GAMING REPORT

	Beginning of Stage 1	End of Stage 1
B(2) water is main tool	GAME 1A	GAME 1B
B(2) plus EWA flexibility	GAME 2A	GAME 2B
Operational shifts as necessary and prudent to provide fish protection.	GAME 3A	GAME 3B

Stage 1: JPOD + DMC/ CA Aqueduct intertie + small expansion of Banks

Stage 2: JPOD + DMC/ CA Aqueduct intertie + Unlimited Banks expansion + 290 kaf Shasta Expansion + 200 kaf Delta island storage + 500 kaf groundwater storage in export area.

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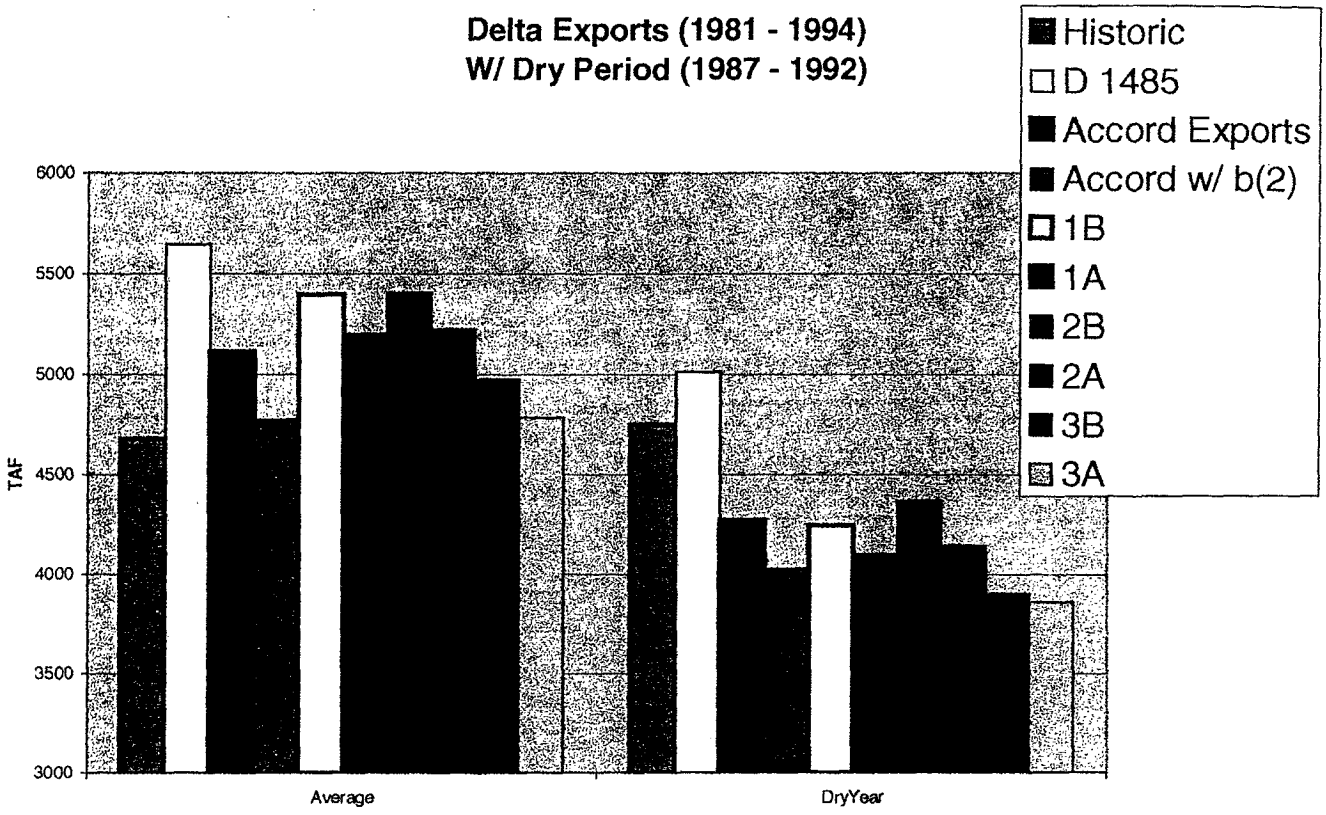

