

Meeting Package October 28, 1997 Meeting of the Integration and Development Team

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1028IDT2

Agenda
October 28, 1997 Meeting
of the
Integration and Development Team

1. Proposal by USF&W Staff and Q&A (30 minutes)
2. Optimized Alternative 3 - Discussion
Storage Considerations
3. Optimized Alternative 1 - Discussion
4. Optimized Alternative 2 - Discussion
5. BDAC Package for November 4-5

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**October 28, 1997 Meeting
of the
Integration and Development Team**

PRODUCTS EXPECTED TODAY

1. CONSENSUS ON OPTIMIZED ALTERNATIVE 3,
EXCEPTING FOR STORAGE.
2. CONSENSUS ON OPIMIZED ALTERNATIVE 1,
EXCEPTING FOR STORAGE.
3. HALF COMPLETION OF OPTIMIZED ALTERNATIVE 2,
EXCEPTING FOR STORAGE.
4. AGREEMENT ON CONTENTS OF BDAC PACKET
Maps
Short Alternative Descriptions
Distinguishing Characteristics Evaluation

1028IDT1

Date: October 28, 1997

To: Alternative Integration and Development Team

From: Rick Woodard

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Subject: Revised Meeting Dates

MEETING TYPE	DATE	TIME	LOCATION
IDT	10/28/97	9:00-4:00	DWR DLA Large Conference Room, 1020 9th Street, 3rd Floor
Core Group	10/31/97	1:30-4:30	1147-C
IDT	11/3/97	1:00-4:00	1142
BDAC	11/4/97	9:00-4:00	Sacramento Convention Center
BDAC	11/5/97	9:00-4:00	Sacramento Convention Center
Core Group	11/7/97	1:30-4:30	1147-C
IDT	11/12/97	1:30-4:30	653
Mgmt. Team	11/13/97	9:00-4:30	1131
Mgmt. Team	11/14/97	9:00-4:30	1131
Core Group	11/14/97	1:30-4:30	1147C (If Mgmt. Team meeting is over)
Core Group	11/17/97	1:30-4:30	TBA
IDT	11/18/97	9:00-4:00	Energy Commission Building, Hearing Room A
Policy Group	11/24/97	9:00-4:30	1131
Policy Group	11/25/97	9:00-4:30	1131
IDT	11/26/97	9:00-4:00	TBA

1027MEET

DRAFT STAFF WORKING PAPER

Notes from October 22, 1997 Meeting of the Interagency Development Team

Flip Chart Note

Agreed: IDT will forward a recommendation to management that no distinction be made between on-stream and off-stream surface storage.

Meeting Notes

While it is generally true that off-stream storage has lower environmental impacts than on-stream storage, this axiom does not hold true in all cases. Increasing the size of existing facilities on the Sacramento and San Joaquin River systems may in some cases be a more environmentally acceptable alternative to construction of a new off-stream impoundment. In any case, it would not be acceptable from a 404(b)(1) point of view to avoid a full analysis of alternatives.

Mark presented water supply reliability and storage considerations to establish a foundation for the discussion of storage related to Alternative 1. Mark summarized supporting work which suggests that water supply benefits of surface storage increase on a continuum up to about 3 MAF on the Sacramento River system and up to about 2 MAF South of Delta off-aqueduct storage. Delta water quality standards, environmental considerations, and economic factors will ultimately drive size decisions. Without more detailed, site-specific information, it is difficult to determine optimal storage volumes. Mark suggested that the IDT's focus should be on identifying a range of storage that is compatible (in terms of resulting Delta flow patterns) with each alternative. The minimal volume of storage would be the volume required to make the alternative work (provide ERPP flows unmet by transfers, allow required temporal shifting of Delta exports away from periods critical to fisheries, etc.) The maximum amount of storage would be the largest quantity that provides incremental benefits, given a set of Delta operational parameters associated with an alternative.

Some IDT members indicated a preference to adopt Mark's suggestion, as represented in the table found on page 3 of the staff paper, "Storage Considerations for Optimized and Preferred Alternatives". Others were unconvinced.

There was a suggestion to show a minimum, a maximum, and a number representing the IDT recommendation which takes into account factors such as supposed implementability and other Solution Principles.

Another suggestion was to decide how much storage is actually going to be part of the CALFED

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program, and leave others to develop storage to meet any needs above that. Others felt a "small vision" does not fulfill CALFED's mandate to develop durable solutions.

There was a suggestion that IDT interpret its commission as including the ability to recommend policy choices to the decision makers, as appropriate.

It was pointed out that, if the decision makers are to understand the storage considerations presented by IDT that it will be necessary to prepare the presentation carefully so as to be understandable. It was clear that the water supply discussion presented at the Policy Group meeting the previous day was not well understood.

There was an objection to use of the term "optimized" to describe the products IDT is developing. There was not a suggestion as to what terminology should be used instead.

There was a suggestion that IDT should perhaps be bold and recommend the "real" maximum and minimum storage. According to some published studies something like 9 MAF could be proposed as a maximum for the Sacramento River watershed. Reactions to this suggestion included reference to Lester's remarks at the Policy Group meeting to the effect that such a declaration would come at the cost of loss of consensus among the stakeholders.

It was emphasized by several participants that we have an assignment to come back four weeks from now with three optimized alternatives, and in 8 weeks to identify the Draft Preferred Alternative to be recommended to management. Much of the work that is needed cannot realistically be done in this time frame, and will have to be done over the ensuing year prior to finalization of the draft document. There was discussion of the need to create realistic expectations on the part of CALFED agency managements, BDAC, stakeholders, and the public as to what is going to be included in the draft document.

There was a suggestion of identifying groundwater conjunctive use as a priority, and leaving the surface storage numbers as recommended by Mark.

A question arose as to what is the function of Mark's paper, and is it the intention of IDT to spend time revising it.

It was recommended that IDT define its tasks for the next four weeks and get it clear among the group. One members indicated that what we were doing that day is not what was expected. The expectation was that we were going to optimize alternative 1 and specify a small range of upstream and off-aqueduct South of Delta storage, instead of working on the storage paper. The suggestion was to come up with a more tangible number for storage.

Another person indicated it is desirable to be as explicit as possible, but we will only be able to generally describe cost per acre-foot and environmental impacts. This will limit our ability to define storage explicitly.

It was suggested that minimum required storage could be based on how much environmental

water would be needed by each alternative. A discussion of equity ensued, and was related to the discussion of the 1/3 environmental, 1/3 agricultural, and 1/3 municipal split of storage benefits that was held at the Policy Group meeting the day before. There seemed to be a consensus among the IDT that the principle of equity must come into play in some form, though equity could be judged over the entire program, not feature by feature. There was discussion of the need to look at the totality of yield.

There was a discussion of in-Delta or near-Delta storage to accommodate pumping cessation for a period of 30 days or possibly more. There was general agreement that the cost of such storage would be rather high, but it was also pointed out that twice as much storage capacity South of the Delta would be required to provide the same yield as storage in or near-Delta.

It was proposed that Optimized Alternative 1 be essentially as described as Alternative 1C, without in-Delta or near-Delta storage to accommodate pumping shutdowns.

It was specifically recommended the writeup for Alternative 1 include discussion of how habitat distribution would be different with this alternative, and why that would be so.

Further consideration of Alternative 1 was put over for the next meeting. It is expected that the water use efficiency sub-team will bring a writeup that will help us to reach closure on the recommended Alternative 1.

Alternative 3 was discussed briefly, and it was decided that the discussion would center on Alternative 3 as proposed by USF&W. This alternative proposes dual intake points on the Sacramento River, probably at Hood and Freeport, a 10,000 cfs isolated facility feeding into Clifton Court and to an expanded forebay, probably consisting of Victoria Island, that would be connected to Clifton Court. No pumping would occur in the South Delta. A 3,000 cfs intake would be constructed on the San Joaquin River upstream of the Delta. Water would be supplied from the isolated facility to Delta islands to compensate for negative water quality impacts induced by operation of the isolated facility.

