

RECLAMATION

Managing Water in the West

Fisheries Issues and Potential Solutions at Roza Dam

- **Gate Operation**
- **Hydroacoustic Monitoring**
- **Potential Solutions (input requested)**



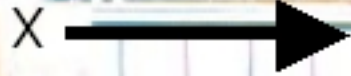
U.S. Department of the Interior
Bureau of Reclamation

Roza Dam

Typical smolt outmigration flow likely provides passage under gate

RECLAMATION

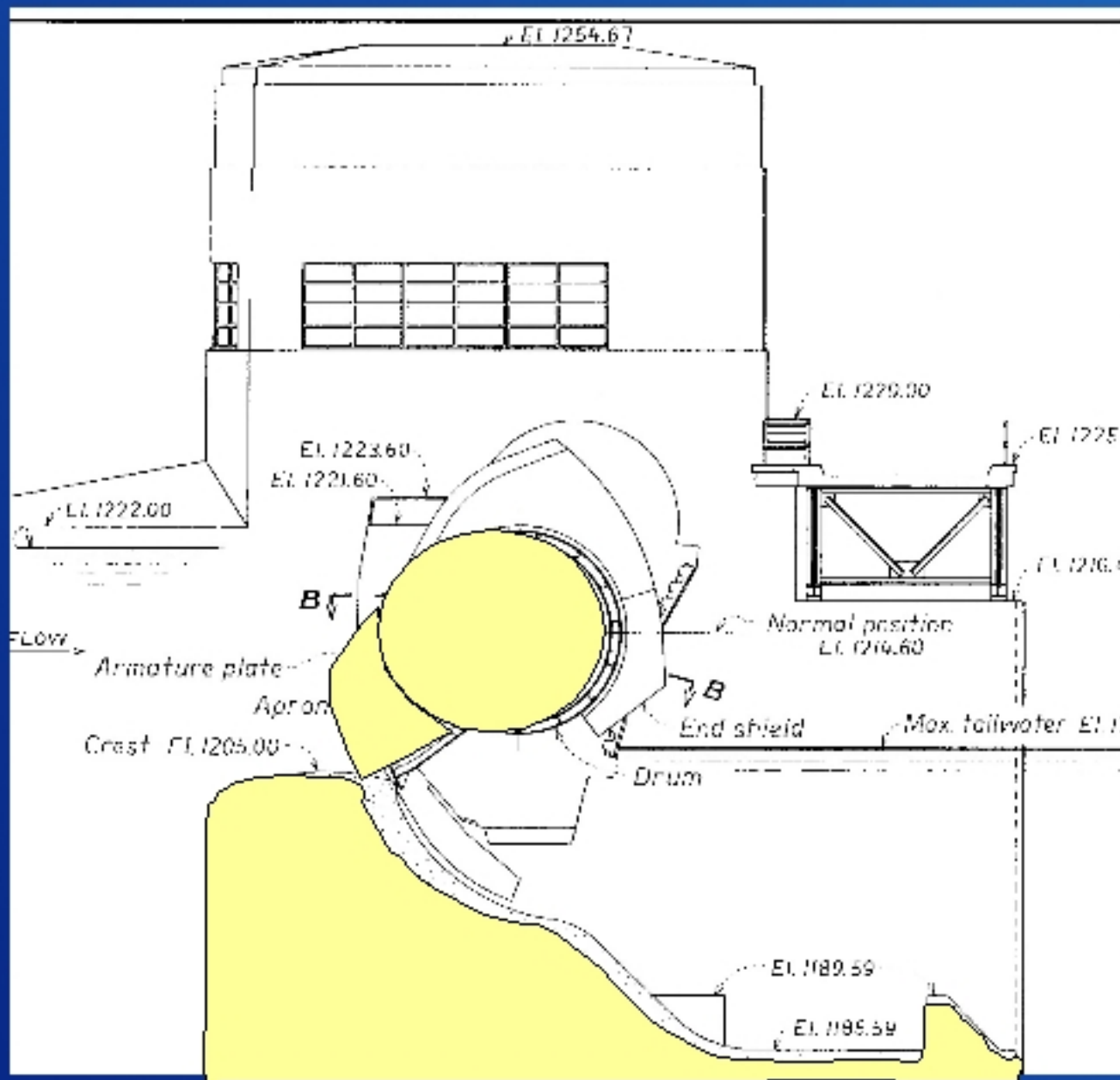
Low Flow Operations



- **Low flow operation inhibits fish from passing dam**
- **Flow under gate, low flow in outmigration period results in small gate opening, 400 cfs target, inefficient existing bypass system**

