HAS A FLOOD OF MONEY PROTECTED YUBA COUNTY?

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HAS A FLOOD OF MONEY PROTECTED YUBA COUNTY?

SUMMARY

The Three Rivers Levee Improvement Authority (TRLIA) was created in 2004 to finance and construct levee improvements in South Yuba County. The Authority’s mission is to provide 200-year levels of flood protection to more than 40,000 residents in Linda, Olivehurst, and Plumas Lake.

There are many important issues involving TRLIA and flood protection in south Yuba County. This Grand Jury selected two issues to investigate in-depth because these appeared to be the most important to the critics.

The first in-depth issue is the lack of protection from an incursion of water through the Goldfields.

The Yuba Goldfields comprise an area of approximately 23 square miles located on the south bank of the Yuba River and reaching from the end of the Patrol Road Levee to the Hwy 20 Bridge over the Yuba River. There was a disastrous flood originating in the Goldfields in 1950 caused by a mining operation intentionally cutting through the south training wall on the Yuba River. There is no engineered, and therefore certifiable, flood protection in the Goldfields.

US Army Corps of Engineers (USACE) modeling studies indicate there is no risk of flooding from a 100-year water event. Additional study by TRLIA is underway to determine at what point there is a risk and what needs to be done, if anything, to mitigate that risk.

The second in-depth issue is the lack of, and need for, a Performance and Compliance Audit of TRLIA.

In response to a letter from a local activist group, a request for a Performance and Compliance Audit was placed on the February 16th Board of Supervisors (BOS) agenda. Following discussion, the matter died. We found, available to the public, sufficient documents exist on the TRLIA web site (www.trlia.org) to establish a precise line of inquiry on the engineering and financial performance of all aspects of the organization. We found annual budget proposals from TRLIA management. These proposed budgets were supported by required annual independent auditor reports, for each year of TRLIA’s existence. However, the reluctance of TRLIA management and some members of the BOS to authorize a Performance and Compliance Audit could taint the public’s perception of transparency and accountability. Therefore we recommend a Performance and Compliance Audit be performed at the completion of phase 4.

The construction of the levees has been documented, reviewed, certified and accredited, where appropriate, by numerous levels of government and the private sector that have the technical knowledge to do so. Two additional issues addressed in this report are the Flood
Protection at the Gold Fields and the design of the levee protection at the 100 year versus 200 year levee accreditation.
GLOSSARY

BOS  Yuba County Board of Supervisors is both the legislative and the executive body of local government for the county.

BOSC  Board of Senior Consultants.

BOSE  Board of Senior Engineers.

CFS  Cubic Feet per Second is a measure of the volume of water flowing past a given point in one second. One cubic foot equals 7.48 gallons.

CWA  California Water Association.

CVFPB  Central Valley Flood Protection Board.

DWR  California Department of Water Resources.


FEMA  Federal Emergency Management Agency.

RD784  Reclamation District 784, established in 1908, operates under the authority of the State of California’s Central Valley Flood Protection Board.

Training Wall  The training walls (north and south side of the Yuba River) in the Goldfields were created by the California Debris Commission to direct the Yuba River waters.

TRLIA  Three Rivers Levee Improvement Authority is a joint powers agency established in May 2004 between Yuba County Board of Supervisors and Reclamation District 784. It has five board members; two from the BOS, two from RD784 and one at large.

USACE  United States Army Corps of Engineers.

YCW A  Yuba County Water Agency was established in 1959 by an act of the State Legislature with its primary functions being: development and sale of hydroelectric power, flood control, fisheries enhancement, recreation, storage of water and sale of water to member districts.

YLFA  Yuba Levee Financing Authority, a joint powers authority established July 2008 between the Yuba County Board of Supervisors and the Yuba County Water Agency. Its mission is to raise local matching funds for the TRLIA projects by the sale of bonds and as a financial oversight entity.
BACKGROUND

South Yuba County is characterized by the confluence of the Yuba, Feather and Bear Rivers and historically experiences a major flood event about every 10 years. The residents of Yuba County have been building and maintaining levees to protect themselves since about 1875. The devastating events of 1986 and 1997 made clear the necessity to improve protection from future flooding disasters if Yuba County was to evolve from solely an agricultural area to one with a mixture of agricultural, industrial and residential opportunities.