Information was provided that indicated that the San Joaquin River is probably capable of providing a maximum of something over 1,000 cfs, once in-stream needs are accounted for, and that, on average, flows in the San Joaquin River in the summer months are below 3,000 cfs. It was also pointed that the mineral quality of water to be had from the San Joaquin River is relatively low.

Alternative 3 will be discussed at the next meeting. In preparation for that meeting:

1. Patrick will get with Darryl Hayes and other USF&W staff to explore the benefits of dual intake facilities on the Sacramento River, and will be prepared with a report at the next IDT meeting.
2. A better explanation will be provided of why the Core Group centered on the features suggested to the IDT as potentially belonging in the optimized alternative.

3. There needs to be a more detailed analysis to determine whether a 15,000 cfs screen capacity with associated pumps would enable continuous export of 15,000 cfs. Though this was the understanding of some IDT members based on the previous meeting where screen and hydrodynamics experts discussed these matters, these experts will be re-contacted and the information confirmed.
4. Get cost per acre-foot of yield estimates for the various types of storage under consideration.
5. Confirm the South Delta agricultural demand that would be supplied under the USF&W proposal.

Process Improvement

1. For each IDT meeting, put a chart on the wall that shows what is to be discussed and what products are expected.
2. Discussions of the IDT should be committed to flip charts to enhance general understanding of what is being agreed to.
3. To the extent possible, meeting materials should be handed out in unified packages, rather than piecemeal.
4. There was a suggestion, rejected by the group, of limiting meetings to half days.

Next Meetings

The next meeting of the IDT will be on October 28. An additional meeting will be scheduled for October 31, if deemed necessary by the IDT at their next meeting.

1023IDTM

DRAFT STAFF WORKING PAPER

Patrick:

Presentation of USF&W Recommended Alternative to IDT:

15-20 minute presentation by USF&W staff, followed by Q&A, following which auxiliary Service staff would leave and IDT deliberations begin.

An "optimized alternative" will be one that, insofar as possible, meets CALFED objectives and Solution Principles, including reducing conflict in the system, improving water supply reliability, being equitable, implementable, and not causing significant redirected impacts. In addition from a practical standpoint, to be successful, the alternative chosen must provide sufficient benefits to the affected parties to constitute a desirable "deal". The Core Group has studied the USF&W proposal as it was originally presented to CALFED, and have identified questions that pertain to the sufficiency of the proposal with respect to some of the above characteristics. The following are some of the issues we anticipate will need to be discussed, and would appreciate Service staff being prepared to describe your recommended approach to optimizing the proposal in such a way as to eliminate significant problems:

1. How does the proposed 10,000 cfs capacity isolated facility, along a 3,000 cfs San Joaquin River diversion maintain adequate export capacity? In the absence of being able to at least maintain current levels of water supply, it is difficult to imagine how the expense of constructing such a facility would be seen as acceptable.

Considerations:

Evaluations presented to the IDT demonstrate the flow in the San Joaquin River is typically below 3,000 cfs in summer months and, once flow requirements are accounted for, it appears diversion capacity from the San Joaquin River would not often exceed about 1,000 cfs.

The demand of South Delta agriculture during peak irrigation periods may be on the order of 4,500 cfs which would be taken from the isolated facility. (We are attempting to firm up this estimate)

2. How can the Service proposal, which has the appearance of being functionally equivalent to a fully isolated facility, be seen as falling within the description of a dual facility which was adopted for environmental analysis and documentation?
3. The Service proposal appears to envision additional water being provided, presumably for ecosystem purposes. More specifically, how would such water be used? From what sources does the Service envision the water coming without depriving others of their water supplies?

Patrick, we are very interested in the Service proposal, and it is not our intent by posing potentially difficult questions to suggest that it is not viable, or that at least it has viable features. We think the same kind of test will have to be met by any proposal that has potential for being the Preferred Alternative.

On a slightly different topic, I was uncomfortable with the part of the last meeting of the IDT where there seemed to be a willingness of some IDT members to discard in-Delta or near-Delta storage on the basis of cost. I wasn't able to articulate my discomfort at the time, but have since clarified my thinking, and I want to try it out on you. My line of reasoning is that we are trying to optimize Alternative 1. We have concluded that addition of in-Delta or near-Delta storage would, in fact, be an optimizing feature, as it would permit cessation of South Delta exports for some period of time. But then, the suggestion is made that we should discard the storage because it costs a lot.

I believe we should not get into this kind of cost comparison at this stage of the selection process. Let us say, for example, there are two ways of optimizing Alternative 1 to avoid entrainment. One is to install in-Delta or near-Delta storage, and the other is XXXXXXXX (something or other). Then, if Option A is less expensive than Option B, fine we adopt Option A. However, as is the actual case, we don't know of another way of producing an optimizing feature for the alternative then if the feature is important, it stays, even if expensive.

Only when we begin comparing the three optimized alternatives in the attempt to find the Preferred Alternative are we able to judge whether the expense of storage in Alternative 1 is warranted with respect to its benefits, as compared to attaining equivalent or greater benefits another way.

I would appreciate your reaction to this thought, as it would be my plan to introduce it sometime during the next meeting.

1024IDT

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Date: Fri, 24 Oct 97 17:04:15 -0700
From: "Patrick Leonard" <patrick_leonard@mail.fws.gov>
To: <rwoodard@water.ca.gov>
Subject: Questions on your fax

Rick:

i got your fax and voice-mail today; Mike Fris and i will be there at 9 am, and hopefully Mike Thabault, if he can get the start of an ISDP meeting delayed an hour or so.

In our brief presentation, we'll focus on delta conveyance, diversion, export, and in-delta storage issues (since we're putting off up- and down-stream storage 'til some point in the future). In particular, we'll focus on why we made the choices we did, with reference to the distinguishing characteristics--in other words, try to describe why we think this is an "optimized" alternative. We'll also specifically compare it to the Core Group's draft alternative 3, to show what we think are the trade-offs there (at least i will--i haven't shared that with the two Mikes yet). While some of the Q&A is likely to be clarification ("what exactly did you mean?"), i hope that some of it also focuses on the choices we've made, pressing us for further rationale and possibly suggesting changes.

Has the Core Group worked up an agenda for the whole meeting yet? I'd appreciate knowing how you think this fits in to the rest; depending on what else the IDT is doing, we might change emphasis here or there in our presentation. I'm available Monday if you want to talk about this; we could also discuss whether there's anything we should send to the IDT in advance, or any handouts/etc. that could be useful.

On to your questions. As a prelude, let me say that we too are only interested in a viable alternative. It was never our intention to describe an alternative that meets the fish and wildlife needs of the CALFED program, but does not address the other goals and objectives. This is not to say that we don't understand more about those fish and wildlife needs, and were more likely able to develop an alternative that meets them than other goals we understood less well; however, our intention has always been to work within the CALFED process to improve ("optimize", if you will) the basic approach we have described to ensure that it meets all CALFED goals and objectives. Somehow, we have not gotten this message across: we might be reluctant to attach numbers to a diversion or a canal size, and to say that they are preliminary and dependent on future, real modelling, but everyone still focuses on "10,000 cfs canal" and 2 5000 cfs diversions, even in the Core Team. This is particularly surprising, since the message i tend to get in the IDT is that the specific size of conveyance and

storage facilities, and the number, size, and location of diversions, is really a Phase III decision.

