Regarding the Equitable Distribution
Of Water in the Imperial Irrigation District

Draft Final Report

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EQUITABLE DISTRIBUTION OF WATER

EXECUTIVE SUMMARY

Background

Our Charge: To evaluate alternative methods for the equitable apportionment of water by the Imperial Irrigation District (IID) on a short-term basis in individual years when this is needed. We were not asked to recommend whether the District should adopt an apportionment of water but, rather, what the District should do if the Directors did decide to adopt an apportionment on a short-term basis.

Our Approach: The work on this project moved forward in three distinct phases: (1) Phase One - confidential background interviews with water users; (2) Phase Two - rigorous analysis of the different methodologies and discussion with the affected stakeholders; and, (3) Phase Three - preparation of a final set of recommendations to the Board for its consideration. This report represents the culmination of Phase Three.

From the outset, we strived to conduct an analysis grounded in the unique realities of water use in the Imperial Valley. To this end, we met with local agricultural, business and government leaders, analyzed District records, and talked with District staff. To facilitate the broader community’s input into this work, we held eight public workshops – two at the project outset, three to summarize draft findings, and three to present draft recommendations. More than 90 people attended the workshops, which were held in Brawley, El Centro and Calexico.

Most critically, we engaged in a series of facilitated discussions with local stakeholders to seek their feedback on our evolving analysis. This group – referred to as the Equitable Distribution Work Group – proved instrumental in fleshing out local perspectives. It met twelve times over a 10-month period, and all meetings were open to and attended by members of the public.

To assess the alternative options, we conducted background research on other irrigation districts’ practices, including reviewing the published literature and conducting interviews with knowledgeable informants, as well as drawing on our knowledge and experience from 35 years of research and teaching on the economics of water. While the recommendations to be presented below have drawn on input from a wide variety of information sources and stakeholders, including especially members of the Work Group, they reflect only the opinion of the consultant team.

Context for Apportionment: We consider apportionment only in the short-term context where the IID Directors determine that the expected demand for water is likely to exceed the supply expected to be available to the District. We refer to this as a supply/demand imbalance (SDI) situation. We do not consider apportionment in any other context.
Criteria for Assessment: Not surprisingly, there is no easy answer to managing an SDI situation. The fact of an SDI makes some hardship inevitable. Every solution has its relative strengths and limitations, and each has its supporters and detractors. We believe, however, that the package of recommendations presented below offers the best opportunity for the District to satisfy seven key criteria. The method of apportionment should be equitable; it should be practical; it should provide predictability; it should provide flexibility; it should minimize economic harm to the local economy; it should be reasonably inexpensive to administer; and it should require minimum intrusion by the District.

Recommendations - Apportionment

Our recommendations are provided below. Based on our discussions with the Work Group and others, we believe that, taken together, they provide a reasonable and practical way to handle an SDI situation.

In order to manage the imbalance between demand and supply, the District should explore options for temporarily lowering demand and encouraging additional conservation, including paying water users to reduce their use or temporarily switching to some form of tiered pricing, as well as options for temporarily raising supply by developing access to storage and/or purchasing water from other districts. However, while we believe that these options have merit and should be seriously considered, we do not believe that they are likely to be adequate as the sole remedy for any SDI situation that might arise in the near future. We believe that the District will also need to institute the apportionment of water in an SDI situation.

Apportionment for field and vegetable crops: Water for field and vegetable crops accounts for about 90% of the water use in the Imperial Valley. For this reason – and the fact that agriculture is key to the region’s economic vitality – most of our analysis and discussions with Work Group have focused on this category of water use. We recommend either (a) an apportionment based on field history grouped by soil type or (b) a transition from this group history to straight-line apportionment.

In an apportionment based on group history, each field would receive an allocation based on the historical average delivery of all fields with that soil type over the period 1987-2005. For fields with heavy soil, the recommended baseline allocation is 5.4 AF/a; for medium soils, it is 6.3 AF/a; and for light soils, it is 7.4 AF/a. A field composed of different soil types would receive an allocation based on the acres of each soil type within the field. In an apportionment with a transition to straight line, there is a shift, over 10 calendar years, from the group history apportionment to a straight-line allocation, where each acre in the district receives the same amount. Between the two, we slightly prefer the apportionment based on group history because it recognizes the differences between soil types.
Straight-line and history are how most agricultural water districts in California apportion water. These districts have not found “allocation to the gate” to be problematical; they have not found that these forms of apportionment create a property right or an entitlement to water. We do not believe that such allocation would create a property right or an entitlement in IID. Nevertheless, if the Board has an overriding concern to avoid allocation to the gate, we offer a qualified recommendation that it adopt an apportionment based on crop water use. We view this as distinctly inferior option to either apportionment based on group history or straight-line because it will be costly for the District, create a large administrative burden, be intrusive, and limit growers’ flexibility.

