to buyers, the State wound up paying for a great deal of the water because of the short-fall in demand. Bulletin 132-92, *Management of the California State Water Project*, published in December of 1992, reported that a total of 429,470 acre-feet of 1991 DWB water had been purchased.

The figure on the following page is from the report and shows the locations and amounts of purchases and sales. Kern County Water Agency (KCWA) bought 53,797 acre-feet. Tulare Lake Basin Water Storage District (TLBWSD) did not buy any. Bulletin 132-92 reported that KCWA had purchased 53,997 acre-feet.

KCWA's *Water Supply Report 1991* makes the following statement on page 4 regarding its DWB purchases.

The cost for water from the Bank was about \$175 per acre-foot at the Delta pumps. Power costs to convey the water to Kern County was an additional \$20 per acre-foot. Urban interests accounted for the bulk of State Bank purchases, about 307,000 acre-feet. The water was simply too expensive for most agricultural interest to affordabout 54,000 acre-feet was purchased by Kern County agricultural interests, and was used to sustain high-value permanent crops on the west side of the County.

THE 1991 DROUGHT WATER BANK



1992

The DWB was activated again in 1992. A similar report was also created, *The 1992 Drought Water Bank*. Even though the water situation was not as dire as in the previous year, “conditions in Northern California watersheds remained far below normal.” However, some changes were incorporated:

As a result of the 1991 Bank experience, DWR implemented several major changes in the operation of the 1992 Bank. First, no water was acquired by the 1992 Bank until signed contracts were obtained from the members purchasing water. Second, to minimize third party economic and environmental impacts, water purchases were limited to groundwater substitution (using wells to extract groundwater to substitute for transferring surface water) and surface reservoir storage contracts; no water was purchased through fallowing of agricultural lands. Third, the purchase price of water was considerably lower than offered in 1991 primarily due to reduced demand and the fact that water was purchased only through groundwater substitution and reservoir storage contracts. Water from these sources is generally less expensive to produce compared to fallowing, which was reflected in the purchase price.

The exhibit on the following page shows the locations and amounts of the sellers and buyers.

Bulletin 160-93, *The California Water Plan Update, Volume 1*, previously referenced in this report, provided the following information regarding the operation of the 1992 Drought Water Bank (page 287).

Area Where Water Was Purchased	Amount Purchased (acre-feet)	Agency Water Was Allocated To	Allocation (acre-feet)
Sacramento River	12,302	City of San Francisco	19,000
Yolo Bypass	42,372	Contra Costa WD	10,000
Yuba, Feather Rivers	64,419	Westside San Joaquin Valley	4,530
American River	10,000	Department of Fish and Game	24,465
Delta	2,500	Westlands WD	51,000
Stanislaus, Merced Rivers	61,705	Tulare Lake Basin WD	31,550
		Kern County WA	8,170
		MWDSC	10,000
Total	193,298		158,715

More was purchased than was sold because of Delta water quality requirements and conveyance losses. The sellers were paid \$50 per acre-foot, while the buyers were charged an initial \$72 per acre-foot that was subsequently lowered to around \$68 per acre-foot. The buyers once again had to pay for delivery costs.

1993

The DWB was not operational during 1993 because it was a year when 100 percent of SWP entitlements were delivered due to positive hydrologic conditions.