So, we want this to work. Believe me, we are not going around advocating what is essentially a peripheral canal for fun, or to make new friends (though when our existing friends get wind of what we're doing, sometimes it seems we could use a few new ones). We do think the basic approach we have described is the basis of a delta solution, but one that still needs more work and hard decisions. On to your questions:

1. "Does the FWS approach maintain adequate export capacity?" (I've learned my lesson: i'm not even going to ask the obvious question.) I think i can describe the detailed modelling process we followed to size the facilities: someone said, "Lester and CALFED seem very nervous about the political feasibility of a large isolated facility; do you think a 10000 cfs canal is big enough to meet export needs?" Answering this question requires a fair amount of knowledge about project operations that we don't really have, as well as a decision--or at least an assumption--about new storage upstream and south of the delta (that could also be part of the CALFED solution). So we took a simplified approach, and asked what could be exported if the canal ran full bore, except that it was completely shut down for about 2 months every year (of course shortages could be spread out throughout the year; it makes no difference). In other words, 300 days of exports of 10,000 cfs (or an average export rate of about 8200 cfs); that works out to about 6 million acre-feet/year, which we thought was roughly equivalent to existing exports. Since we really weren't sure of maintaining that average rate of 8200 cfs using only a total of 10000 cfs from the Sacramento, we added another diversion (on the SJR) with the thought it would both serve the export facility directly some times when Sacramento had to be shut down, and allow unreduced exports when in-delta storage was being filled.

We never explicitly included supplying in-delta needs, since we didn't really know the magnitude. Certainly we never considered devoting up to 4500 cfs of the isolated facility to meet s.delta needs! We did think the extra diversion and in-delta storage would allow us to meet some of these needs however--hopefully enough to keep s.delta water quality at similar levels as other versions of alt 3.

However, and i can't say this often enough, we never thought we were identifying "final" numbers. I don't doubt that Dave or Mark or Stein could take five minutes and explain why our simplified approach just doesn't work--and i hope they will. What Mark has said so far has me thinking i'll take a page from the "draft staff working paper" and start describing a "10,000 to 14,000 cfs isolated facility" (note that this is a slightly smaller percentage range than the "7000 to 10,000

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cfs" in alt 3 of the draft working paper), with "multiple, redundant diversions on the Sacramento River and possibly other tributaries to the Delta", tied in to "two to three hundred thousand acre-feet of in-delta storage, to be used to buffer exports both when diversions are reduced to protect ecological resources, and when in-delta demand supplied through the isolated facility peaks", and, if we really don't deal with storage beyond "a range" in Phase II, suggest that most refinements are really Phase III issues.

2. "Alternative 3 is called 'Dual Facility', but aren't you talking about a totally isolated facility?" We certainly are, but i don't really understand the question. Is a totally isolated facility "eliminated from further consideration by virtue of semantics", rather than impact analysis or effectiveness in meeting goals, objectives, and solution principles? Does the purpose and need statement eliminate consideration of totally isolated facilities? If this really is a question, we need to talk a lot more (and should probably include at least EPA in our discussions). Anyway, this is the question Mike Spear asked at the last policy meeting "FWS is interested in what is essentially a totally isolated facility, and we're not sure that's covered by the existing alternatives. Will such an alternative be analyzed?" Lester committed that in fact it would be. I know Mike thought of that as "in the context of the EIS", and hope Lester did too.

In any case, i can help describe our approach as a "dual facility", if needed: diversions from the sacramento and the san joaquin rivers, delivery to the export facility both from an isolated facility and a modified "chain of lakes", any number of possibilities that could be covered by "dual". Granted, it does not follow the pattern "Alternative 3 equals Alternative 1 plus Alt 2, plus something else", if that's the definition of "dual facility".

Before getting to this question, i'd think we'd all start wondering about alternatives 1 and 2: are they consistent with the solution principles? do they meet the purpose and need? I don't think anyone is seriously considering "screening" these alternatives out--but then i didn't think anyone was questioning whether our approach to alt 3 was appropriate or not.

3. "Is there additional water? how is it used? where does it come from?" I'm not sure i fully understand this; i think it comes from some figures about needs on the sacramento and san joaquin rivers that were included in earlier versions of our approach--possibly including our presentation to the Core Team?

I should clarify now that we are not talking about "extra" flows/environmental water needs beyond what's in the ERPP. If we think

what's in the ERPP is not sufficient, we'll address it there, not in an alternative. Our original goal was to ensure that conditions required in the Delta Native Fishes Recovery Plan and recommended by the AFRP were met; we understand that it is the intent that these are included in the ERPP.

The last part of the question, "from what sources?", is also a little confusing. If we were looking for additional environmental water, it would come from the sources already being considered for such water: acquisition from willing sellers, project reoperation, new storage, etc. I hope that our eagerness to get beyond a vague range of storage, and to eliminate certain well-studied sites that we consider unacceptable is not seen as an aversion to new storage per se. We are by no means opposed to storage, but we would really like to know what we're buying, if we end up buying (with assurances) something.

Finally, on your question about the last IDT meeting, i agree with you, except that i'm not sure the people who are objecting--namely Tom--are doing so because of cost. I thought his objection was "this wasn't really in any of alts 1a, b, and c, so we can't put it in here". However, i think Lester asked us to identify three "functioning alternatives", and we may need to add things like this in our attempts to optimize alternatives. Even though i'm not sure cost was the basis of Tom's objection, i agree with your perspective on the role of cost in our analysis at this time.

Let me know if you have any questions, and let's try to talk before Wednesday so i have a better idea of how our presentation and followup discussion should fit in with the rest of the day's agenda. Thanks,

p.l.

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Date: Fri, 24 Oct 97 14:52:56 -0700
From: "Patrick Leonard" <patrick_leonard@mail.fws.gov>
To: <mcowin@water.ca.gov>
Subject: Re[2]: Storage Range

Mark:

I just came back from a meeting of the BDAC "Assurances" work group; while the whole assurances package is far from put to bed, it seems certain that people view implementation of the various CALFED programs as proceeding "together", to the degree that each program essentially holds the others hostage: one doesn't get completed 'til they all do. In particular, completion/full implementation of the ERPP is linked to completion of any new storage and conveyance facilities.

In this context, i worry about how your recommendation would work. No matter how often we said "range", of both storage and deliveries, an expectation, perhaps almost an entitlement, would naturally develop in most people's minds about the high end of that range. Suddenly, when the Principles Agreement or Implementation Agreement or whatever the Assurances Package turns out to be is signed, full implementation of the ERPP would be tied to construction of storage facilities at the high end of the range--or at least to water deliveries of the extent that would be possible if such facilities were developed. Before mortgaging the ERPP on future storage and deliveries, i'd like to be sure it was technically, environmentally, and economically feasible. And of course, environmental feasibility is the easiest of these 3 to finesse: when we do the risk analysis, surely everyone is looking to construct facilities that have essentially no meaningful risk of failure; anyone going to pay for the facility is going to want to be pretty certain about its cost effectiveness. However, many people are perfectly happy to take a much less conservative approach to environmental risk: can those impacts be mitigated? we won't really know for a century or so, so let's give it a try! Is that migratory corridor really that important? only one way to find out!

And it would be nice to be able to evaluate the total costs of the different alternatives. I'm not sure what the Core Group thinks of this now, but i really don't think we should separate decisions about conveyance from decisions about storage. In order to accomplish roughly similar levels (and i'm not even sure we can get to this point) of water supply reliability, i think we'd need significantly more storage under alt 1 than alt 3 (in general, with refinements for the different features in the different sub-alt). We should be able to present this in the impact analysis: sure, alt 3 requires an expensive canal--but to get roughly the same benefits from alt 1, we'd need more expensive storage (and still may not have the ecosystem benefits). (I think we would probably need some storage in our version of alt 3, too, but not as much) I'm not sure how this would be visible under your recommendation.

p.l.

Reply Separator

Subject: Re: Storage Range
Author: Mark Cowin <mcowin@water.ca.gov> at ~internet
Date: 10/24/97 7:12 AM

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Patrick,

Thanks for your comments. I agree that if we could show that only some limited amount of storage is technically feasible, that would be a straight forward way to limit the range. Unfortunately, as we're discovering in our reservoir screening process, this is an extremely difficult task. Over the past few decades, studies have been conducted that cover tens of millions of acre-feet of multi-purpose storage. Rarely do these studies show that its technically infeasible (from strict engineering considerations) to construct the project. Environmental considerations and cost-effectiveness are another matter. Very few projects have had the intense on-site study (environmental surveys and geological investigation) necessary to determine potential impacts and final design parameters. This, together with uncertainty associated with conveying water through the Delta for export, leaves much uncertainty about cost-effectiveness.