In 2003 The California Department of Water Resources (DWR) and the U.S. Army Corps of Engineers (USACE) called a meeting with all local agencies to brief them on the preliminary results of a study they had undertaken called “The Lower Feather River Flood Plain Mapping Study.” The study showed that much of southern Yuba County did not meet Federal Emergency Management Agency (FEMA) 100-year flood protection criteria and it was going to be mapped into the flood plain. This provided a wakeup call to the Yuba County Water Agency (YCWA), Yuba County Board of Supervisors (BOS) and Reclamation District 784 (RD784). They now realized something would have to be done.

In May 2004 the County BOS and RD784 created the Three Rivers Levee Improvement Authority (TRLIA), a joint powers agency, to finance and construct levee improvements in south Yuba County. Their motives were twofold: first to improve the safety of the residents of Linda and Olivehurst, and second to provide a foundation of protection to allow residential development in Plumas Lake.

“The Authority’s mission is to provide 200-year levels of flood protection to more than 40,000 residents in Linda, Olivehurst, and Plumas Lake. Four work phases – covering 29 miles of levees – were identified to achieve this goal. More than $405 million is being invested in the levee improvement projects...”

Recent flood history of the three rivers and the effects on southern Yuba County illustrated the need for...
improvement in flood control.
- 1950 – The Yuba River broke out of banks near Hammonton, flooding areas to the south.
- 1955 – Water to the top of levees.
- 1986 – Yuba River levee ruptured east of Highway 70 (behind current Wal-Mart), flooding parts of Linda and Olivehurst south to Broadway.
- 1997 – Feather River levee ruptured at the west end of Country Club Road, flooding Arboga, southwest Linda and Olivehurst and areas north of the Bear River levee from Highway 70 to the southern end of Olivehurst.

Since its creation, TRLIA and flood protection in Yuba County has never been the subject of a Grand Jury inquiry even though the work has been very visible to the residents of Yuba County for the seven years of its existence and $405 million has been spent for levee improvements. The 2010-2011 Grand Jury decided an inquiry was warranted and should be conducted.

Research conducted by the Grand Jury revealed numerous questions and issues that were important to Yuba County residents. Among them the most notable were the following:

1. The lack of protection from an incursion of water through the Goldfields.
2. The lack of, and need for, a Performance and Compliance Audit.
3. The design of the levees such that only portions of the flood plain are protected.
4. Why was levee accreditation to a 100-year level when 200-year was promised?
5. Wheatland and District 10 protection was not included in the levee improvement plan.
6. Property owners who benefit from the protection of the TRLIA improved levee system were assessed, by voter approval, a new tax for the maintenance of the levees.
7. Levee repairs were originally estimated to be $25 million. How did the cost escalate to over $405 million?
8. No slurry wall installed after the 1986 break in the levee behind Wal-Mart, resulting in a remaining danger, and the possibility of a levee break at that same location.
9. No evacuation plan for Plumas Lake.

During the course of inquiry the scope and extent of TRLIA’s projects including, but not limited to, finance, construction and compliance to regulations were presented to the members of the Grand Jury. Due to the magnitude of the project and the limited amount of time the Grand Jury has to investigate, the main focus was narrowed to two issues. First, the threat of flooding through the Goldfields was selected because upon cursory examination it appeared to present a serious hole in protection. It is the duty of the Grand Jury to respond to complaints of residents especially when their safety is a concern. Fear of flooding is such a universal dread that we felt obligated to investigate this issue because of its
importance to the community. Flooding in the past has resulted in a heightened awareness to the possibility of additional flooding in the future. Examining the risks and preventive measures implemented will hopefully confirm or refute the notion that flooding will occur again because of the Goldfields issue.

Second, the need for a Performance and Compliance Audit was selected because of the size of the project, the amount of taxpayer dollars spent and to provide transparency and accountability to the residents of Yuba County. Although only two issues were chosen for a more in-depth examination, responses to other issues/questions were uncovered throughout the inquiry and have been provided in this report, when possible, in the Discussion section.
**APPROACH**

Interviews were conducted with several Yuba County residents who are vocal in questioning different aspects of TRLIA, its performance and results. These interviews were conducted first in order to compile a list of concerns most important to the residents of Yuba County.

Additionally we queried a representative cross-section of residents to find out what their questions and concerns were about the levees.

These issues (listed in the Background section) were then used as a template for interviews with individuals responsible for TRLIA’s performance and the perceived threat from the Goldfields.

It is encouraging to note that both critics and proponents agreed upon some issues. First, the need to improve flood protection for south Yuba County was very important to both. Second, the high quality of the levees that have been completed, certified by an engineer, and accredited by FEMA. And last, they both agreed that the issues surrounding the Goldfields are very complex.