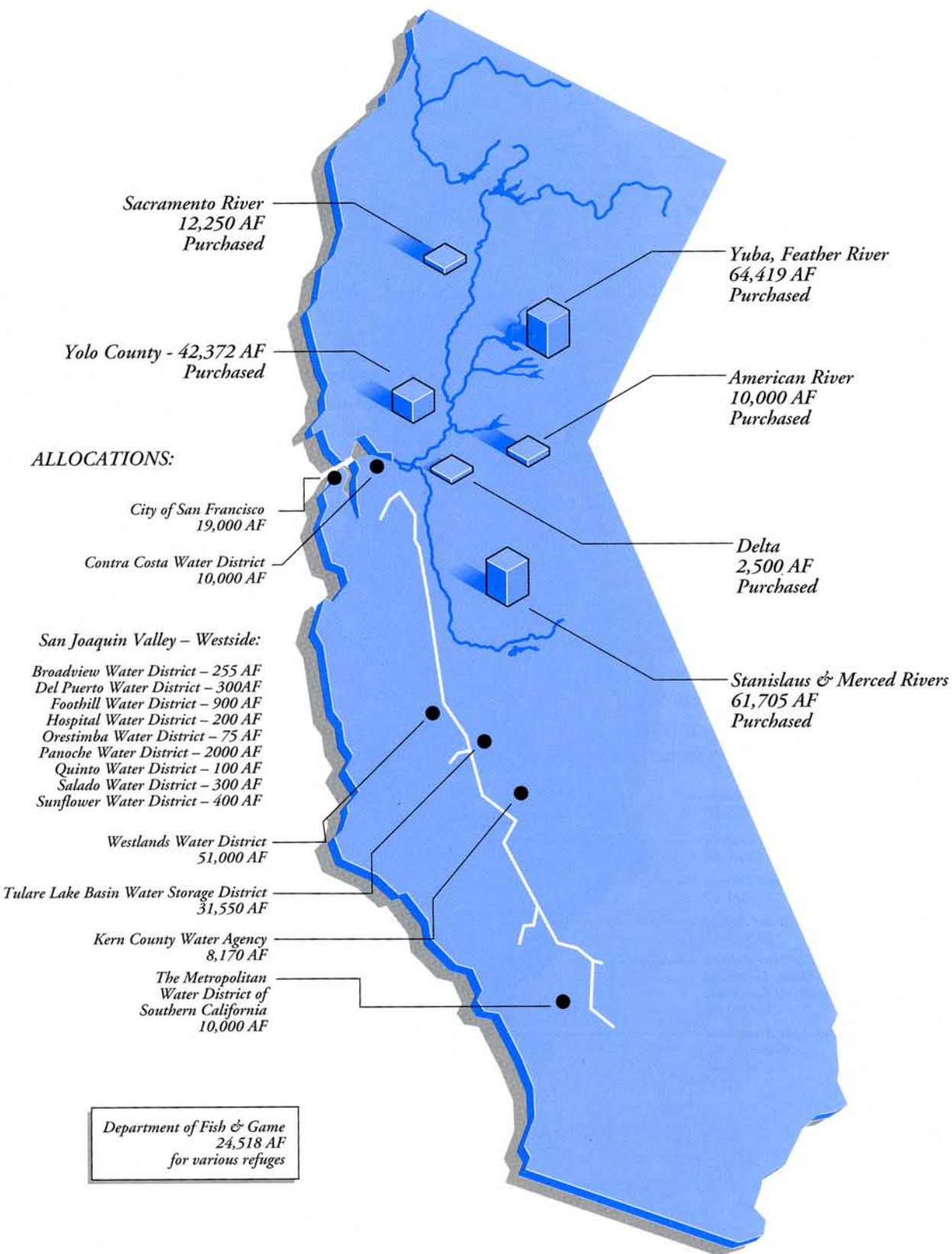
1994

The DWB became active again in June of 1994, but no report on its activities was issued.

Bulletin 160-98, *The California Water Plan Update, Volume 1*, page 3-57, reported that, in 1994, 222 taf (thousand acre-feet) were acquired, of which 48 taf went to water quality and habitat needs. The remaining 174 taf were sold to purchasers south of the Delta – 150 taf to agricultural and 24 taf to urban. The reported sale price at the south Delta pumps was \$68 per acre-foot. The buyers were not identified.

Bulletin 132-95 reported lower sales (115,083 acre-feet) for the 1994 DWB. Supplemental information from the State Water Project Analysis Office supports the higher Bulletin 160-98 figures, but indicates that the ultimate cost of the water to the buyers was slightly over \$66 per acre-foot.

THE 1992 DROUGHT WATER BANK



ADDENDUM 11

Regional Groundwater

Regional Groundwater

Because so little rain falls during the growing season in the subject area, irrigation is required for agricultural production. Irrigation water generally comes from a combination of surface water (local, state, and federal project deliveries) and groundwater. Historically, groundwater has played a major role in irrigation in this region. In years when reduced surface water deliveries are available, the groundwater resource is relied upon even more. Therefore, a proper understanding of the groundwater characteristics is important to this valuation assignment.

Information on regional groundwater is presented in Bulletin 160-98, *The California Water Plan Update, Volume 1*, Department of Water Resources, 1998. Beginning on page 3-48:

Groundwater Supplies

In an average year, about 30 percent of California's urban and agricultural applied water is provided by groundwater extraction. In drought years when surface supplies are reduced, groundwater supports an even larger percentage of use. The amount of water stored in California's aquifers is far greater than that stored in the State's surface water reservoirs, although only a portion of California's groundwater resources can be economically and practically extracted for use.

In evaluating California water supplies, an important difference between surface water and groundwater must be accounted for – the availability of data quantifying the resource. Surface water reservoirs are constructed to provide known storage capacities, reservoir inflows and releases can be measured, and stream gages provide direct measurements of flows in surface water systems. Groundwater basins have relatively indeterminate dimensions, inflow (e.g., recharge) to an entire basin cannot be directly measured, and total basin extractions and natural outflow are seldom directly measured. In addition to physical differences between surface water and groundwater systems, statutory differences in the administration of the resources also affect data availability. Entities who construct surface water reservoirs must have State water rights for the facility, and all but the smallest dams are regulated by the State's dam safety program. These requirements help define and quantify the resource. In contrast, groundwater may be managed by local agencies ... but there are no statewide requirements that require quantification of the resource. Much of California's groundwater production is self-supplied, and is not managed or quantified by local agencies.

The following description of groundwater supplies is presented in a more general manner than was used for surface water supplies, reflecting the difference in data availability. Much of the groundwater information in this

section is based on calculations, rather than on direct measurement. Estimating overdraft in a basin, for example, relies on interpretation of measured data (water levels in wells) and interpretation of calculated information (extractions from the basin). The ability to assess statewide groundwater resources would benefit greatly from additional data collection and better access to existing data.

Base Year Supplies

Table 3-14 summarizes estimated 1995 level groundwater supplies. The data represent current levels of groundwater production, and not necessarily the maximum potential of statewide groundwater supplies. The data include water reapplied through deep percolation and exclude groundwater overdraft.

TABLE 3-14
Estimated 1995 Level Groundwater Supplies by Hydrologic Region (taf)

Region	Average	Drought
North Coast	263	294
San Francisco Bay	68	92
Central Coast	1,045	1,142
South Coast	1,177	1,371
Sacramento River	2,672	3,218
San Joaquin River	2,195	2,900
Tulare Lake	4,340	5,970
North Lahontan	157	187
South Lahontan	239	273
Colorado River	337	337
Total (rounded)	12,490	15,780

To help put this information in perspective, the sidebar illustrates typical groundwater production conditions in three hydrologic regions that rely heavily on groundwater because their local surface water supplies do not fully support existing development. These regions – the San Joaquin, Tulare Lake, and Central Coast regions – all have alluvial aquifer systems that support significant groundwater development, as suggested by the information presented in the sidebar. (The data shown are typical of wells used for agricultural or municipal production. A well used to supply an individual residence would have a much smaller capacity. Over 90 percent of the groundwater use in each of these regions is for agricultural use.) In contrast, aquifer systems in fractured rock, such as those used to supply small communities in the Sierra Nevada foothills, can generally support only limited groundwater development.