Given the depth of our concerns with a crop water use approach, some additional explanation is warranted. With crop-based apportionment, growers will need to submit cropping plans to the District indicating how many acres of each crop they plan to raise during the coming period, and the District will need to monitor and enforce compliance with the cropping plans. While this form of apportionment provides flexibility for a grower to choose his cropping pattern, it then holds the grower rigidly to this cropping pattern. It can provide no flexibility for harvesting a reduced acreage, or for fallowing some land, because that would undermine the integrity of the apportionment. It makes every grower hostage to everyone else’s cropping pattern: if some growers change their cropping pattern in a way that increases the total crop water use, everybody’s water use has to be scaled, even growers who have not changed their cropping pattern.

With apportionment based on group history and straight-line apportionment, we recommend that transfers among different fields charged to the same account be permitted. This is effectively equivalent to allocating to the account, or to the farming unit, rather than to the individual field. However, we do not believe this should be permitted with apportionment based on crop water use because it would violate the integrity of the apportionment, except among fields with the same crop water use factor.

We considered but rejected other forms of apportionment. We believe that apportionment based on assessed value would be both costly to implement and unfair to many growers. We believe that an apportionment based on an immediate shift to straight line would lack the transition needed for many growers to adapt. Regarding an apportionment based on individual field history, after a careful analysis of the District’s data, we came to the conclusion that the District does not have a sufficiently consistent and complete record of these individual field deliveries and, therefore, it would not be practical for the District to apportion water based on the average historical delivery to each individual field.

The reason for this conclusion is as follows. There are almost 7,000 fields which have received at least one delivery of water between 1987 and 2005, and therefore have some sort of claim to receive water. About 5,000 of these fields received one delivery of water

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1 To prevent land fallowing, the District should place an upper limit on the maximum amount that can be transferred away from any field in an account.
2 Even if it were practical, we do not believe that apportionment based on individual field history would be equitable because of the large amount of variation in field-level water use which cannot be explained statistically by the soil, the crop grown, the method of irrigation, or the weather.
in every year over the period. The other 2,000 fields do not have a consistent long-run history of deliveries. Of the 5,000 fields with a long-run history of deliveries, we estimate that about 20-30% may have histories that are incomplete or questionable. In total, there are as many as 3,000 or more fields with histories that are problematic for apportionment based on individual field history.

**Apportionment for Permanent Crops:** Permanent crops account for 6% of the District's water use. We believe that permanent crops merit a somewhat different treatment from field crops and vegetables because of the relatively long life of these permanent crops. As a result, there is an especially large economic value at stake: if a year's water supply were to be disrupted for these crops and the crop was lost, the farmer would be losing not only that year's revenue but also a revenue stream for future years.

We recommend an apportionment for these uses be based on a crop water use approach. The crop water use factors should not just be based on the past history of water use in the District; in addition, the District should require a reasonable level of water use efficiency going forward, and should build this into the crop water use factors it develops.

Because the potential economic loss from a reduction in water supply is greater for permanent crops than for field crops and vegetables, and because an efficiency requirement would already be incorporated in the water use factors, we recommend that, in an SDI situation, the District should generally impose a smaller reduction relative to the baseline allocation for these crops, or possibly no reduction, compared to the reduction required for field crops and vegetables.

**Apportionment for Non-Agricultural Uses Including Industrial and Geothermal:** These uses account for about 1% of water use in the District. Because these uses are extremely heterogeneous, we recommend that the apportionment for them be based on water use factors which incorporate a requirement for a reasonable level of water use efficiency. Rather than making land area the unit of allocation, the unit of allocation should be output, with the water use factors being per unit of output. In the event of an SDI situation, users would submit a production plan to the District, and the water use factors would be applied to the planned output over the apportionment period. The District should monitor the production plan and, periodically, verify the efficiency of water use.

We recommend that, in an SDI situation, the District should generally impose a smaller reduction relative to the baseline allocation for these industrial uses, or possibly no reduction, compared to the reduction required for field crops and vegetables.