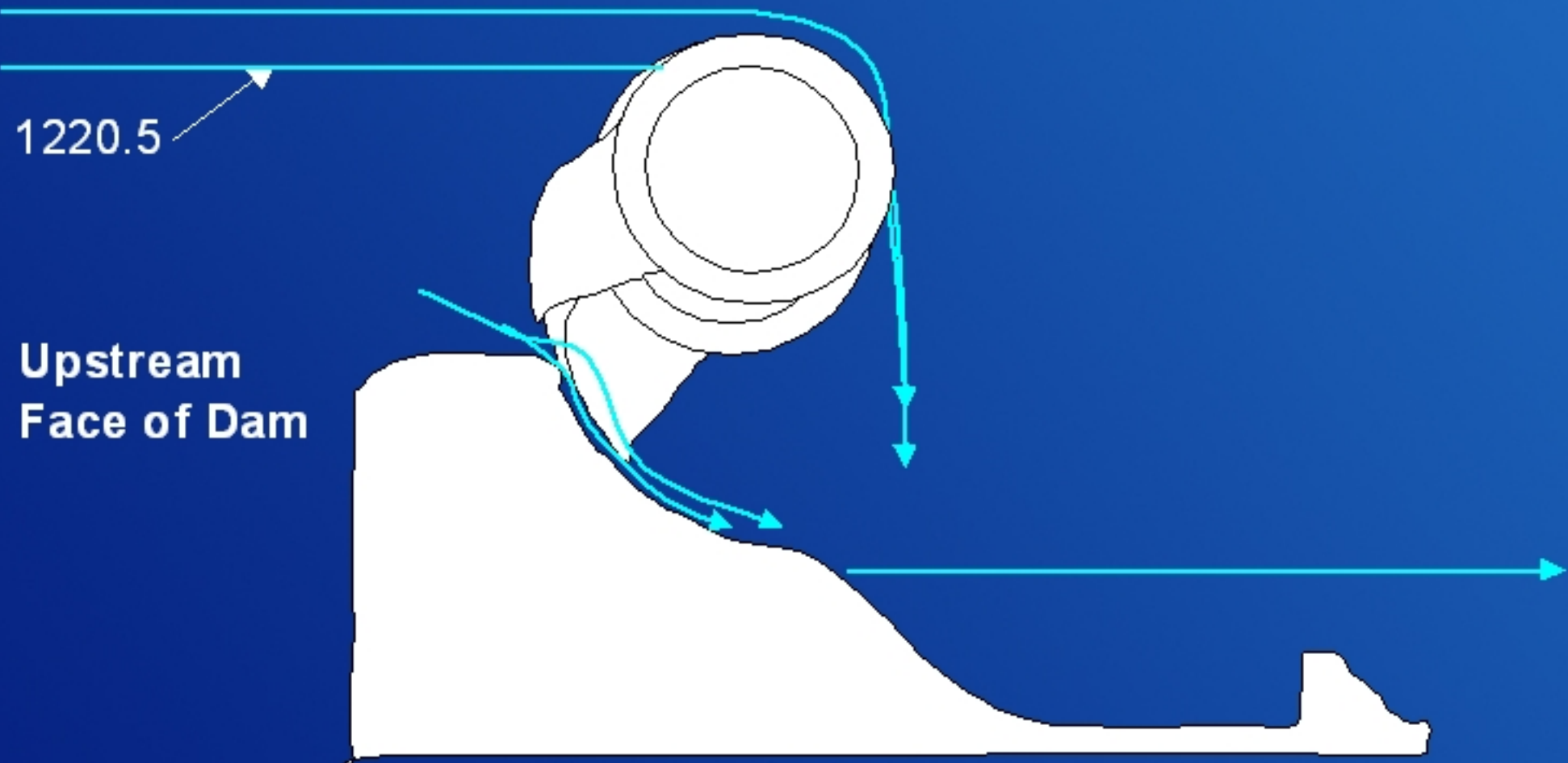
RECLAMATION

Roza Roller Gate XS



RECLAMATION

Roller Gate Movement



RECLAMATION

Gate tuck to operate with surface spill requires ~ 1200 cfs



RECLAMATION

Gate Tuck, April 22 2005



RECLAMATION

Roza Gate Tuck

- 1200 cfs not available for tuck all the time
- 1st 400 cfs for downstream target and fish facilities
- Next available water for irrigation
- Remainder used for power generation (flexible)