All this uncertainty leads me to the approach I've been recommending. The way I see it, the storage range we include in our preferred alternative isn't a promise that the storage will be built, but a general agreement that IF environmentally acceptable, cost-effective sites are identified in later (Phase 3) study, operation of new storage within our given range is compatible with our Bay-Delta solution. Of course, we can go a little farther in Phase 2. We can also provide a list of the alternative storage sites that will be considered, and summarize both the existing information and the information needs associated with each.

Thanks again for your help. Any reaction you would like to offer to this would be welcome.

-- Mark

At 03:05 PM 10/23/97 -0700, you wrote:

>
> Mark:
>
> I'm not sure this will be very helpful, but I think what i
>
> said was more in the discussion of "narrowing the range for each
> alternative", rather than about the "preliminary" (for want of a
> better word) range that you presented in your paper. When we get to
> each alternative, I do think we need to be more specific, even though
> we don't need/want to choose a specific site as part of phase 2. So
> it's in the narrowing down of the preliminary range that factors other
> than physical capacity in the delta facilities (maybe i'm mistaken
> here, but i didn't think Kathy was talking about 'flow patterns' so
> much as 'given certain assumptions, what's the amount of theoretical
> storage beyond which we gain essentially nothing by increasing storage
> alone?'). I'm afraid that when we do this narrowing down, we need some
> site-specific information, not necessarily to consider a number of
> alternative sites, but as a kind of exemplar of what we're talking
> about. So if we're talking about an alternative with, say, 2 million
> acre-feet of off-aqueduct storage, we should add "such as site X".
> This will show that such a site really does exist (and we aren't
> "promising" something in the alternative that we can't ever deliver),
> and that it's technically (geologically, seismically, economically,
> environmentally) feasible. It does not, however, mean we have
> "selected" it, or are somehow committed to that site--that's a phase 3
> decision. I think that, with enough attention, some of these
> "technical" considerations might help limit the upper end of the range

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> considered for each alternative somewhere below the theoretical
> maximum based in your paper. In fact, i thought the surface storage
> screening group (or whatever their name is) was actually looking at
> some of these technical considerations and trying to decide if they
> did eliminate specific sites (and, possibly, entire categories, if no
> sites in that category survive the screening).

>
> I hope this is helpful. I'm sorry i didn't get a chance to say it
> yesterday, but i really appreciate the work you went through with
> this--it certainly helped me better understand the discussion we've
> been having about storage. I went into the meeting thinking it
> provided the basis for further refinement under each alternative, but
> now i guess i'm not so sure. I'm looking forward to seeing your
> revision. Thanks,

>
> p.l.

> _____ Reply Separator

>Subject: Storage Range
>Author: Mark Cowin <mcowin@water.ca.gov> at ~internet
>Date: 10/23/97 12:09 PM

>
>Patrick,
> I wanted to follow up on our IDT discussion yesterday regarding the
>range of storage for our alternatives. At one point I believe you said
>that the maximum end of the storage range should be constrained by more
>than just consideration of Delta flow patterns. I was hoping you could
>elaborate. Given that any new storage must comply with CEQA, NEPA, CWA,
>etc., (so on-site impacts will be mitigated) what other criteria would you
>suggest we use to limit the maximum end of the storage range?

> I'd appreciate it if you could give me a call or reply by e-mail, so
>that I might have a little more to go on in my attempt to redraft the
>material I presented yesterday.

> Thanks,
> Mark

>
> 653-2986
> mcowin@water.ca.gov

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>
>
>

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Date: Fri, 24 Oct 1997 13:51:53 -0700
X-Sender: kkelly@doppop2
To: Mark Cowin <mcowin@water.ca.gov>
From: Kathy Kelly <kkelly@water.ca.gov>
Subject: Re: Storage Range

Mark--

According to Bob Potter, the Director is concerned that an alternative will be chosen that promises more than it can deliver because the storage necessary to make the alternative feasible cannot be built. I see two tasks related to storage: First, quantifying the range of storage for each alternative and its related water supply; Second, evaluating the feasibility of the proposed reservoir sites and conjunctive use programs.

I know you have been involved in the process for evaluating the reservoir sites. I hope the criteria the group is using isn't so restrictive that no sites are left!

I haven't gone through the documents containing the studies yet. I will this weekend. I am sure after I do, all the answers will be obvious!

KK

>Kathy,
> FYI, here's an exchange I've had with Patrick Leonard. Any reaction?
> -- Mark
>
>
>
>
>

>>Date: Fri, 24 Oct 1997 07:12:47 -0700
>>To: "Patrick Leonard" <patrick_leonard@mail.fws.gov>
>>From: Mark Cowin <mcowin@water.ca.gov>
>>Subject: Re: Storage Range
>>In-Reply-To: <9710238776.AA877644431@smtp1.irm.r9.fws.gov>
>>

>>Patrick,
>> Thanks for your comments. I agree that if we could show that only some
>limited amount of storage is technically feasible, that would be a straight
>forward way to limit the range. Unfortunately, as we're discovering in our
>reservoir screening process, this is an extremely difficult task. Over the
>past few decades, studies have been conducted that cover tens of millions
>of acre-feet of multi-purpose storage. Rarely do these studies show that
>its technically infeasible (from strict engineering considerations) to
>construct the project. Environmental considerations and cost-effectiveness
>are another matter. Very few projects have had the intense on-site study
>(environmental surveys and geological investigation) necessary to determine
>potential impacts and final design parameters. This, together with
>uncertainty associated with conveying water through the Delta for export,
>leaves much uncertainty about cost-effectiveness.
>> All this uncertainty leads me to the approach I've been recommending.
>The way I see it, the storage range we include in our preferred alternative
>isn't a promise that the storage will be built, but a general agreement
>that IF environmentally acceptable, cost-effective sites are identified in
>later (Phase 3) study, operation of new storage within our given range is
>compatible with our Bay-Delta solution. Of course, we can go a little

>>>

>>>

>>>Patrick,

>>> I wanted to follow up on our IDT discussion yesterday regarding the
>>>range of storage for our alternatives. At one point I believe you said
>>>that the maximum end of the storage range should be constrained by more
>>>than just consideration of Delta flow patterns. I was hoping you could
>>>elaborate. Given that any new storage must comply with CEQA, NEPA, CWA,
>>>etc., (so on-site impacts will be mitigated) what other criteria would you
>>>suggest we use to limit the maximum end of the storage range?

>>> I'd appreciate it if you could give me a call or reply by e-mail, so
>>>that I might have a little more to go on in my attempt to redraft the
>>>material I presented yesterday.

>>> Thanks,

>>> Mark

>>>

>>> 653-2986

>>> mcowin@water.ca.gov

>>>

>>>

>>>

>>>

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To: "Patrick Leonard" <patrick_leonard@mail.fws.gov>
From: Mark Cowin <mcowin@water.ca.gov>
Subject: Re: Storage Range
Cc:
Bcc:
X-Attachments:

Patrick,

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All this uncertainty leads me to the approach I've been recommending. The way I see it, the storage range we include in our preferred alternative isn't a promise that the storage will be built, but a general agreement that IF environmentally acceptable, cost-effective sites are identified in later (Phase 3) study, operation of new storage within our given range is compatible with our Bay-Delta solution. Of course, we can go a little farther in Phase 2. We can also provide a list of the alternative storage sites that will be considered, and summarize both the existing information and the information needs associated with each.

Thanks again for your help. Any reaction to this would be welcome.

