

MEMORANDUM**Workshop #3, Red (Pink) Breakout Session Notes**

TO: CALFED PROJECT TEAM
FROM: Loren Bollerff
DATE: October 14, 1995

*use to improve
description
+
to identify
actions.*

MORNING SESSION (10:30-12:00)**Overview**

Sharon Gross provided an overview:

- Looking for multiple objectives
- Need to keep other action categories in mind when looking for linkages (since we are looking at only 2 of the 8 action category groupings)
- There is some disparity in level of detail among categories

Are we going to put values on these action categories? No, the intent is not to rank them.

Are the objectives final? No, still modifying but generally getting close; this is the most updated list.

ACTION CATEGORIES TO REDUCE EFFECTS OF DIVERSIONS**FISH SCREENS**

B.J. Miller - are we talking about all diversions including (1) upstream diversions, (2) State and Federal export pumps, or (3) in-Delta diversion? We are considering all.

Comment from group - of the three, two have more impact with regards to entrainment of fish; upstream diversions have little effect on entrainment)

Lester comment on B.J.'s question - found with staff that some of the action categories are universal; i.e fish screens may have effect wherever diversion is. Others, like moving diversions are hard to score unless we start separating out; if in-Delta is one thing and if export pumps is another. Therefore, some can be broken out but we want all considered.

Aquatic Habitat (benefited by fishscreens?)

Fish screens have nothing to do with improving aquatic habitat.

Fish screens are related in that population of species is an important component of the food chain portion of habitat

What does habitat mean? Like riparian (what grows on the banks) or how channels are configured or does it include preservation of food chain, water quality, toxics in the water, etc. , or just physical characteristics of the land immediately adjacent to the water.

Maybe what we are saying is that aquatic habitat would be more fish friendly if the pumps were not sucking water out of part of the habitat or is this something else? Some may say this is not habitat, that it is pumps entraining fish - that is separate from habitat.

Flow is habitat, including temperature, and components like that. Now that we are talking just about fish screens, all the flows, temperature, etc. are the same and we are just talking about the numbers of fish being chewed up so even if habitat does include flow the score should be zero for this case. Helpful to think of all other parameters staying while we are looking at a specific action category.

There may be data related question; do you need more flow without screens, could you have less flow with screens or is there no linkage at all? Frank responded that depends if you consider the presence of predators a characteristic of habitat; if you remove the predator effect by installing screens would probably have an effect on habitat but may be more in terms of population of the fish and the positive mark would go in the next box.

Suggested approach - in mailout aquatic habitat had about 8 subobjectives; if we look back and ask question if fish screens would help any of these it would help clarify what aquatic habitat means. Or, move on to species population and back up to aquatic habitat if needed.

Frank - Linkages: if part of habitat is flow and the location of X2, then strong link to placement of X2 and the number of unscreened diversions that may be in the location of X2 (would want to screen those). Others thought that would be handled in another box like wetlands habitat.

Fish screen it self is not the factor effecting aquatic habitat. Linked more to location and flow.

Suggestion to speed up by assuming everything has a +, -, or L and that nothing has a blank. Everything may be connected.

Wetlands Habitat (benefited by fish screens?)

Nothing to do with wetlands habitat.

Fish screens serving managed wetlands (rather than tidal wetlands) would insure continued management of those wetlands so would be a benefit. Also, if need water to divert into Susan Marsh for example there would be limitations due to ESA and may need a fishscreen in order to divert; would benefit the wetland.

Species Population (benefited by fish screens?)

Big +, positive impact.

Linked to adaptive management; do some pilot studies due to uncertainty on how effective fishscreens may be. With the lack of technology for certain life forms, adaptive management (real time monitoring of when small fish are present) to avoid diversions when present could link to make fish screens very effective in terms of effect on species

population. - Amounts to reducing diversions, even when screened, when certain life small life form (eggs and larvae for example) are present.

Could be further be linked to demand management for timing of diversions.

Could be enhanced by consolidation or relocating of diversions.