In these hydrologic regions water users frequently take advantage of surface water available in wet years to recharge groundwater basins. In drought years when surface water is not

Available, water users increase groundwater pumping. For example, Friant-Kern CVP contractors maximize groundwater recharge with less expensive Class II supplies (wet weather water) when they are available. Member agencies of KCWA have developed extensive recharge facilities along the Kern River channel to take advantage of wet year flows.

The following information comes from page 3-49 of the Bulletin. It is the 'sidebar' referenced in the previous discussion.

Typical Groundwater Production Conditions

The Department collects data from a statewide network of wells to monitor long-term changes in groundwater levels. The network includes local agency wells and privately-owned wells. These data were combined with Bulletin 160 water use information to prepare the tabulation of typical groundwater production conditions shown below. Long-term water level data can show the effects of increased groundwater extraction in drought years; it can also show the effects of changing water management practices in a basin.

Local conditions within the tabulated basins may deviate greatly from the typical conditions shown below. In the Tulare Lake Region, for example, some groundwater production is occurring from wells with pumping lifts of over 800 feet.

Basin	Extraction (taf/yr)	Well Yields (gpm)	Pumping Lifts (feet)
San Joaquin River Region			
Madera	570	750-2,000	160
Merced	560	1,500-1,900	110
Delta Mendota	510	800-2,000	35-150
Turlock	450	1,000-2,000	90
Chowchilla	260	1,500-1,900	110
Modesto	230	1,000-2,000	90
Tulare Lake Region			
Kings	1,790	500-1,500	150
Kern	1,400	1,500-2,500	200-250
Kaweah	760	1,000-2,000	125-250
Tulare Lake	670	300-1,000	270
Tule	660	NA	150-200
Westside	210	800-1,500	200-800
Pleasant Valley	100	NA	350
Central Coast Region			
Salinas Valley	550	1,000-4,000	180
Pajaro Valley	60	500	10-300

Shallow Groundwater

The following text and maps are taken from *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley, Final Report of the San Joaquin Valley Drainage Program*, September 1990. The document was prepared by U.S. Department of the Interior agencies (Bureau of Reclamation, Fish and Wildlife Service and Geological Survey) and California Resource Agency (Department of Fish and Game, and Department of Water Resources).

Beginning on page 15 of the document:

A Brief History

The conditions associated with agricultural drainage in the San Joaquin Valley are not new to the region. Inadequate drainage and accumulating salts have been persistent problems in parts of the valley for more than a century, making some cultivated land unusable as far back as the 1880s and 1890s (Ogden, 1988). Widespread acreages of grain, first planted on the western side of the valley in the 1870s and 1880s, were irrigated with water from the San Joaquin and Kings rivers. This type of farming spread until, by the 1890s, the rivers' natural flows were no longer adequate to meet the growing agricultural demand for water. Poor natural drainage conditions, coupled with rising ground-water levels and increasing soil salinity, meant that land had to be removed from production and some farms ultimately abandoned.

The development of irrigated agriculture in the San Joaquin Valley since 1900 owes a great deal to the improvements in pump technology that took place in the 1930s. These achievements led to the development of large turbine pumps that could lift water hundreds of feet from below ground. In time, heavy pumping triggered severe groundwater overdraft because more water was being extracted than was being replaced naturally. Groundwater levels and hydraulic pressure fell rapidly, and widespread land subsidence began to occur. By the late 1950s, estimated overdraft in Kern County had reached 750,000 acre-feet per year.

Initial facilities of the Federal Central Valley Project transported water from Northern California through the Sacramento-San Joaquin Delta and the Delta-Mendota Canal in 1951 to irrigate 600,000 acres of land in the northern part of the San Joaquin Valley. This water primarily replaced and supplemented San Joaquin river water that was diverted at Friant Dam to the southern San Joaquin Valley.

The CVP's San Luis Unit and the State Water Project, each authorized in 1960, began delivering Northern California water to agricultural lands in the southern San Joaquin Valley in 1968. Together they provide water to irrigate about 1 million acres. Authorization of the San Luis Unit also mandated construction of an interceptor drain to collect irrigation drainage water from its service area and carry it to the Delta for disposal. The Bureau

of Reclamation's 1955 feasibility report for the San Luis Unit described the drain as an earthen ditch that would drain 96,000 acres. By 1962, Reclamation's plans had changed to a concrete-lined canal to drain 300,000 acres. In 1964, alternative plans added a regulating reservoir to temporarily retain drainage (USBR, 1964). A decision was made in the mid-1970s to use the reservoir to store and evaporate drainage water until the drainage canal to the Delta could be completed.

At this same time, questions were raised about the potential effects of untreated agricultural drainage on the quality of water in the Delta and San Francisco Bay. This concern was reflected in a rider added to the CVP appropriations act by Congress in 1965, which stated that "...the final point of discharge for the interceptor drain for the San Luis Unit shall not be determined until development by the Secretary of the Interior and the State of California of a plan which shall conform with the water quality standards of the State of California as approved by the Administrator of the Environmental Protection Agency." This proviso remains in effect today.