-- Mark

At 03:05 PM 10/23/97 -0700, you wrote:

>
> Mark:
>
> I'm not sure this will be very helpful, but I think what i
> said was more in the discussion of "narrowing the range for each
> alternative", rather than about the "preliminary" (for want of a
> better word) range that you presented in your paper. When we get to
> each alternative, I do think we need to be more specific, even though
> we don't need/want to choose a specific site as part of phase 2. So
> it's in the narrowing down of the preliminary range that factors other
> than physical capacity in the delta facilities (maybe i'm mistaken
> here, but i didn't think Kathy was talking about 'flow patterns' so
> much as 'given certain assumptions, what's the amount of theoretical
> storage beyond which we gain essentially nothing by increasing storage
> alone?'). I'm afraid that when we do this narrowing down, we need some
> site-specific information, not necessarily to consider a number of
> alternative sites, but as a kind of exemplar of what we're talking
> about. So if we're talking about an alternative with, say, 2 million
> acre-feet of off-aqueduct storage, we should add "such as site X".
> This will show that such a site really does exist (and we aren't
> "promising" something in the alternative that we can't ever deliver),
> and that it's technically (geologically, seismically, economically,
> environmentally) feasible. It does not, however, mean we have

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> "selected" it, or are somehow committed to that site--that's a phase 3
> decision. I think that, with enough attention, some of these
> "technical" considerations might help limit the upper end of the range
> considered for each alternative somewhere below the theoretical
> maximum based in your paper. In fact, i thought the surface storage
> screening group (or whatever their name is) was actually looking at
> some of these technical considerations and trying to decide if they
> did eliminate specific sites (and, possibly, entire categories, if no
> sites in that category survive the screening).

> I hope this is helpful. I'm sorry i didn't get a chance to say it
> yesterday, but i really appreciate the work you went through with
> this--it certainly helped me better understand the discussion we've
> been having about storage. I went into the meeting thinking it
> provided the basis for further refinement under each alternative, but
> now i guess i'm not so sure. I'm looking forward to seeing your
> revision. Thanks,

> p.l.

> _____ Reply Separator

>Subject: Storage Range
>Author: Mark Cowin <mcowin@water.ca.gov> at -internet
>Date: 10/23/97 12:09 PM

>Patrick,

> I wanted to follow up on our IDT discussion yesterday regarding the
>range of storage for our alternatives. At one point I believe you said
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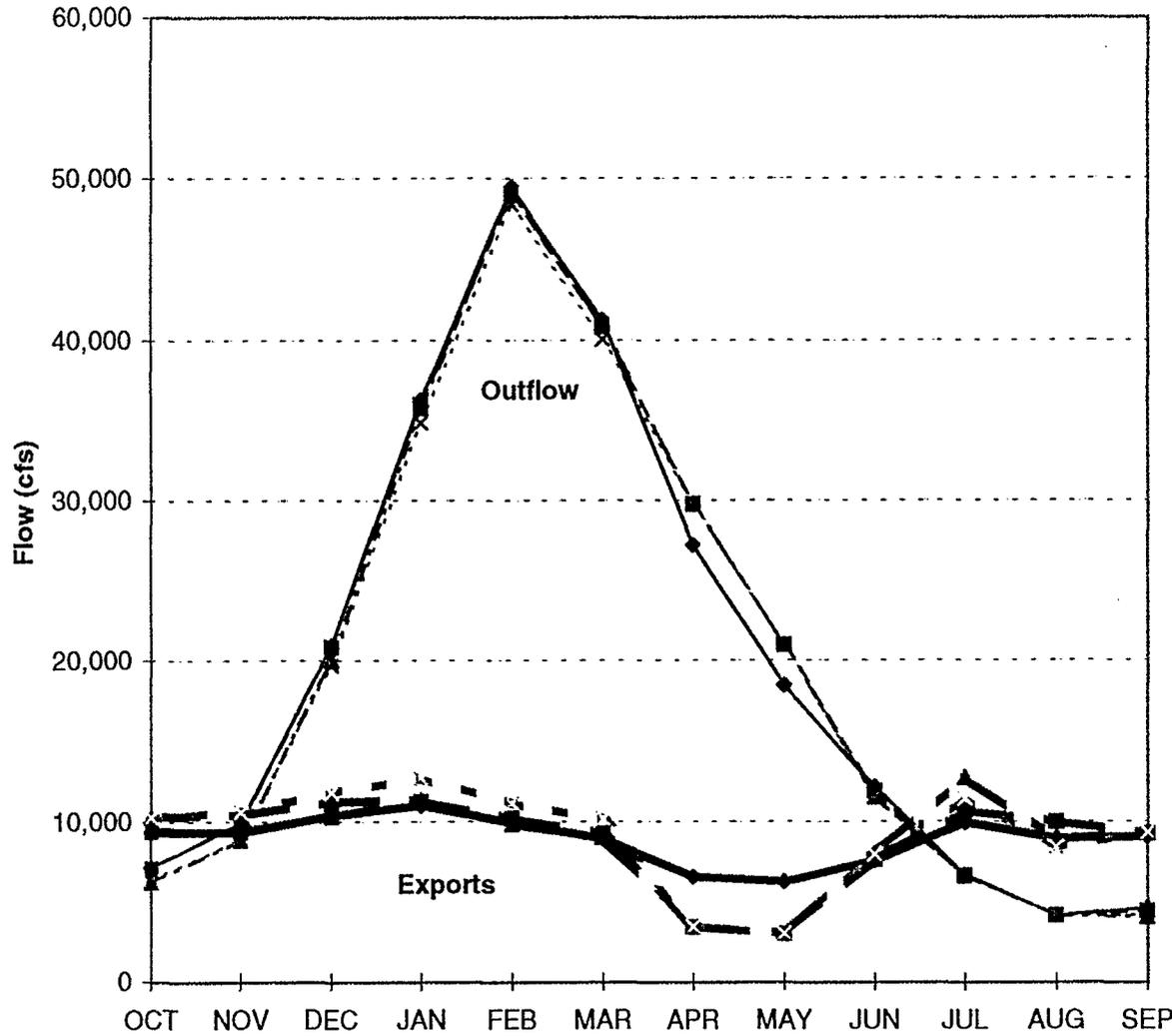
> Mark

> 653-2986

> mcowin@water.ca.gov

Delta Outflow & Exports

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- ◆— No Action
- No Action & Apr/May Restrictions
- ▲— SDI & Apr/May Restrictions
- ×— SDI, Storage & Apr/May Restrictions

Annual Export Totals Compared to No Action
No Action & Apr/May Restrictions: -210 TAF
SDI & Apr/May Restrictions: + 25 TAF
SDI, Storage & Apr/May Restrictions: + 180 TAF

Cost Estimate for the San Joaquin Diversion In the USF&W Alternative

Assumptions:

- 1) Diversion and Isolated conveyance channel capacity 3,000 cfs
- 2) Channel connects to Clifton Court Forebay and is approximately 16 miles long
- 3) Diversion screen is designed for an approach velocity of 0.33 fps, and would divert less water to achieve 0.2 fps.
- 4) Diversion on San Joaquin is located between Tom Paine Slough and Old River

3,000 cfs intake, fish screens and pump station	\$236
16 mile 3,000 cfs earth channel with siphons	\$210
Total Cost of San Joaquin Diversion:	\$446