- Low historic average exports shows lack of demand, lack of buildup
- Comparison of D 1485 and Accord shows impact of Accord
- Accord w/ b(2) is an estimate of exports assuming Accord standards plus use of b(2) in the Delta as in Game 1a. However, this scenario was not gamed.
- Game 1a. Adding unlimited JPOD largely eliminates effect of b(2) water compared to Accord on average, but not in dry years.
- Game 2a. Additional flexibility allowed greater environmental protection while maintaining or improving exports.
- Game 3a. Significant reduction in exports.
- "B" games all increased exports, with Game 2 getting the greatest boost and Game 3 the least.

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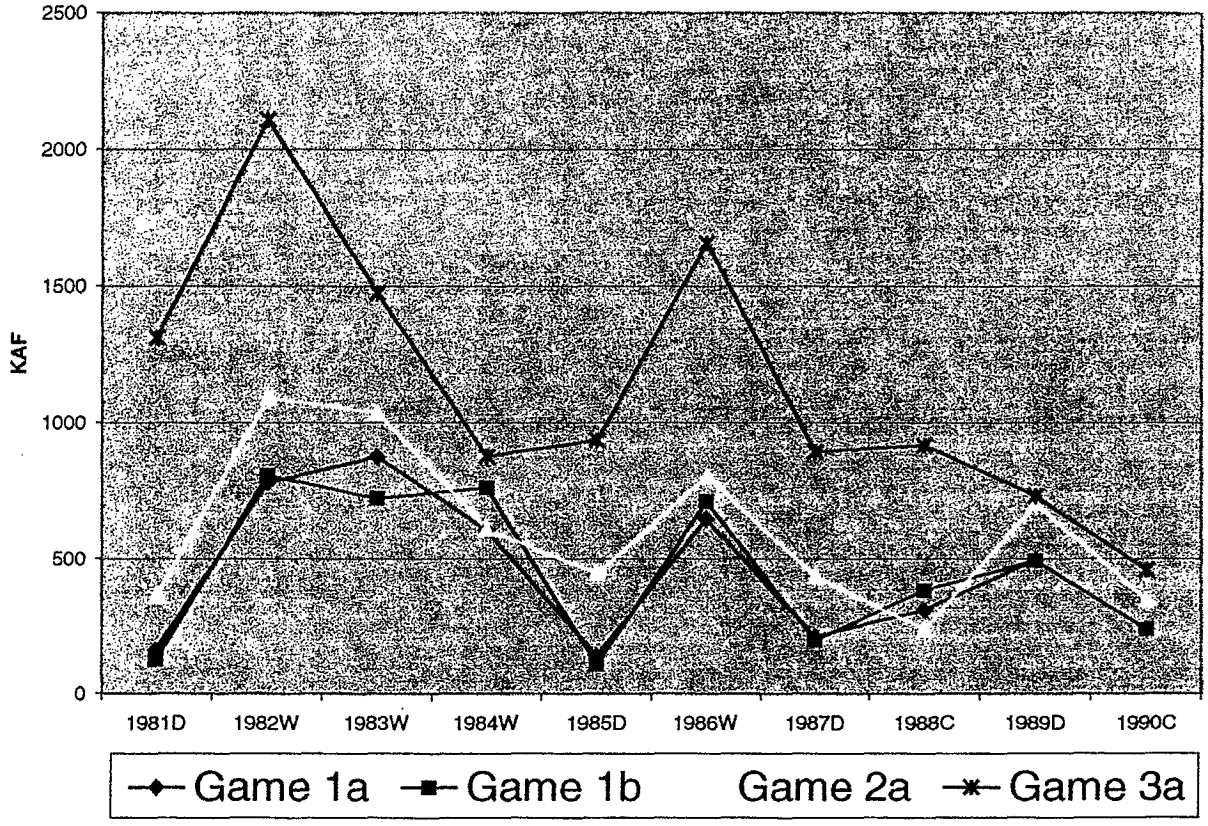
instantaneous
Export Shifting For Fish



- Games 1a/ 1b are nearly identical.
- Game 2a adds a few hundred thousand kaf of shifting capability
- Game 3a adds considerable shifting. However, note that differences between Game 3a (the upper limit on protection) and other games are largely eliminated during extended drought.