Conflict Among Beneficial Uses

Positive effect.

Could be negative impact if allow diversion amounts to increase.

Assuming screen is not designed perfectly, then maintenance of the screens may reduce what water can be taken.

B.J. Miller - does not understand this argument since in order for a fish screen to have a negative impact by allowing more water to be diverted you have to assume that reason for building fish screen in the first place (protecting the environment) would somehow be forgotten. You are saying if you put fish screen on it will allow you to divert more water and that this is bad for the environment and therefore a negative effect. But the same reason you put on the fish screen is going to provoke you to put restrictions on the amount of water you can divert whether or not the fish screen is there. This is like saying the regulatory agency that caused you to build the fish screen somehow goes away and you can now divert indiscriminately regardless of what damages occur - not consistent. You are not going to spend all that money for fish screens and do environmental damage.

Can be a positive as long the continued regulation reflected.

Additional negative is state of art fish screens are very expensive.

Also linked to effective water management.

All boxes will likely have linkages.

Uncertainty

Positive effect.

Steve - Fish screens have reliability problems, the technology is not there; the screen could break and stop the diversion and therefore unreliable;

B.J. Miller questioned this argument; it is saying a farmer in the Delta may now have a reliable supply by virtue of the fact that his diversion entraining fish and damaging the environment. This is actually an unreliable supply but may not know it yet. By building a fish screen that may somehow fail does not induce unreliability. If for some reason a fish screen doesn't have to be built it is because it does not cause much damage and he therefore has a reliable supply. He thinks it is a false negative - unrealistic perception of how a fish screen could result in increased uncertainty. It is like saying that building a pumping plant to supply water to users constitutes unreliability since the pumping plant could break.

Drinking Water Quality

No impact.

Not really common linkages.

One brief positive, water out of the Delta goes to southern Cal and mixed with higher tds water out Colorado River water would have positive quality effects for San Diego (more they can recycle); therefore at this secondary level, the screen allowing you to divert more water has a secondary benefit

Similar negative, with dissolved organic carbon in the water and more diversion.

Conclusion of group was generally no effect; zero effect

Agriculture, Industrial, Recreational, and Environmental Water Quality

All zero effects

Vulnerability

All zero effects

Discussion on adaptive management: How broad for Actions to Reduce Entrainment Effects of Diversions? Adaptive management is too broad for BJ. Considerable discussion around context of reducing entrainment. Group concluded that for this case it means reducing or eliminating diversions and timing of releases to reduce effects of entrainment effects of diversions. Footnote that this means to reduce diversions and manage flows to move fish past diversions. (NOTE: This conclusion was later found to be misdirected since the action categories were not intended to be tied only to the group listed in the upper left corner of each sheet. Therefore, adaptive management should have been viewed from the broader perspective and not just the two developed above.)

B.J. wanted to add two categories. 1) eliminating in-Delta agricultural diversions and 2) change diversion location of diversions to where they are more effective (thinking of State and Federal pumps); move to where water flows past screens rather than where water flows to the screens. ✓

INSTALLATION OF BARRIERS TO FISH MOVEMENT

Aquatic Habitat

Positive effect.

Old River barrier could knock down the block in oxygen that is a barrier to fish movement (improve dissolved oxygen)

Could have negative effects in some sloughs and other areas by decreasing water quality.

Wetlands Habitat

Possibility of physical barriers effecting water levels that could adversely affect wetlands negatively.

But as we discussed above for fish screens, there would be controls to guard against the negative effects. Example with Old River Barrier, if flow gets too high there will be flooding and the barrier would need to be removed.

Group concluded zero effect.

Species Population

Big + effect.

However, what is good for one species may be bad for another.

Some real potential for negative effects (i.e. limit access to suitable habitat, and differences in adult and small fish, need to link to adaptive management.

Concluded there are definite + and -

Suggestion that we look at where there are large pluses or negatives so save time

Conflict Among Beneficial Uses

Positive effect.

Could be negative effect.