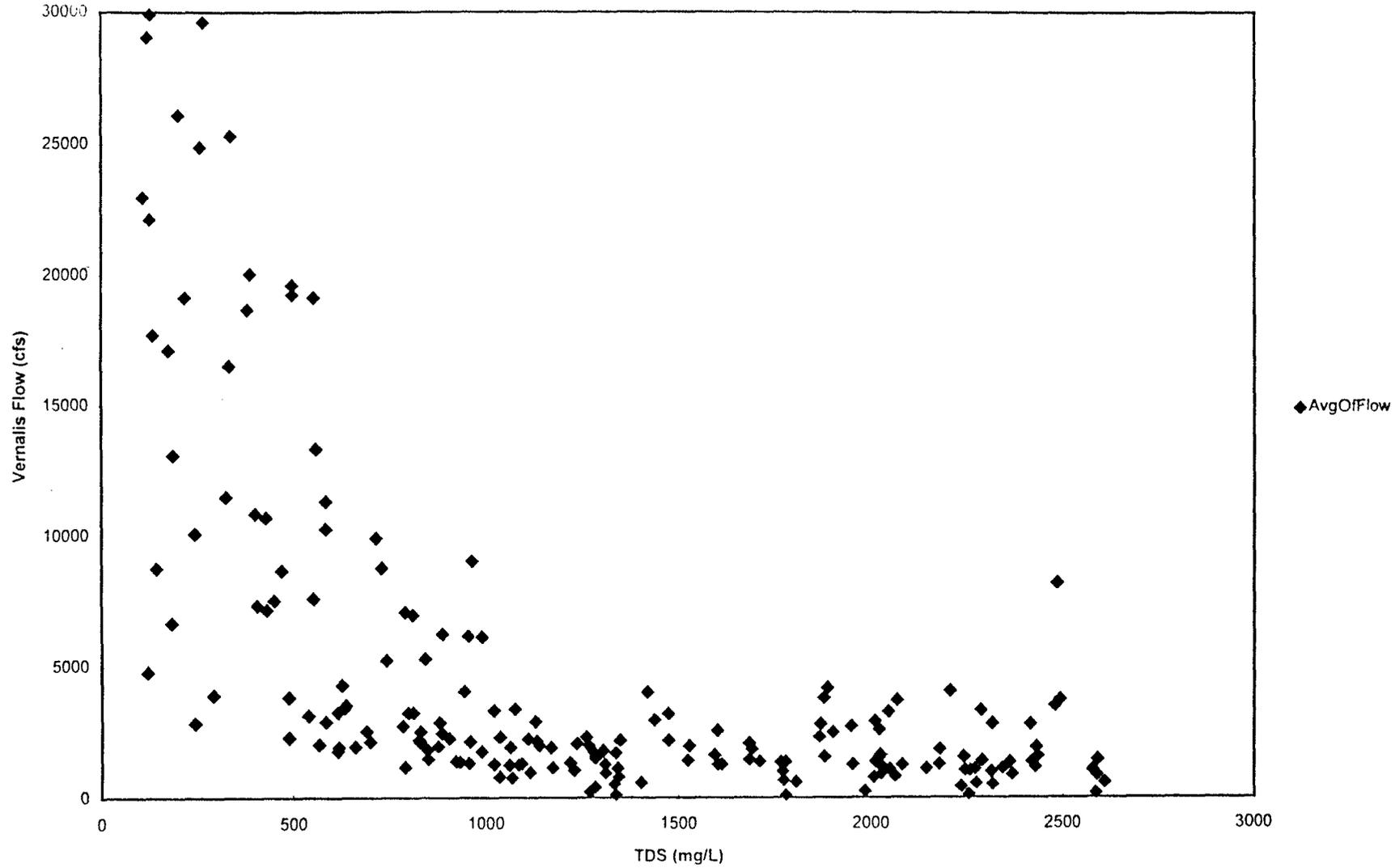
SJR flow @ Yonahis above B-D Flow Reg, Stan. Fish Reg,
 & w.R. Reg. (in cfs)

PRELIMINARY
 SUBJECT TO REVIEW

Table Output:

YEAR	1 OCT	2 NOV	3 DEC	4 JAN	5 FEB	6 MAR	7 APR	8 MAY	9 JUN	10 JUL	11 AUG	12 SEP	TOTAL
1922	200	1,597	2,521	2,773	3,246	3,453	1,082	1,094	1,457	1,714	1,479	1,400	22,036
1923	1,237	2,319	3,143	4,302	880	1,235	474	1,385	733	1,664	1,496	1,347	20,216
1924	117	1,597	1,328	1,344	1,043	1,011	0	0	555	156	66	643	7,859
1925	0	1,244	1,260	1,176	1,244	294	0	0	695	1,428	1,260	1,148	9,750
1926	0	1,160	1,227	1,176	498	0	7	0	388	307	69	724	5,557
1927	0	1,714	1,865	1,714	1,220	1,114	0	0	75	1,496	1,328	1,975	12,501
1928	1,496	2,050	1,882	2,084	461	1,484	414	0	514	1,193	1,076	1,052	13,702
1929	0	1,143	1,176	1,176	963	1,012	0	0	672	120	0	575	6,837
1930	0	1,025	992	1,160	405	693	0	0	655	151	39	609	5,730
1931	0	1,042	992	1,059	567	585	0	0	449	233	209	719	5,854
1932	0	1,109	3,092	3,529	3,898	1,835	0	0	0	1,452	1,292	1,425	17,633
1933	0	1,445	1,193	1,529	455	645	0	0	0	627	295	828	7,017
1934	0	1,042	1,160	1,227	656	450	0	0	503	146	103	653	5,939
1935	0	1,260	1,344	3,040	0	1,570	2,216	521	398	1,809	1,395	1,476	15,030
1936	397	1,731	1,428	1,815	8,770	4,760	1,211	0	293	1,613	1,428	1,509	24,951
1937	519	1,765	1,630	2,521	12,055	7,672	2,466	2,185	2,135	1,765	1,529	1,345	37,587
1938	507	2,000	4,974	7,176	16,428	29,776	16,089	18,171	9,911	3,210	1,613	2,958	112,828
1939	5,000	3,607	1,698	2,138	1,728	1,184	0	176	734	840	286	669	14,122
1940	1,000	1,344	1,328	4,117	4,593	5,930	1,641	733	868	1,613	1,496	1,328	25,120
1941	402	1,714	3,496	4,773	10,868	8,430	4,927	3,523	3,945	2,067	1,647	2,067	47,888
1942	1,600	2,487	4,219	7,647	5,079	4,324	970	273	3,004	2,084	1,697	1,798	35,219
1943	1,000	3,478	2,333	10,403	6,894	13,585	2,113	2,289	3,000	1,832	1,630	1,428	50,400
1944	874	1,933	1,937	1,630	1,490	1,068	328	950	1,155	1,445	1,012	1,204	14,707
1945	176	1,731	1,714	1,630	4,562	4,565	1,101	1,700	701	1,714	1,513	1,407	22,530
1946	1,704	2,463	5,445	5,495	1,456	409	465	1,256	454	1,613	1,513	1,261	23,065
1947	100	1,637	1,966	1,966	1,178	0	0	0	603	0	0	644	8,189
1948	0	1,060	1,126	1,076	0	456	279	0	684	1,395	1,244	1,341	8,861
1949	0	1,244	1,216	1,176	185	1,323	0	0	627	1,104	749	1,296	8,913
1950	0	1,260	1,207	1,546	373	109	0	0	425	1,193	840	1,274	8,125
1951	0	3,406	11,034	10,915	5,584	1,419	0	1,111	265	1,479	1,378	1,227	38,207
1952	207	1,496	2,528	5,930	4,587	10,563	6,033	9,734	4,903	2,252	1,546	2,605	52,978
1953	5,000	2,513	2,923	5,383	3,103	535	103	1,171	856	1,344	1,227	1,092	24,751
1954	119	1,294	1,311	1,378	0	933	0	78	774	1,328	1,210	1,119	9,540
1955	0	1,193	1,077	1,580	0	323	0	0	499	267	48	734	5,801
1956	0	1,277	11,033	20,287	10,868	5,042	157	684	2,723	1,748	1,462	1,496	56,812
1957	1,000	2,019	1,478	1,410	949	966	0	1,327	880	1,395	1,210	1,076	14,552
1958	160	1,376	1,445	1,697	539	8,630	8,762	7,547	7,321	2,218	1,647	2,084	43,733
1959	1,207	1,738	1,294	1,428	2,070	0	0	0	485	790	628	678	10,762
1960	0	1,109	1,033	1,120	1,389	789	0	20	857	0	0	620	6,668
1961	0	1,143	1,176	1,126	645	224	0	0	473	0	0	647	5,334
1962	0	1,126	1,106	1,092	4,260	2,348	0	0	365	1,143	776	1,223	13,446
1963	0	1,027	1,176	1,745	0	538	0	4	0	1,865	1,479	1,526	9,564
1964	0	2,151	1,496	1,563	200	308	0	0	306	115	29	684	6,880
1965	0	1,546	4,218	12,462	4,264	2,064	915	0	896	1,681	1,412	1,412	30,803
1966	1,000	4,857	4,036	4,874	2,817	89	0	0	489	1,160	1,092	1,049	22,100
1967	71	1,428	2,672	2,991	243	6,324	8,953	12,877	8,322	7,798	2,723	3,143	57,812
1968	1,000	2,301	1,645	1,817	2,133	0	0	155	514	840	739	773	12,318
1969	60	1,378	1,731	15,327	24,478	23,532	18,593	17,064	11,596	4,185	1,714	2,874	122,544
1970	4,857	4,030	2,961	16,690	6,125	2,545	0	1,309	311	1,513	1,395	1,328	42,961
1971	326	1,560	2,134	2,067	1,515	327	0	1,066	782	1,344	1,244	1,109	13,494
1972	0	1,193	1,412	1,395	0	0	0	0	345	211	0	646	5,200
1973	0	1,294	1,311	1,925	3,843	5,340	1,408	359	1,021	1,597	1,445	1,319	20,860
1974	574	2,605	2,907	7,394	1,880	3,589	1,370	249	913	1,681	1,496	1,361	26,009
1975	690	1,832	1,597	1,597	2,067	5,099	1,803	1,578	2,822	1,781	1,529	1,361	23,716
1976	91	2,118	1,395	1,344	1,222	1,098	0	0	706	1	0	576	9,408
1977	1,203	1,899	1,479	1,092	584	629	0	0	622	112	21	605	8,272
1978	0	1,210	1,378	3,330	3,517	9,918	8,884	6,622	1,014	2,270	1,496	2,554	42,193
1979	1,373	2,151	1,513	3,764	5,554	4,547	976	1,682	832	1,496	1,344	1,258	26,490
1980	527	1,933	1,580	12,446	16,092	12,585	2,483	3,247	4,378	2,017	1,647	2,907	61,841
1981	1,278	2,706	1,344	1,697	209	104	0	142	564	807	705	751	10,366
1982	214	1,529	1,983	9,949	10,679	15,356	18,918	11,566	7,256	2,403	2,017	4,269	86,129
1983	7,529	11,620	17,915	25,221	29,612	40,613	21,379	20,273	21,547	12,974	5,193	6,256	220,133
1984	8,466	13,623	19,826	16,826	6,254	1,616	0	930	883	1,613	1,597	1,395	73,048
1985	141	1,546	1,580	1,445	1,192	817	0	0	589	739	106	762	8,918
1986	152	1,529	1,580	1,546	16,147	22,714	6,382	4,205	6,445	1,681	1,529	1,412	65,322
1987	851	1,664	1,260	1,294	1,217	851	0	21	739	0	0	574	8,543
1988	0	1,126	1,059	1,092	175	668	0	0	605	0	0	679	5,404
1989	0	1,025	1,126	1,092	564	948	0	0	689	195	61	712	6,433
1990	0	1,059	975	1,092	158	650	0	0	511	51	0	607	5,103
1991	0	1,008	958	941	352	1,669	0	0	570	354	120	680	6,650
1992	0	1,143	975	1,059	1,079	767	0	0	0	407	236	757	6,423
AVG	790	2,054	2,585	4,125	3,794	4,181	2,014	1,962	1,865	1,448	1,011	1,354	27,186
MIN	0	1,006	958	941	0	0	0	0	0	0	0	574	5,103
MAX	8,466	13,623	19,826	25,221	29,612	40,613	21,379	20,273	21,547	12,974	5,193	6,256	220,133