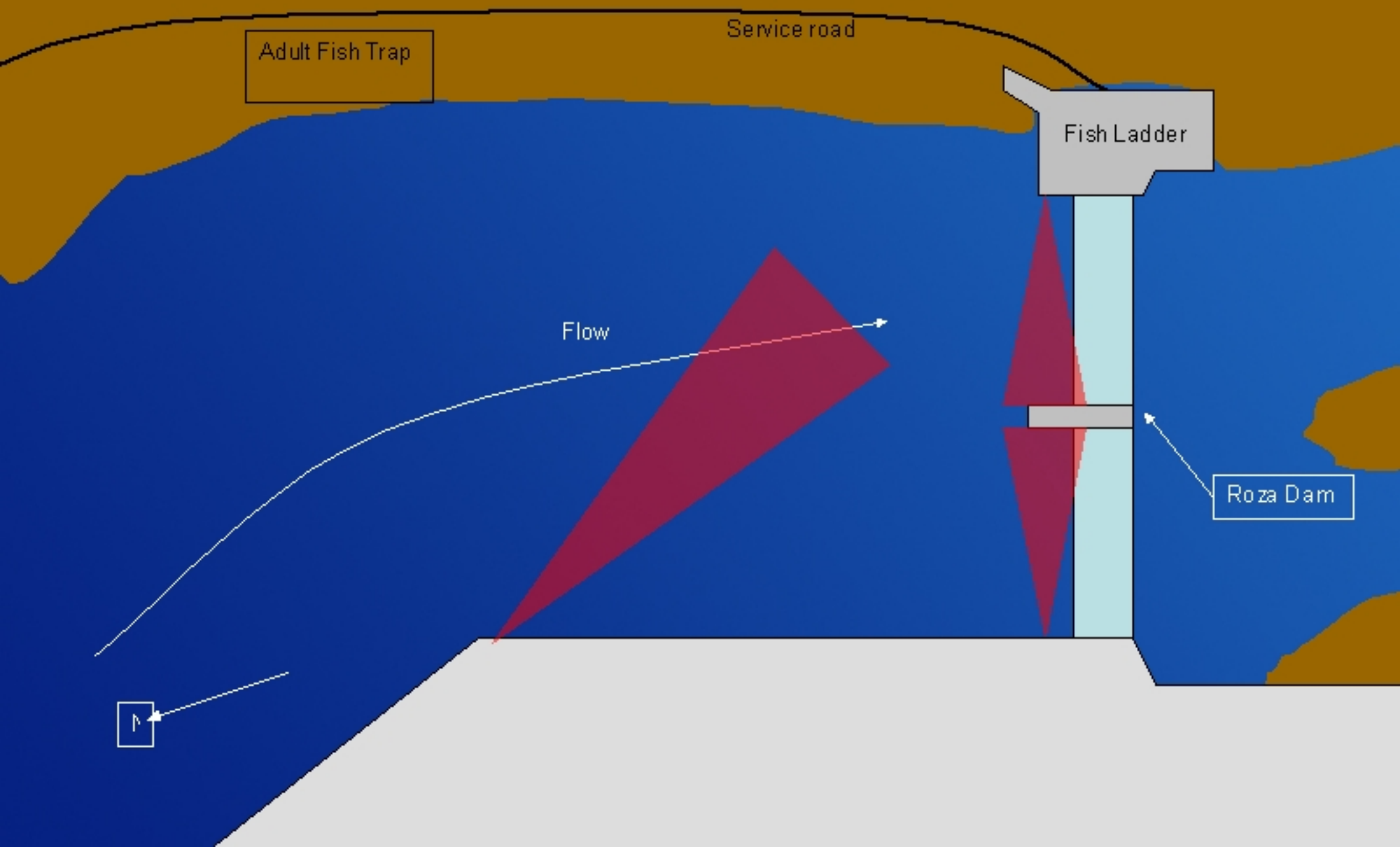
RECLAMATION

Operational Questions

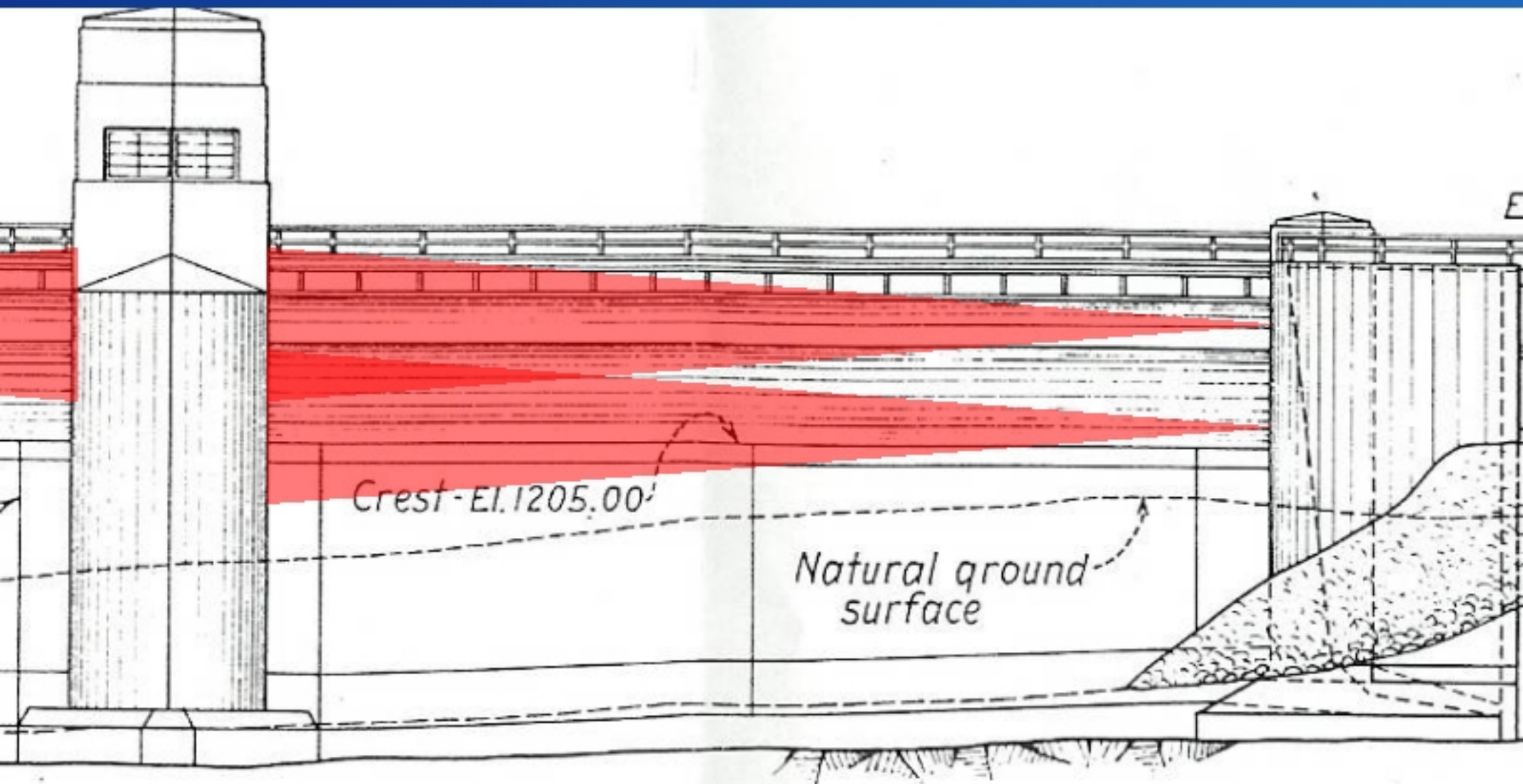
- How do we determine the timing and duration of operations for fish passage?
 - Avoid unnecessary fish delay while maximizing power generation
- What flows provide an undershot gate opening that is just as efficient at passing fish as providing surface flow over the gate?
 - Labor resources required to tuck gate
- Hydroacoustic equipment was installed in 2005 & 2006 to help answer these questions

RECLAMATION

Hydroacoustic Echosounders



Hydroacoustic Echosounders West Gate



Crest - El. 1205.00'