Initially, the San Luis Drain was conceived as a State/Federal facility, but the State twice declined to participate. The Bureau of Reclamation began construction in 1968 and, by 1975, had completed 85 miles of the main drain, 120 miles of collector drains, and the first phase of the regulating reservoir (Kesterson). In 1970, Kesterson Reservoir became part of a new national wildlife refuge managed jointly by Reclamation and the U.S. Fish and Wildlife Service.

Federal budget constraints and growing environmental concern about releasing irrigation runoff into the Delta halted work on the reservoir and the drain.

In 1975, the Bureau of Reclamation, the California Department of Water Resources, and the State Water Resources Control Board formed the San Joaquin Valley Interagency Drainage Program to find a solution to valley drainage problems that would be economically, environmentally, and politically acceptable. The group's recommendation was to complete the drain to a discharge point in the Delta near Chipps Island (IDP, 1979). In 1981, Reclamation began a special study to fulfill requirements for a discharge permit from the State Water Resources Control Board.

The 1983 discovery of deformities and deaths of aquatic birds at Kesterson Reservoir altered the perception of drainage problems on the western side of the valley. Selenium poisoning was determined to be the probable culprit. In 1984 the San Joaquin Valley Drainage Program was established as a joint Federal and State effort to investigate drainage and drainage-related problems and to identify possible solutions.

In 1985, the Secretary of the Interior ordered that discharge of subsurface drainage to Kesterson be halted, and the feeder drains leading to the San Luis Drain and the reservoir were plugged in 1986. The reservoir is now closed. The vegetation has been plowed under, and low-lying areas were filled in 1988.

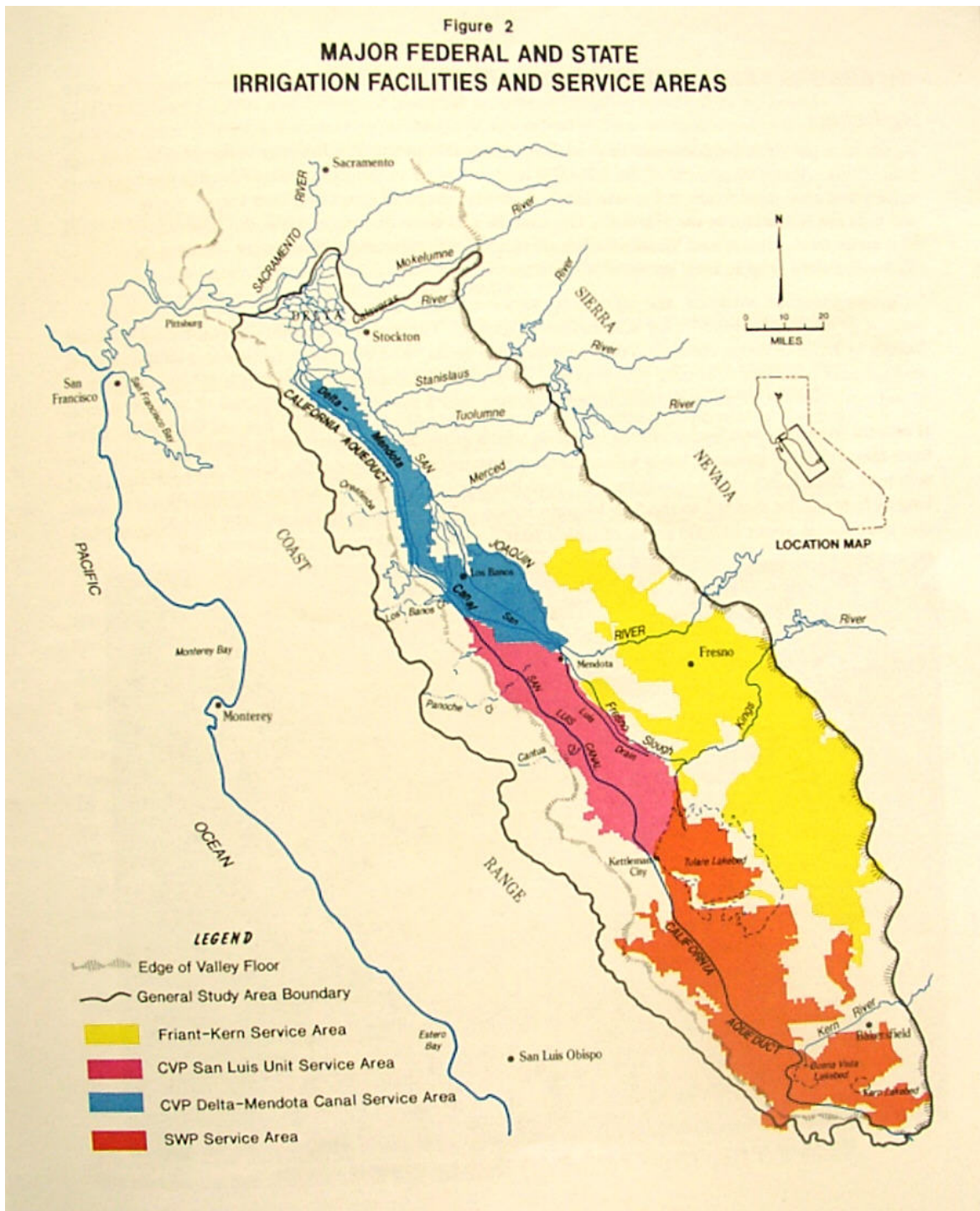
Contamination-related problems similar to those identified at Kesterson are now appearing in parts of the Tulare Basin, which receives irrigation water from the State Water Project, in addition to other surface and groundwater supplies. Wildlife deformities and deaths have been observed at several agricultural drainage evaporation ponds.'

The following exhibit comes from page 19 of the document.