**Apportionment to Urban Water Agencies:** Urban water use accounts for about 3% of the water use in the District. For urban water agencies, we recommend that the unit for

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3 The delivery data are used primarily for accounting and billing purposes. There appear to be errors whereby deliveries to one field in an account are recorded as deliveries to another field in the same account: while accurate at the account level, the data are not necessarily accurate at the field level.

4 Because of the long-lived nature of these crops, the monitoring of the cropping plan by the District will be much easier than for field crops and vegetables.
apportionment be the number of people served by the agencies. The allotted per capita
water use factor, in gallons per capita per day, would be applied to the current service
population to determine the total apportionment to the water agency.

Water use varies significantly among different towns in the Valley, reflecting differences
in the mix of residential and non-residential uses, landscaping, housing vintage and
density, and metering. We do not recommend that the same per capita water use factor be
applied immediately to each urban water agency. However, in order to be equitable, and
to provide a level playing field for the location of future new urban development in the
Valley, it is important that new urban growth be held to the same water use standards.
Therefore, the District should promote a uniform effort to achieve conservation in new
urban growth. To that end, we recommend that the District consider applying the same
per capita water use factor for future growth in the population, while still allowing for
differences in the per capita water use associated with the existing (2006) population.

We also recommend that, going forward, the District work with the urban water agencies
to ensure that they develop effective urban water conservation plans and comply fully
with all applicable BMPs for urban water conservation, including metering.

Given increased compliance with BMPs for existing water use, including metering, the
existing per capita water use is expected to decline in some areas. The per capita water
use factors applied to the existing population in these areas should then be adjusted
downwards to reflect the reduction in water use.

If the urban water agencies meet these conditions, we recommend that, in an SDI
situation, the District should generally impose on them a smaller reduction relative to
their baseline allocation, compared to the reduction required for field crops and
vegetables.

**Recommendations – Easing the Burden of Apportionment**

The clear economic lesson from widespread experience of the regulation of production in
many different contexts is that, if businesses are to be regulated, what they want is
transparency and certainty; they want to know ahead of time what is required of them so
they can plan their affairs accordingly and take steps to comply in a manner that is best
for them.

Given the possibility of a future SDI situation and the potential need for apportionment,
we strongly recommend that the District decide ahead of time how it will apportion water
in an SDI situation. The sooner the District makes a decision, the more time individual
water users have to make plans and find ways to hedge against the contingency of a
future SDI situation. Conversely, delaying a decision until an SDI actually occurs would
greatly undermine growers’ ability to plan ahead and would exacerbate the cost to the
Valley’s overall economy.
Developing A Supplemental Supply of Water to Ease the Burden of Apportionment:
Flexibility has real economic value, especially in an SDI situation. It is inevitable that
some water users in the District will want to obtain some additional water above their
allocation, while others may turn out to have some water they do not need.

To provide some needed flexibility, we recommend that the District take whatever steps
it can to develop a supplemental supply of water for use in an SDI situation, with which
the District can then use to function as a supplier of last resort, rather like the California
Department of Water Resources’ Drought Water Bank did in 1991-93. This could be
done by paying users in the District to conserve and use less water, by acquiring water
from outside the District, and by putting in place a modified “take-or-pay” system that
encourage growers to identify – one or two months prior to the end of the allocation
period – that portion of their allocation they will not need.

Permitting Exchanges of Water: While we recommend that the District take these steps
to function as a supplemental supplier of last resort, we do not believe that they alone will
provide adequate flexibility to meet all water users’ needs in an SDI situation. We believe
that these measures should be complemented by permitting internal exchanges of water
among growers within the District, subject to some important safeguards. The
safeguards we recommend are as follows:

- The District should permit internal exchanges only as long as the purpose is to
  use the water reasonably and beneficially within the District, and not to hold it
  for financial speculation.
- The parties to the exchange should be required to submit an application to the
  District to make the exchange. The District would have to approve the
  application.
- The District should set a limit on the maximum amount of water per acre that
  can be transferred off a field.
- The District should also set a limit on the maximum amount of water per acre
  that can be acquired.
- Urban water agencies should deal directly with the District as supplier of last
  resort. They should not be allowed to obtain water through exchanges with
  agricultural users because of the difference in their ability to pay for water.