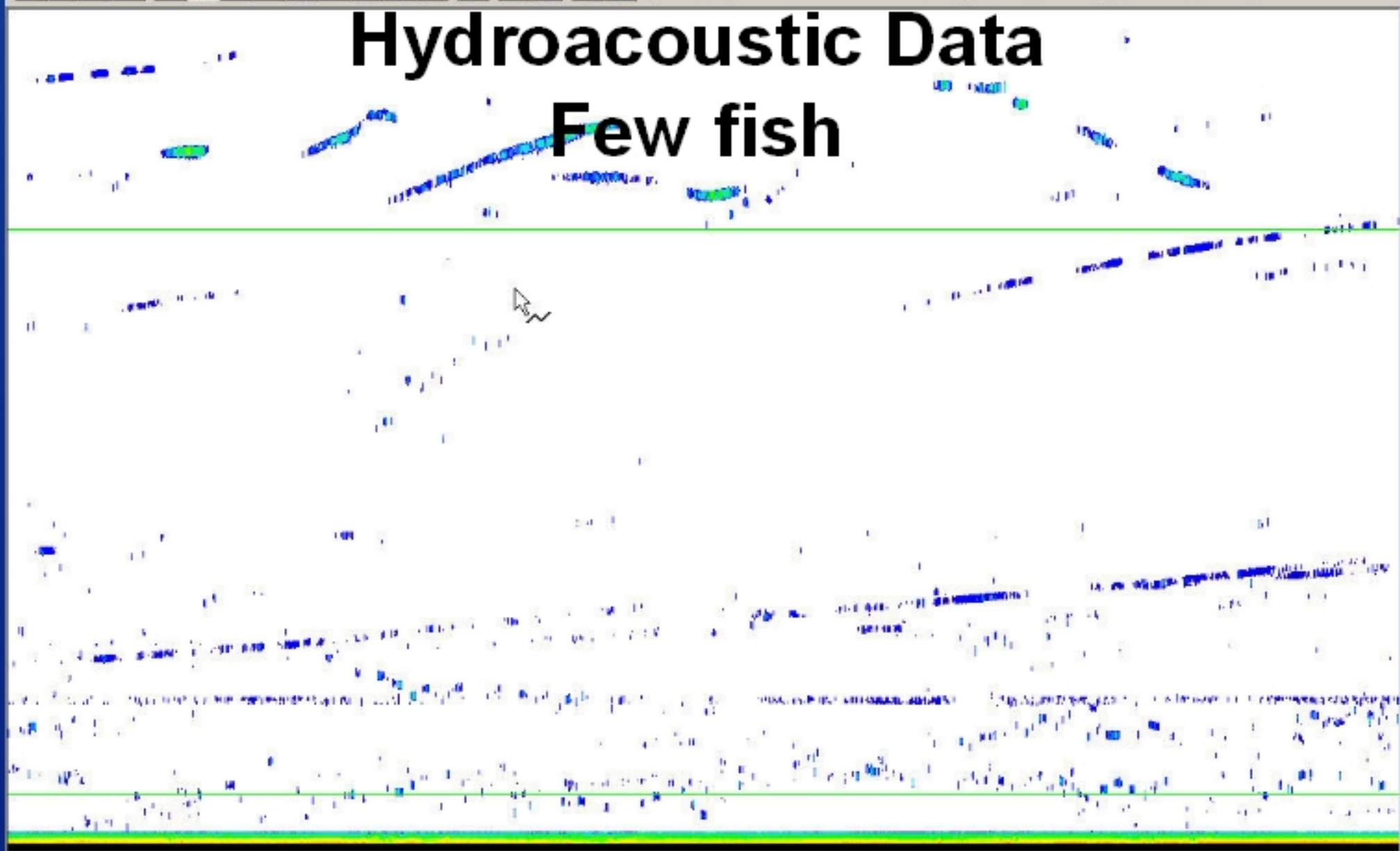
Natural ground surface

AM ELEVATION

RECLAMATION

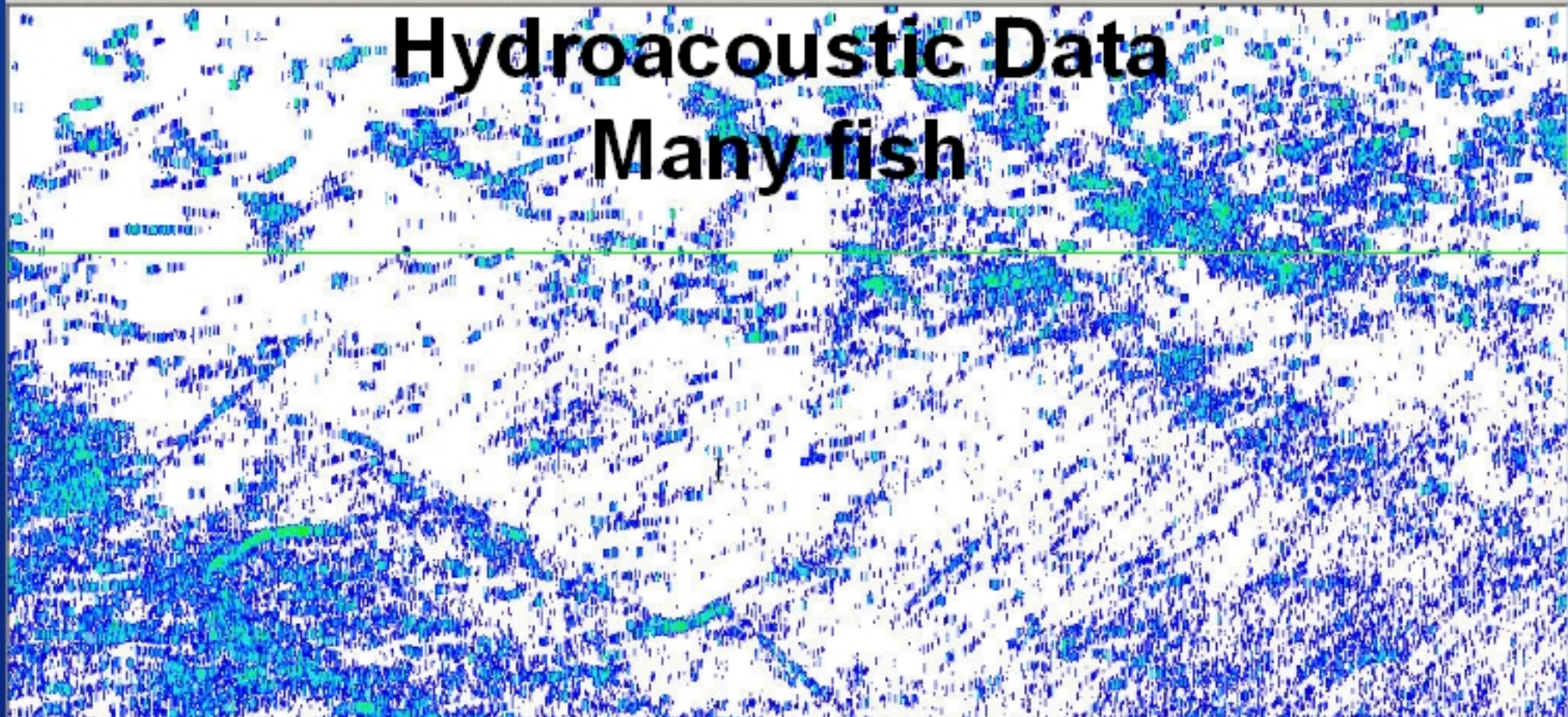
Hydroacoustic Data

Few fish



Hydroacoustic Data

Many fish



•Increasing trend in fish density over time was one cue that fish were being delayed

Data used for decision-making in 2005

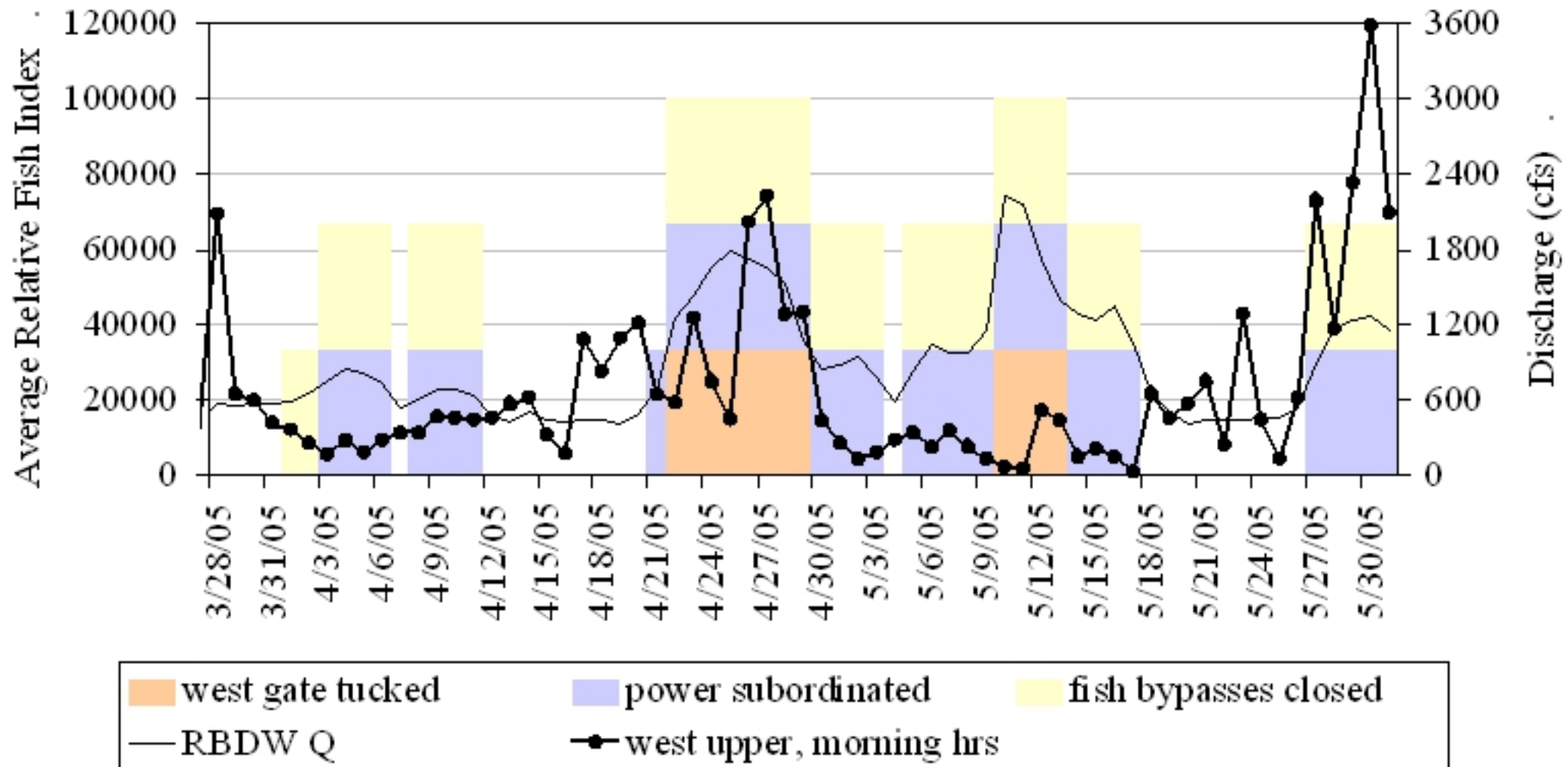
- Used Hydroacoustic data, flow data, and visual observation of the pool to decide when and how long to withdrawal water from power generation (subordinate) and/or close fish bypasses
- This reallocated water allows for either increasing the east gate opening, or a gate tuck if enough water was available (~1200 cfs)

Data used for decision-making and data need in 2006

- Ample water this year, tucked frequently with little need for subordination and no need to close fish bypasses**
- Needed to get more data on fish densities at different gate openings**
- At times, did not tuck gate even when enough water was available**