Uncertainty

Positive, if it does what it is designed for

Negative, if Old River lowers water level in South Delta

B.J. pointed out that the barriers will be paid for by people who want to reduce uncertainty.

Drinking Water Quality

In general no major effects on water quality but depends on location.

Could be negative in South Delta.

All negative impacts can't necessarily be eliminated in design.

Linked to flows and location

Depends on physical or acoustic barrier

Other water quality issues also linked to flow and location.

Risk to Land Use and Infrastructure

Could be a negative effect on levees depending on time of construction, could increase flood hazard in some areas, depends on the application; flood issue needs to be looked at very closely. Could locally increase flooding, erosion.

Many thought it is linked to other categories, like changing flow.

Summer flows can be regulated, winter cannot.

Both linked and negative.

Risk to Water Supply Facilities

Same as land use

Risk to Water Quality

Linked, flood barriers, fish barriers, etc. all linked

Ecosystem Water Quality

Same, linked

ADAPTIVE MANAGEMENT STRATEGIES

Again, suggestion that we go through the big plus and minus without block by block discussion and return for linkages. Also assume that they can be implemented in optimal (positive) fashion. Therefore, the following items are not listed for each objective as was done above.

- + under conflict among beneficial uses and uncertainty
- + where there is significant variation in the environment
- + under species population, that's why it would be done
- + for environmental water quality, relates to species population, aquatic habitat and wetlands habitat linked (L) to flows

Risk to land use, adaptive management could eliminate pumping and growing season so conflict between beneficial uses could be negative. Benefit for species is not necessarily a reduction in conflict among uses.

If have adaptive management that says you aren't going to be pumping at a certain time could be potential negative to farmers

How would adaptive management practices specifically reduce conflicts? Dealing with a world of conflicting interests then would prioritize adaptive management and will reduce someone's beneficial uses. Options to have State pump Federal water, and put in San Luis; changing timing but not amount of water may be better from biological side..

*DI/O/KE
MPT*

May reduce uncertainty by saying farmer will get less water but doesn't reduce his conflict. also - under uncertainty may also be negative by changing timing of diversion: (may be no place to put water?). Example, 5 different species where regulate 2 months for each, 2 month window where you can pump; may be in rainy season with local drainage filling all the storages, what good is winter pumping. Could be potentially minus or plus.

Sometimes no place to store water and sometimes reservoirs are dry but can't pump. Wouldn't adaptive management help with that? Not when it is done for the species or purpose of entrainment. If you do for water supply as well as for species it would be a positive.

Minus with an Link. Problem with the State water project, no idea of when can pump. Some did not agree.

Link with offstream storage.

If have water supply where someone imposes a way of operating it has to have a negative impact.

How can adaptive management provide a positive? Helps flexibility to reflect flexibility. Can allow to increase diversions. Does give less certainty relative to alternative way of managing for fish where there is some blanket curtailment with non diversion.

What is positive effect for environmental water quality? From comprehensive strategy of managing flows differently.

IMPROVE FISH SALVAGE OPERATIONS (trap and truck)

just + on species population and leave others blank

could reduce uncertainty if not linked with a modification of take limits

Frank - recognition that it is linked to modifications in take limits; if more fish showing up that are surviving to be counted and to be trucked that they don't count against pumping.

would reduce conflict

PREDATOR REMOVAL AND CONTROL

+ for some species and - for others (impacting striped bass)

same for conflict (- for fishing and + for salmon),

could cause problems with uncertainty (if more fish are getting to Clifton Court due to predator removal that needs to be reflected in take limits.)

+ for aquatic habitat due to reduced competition; maybe this species population interaction

+ in aquatic habitat, removing artificial structures to reduce predators could improve habitat without physical removing predators. Would this reduce habitat for non predator species since population could be similar but not concentrated around those structures that made predators efficient.