The Web sites for TRLIA, RD784, USACE, Yuba County Water Agency (YCWA), and the United States Geological Survey (USGS) have been utilized for additional research in this report.
DISCUSSION

Flood Protection at the Goldfields

The Yuba Goldfields comprise an area of approximately 23 square miles located on the south bank of the Yuba River and reaching from the end of the Patrol Road Levee to the Hwy 20 Bridge over the Yuba River.

Hydraulic mining in 1852 and 1893 changed the landscape and defined the current area. The area is now dominated by the tailings from the hydraulic mining. Gold dredging of the tailing began in 1902 and continues to the current time. Removal of aggregate is a major industry in Yuba County.

The U.S. Army Corps of Engineers made a presentation, “Hydraulic and Preliminary Economic Analysis of the Yuba River Goldfields,” to the California Central Valley Flood Protection Board on March 26, 2010. There they stated the results of their General Re-evaluation Report (GRR) of the Yuba Goldfields which was undertaken “to determine the risk of flooding from the Goldfields” and “to determine Federal interest in a project component to reduce the flood risk.”¹ The GRR modeled the Goldfields for 50, 100, 200 and 500-year water events with breakouts at mile 7.6, mile 10.3 and mile 13.3.

As part of the presentation, the USACE proposed a 4-mile levee to route any flood waters back to the Yuba River. Their conservative estimate for this levee was $45 million. TRLIA’s estimate for the same levee based on their experience with the per-mile cost of the Bear and Feather River set-back levees (which is comparable to new levee construction) is $100 million. The USACE estimate of damages from a breach in the Goldfields is $4 million. Therefore, the Benefit/Cost Ratio (B/C), where the benefits must exceed the cost, is 0.1.
They also state that benefits are constrained due to low flood depths (1 to 4 feet) and a low re-occurrence probability. Their conclusion is the Goldfields do not represent a risk to public safety at the 100-year level, but do at somewhere in excess of the 150-year level. They also determined the B/C does not warrant Federal interest in additional flood control in the Goldfields at this time, but does not preclude future interest. However, this determination will not ease the concern of residents of the affected area who are afraid their house and property may be standing in 4 feet of water should such a flood event take place.

Some proponents conclude that without USACE interest, there would be no federal or state help with funding improvements in the Goldfields area. This might be mitigated at the state level by SB 5 requirements to meet 200-year urban levee protection.

TRLIA has decided that even though the USACE has determined that the Goldfields are sufficiently protected from a 100-year event, its technical basis for this determination is not sufficient for a civil engineer to certify it as meeting 100-year criteria. TRLIA is performing a separate detailed analysis of the Goldfields and modeling the water flow if the training wall is breached. The result of water coming through the porous rock in the Goldfields will be quite different than what happens when an engineered levee is breached. In such circumstances there would be a rapid inundation by floodwaters with a high expectation of risk of life and severe damage. In the Goldfields the floodwaters would accumulate much more slowly and would be much shallower. When the study is complete, they will have documented the floodplain at 100-year and 200-year levels even if they do nothing. There may not be any repair to the Goldfields, but it might be mapped as a residual floodplain.

A concern to everyone is the condition of the Goldfields in the future. Because of mining, aggregate extraction and gold dredging, this condition changes over the short-term and will transform even more drastically over the long-term. The Goldfields are a very complex hydrologic modeling problem because of the many channels and the permeable character of the structures. Modeling software is not presently sophisticated enough to account for the seepage nature of the water flow through the Goldfields and therefore, makes the prediction of the floodplain very difficult. Since the training wall is a non-engineered structure and cannot be certified by today’s standards, TRLIA’s modeling will assume a breach similar to the 1950 flood (a break in the training wall) to see where the water will go.

TRLIA has said it appreciates the high public interest in the Goldfields and wants to be certain its analysis is as accurate as possible. It has hired an independent quality control reviewer from a different firm and will utilize their Board of Senior Engineers (BOSE), a nationally recognized board of experts, who will critique the analysis and make sure TRLIA reasonably represents the risks of the Goldfields.
Has a Flood of Money protected Yuba County?