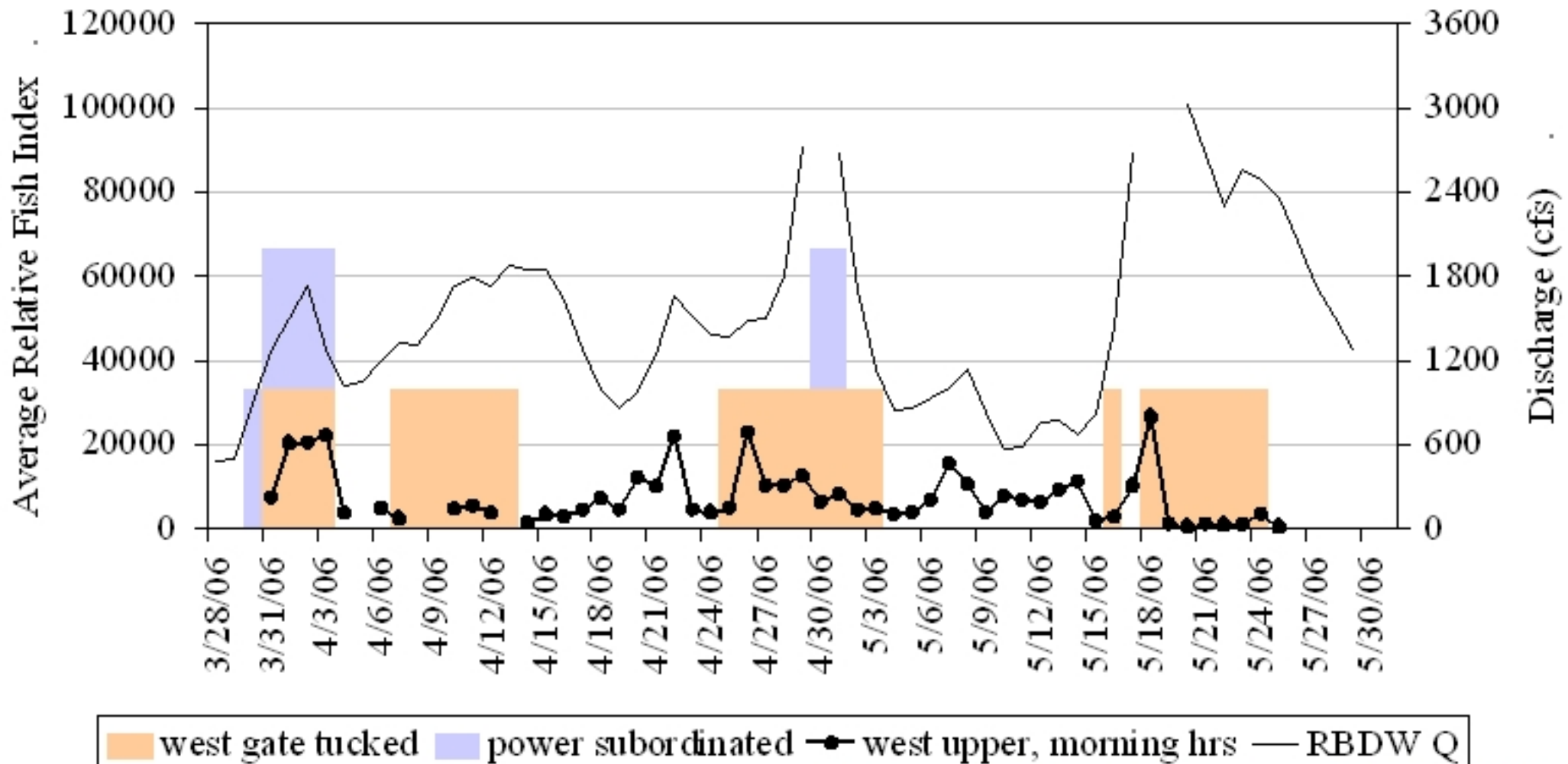
Hydroacoustic Data, 2005

Fish Index 0000-0700 hrs, Roza Pool, 2005

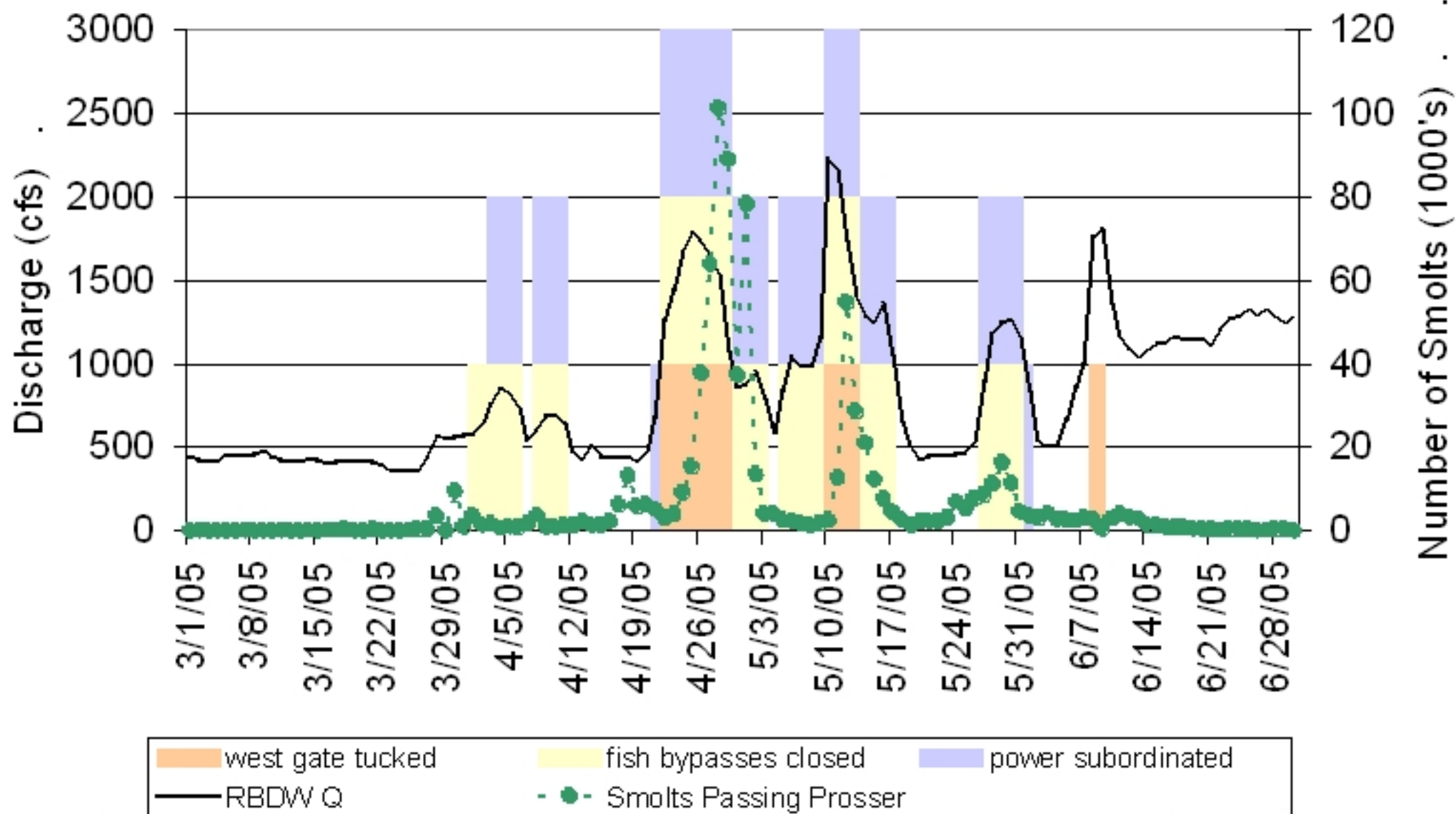


Hydroacoustic Data, 2006

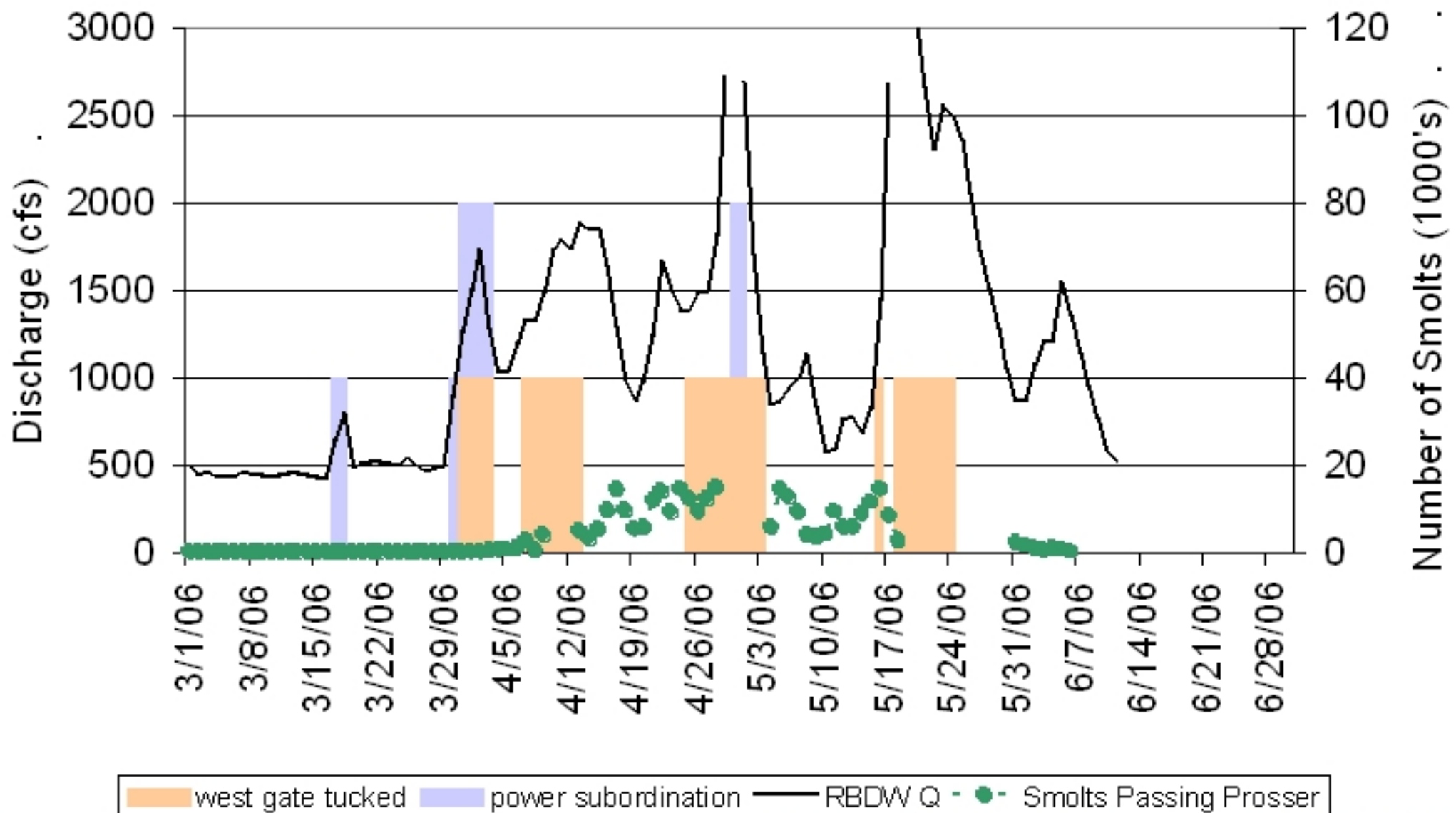
Fish Index 0000-0700 hrs, Roza Pool, 2006