ELIMINATE IN-DELTA AGRICULTURE DIVERSIONS

could we include wetland diversions also? (includes Susun Marsh) Why would anyone want to do this?

deal with ag first

+ for species populations

- on land use

Uncertain for farmers (unless carried to point of absolute certainty where don't farm anymore) - special case of certainty; May reduce uncertainty but does increase the conflict if taking farmers out of production. But the process of eliminating the diversion would be a contentious process but once it was done the conflict is over.

Increases the conflict and depending on the time frame it does have an impact on uncertainty on farmers since at point of elimination of diversion they have great uncertainty on their economic future.

Under conflicts positive for everything but agriculture.

Maybe there should have been an objective that is maintenance of productive agriculture - then would be a big negative.

Missing objective of reducing water supply cost

Negative effect on levees if no farmer or incentive to protect (would have to be another source). Owner of land would have to maintain the levees. Other thought that it depends since could breach some of the levees.

Eliminating farming could reduce subsidence from oxidation and helps vulnerability

Could go either way + or - depending on what do with the land

Anna - If don't have Delta levees then almost no water supply for Southern California. Debate on water supply, secondary impacts; may be going too far. If nobody maintaining it will fall apart and if someone maintains it will be different

If eliminate diversion then reduce much of island discharge so could be benefit to drinking water. Wouldn't be putting more peat water into Delta if levees not maintained? If eliminate diversions would eliminate much of the discharge so would be a benefit.

Assume for this category that levees will be maintained.

Water quality could be significantly impacted if levees allowed to degrade as a note, assume they will be maintained; if not then secondary type impact.

+ in environmental water quality and recreational water quality

Frank question to Anna, could you conceive of a way that diversions and levees could be eliminated that may not result in degradation of water quality?; i.e. say one decides to let 5 levees go. If move (link) with moving diversion then could. Recreation would be impacted since it is a local effect.

Agricultural and industrial water quality pluses.

All water quality highly dependent on what is done on the islands.

AFTERNOON SESSION (1:30-3:00)

Decided on two new categories as discussed in morning session: 1) to move State and Federal diversions to where they are more effective (with flow past rather than to the screens) and 2) move diversions to a point of lower impact (broader category with all diversions)

MOVE DIVERSIONS TO WHERE SCREENS ARE MORE EFFECTIVE

AQUATIC HABITAT

Same as fish screen row?

SPECIES POPULATION

+ on species population,

Be sensitive to rerouting of diversion and impact on streams and sloughs along a route; example streams on East side of Delta; or increasing residence time or reducing reverse flows in the South Delta as a positive, but negative may be depending on what type of bypass flow you have past diversion (if a diversion on the Sacramento River less remaining instream flows below the diversion?)

Interception of other streams could be negative; but depends on how they are passed (siphons under) could be positive. Very dependent on design.

To extent that shallow water habitat in dead-end sloughs is good, now creating in South Delta would be a benefit plus.

Need link under species population same as on fish screens that needs to be coupled with other regulatory constraints.

WETLANDS HABITAT

Neutral except for any site specific impacts

CONFLICT AMONG BENEFICIAL USES

Positive, would reduce conflict

UNCERTAINTY

Would increase certainty

WATER QUALITY

Positive for drinking water, agriculture, and industrial

Not necessarily positive for agriculture; if don't have fresh water flushing could reduce water quality. Again, depends on how you did this, especially for Central Delta agriculture.

Also, other M&I users (depends) South Bay and North bay that could be impacted. Could go either way for Contra Costa. May require change in the operation of the diversions.

Potential benefits to water quality in South Delta, reduction in amount of salt returning from agricultural lands from San Joaquin River.

May be variable impact on some species; i.e. American shad could be negatively impacted under species population; depends on species

Industrial water quality could go either way depending on specifics

Recreational is site specific

Environmental water quality is dependent on flow regime and linkage if reservoir releases made for environment or for diversions.

RISK TO LAND USE & INFRASTRUCTURE

Will reduce risk to land use since less water flowing through delta

Anna does not see improvement since the extremes will stay the same in winter, and tidal erosion would remain the same because of the extremes.