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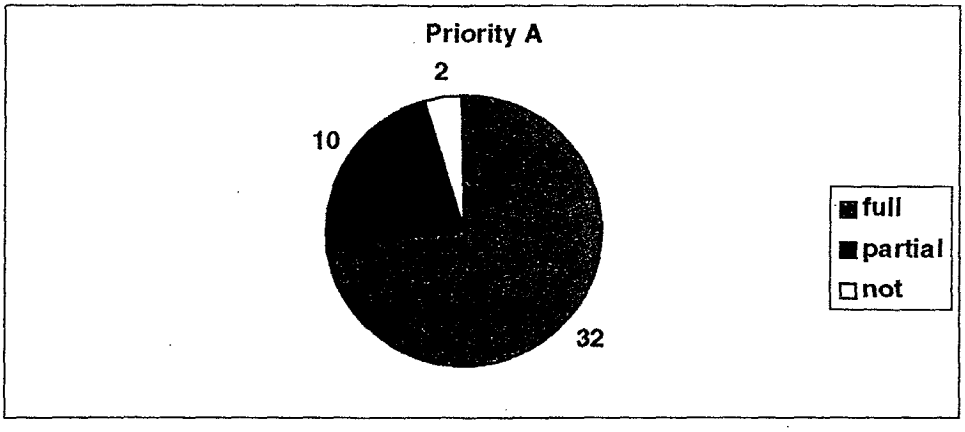
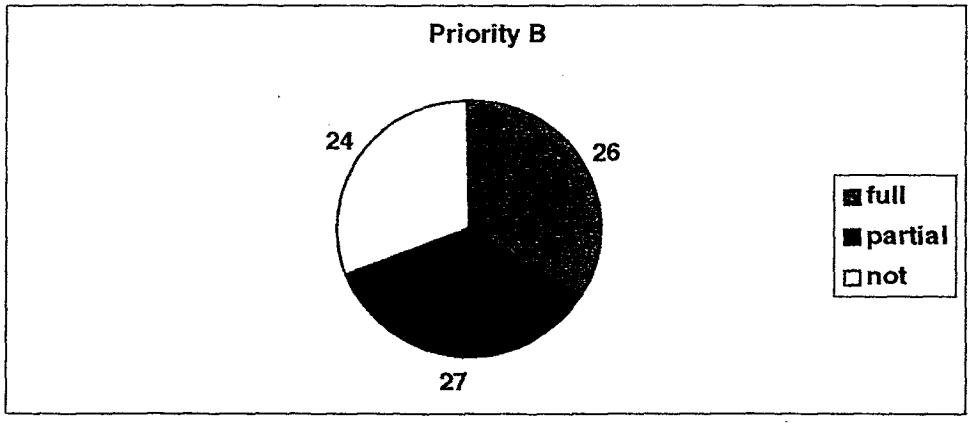