CVP and SWP Service Areas

(Source: A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley, Page 19)

Figure 2
**MAJOR FEDERAL AND STATE
 IRRIGATION FACILITIES AND SERVICE AREAS**



Continuing from page 25 of the document:

Geohydrology

Understanding the geologic makeup and hydrologic characteristics of the study area is necessary to understanding the cause of the drainage problem.

Geology

The Corcoran Clay, a clay layer 20 to 200 feet thick that underlies all but a small part of the study area, was formed as a lakebed about 600,000 years ago and is an important geologic feature of the San Joaquin Valley. Lying as much as 850 feet deep along the Coast Ranges and 200 to 500 feet deep in the valley trough, the Corcoran Clay effectively divides the ground-water system into two major aquifers - a confined aquifer below it and a semiconfined aquifer above it (Page, 1986).

In the San Joaquin Basin, the semiconfined aquifer can be divided into three geohydrologic units, based on the sources of the soils and sediments. These are Coast Range alluvium, Sierra Nevada sediments, and flood-basin deposits. The Coast Range alluvial deposits, which range in thickness from 850 feet along the slopes of the Coast Range to a few feet along the valley trough, were derived largely from the erosion of marine rocks that form the Coast Ranges and contain abundant salt. Some of the marine sediments contain elevated concentrations of selenium and other trace elements. The Sierra Nevada sediments on the eastern side of the valley generally do not contain elevated selenium concentrations. The flood-basin deposits are a relatively thin layer in areas of the valley trough that have been created in recent geologic time. These three geohydrologic units differ in texture, hydrologic properties, chemical characteristics, and oxidation state.

In the Tulare Basin, the semiconfined aquifer consists of the same three geohydrologic units found in the San Joaquin Basin, plus one additional unit, Tulare Lake sediments. The Tulare Basin is characterized by the presence of several dry lakebeds, including Tulare, Buena Vista, and Kern.

The marine sediments from which most soils in the study area are derived contain salts and potentially toxic trace elements, such as arsenic, boron, molybdenum, and selenium. When these soils are irrigated, the substances dissolve and leach into the shallow groundwater (Gilliom, et al., 1989a). Selenium is largely a Westside phenomenon. Soils derived from Coast Range sediments are generally far saltier than soils formed from Sierran sediments. In fact, selenium in livestock feed grown in some areas of the eastern side of the valley is so low that it must be added to the livestock diet. ... Most soluble selenium has been leached from the soils over the past 30 to 40 years, and it now occurs in solution in the shallow groundwater. It is drained from there when growers attempt to protect crop roots from salts and a high water table. Generally, growers need not be concerned about protecting crops from selenium.

Surface Water

Precipitation in the study area is low, ranging annually from 5 inches in the south to 10 inches in the north. Virtually all rainfall occurs from November through April, and, by midsummer, the small natural flows in most Westside streams have ended or dwindled to little more than trickles. Storage and development of irrigation facilities on eastside streams have reduced inflow to once-large lakes such as Tulare and Kern. Now water reaches their dry lakebeds only in extremely wet years, such as 1983.

The San Joaquin River and its major Westside tributaries, Salt Slough and Mud Slough, are important to the study area because they convey drainage water away from the Northern and Grasslands subareas. San Joaquin River flows are controlled by dams on tributaries and on the main stem upstream from Fresno. Water stored in Millerton Reservoir is diverted through the Friant-Kern and Madera canals. Irrigation water historically diverted from the lower reaches of the San Joaquin River was replaced with Central Valley Project water provided through the Delta-Mendota Canal, beginning in 1951. Now, the San Joaquin River is essentially dry much of the year from below Gravelly Ford to the point at which irrigation return flow and local runoff replenish the river. Development on major eastside tributaries has also reduced the flow on the San Joaquin River. The combination of these actions causes problems in water quantity and quality, both for fish and for other downstream river users, especially in the South Delta area.

Groundwater

Pumping of groundwater for irrigation from 1920 to 1950 drew ground-water levels down as much as 200 feet in large portions of the study area (Beltz, 1988). High pumping costs, land subsidence, and declining water quality created a need for new water supplies. By 1951, Federal Central Valley Project water was being pumped from the Delta and delivered to the Northern and Grasslands subareas through the Delta-Mendota Canal. By 1968, water was being delivered to the Westlands, Tulare, and Kern subareas through facilities of the CVP's San Luis Unit and the State Water Project.