Table 1 – Historic Flood Flows on the Feather River and Yuba River

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<tbody>
<tr>
<td>Feather Discharge</td>
<td>88,000 cfs</td>
<td>203,000 cfs</td>
<td>158,000 cfs</td>
<td>150,000 cfs</td>
<td>163,000 cfs</td>
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<tr>
<td>above Yuba Confluence</td>
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<td></td>
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<tr>
<td>Yuba Discharge Above Feather Confluence</td>
<td>107,000 cfs</td>
<td>153,000 cfs</td>
<td>180,000 cfs</td>
<td>101,900 cfs</td>
<td>161,000 cfs</td>
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</tbody>
</table>

Data from USACE – Sacramento District, Courtesy of MBK Engineers

Table 1 demonstrates that the current flow on the Yuba River was greater in 1955, 1964, 1986 and 1997, when the training wall was intact, than the current flow in 1950 when it was breached intentionally, by mining interests, causing the resultant flood.

**Performance and Compliance Audit**

A local activist group, Yuba First, wrote a letter to the Yuba County BOS calling for a “Legal Performance and Compliance Audit” in January 2010. Their concern, expressed in an Appeal-Democrat article by Ben van der Meer on February 3, 2010 is that “while the levees deserve praise, accountability for how they were built was lacking...If a more detailed audit was done, they said, it would help form TRLIA’s direction and guide similar levee upgrades.”

Estimates on the cost of this type of audit range between $40,000 and $200,000 which is a substantial amount of money. The same Appeal-Democrat article reported Board of Supervisors “Chairwoman Mary Jane Griego asked county staff to investigate how much an audit might cost...”

The audit request was on the BOS agenda for the February 16, 2010 meeting. The minutes of the meeting under “Items of Public Interest” indicate Assistant County Administrator, Randy Margo, recapped: the initial request; public comments; associated costs; and responded to Board inquiries. This was followed by comments from the public. The entry ends with “Following Board discussion, with no motion forthcoming, the matter died.”

During Grand Jury interviews with TRLIA management, and members of the BOS, a need for a Performance and Compliance Audit was discussed. While some were receptive, even favoring it, others resisted the idea. This Grand Jury believes when this agenda item was allowed to “die” this demonstrated a lack of desire by the BOS to conduct the audit.

Most of the critics were clear they were not accusing either BOS or TRLIA management of any improprieties. However, a deficiency of comprehensive audits can leave government agencies or private sector companies without accountability, regardless of the best interests of their constituents or stock holders.
Table 2 – Review and Approval at each level

<table>
<thead>
<tr>
<th>Approval Level</th>
<th>Approving Authority</th>
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<tbody>
<tr>
<td>TRLIA:</td>
<td>BOSC</td>
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<td>Yuba County:</td>
<td>BOS YCWA RD784 YLFA</td>
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<td>State of California:</td>
<td>CWA CVFPB</td>
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<td>Federal government:</td>
<td>USACE FEMA</td>
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</table>

Table 2 illustrates; in order to spend money on the project or to perform any engineering, construction or regulatory work on a levee, there are myriad levels of review and approval required.

A visit to the TRLIA web site (www.trlia.org) demonstrates the openness and transparency of TRLIA’s operation. However, it also points out the difficulty anyone not a professional (engineer or CPA) will have gaining any understanding of the complexity of the task undertaken, the accomplishments, the significant challenges (both engineering and financial) overcome during their tenure, and their possible failures.

The table below illustrates the content of one of the categories available on the TRLIA web site. There are literally hundreds of documents describing the steps TRLIA has undertaken during the years required to get this far in their projects.

Documents:
- Audits: 8 Documents (FY 0304 thru FY 0910)
- Budgets: 6 Documents (FY 0506 thru FY 1011)
- Contracts: 156 Documents (agreements, amendments and modifications)
- CVFPB Reports: 57 Documents (Status Reports 02/17/2006 thru 03/14/2011)
- Design & Construction: Too many documents to count
- EIP & Funding: Too many documents to count
- Agreements: Too many documents to count
- Environmental: Too many documents to count
- Documents: Too many documents to count
- JPA Agreements: 5 Documents
- Permits: Too many documents to count
- Presentations: 21 Microsoft® PowerPoint® Presentations
- Project Maps: 14 Maps
- Resolutions and Ordinances: By date
- Safety Assurance Review: 11 Documents
- YLFA Reports: 18 Documents

From WWW.TRLIA.ORG
Paraphrasing one proponent “If you want to understand the engineering aspects you hire an engineer, we’re not going to explain it to everyone because we don’t have the resources to sit down with every individual,” and in response to questions about the finances, “You have to have high degree of accounting knowledge to understand it.”

**Design of TRLIA Levee Protection**

In the history of the Yuba County levee system, the levees have never been topped. The 1950 flood was the result of a dredging company blocking the normal flow of the Yuba River then cutting a break through the training wall. The 1986 flood was caused by an undermining of the Yuba River levee in Linda. The 1997 flood was caused by a breach in the Feather River levee near Star Bend.