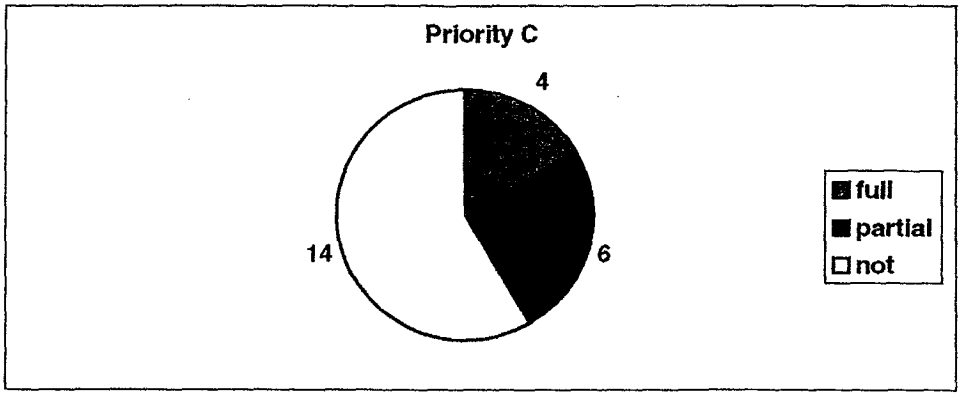
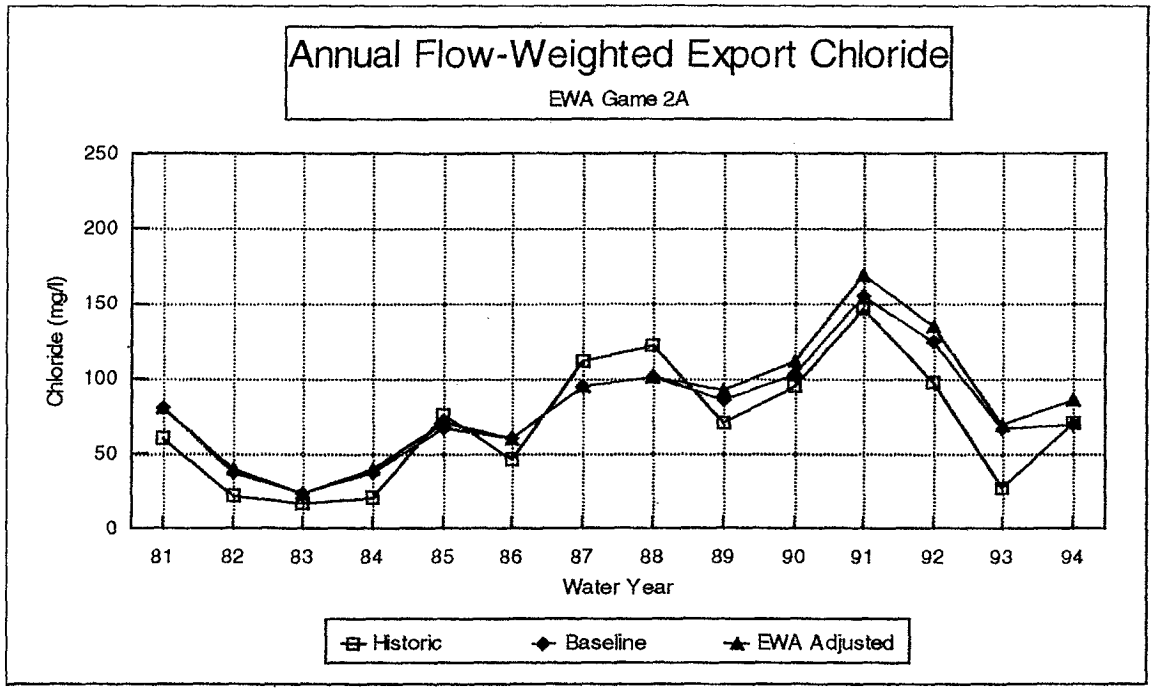
FISHERY ACTIONS ACCOMPLISHED IN EARLY STAGE 1
WITH B2 + REOPERATION
GAME 1981-1994
2A