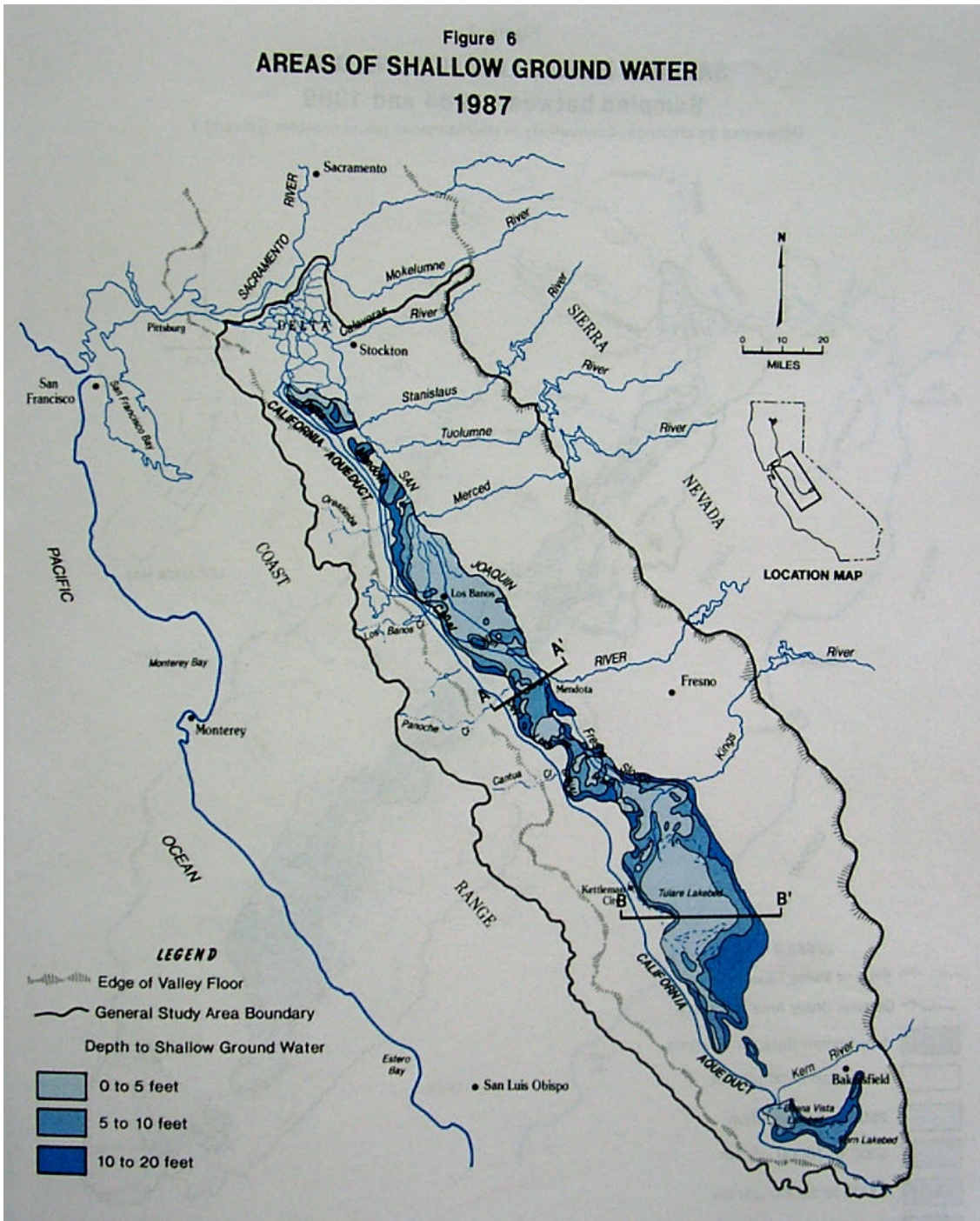
With a reliable supply of surface water, ground-water pumping for irrigation lessened and the ground-water reservoir gradually began to refill. The semiconfined aquifer above the Corcoran Clay is now fully saturated in much of the Westside area. Water tables continue to rise, and the waterlogged area is expanding. During the period 1977-1987, the 0-to-5 foot area expanded from 533,000 acres to 817,000 acres (W.C. Swain, 1990a)...

Irrigation-induced leaching of the soil and accumulation of salts from both the leaching and from imported water has concentrated dissolved salts in the upper portion of the semiconfined aquifer. Most of these salts are now located in a zone 20 to 150 feet below the ground surface (DuBrovsky and Neil, 1990). Ground-water quality is generally better above and below this zone.

The following exhibit shows the areas of shallow groundwater and comes from page 31 of the document.

Areas of Shallow Groundwater

(Source: *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley*, Page 31)



Groundwater Production Costs

Referencing from Bulletin 160-93, *The California Water Plan Update, Volume 1*, (page 172):

Agricultural Groundwater Production Costs

As with urban areas, agricultural groundwater costs vary considerably throughout California. Many factors influence these costs, including depth to groundwater, pump efficiencies, and electricity rates. Another factor was the drought which lowered groundwater levels and increased pumping costs. Table 7-10 represents a range of averages for agricultural groundwater costs for the hydrologic regions. The costs include capital, operation (including pumping energy costs), maintenance, and replacement costs. Costs were determined from a survey of well drillers in the hydrologic regions and from DWR district files.

TABLE 7-10
Typical Agricultural Groundwater Production Costs in 1992 by
Hydrologic Region

Region	Groundwater Costs (\$/acre-foot)*
North Coast	10-70
San Francisco Bay	60-130
Central Coast	80
South Coast	80-120
Sacramento River	30-60
San Joaquin	30-40
Tulare Lake	40-80
North Lahontan	60
South Lahontan	20
Colorado River	90

*The range represents the average cost at specific locations within a region, and includes capital, operation, maintenance, and replacement costs.

ADDENDUM 12

**U.S. Bureau of Reclamation
Guidelines for Water Right Appraisals**

U.S. Bureau of Reclamation

Guidelines for Water Right Appraisals

Appraisal of Water Right Acquisitions. The acquisition of water rights will be appraised in compliance with the same authorities as those cited above for acquisition appraisals. When acquiring water rights, the following directives apply:

1. Reclamation acquires storage and/or natural flow water for specific purposes by purchase of permanent water rights, leasing, or dry year options (options to use water for certain seasons over a period of time).
2. Only established and legally approved water rights are to be appraised and acquired.
3. Typically, such water rights are only acquired from voluntary sellers.
4. An appraisal shall be performed to estimate the fair market value of water rights.
5. The appraisal shall be prepared by an appraiser knowledgeable in water rights appraisals.
6. The most common method to appraise acquired water rights is the sales comparison approach of irrigated and non-irrigated land sales, along with a “before” and “after” method of valuation. Irrigated land sales with water rights are used to estimate the fair market value of the property in the “before” condition, while dry land sales without water rights are used to estimate the fair market value in the “after” condition.
7. If water rights are bought and sold in the open market in the area, then such sales will be considered in the appraisal. They may be used as supporting data or in lieu of the “before” and “after” method.
8. The appraiser must consider the salvage value of any irrigation equipment which is no longer needed in the “after” condition.
9. The appraiser must consider the ownership and rights to be acquired and the sales in terms of the same use, a different use, and/or a change of use. The value may change significantly as the use changes and is legalized.
10. Values of water rights shall not be established by negotiations or by economic determinations not common in market established acquisitions.