Kathy - could be detrimental since funding mechanism lost if incentive removed for M&I.

RISK TO WATER SUPPLY FACILITIES

+ for water supply since taken from another location; B.J. depends how you do, if through Delta then maybe not reduced risk, if go around the Delta with some type of isolated facility then maybe yes. How you conveyed water would determine.

Same rationale for RISK TO WATER QUALITY AND RISK TO ECOSYSTEM

MOVE ALL DIVERSIONS TO POINT OF LOWER AQUATIC IMPACT**AQUATIC HABITAT**

Positive

Consolidation of diversions may cause other impacts (ie dredging)

SPECIES POPULATION

Positive

WATER SUPPLY

Basically the same as for moving the State/Federal diversion

Drinking water quality would depend on where you take it, depends on location especially lower down in the system

move other items (scoring) down from move State/Federal diversions

FISH HATCHERY AND HARVEST MANAGEMENT

Hatchery doesn't belong here since it would increase entrainment if effective. We clarified that we should not focus on the top left statement (or grouping) since it was just a way to divide the categories on the eight sheets; we need to look at each category against the objectives only.

Trucking fish around diversion could reduce entrainment

B.J. thought both fish hatchery and harvest management are nightmares; raises question on hatchery production and if good for native stocks and if already too much harvest management

divided hatchery and harvest management

HATCHERY

SPECIES POPULATION

Plus and minus, do you want Chinook or natural Chinook

HARVEST MANAGEMENT

SPECIES POPULATION

Plus and minus; are concerns to extent that harvest management takes away recreational and commercial fishing opportunities; more of one species may mean less of other species

Striped bass eating winter run

Again, since we are not limited by the upper left grouping some have more to say about adaptive management; will submit in writing.

ACTION CATEGORIES FOR DEMAND MANAGEMENT

Assumptions are different for this sheet; desalination is new water and others are rearrangement of allocation of water; also if we don't know who's money goes into items how can we assess benefits?

B.J. doesn't believe that these should be in alternatives. Water users have already been through all these analyses and are convinced that they need to export more water out of Delta. They understand the environmental problems exporting now, to say nothing about exporting more water. They are searching in this process for some way to get more water out of the Delta because they are convinced they need it and to do that in a way that is better for the environment. By making these things alternatives you are saying users don't need more water out of Delta and they have decided they do despite all the analyses he has seen by everyone on how much water can be produced by these means concludes that more water needs to be exported. All these are going to be done anyway more aggressively. Except for land retirement and desalination, they don't result in new water. How did these get to be alternatives when they being done anyway regardless of the solution in the Delta? All export users have already signed into these.

Lester, still thinks there is a great deal of dispute on how much can do with demand management particularly south of the Delta. A whole community of interest is saying you don't need another acre-foot out of the Delta and that you need to do these seriously. We can say we looked at all alternatives for NEPA/CEQA. Need to look at appropriate balance of supply and demand options. Allot of these would act the same as supply enhancement from another some other category. Water conservation south of the Delta is no different in the way it impacts the Delta than water reclamation; is integrated resources plan that has to be looked out. Allot of agencies have signed the MOU and are implementing BMP; concern due to fiscal constraints in cities they are going to drop the program; therefore, the commitment that is there now may not be there in five years.

Are many people with influence that feel these are needed. Exporters have spent allot of time and money and are convinced these aren't the answer.

These are a strong part of DWR Bulletin 160 in reducing demands in the future. But when you try to place these actions as against impacts in the Delta you have to go back to the entire water supply exported from the Delta and analyze what water has been exported and how these factors effect that specific supply. Nothing seen in this process so far is addressing the water supply of the contractors. What have they taken, what has the project planned, what are they likely to get under existing and future standards is needed, and then apply the demand management against these.

Mary - What we are attempting to do here that is different than the three-way process or other Bay-Delta proceedings? This morning in WATER SUPPLY PREDICTABILITY breakout group they placed demand management as an action category. What is balanced way to look at supply and possibility of giving demand side of the equation some equity? Maybe that is what this trying to do. Ultimately we need to look at supply.