WATER QUALITY



- Basic trend is for somewhat higher salinity in export water. Caused by relative increase in summer/fall pumping. Caused by increased demand, reduced allowable spring pumping under Accord standards.
- Application of EWA flexibility exacerbates this trend slightly due to additional summer/fall pumping.

- TOC likely to move in opposite direction. Less winter/ spring pumping means less TOC loading.

Total Organic Carbon

E-038744

KEY OUTCOMES OF GAMES

- Game 1
  - WQCP standards + VAMP export reductions + additional B(2) actions provide significant fish improvements compared to actual historic operations (under D 1485) for the years 1981 - 1994.
  - Inclusion of b(1) reoperation would have increased fish benefits, but reduced exports.
- Game 2
  - Addition of EWA with assets + ability to reoperate system (based upon EWA collateral) increases total fish benefits while maintaining or increasing exports. Would require EWA with access to several hundred thousand acre-feet of water in some years.
- Game 3
  - Major increase in export limitations to protect fish. However, consumes all remaining flexibility in existing system and reduces exports. No ability to fill storage south of Delta except in wettest years. At current level of development, would require purchase of several hundred thousand acre-feet nearly every year. Additional storage north of Delta could reduce supply impacts in the future.

So. of Delta storage became irrelevant because it could never be filled.

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CONCLUSION:

- B(2) account should be supplemented with EWA. 800,000 af
- EWA makes reoperation palatable to the Projects by assuming the risks associated with voluntary changes in operations to protect fish.
    - EWA assets are typically used as collateral to guarantee the Projects that reduced exports will be made up, either in advance of changed operations or afterward. E.g., 100 kaf of EWA groundwater (or purchase options) should allow the EWA to reduce exports by 100 kaf in the winter. Frequently, the lost exports will be made up later in the winter. If not, then the EWA would be required to replace the water before the water users experienced any problems resulting from the reduced exports.
- These "no harm" reoperations are extremely productive. The majority of EWA protections are generating by simply reoperating existing Project facilities. Only in a minority of cases does the EWA need to purchase water to pay back the Projects for lost water.
- B(2) rules which use b(1) reoperation to preserve b(2) for later use in the export area are likely to induce resistance from the Projects. It is essential that the ultimate b(2) accounting rules not discourage the Projects from participating in "no harm" reoperation. If they do, then the effectiveness of the EWA will drop significantly
- EWA asset needs are the most acute in wetter years. Water user needs are the most acute in dry years. This offset creates opportunities for creative sharing of new assets to give each side what it needs most.
- B(2)/ EWA operations tend to force exports out of the winter/spring and into the summer/fall. Could increase average salinity of water exported.
- The shift of exports from winter/spring to summer/fall favors some species at some increased risk to other species. While the species at increased risk are mostly exotics, substantial angling recreation benefits are involved.
- B(2)/ EWA operations tend to reduce exports during the February peak in Delta TOC. This change in operations could reduce average TOC of water exported.

TOOLS

All infrastructure tools create new flexibility. That flexibility may be converted into increases in exports, increases in reoperation to benefit fish, or a combination of the two. The benefits of infrastructure expansion should be split between the EWA and Projects to assure mutual benefit and mutual support.

- Joint Point of Diversion/ Expansion of Banks Pumping Rights. Without these tools, unlikely that CALFED can create enough flexibility to simultaneously meet stated needs of fish agencies and water users.

- Delta Storage. Highly efficient storage with yield/storage capacity ratio of about 100%. Intertie to Clifton Court improves even more. However, supply is biased toward wetter years. Tool is, therefore, most appropriate for EWA or CVP. Urban concerns about impact of organics from peat soil remain.

- South of Delta storage. Valuable, provided that export capacity exists to fill reliably in wet years. Major benefits are dry year supplies and as collateral to EWA. However, the storage analyzed to date (500 kaf of groundwater) is too small provide major benefits to water users during extended droughts. Dame 3 not useful because it couldn't be filled.

- North of Delta storage. Valuable. Easier to fill than storage in export area. Moreover, no capacity problems with transport across Delta during dry years. However, volumes tested to date (290 kaf expansion of Shasta) too small to make a major difference in supply or fish protection (yield increase was about 20% of increased storage). Dave is thinking this has more value than previously considered.

- Yuba storage. The Yuba storage system remains underutilized. Water purchases of stored Yuba water could provide immediate benefits at low cost, without the need for new infrastructure. However, reduced storage could have implications for power generation and temperature control.

- Transfers. Options provide a key tool for the EWA, though may actually purchase water in a minority of years. Transfers by water users are equivalent to shortages and were not analyzed.

- Efficiency. Potential benefits to EWA and user supplies not analyzed in gaming. However, purchase of reduced demand via efficiency could play a significant role in meeting fish and water user needs.