R. Appraisal of Water Right Leases. The value of leasing of water rights shall be established by comparing recent water leases that have occurred in the market place to those of the property being appraised. The value of leasing water shall not exceed the combined value of leasing both the land and water.

Appraisal Process and Approaches. One or more appraisal approaches and methods shall be used to estimate fair market value. The three basic approaches to value are the Sales Comparison Approach, the Cost Approach, and the Income Approach. Modified versions of these approaches and methods may be developed and used by the appraiser to solve unusual appraisal assignments. The approach or combination of approaches shall be selected which best suits the appraisal assignment and provides the strongest evidence and support for value conclusion. The following directives relate to fair market value, highest and best use, and appraisal approaches and procedures.

A. Fair Market Value. With few exceptions, the basis for Reclamation appraisals is the “fair market value” of the property, as of the effective date of the appraisal (UASFLA, 1992, pp. 3-8). Where title transfer of land and facilities from Reclamation to an entity is authorized by some other Federal authority, a value other than fair market value may be the basis for the transfer and compensation to the United States. Other possible exceptions to this may be recreation concession rates and recreation user fees. The latter which provide special benefits to the general public may be based on considerations not included in 43 CFR 429 and a value other than fair market value.

B. Highest and Best Use. Fair market value will be determined with reference to the subject property’s highest and best use. Ample evidence must be provided to support and substantiate the highest and best use. This will enable the appraiser to testify with sincerity and confidence that the estimated value represents the fair market value of the property, based on market data and information (UASFLA, 1992, pp. 8-11).

C. Three Basic Approaches to Value.

1. **Sales Comparison Approach.** Using this approach, a value indication is derived by comparing the property being appraised to similar properties that have recently been sold, applying appropriate units of comparison, and making adjustments to the prices of the comparable sales based on elements of comparison. Comparable sales used in this approach shall be physically inspected and, if possible, shall be confirmed by the appraiser with the buyer, seller, closing agent, broker, or other individuals having direct knowledge of the transaction. Sale prices must be verified to ascertain whether terms and conditions of sales were conventional and occurred under open competitive market conditions. Forced sales, distress sales, sales to a condemning authority, sales between members of a family or closely related business entities, sales involving the exchange of property, and sales after the date-of-taking are either inadmissible or avoided. Although sometimes incorporated in this approach, asking prices for listings are generally considered to reflect the high end of a value range for a particular property and are therefore only occasionally used as a basis for estimating fair market. Certain care should also be exercised when using bank foreclosure sales and estate sales. This approach is the most common and preferred method of valuation when comparable sales data are available.

2. **Cost Approach.** This approach to value is derived from the current cost to construct a reproduction or replacement of the improvements, minus the amount of depreciation evident in the structures from all causes, plus the value of the land and entrepreneurial profit. This approach is particularly applicable when the property being appraised involves relatively new improvements which represent the highest and best use of the land, or when relatively unique or specialized improvements are located on the site and for which there exist no comparable properties on the market.
3. **Income Approach.** This approach converts anticipated future benefits or returns in dollars from the ownership of a property into a value estimate. Anticipated future income and or reversions are discounted to a present worth value through the capitalization process. This approach is widely used in appraising income-producing properties.

D. Other Approaches and Procedures.

1. **Before and After Procedure.** This procedure is principally used to appraise partial acquisitions, disposals, and leases. Just compensation is derived by first estimating the market value of the entire or larger parcel before the transaction and then subtracting from it the estimated market value of the remaining parcel after the transaction, including a consideration of severance damages and special benefits.
2. **Subdivision/Development Approach.** This approach is used to appraise an undeveloped property having a highest and best use for subdivision development (UASFLA, 1992, pp. 25-26). In this approach, an indication of value is derived by first estimating the market values of the total number of lots into which the property would most likely be divided. Development costs, including a reasonable profit for the developer, are then deducted from this value.
3. **Going Rate Method.** Using this method, an indication of value is based on rates being paid by utility companies to private and other entities for rights-of-way or easements on a per foot or rod basis. These rates reflect acquisitions in the same general area as that of the appraised property. If such rates are not available within the locality, market rates from outside the area or even the State can be considered for a particular use. When using this method, the appraiser must make adjustments for differences in the factors of value between markets.
4. **Farm Budget Study.** This method analyzes gross income, expenses, and net income for a farm over a specified period of time. This procedure is used to appraise excess lands. In Reclamation appraisals, it is mostly used to determine highest and best use of excess lands, without reference to project benefits, as either irrigated land or dry land.

ADDENDUM 13

**Section 3405. Water Transfers, Improved Water
Management and Conservation**

Section 3405. Water Transfers, Improved Water Management and Conservation

Water Transfers

In order to assist California urban areas, agricultural water users, and others in meeting their future water needs, subject to the conditions and requirements of this subsection, all individuals or districts who receive Central Valley Project water under water service or repayment contracts, water rights settlement contracts or exchange contracts entered into prior to or after the date of enactment of this title are authorized to transfer all or a portion of the water subject to such contract to any other California water user or water agency, State or Federal agency, Indian Tribe, or private non-profit organization for project purposes or any purpose recognized as beneficial under applicable State law. Except as provided herein, the terms of such transfers shall be set by mutual agreement between the transferee and the transferor.