Herb - what are water users likely to get under future conditions

BJ - does more water need to be exported from Delta or not? Needs to be taken head on with some special committee? Making it alternative is not the way to go.

Lester - could determine how much water could safely move out of Delta, other is to determine what you really need (not what you would like to have) -- will lead to conflict. We are trying to focus on reducing conflict and increasing flexibility. If can meet ecosystem objectives (net improvement) and have increased flexibility and reduced conflict, then people can use transfers and other mechanisms to meet their needs within the constraints; if can do this minimize confrontation of how much is needed and what the system can yield.

Ronnie - not comfortable in plugging in bulletin 160 results; since lets existing trends continue and forecasting what results will be. Need to look for increased opportunity to change things. Retain demand management as an action category along with all the others. Not already doing everything, ie water pricing. Pricing has impact on all other things on the list. If water is more expensive, water conservation becomes more cost effective.

B.J. - water conservation becomes less affordable.

Ronnie - no, because of opportunity cost; every acre-foot saved is worth more; not worth putting expensive system if water saved does not justify that cost.

Water transfers is also needs to be included as a demand management action category.

In general, water export needs depend on what your goals are; if choose not to export a certain amount of water to Southern California maybe some of those industries or people will move (would have negative impacts on some people) but there is no set need for certain level of export. Needs or desires depend on many aspects of the system (ag. productivity, population in So. CA, industry etc.). When we choose these levels may find that we do need increased levels of export. Without talking about allot of things can't say what those exports should be.

B.J. - not making those choices in this process or planning future of California water supply. Some analysis would indicate that it would not matter much if demand was a million acre-feet more; would still conduct many of the same actions [most action items (ie habitat restoration) are insensitive to what you decide for exports]. This would be better

course of action than trying to decide how much conservation is needed in Riverside County, how much reclamation and reuse, how much land fallowing, water pricing etc. Should not ignore in process but not as alternatives.

If willing to considering stopping some Delta agriculture, why not explore stopping some San Joaquin agriculture? Fallowing all land south of the Delta (not being advocated) but would be a significant impact (to counter above argument that a million acre-feet more demand would make little difference.)

Mary - going back to mission statement; would any of these demand management actionable categories with regard to increasing flexibility, restoring ecosystem, or reducing conflicts in the Delta? She would say that the demand management actions support these.

We can only deal with the export water supply; therefore, if you are going to deal with the demand management subjects they need to be in the context of their relation to the water being exported and not the future growth of California. Bulletin 160 shows need for 3 million more acre-feet to meet needs to 2020; not talking about finding that but how to firm up that dedicated to State and Federal projects.

Lester - agreed with B.J. that allot of actions are insensitive to demands that fluctuate by a million acre-feet or so; i.e. fish screens, shaded habitat, etc. but this demand management grouping is different.

Frank - May need more habitat if export demands are higher.

B.J. - The current situation in the Delta with current level of exports is bad for fish. If just try to solve the problems we now have without addressing if more or less water should be exported is problem enough to deal with. He thinks the solution will be the same regardless of the same or more water exported. If true, maybe we should look at this more before we take on these highly contentious items; they need to be delta with but not as alternatives; separately look at sensitivity and potentially remove.

Comment that maybe CALFED process can facilitate water conservation at a lower cost.

Water suppliers are doing these now to protect themselves against high degree of variability of water supply from the Delta. Want credit as a protective source not as a substitute for correcting the problems inherent in the Delta.

The actions are not going on to the extent that they could. If we are looking at everything, then we are looking at everything.

B.J. - Study these to see if they could be done to degree that some people think they could be carried out and see if they are sensitive. If not could remove them and move along. Have enough other issues to deal with.