Vernalis Flow vs. TDS Relationship

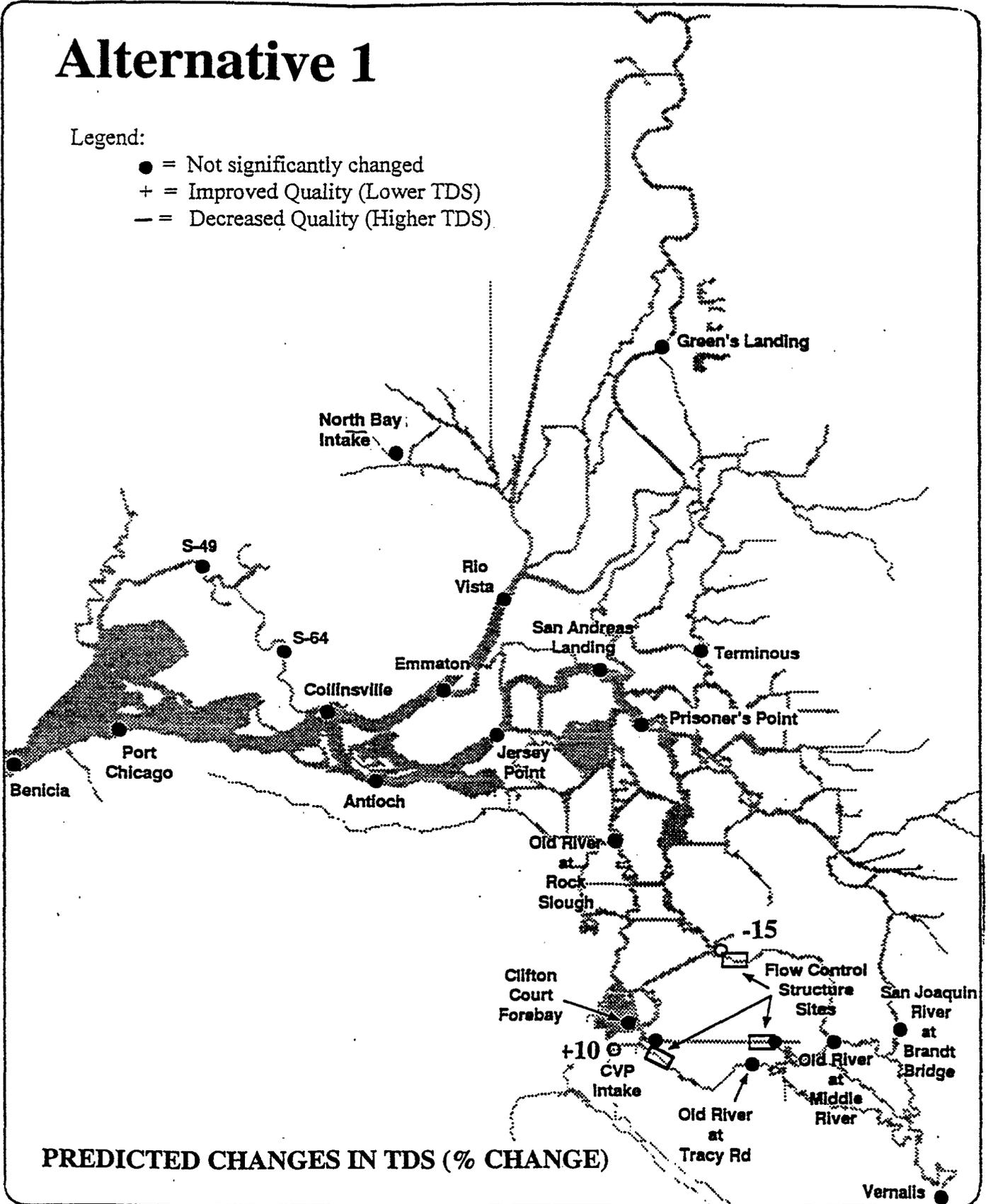


Handwritten scribble

Alternative 1

Legend:

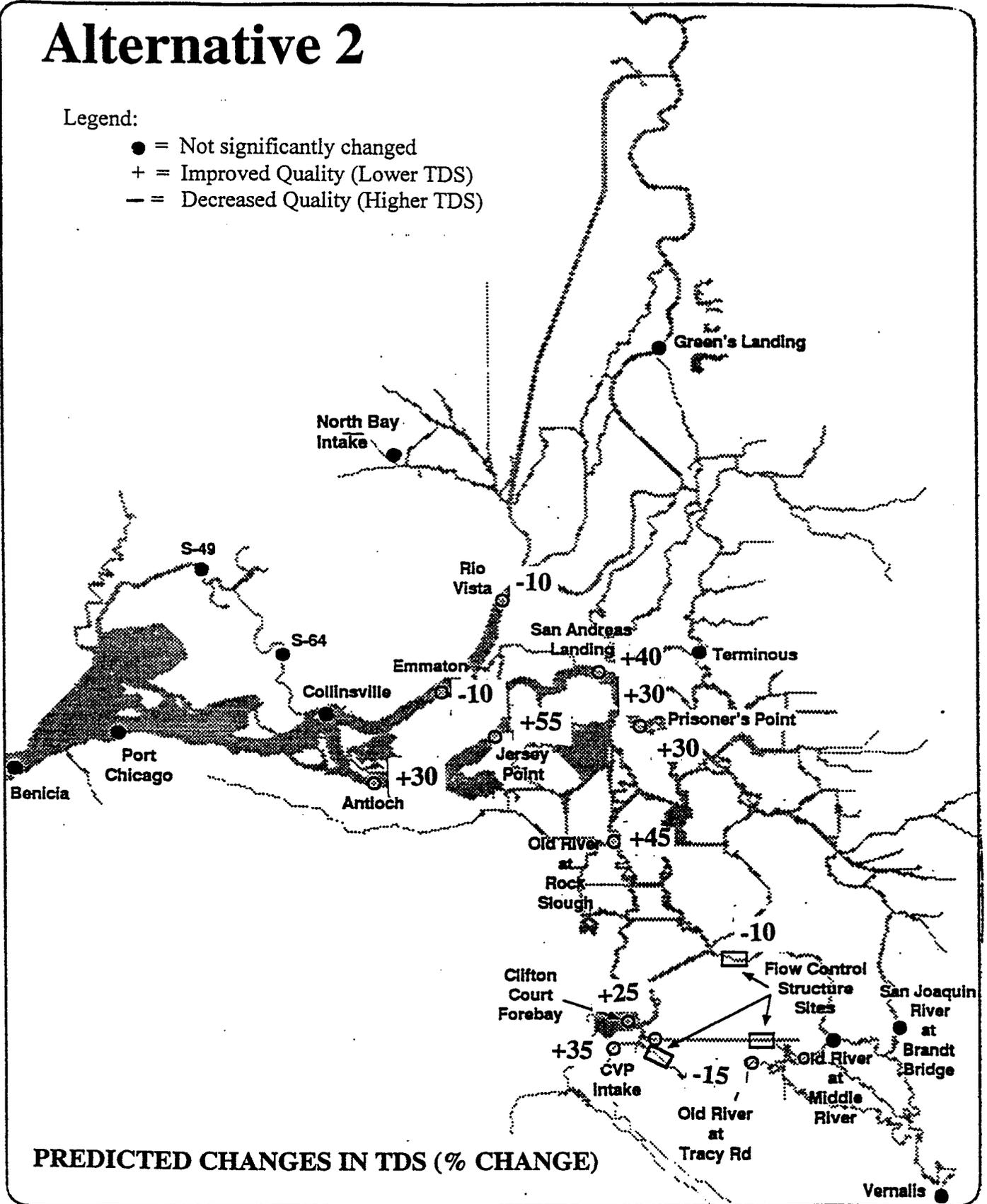
- = Not significantly changed
- + = Improved Quality (Lower TDS)
- = Decreased Quality (Higher TDS)



Alternative 2

Legend:

- = Not significantly changed
- + = Improved Quality (Lower TDS)
- = Decreased Quality (Higher TDS)

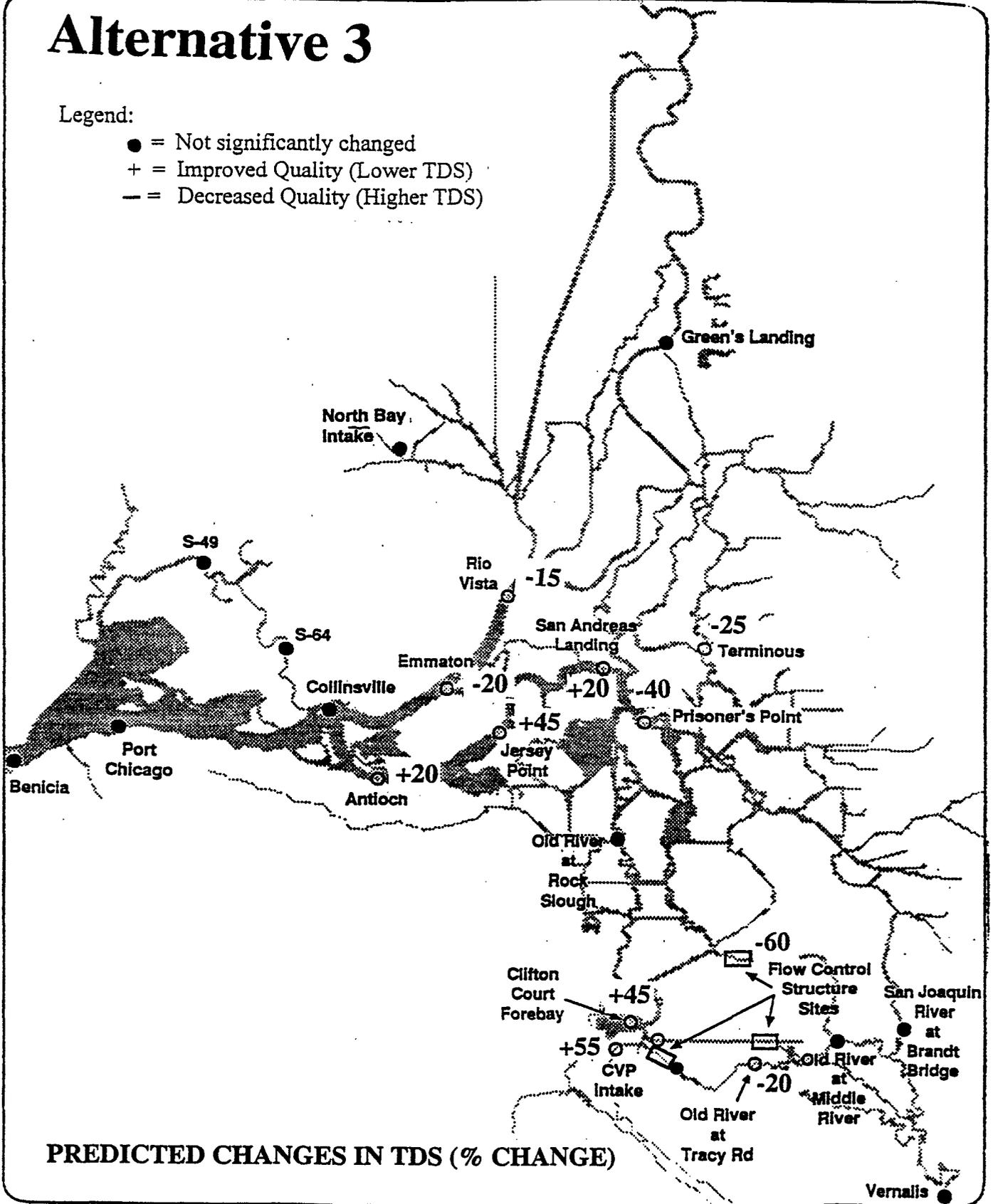


PREDICTED CHANGES IN TDS (% CHANGE)

Alternative 3

Legend:

- = Not significantly changed
- + = Improved Quality (Lower TDS)
- = Decreased Quality (Higher TDS)



PREDICTED CHANGES IN TDS (% CHANGE)