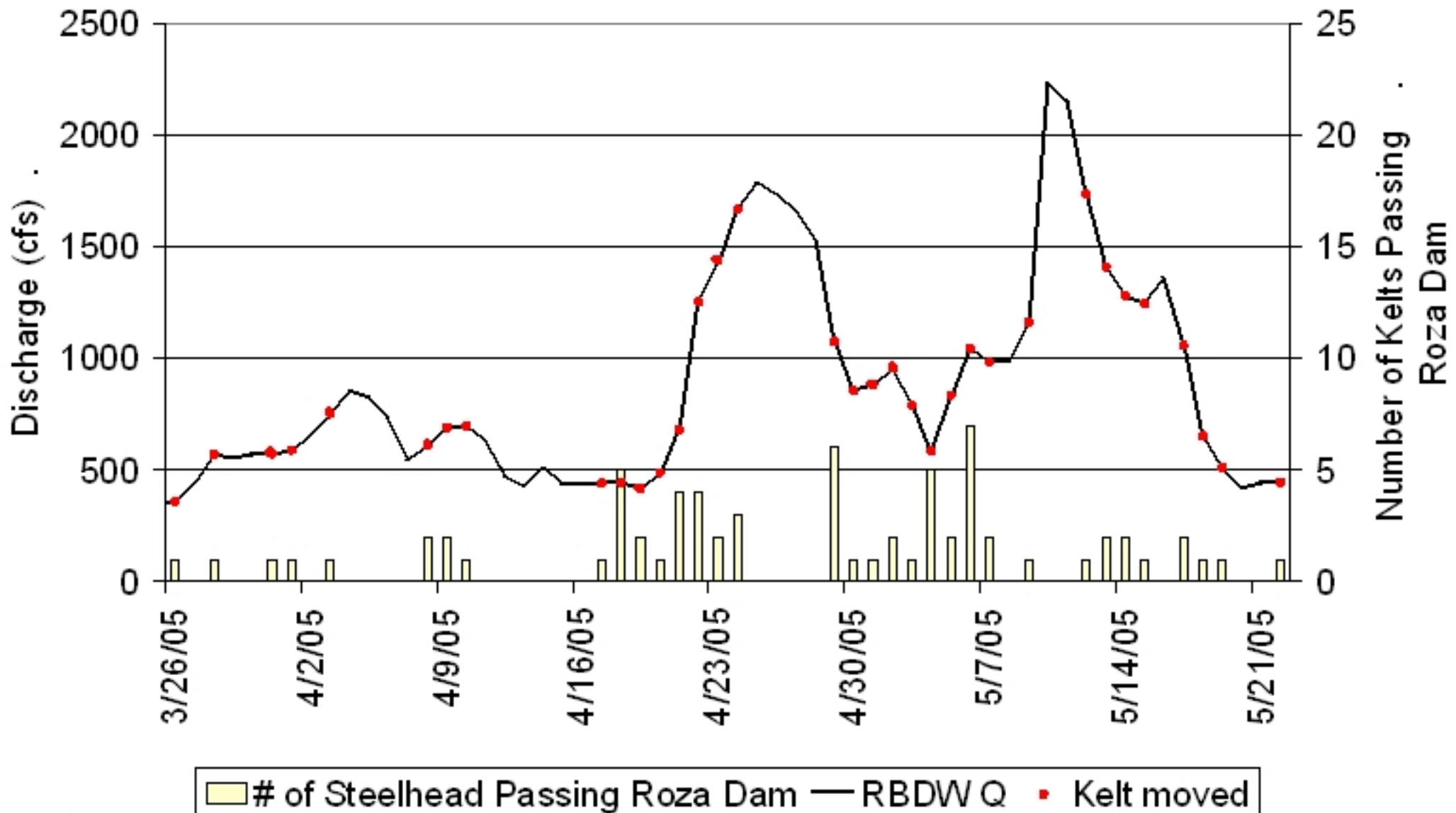
Roza Operations and Smolt Passage, 2005



Roza Operations and Smolt Passage, 2006



Roza Operations and Kelt Passage

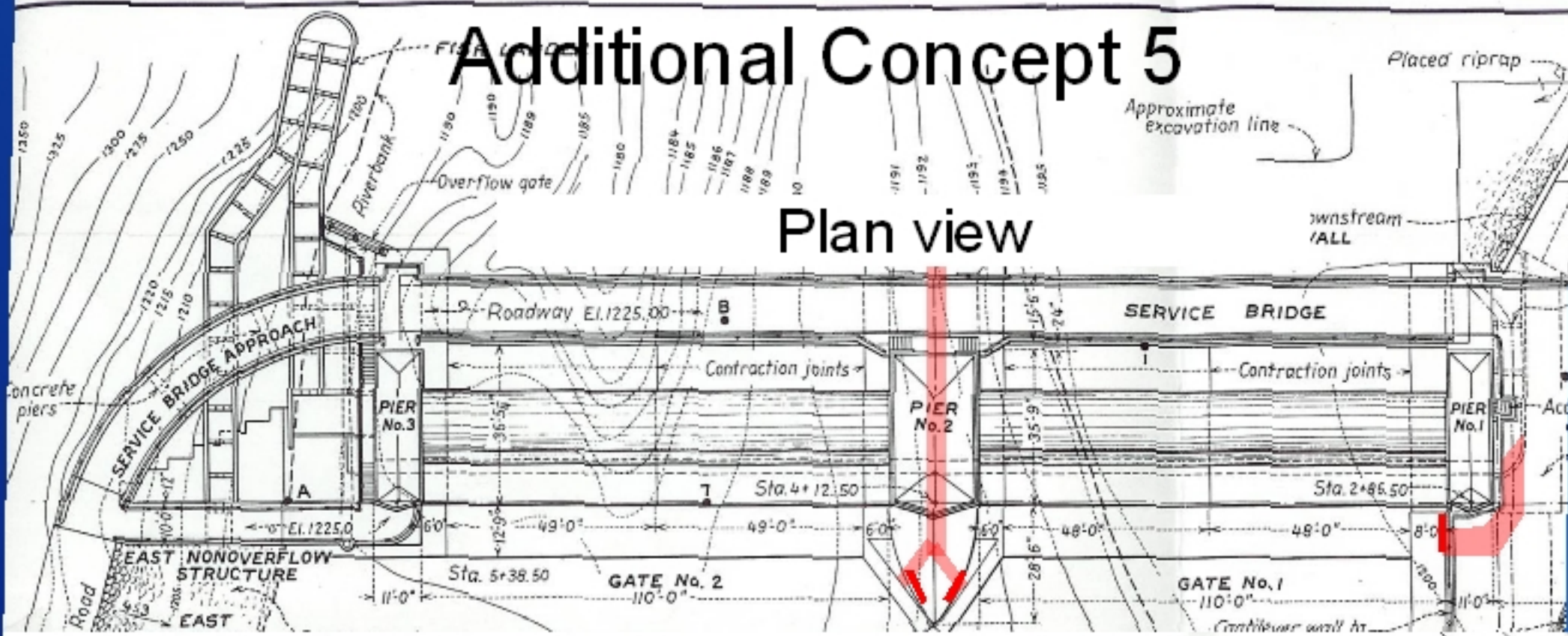


Roza Dam Fish Passage Options

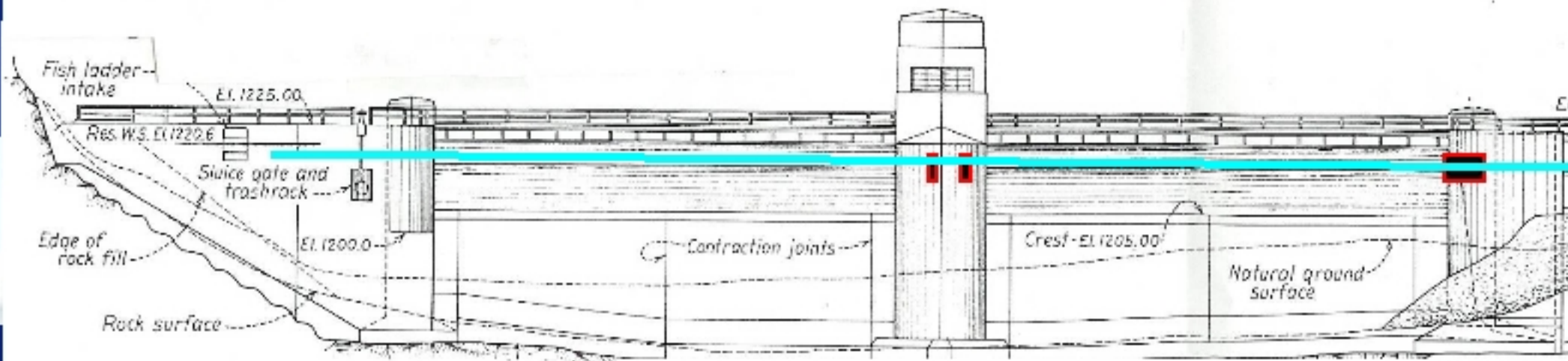
Many considered

RECLAMATION

Additional Concept 5

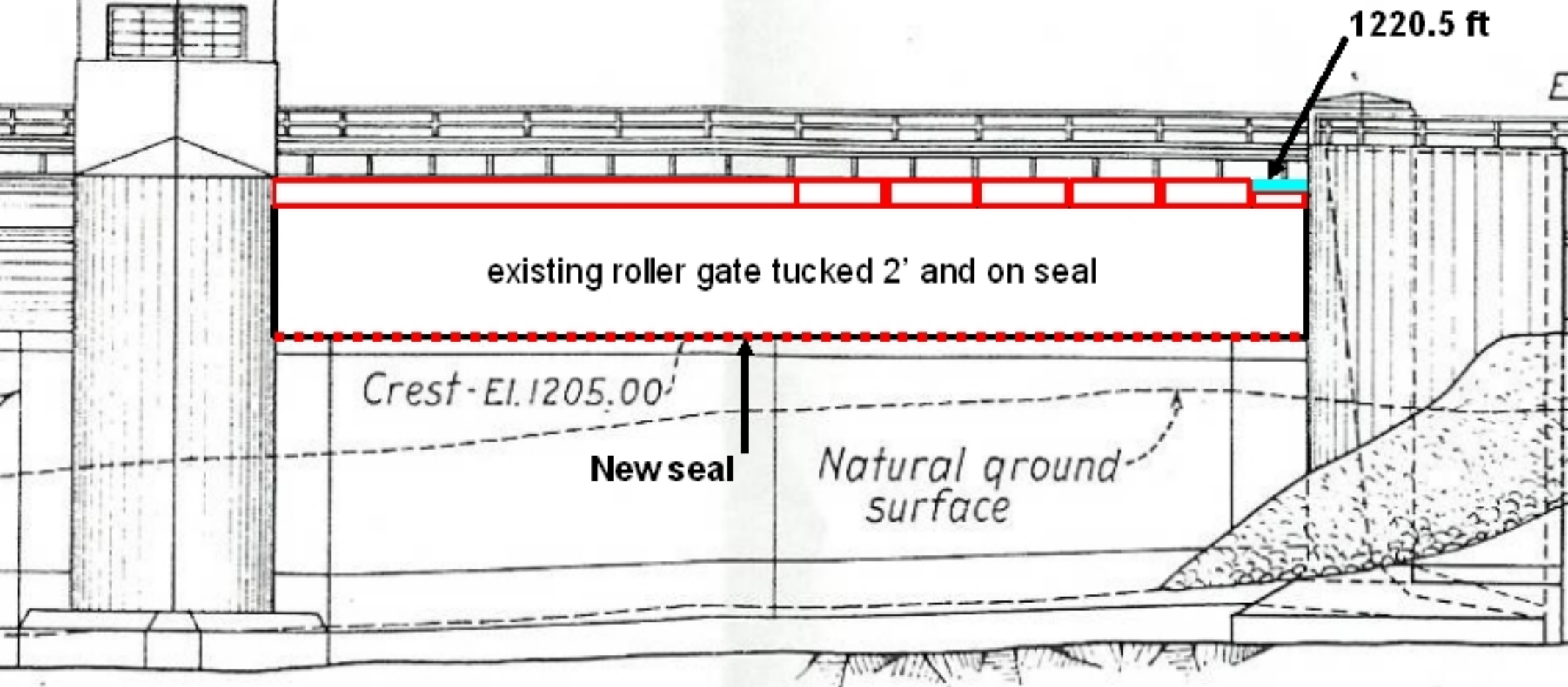


Plan view



Upstream cross section

Appraisal Concept 3

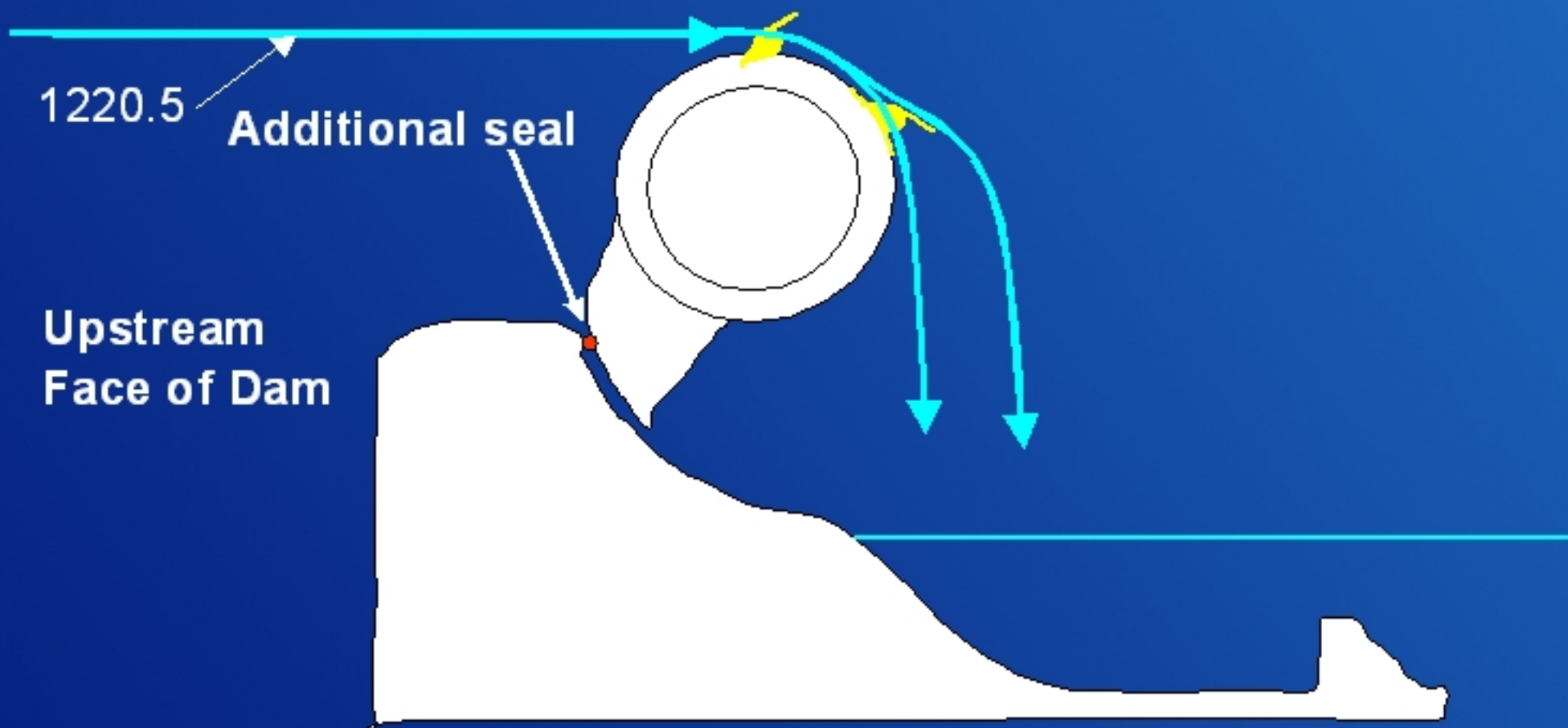


Upstream cross section

Adjustable obermeyer gates required to maintain forebay elevation while keeping both roller gates on seal

RECLAMATION

Roza Dam Fish Passage



RECLAMATION

Roza Dam Fish Passage Options

- **Denver TSC working on this structural option and scheduled to complete design in FY07**
- **Reclamation requesting**
 - Final design funding in FY09
 - Construction funding in FY10

Fish Passage Considerations

- This option will allow fish passage with a target flow below dam of 400 cfs
- Does not address issue of providing smolt outmigration flow in bypass reach
- BPA and Roza Irrigation District support this structural fix because it allows surface water passage route while potentially eliminating need for power subordination
- Continued power subordination for fish passage not desirable to BPA, RID, or Reclamation mission

Will obermeyer gate option work?

Attraction to overflow spill

Outmigration flow condition in bypass reach

RECLAMATION