Mary - Principle of equity and the sense of what people are giving up needs to be addressed. Agrees that they don't belong as actions but does not agree that they are insensitive;

Chris - is system insensitive to raising water to \$1000/ acre-foot? Or, what if retire all alfalfa, wheat, and barley; would fee up 20 % agricultural water? (to make a point that things aren't necessarily insensitive)

B.J. - Why wouldn't a farmer be doing everything he could to make all the money he could. If you increase the price of water to the point he can't farm anymore, he will sell the land to someone who can buy the land so that the mortgage payments for the land and the increased price of water are equal to his old mortgage price and cheaper price of water and farm the same thing or something that uses more water.

Put down demand management as the action, not the category. All demand management action categories may end up scoring the same. Suggested keeping a desalination row and a demand management row and crossing out the rest.

Lester - allot of the action categories are alternatives; ie. fish screens. Many of the demand management action categories used to model and then test the system how it responds to different levels of demand in different locations; make assumptions and see what effect. This is different than taking an action like fish screens. Some are different like land retirement and fallowing which have other applications. Vary demand and look at impacts; won't look at individual areas like Westlands, Tulare, Kern, but will make assumptions about implementation of different types of conservation and water management and then model to see what impacts.

Could also have water quality benefits from water conservation.

At what point do we bring in costs and other real factors into the decision? Are we prematurely debating some of the advantages and disadvantages of these particular options and once you look at cost find they go away or remain? Rough costs after first of the year.

All these action items point towards reducing exports.

Suggestion to make these location dependent; ie. demand management or managing exports, demand management for upstream users, demand management within the Delta.

Herb - None of these reduce exports within the project applicable for this study since State Water Project does not meet the demands of the service area now. Demand management is a stop gap against trying to deal with the total future demand picture. Provides some relief against unreliability but will not reduce the demands of any of those areas.

Assume that demand management is sensitive - just for comparison and completing chart. Break into three action categories; 1) Demand management in the Delta, 2) demand management in upstream areas, and 3) demand management in export (downstream) areas.

There was a suggestion to add another category for institutional actions that reduce the cost of other demand management actions (funding for research, etc.). What is the difference between this and water conservation? Water conservation is basically some bureaucrat saying it must conserve a specific amount of water by specific methods; the alternative is institutional actions to facilitate individuals to implement water conservation more cheaply.

DEMAND MANAGEMENT IN DELTA

Aquatic habitat and wetlands habitat (if retire land may have wetlands habitat) are both plus. Not necessarily.

Water supply conflicts (improved).

Uncertainty improved.

Water quality benefits are linked to other issues (can't analyze independently). And positive.

If agriculture using less water the quality may go down.

Water quality - can't determine impacts, linked to specifics

Vulnerability? Neutral.

REDUCE DEMAND UPSTREAM

B.J. - If demand management includes taking land out of production then amount of water flowing into the Delta would be increased. If mean more efficient water use, all the studies indicate that little or no additional water would show up since the Sacramento and San Joaquin basins are so efficient; only way can waste water is too much evapotranspiration or wasting water to saline sinks. Everything else gets reused. One upstream farmers waste is another downstream farmers supply.

Example, Central Valley uses 25 million acre-feet annually for agriculture. If increase the efficiency by 10 percent, what shows up in the Delta is an additional 100,000 to 200,000 acre-feet; large increase in efficiency and little increased water entering the Delta.

But there are timing and water quality issues that relate to habitat.

Maybe not a huge benefit in additional water entering the Delta but if reduce the demand in certain areas there may be big upstream localized reduction in effects on species populations. Others thought we were focusing on impacts in the Delta from reduced upstream demand. Solution set is bigger than Delta.

Allot of negatives for wetlands; agricultural drainage is now providing wildlife/waterfowl benefit and may be reduced by upstream demand reductions. Again, depends on what you do; may be plus/negative since saved water could be reallocated to wetlands. Could loose the benefits from rice wetlands. Depends on what use water for.

Frank - argues that biology is sensitive to these items, even if can't measure. Also, there is a political sensitivity of the viability of this program

Marcel l- at end of the process when have a program, how will it be paid for, by all of California or contractors? Financing person is looking into this.