We recognize that there are some important and deeply felt concerns about permitting
internal water exchanges within IID. We understand the basis for these concerns, and we
respect them. But, from our experience, we believe there is a trade-off between what the
District can accomplish in a cost-effective manner, and what the individual users can do
among themselves. We believe that the package of measures recommended here best
accomplishes the multiple goals to be considered when designing an apportionment.

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5 Our recommendation is conditional on the District’s adopting an apportionment based on group history or
straight-line. We do not recommend that internal exchanges be permitted if the District adopts an
apportionment based on crop water use, except among fields growing crops with the same water use factor.
It should be noted that the State Water Code does permit internal water exchanges in the context of some form of water apportionment. The form of water apportionment that it discusses is apportionment based on assessed valuation, and it states explicitly (Section 22251) that "any landowner may assign for use within the district his right to the whole or any portion of the water apportioned to him." This would appear to provide a sanction for internal exchanges, at least in concept. But we strongly agree with the view that what is allowed and how it is done matter greatly: hence the need for careful safeguards such as those we have recommended.

Some concern has been expressed about the possibility of price gouging by the seller in an internal exchange. While this possibility exists any time two parties come together, we believe it is unlikely to become a significant issue in IID. First, prices in IID are likely to be far more moderate than in other districts which permit internal exchanges. Second, by functioning as a supplemental supplier of last resort, the District will take an important step towards putting an effective cap on the prices that might be charged by an individual seller in an internal exchange. This is an economic approach to price control, as opposed to a bureaucratic regulatory approach, and it is far more likely to be successful.

**Recommendations - Advance Preparations**

The premise underlying our recommendations is that the District would adopt an apportionment, if at all, only in an SDI situation. However, we do not believe the District should take no action relating to apportionment prior to the declaration of an SDI situation. On the contrary, we believe that there are several important steps that the District should take now to prepare itself against the contingency of a future need for apportionment in an SDI situation.

One step that we recommend, as noted above, is to decide ahead of time on how apportionment will be implemented if it becomes necessary in a future SDI situation, without waiting until an SDI occurs. We also recommend that the following actions be taken now:

A) The District should verify all of the acreage that would be covered by apportionment.
B) If the District decides to adopt apportionment based on group history, it should confirm the soil classification of all the acreage covered by apportionment; determine the treatment of the small category of soils classified as "other;" make the soil group classification publicly available; and establish a process to deal with any appeals.
C) If the District decides to adopt apportionment based on crop water use, it should develop the water use factors that apply to individual crops and groups of crops.
D) If the District decides to adopt apportionment based on crop water use or group history, the District should resolve the relationship between fields and gates in those cases where this is now uncertain, so that it is possible for the District to track deliveries to every individual field within the District.
E) The District should take the steps necessary to prepare its software and data system for recording the ordering and delivery of the water in order to accommodate the apportionment of water.

F) The District should improve its capacity for measuring deliveries at the gate and the field. If apportionment is introduced, it is likely that water users will require a higher degree of accuracy than the present measurement system provides. This may eventually entail an automated, remote measurement of delivery.

G) The District needs to resolve legal issues regarding the water availability fee. It also needs to adopt a policy regarding lands with no history of delivery and no payment of the water availability fee.

H) The District should develop the water use factors that will be applied for permanent crops and for non-agricultural uses, including industrial and geothermal.

I) The District should take steps to ensure that the urban water agencies it supplies have an effective drought contingency plan, have an effective conservation plans, and are fully complying with the applicable urban BMPs for conservation. Given this focus, the District should ensure that it has at least one staff person with strong expertise in urban water use and conservation.

J) The District should take steps to ensure that it has a reliable methodology for predicting upcoming water demand by various water user categories in order to provide a firm basis for decision-making on whether to declare an SDI situation.

K) We encourage the District to explore all cost-effective options for developing some near-term storage.

L) We encourage the District to conduct a test of tiered pricing to determine its potential as a tool for managing an SDI situation, as well as a complement to the District’s activities in connection with the Efficiency Conservation Definite plan.

M) More generally, the District needs to determine how the recommendations for apportionment here should be linked to whatever is recommended for the Efficiency Conservation Definite Plan.

In conclusion, we are mindful that IID is a large and diverse water district. There are different users with different needs. Consequently, there is no ideal method of apportionment that can work perfectly for everyone. Therefore, while we have strived for fairness, some compromises are inevitable. Moreover, any method of apportionment has to be practical not just for a subset of the users or a subset of the acreage farmed, but for all users and all the acreage. Recognizing these inherent limitations, we believe what we have recommended is equitable and practical.