1. **Conditions for Transfers.** - All transfers to Central Valley Project water authorized by this subsection shall be subject to review and approval by the Secretary under the conditions specified in this subsection. Transfers involving more than 20 percent of the Central Valley Project water subject to long-term contract within any contracting district or agency shall also be subject to review and approval by such district or agency under the conditions specified in this subsection:
 - A. No transfer to combination of transfers authorized by this subsection shall exceed, in any year, the average annual quantity of water under contract actually delivered to the contracting district or agency during the last three years of normal water delivery prior to the date of enactment of this title.
 - B. All water under the contract which is transferred under authority of this subsection to any district or agency which is not a Central Valley Project contractor at the time of enactment of this title shall, if used for irrigation purposes, be repaid at the greater of the full-cost or cost of service rates, or, if the water is used for municipal and industrial purposes, at the greater of the cost of service or municipal and industrial rates.
 - C. No transfers authorized by this subsection shall be approved unless the transfer is between a willing buyer and a willing seller under such terms and conditions as may be mutually agreed upon.
 - D. No transfer authorized by this subsection shall be approved unless the transfer is consistent with State law, including but not limited to provisions of the California Environmental Quality Act.

- E. All transfers authorized by this subsection shall be deemed a beneficial use of water by the transferor for the purposes of section 8 of the Act of June 17, 1902, 32 Stat. 390, 43 U.S.C. 372.
- F. All transfers entered into pursuant to this subsection for uses outside the Central Valley Project service area shall be subject to a right of first refusal on the same terms and conditions by entities within the Central Valley Project service area. The right of first refusal must be exercised within ninety days from the date that notice is provided of the proposed transfer. Should an entity exercise the right of first refusal, it must compensate the transferee who had negotiated the agreement upon which the right of first refusal is being exercised for that entity's total costs associated with the development and negotiation of the transfer.
- G. No transfer authorized by this subsection shall be considered by the Secretary as conferring supplemental or additional benefits on Central Valley Project water contractors as provided in section 203 of Public Law 97-293 (43 U.S.C. 390(cc)).
- H. The Secretary shall not approve a transfer authorized by this subsection unless the Secretary has determined, consistent with paragraph 3405(a) (2) of this title, that the transfer will not violate the provisions of this title or other Federal law and will have no significant adverse effect on the Secretary's ability to deliver water pursuant to the Secretary's Central Valley Project contractual obligations or fish and wildlife obligations under this title because of limitations in conveyance or pumping capacity.
- I. The water subject to any transfer undertaken pursuant to this subsection shall be limited to water that would have been consumptively used or irretrievably lost to beneficial use during the year or years of the transfer.
- J. The Secretary shall not approve a transfer authorized by this subsection unless the Secretary determines, consistent with paragraph 3405(a) (2) of this title, that such transfer will have no significant long-term adverse impact on groundwater conditions in the transferor's service area.
- K. The Secretary shall not approve a transfer unless the Secretary determines, consistent with paragraph 3405(a) (2) of this title, that such transfer will have no unreasonable impact on the water supply, operations, or financial conditions of the transferor's contracting district or agency or its water users.
- L. The Secretary shall not approve a transfer if the Secretary determines, consistent with paragraph 3405(a) (2) of this title, that such transfer would result in a significant reduction in the quantity or decrease in the quality of water supplies currently used for fish and wildlife purposes, unless the Secretary determines pursuant to finding setting forth the basis for such determination that such adverse effects would be more than offset by the benefits of the proposed transfer. In the event of such a determination, the Secretary shall develop and implement alternative measures and mitigation activities as integral and concurrent elements of any such transfer to provide fish and wildlife benefits substantially equivalent to those lost as a consequence of such transfer.

- M. Transfers between Central Valley Project contractors within countries, watersheds, or other areas of origin, as those terms are utilized under California law, shall be deemed to meet the conditions set forth in subparagraphs (A) and (I) of this paragraph.
2. **Review and Approval of Transfers.** - All transfers subject to review and approval under this subsection shall be reviewed and approved in a manner consistent with the following:
- A. Decisions on water transfers subject to review by a contracting district or agency or by the Secretary shall be rendered within ninety days of receiving a written transfer proposal from the transferee or transferor. Such written proposal should provide all information reasonably necessary to determine whether the transfer complies with the terms and conditions of this subsection.
 - B. All transfers subject to review by a contracting district or agency shall be reviewed in a public process similar to that provided for in section 226 of Pub. L. 97-293.
 - C. The contracting district or agency or the Secretary shall approve all transfers subject to review and approval by such entity if such transfers are consistent with the terms and conditions of this subsection. To disapprove a transfer, the contracting district or agency or the Secretary shall inform the transferee and transferor, in writing, why the transfer does not comply with the terms and conditions of this subsection and what alternatives, if any, could be included so that the transfer would reasonably comply with the requirements of this subsection.
 - D. If the contracting district or agency or the Secretary fails to approve or disapprove a proposed transfer within ninety days of receiving a complete written proposal from the transferee or transferor, then the transfer shall be deemed approved.
3. **Transfers executed after September 30, 1999 shall only be governed by the provisions of subparagraphs 3405(a) (1) (A) -(C), (E), (G), (H), (I), (L), and (M) of this title, and by State law.**