TRLIA established a 3 member Board of Senior Consultants (BOSC) to provide an independent quality assurance review of the FEMA Certification Summary Report. Their review included:

- A cursory review of design and construction to assure that the design had followed the standards of engineering
- A check that adequate and appropriate information had been gathered to perform engineering analyses
- A check that the analyses performed was the appropriate analyses and that they were accomplished correctly
- A review of the Construction Completion Reports
- A review of the Certification Summary Report to ensure that the references cited as support for the Engineer’s Opinions given were appropriate and adequate

TRLIA won two American Society of Civil Engineers Region 9 (ASCE) awards for Flood Control Project of the Year. In 2008 it was for the Bear River Setback. In 2010 it awarded TRLIA the same honor for the Feather River Setback Levee project. These honors indicate that those within the flood control engineering community think highly of the design and construction of TRLIA’s levees.

**Why was levee accreditation to a 100-year level when 200-year was promised?**

The amount of protection offered by a levee is directly related to the degree of protection needed for a certain water event. Therefore, it is first necessary to define a 100-year/200-year water event. Hydrologists, scientists who study the movement, distribution and quality of water and meteorologists, other scientists who study the atmosphere and weather, study historical data about rainfall and stream stage, to determine that the probability that a particular river will reach a stage of so many feet is once in 100 years. In other words, a water event of that magnitude has a 1 percent chance (1 in 100) of happening in any year. A 200-year event has a .5 percent chance (1 in 200) of happening in any year. To clarify, it is entirely possible to have a 100-year water event happen two years in a row since there is a 1 percent chance of it happening every year.
Table 3 shows what the water flow would have to be for an event to be considered a 100-year event or a 200-year event. The Feather below the Yuba confluence is highest at 280,300 cfs and 350,000 cfs because there the water flows from both the Feather River and the Yuba River are merged. To lend perspective on these figures, the normal flow over Niagara Falls is greater than 750,000 cfs.

Once this information is determined, civil engineers design and build a levee system to protect the people from injury or death and their property from damage or loss of accessibility during these water events. A civil engineer then certifies, with his stamp and signature, that in his expert, trained and experienced opinion, the levee system will protect against an event when it occurs.

As stated on the TRLIA web site and in their brochures the mission of TRLIA is to provide 200-year flood protection to south Yuba County. It is also a mandate of Senate Bill 5 (SB5) that there will be a plan in place by 2015 to bring all of California’s urban (populations greater than 10,000 people) levees up to 200-year flood protection status by 2025. The penalty for not having 200-year levees will be the inability to do any development in the impacted floodplain.

However, SB5 “puts the cart before the horse.” That is, the levee criteria have not been established for a 200-year event. However, the engineering of the improved levees has been constructed to contain a 200-year water flow. It is the expectation that once the State of California completes its definition of 200-year flood protection, TRLIA’s levees should meet those criteria.

On March 16, 2011, Ric Reinhardt, TRLIA Program Manager, made a presentation to the TRLIA Board on SB5 and its impact on the Yuba County levee system. Following the presentation, the discussion among the Board members and the presenter indicated that the Yuba County levees were well on their way to meeting the 200-year requirements, in preliminary release, and Yuba County was far ahead of other counties in Northern California.

TRLIA’s Western Pacific Interceptor Canal, Bear River and Lower Feather River levees have been certified and accredited by the Federal Emergency Management Agency (FEMA) to 100-year status. Interestingly, FEMA never refers to “100-year protection,” but
calls it “the base flood that has a 1-percent-chance of being equaled or exceeded in any given year.” FEMA also points out that “if at any point additional information is provided to FEMA that shows the levee system no longer meets certification criteria…we will contact the levee owner and community about [the possibility of] de-accrediting the levee system.” The significance of the possibility of de-accrediting is its potential impact vis-à-vis FEMA’s Digital Flood Insurance Rate Map (DFIRM). The DFIRM is utilized by flood insurance companies to determine annual cost of flood insurance.
FINDINGS

F1. Analysis of the Goldfields to determine if they pose a flood risk to public safety and the experience of multiple water events since 1950 has demonstrated no risk at the 100-year water event level, however, somewhere in excess of the 150-year level a risk may exist.

F2. With the completion and certification of Phase Four levee improvements (expected in 2011) all the levees will be certified and accredited by FEMA at the 100-year level.

F3. The 29-miles of TRLIA levees are expected to meet the State of California newly defined 200-year criteria for certification when that criterion is finalized.

F4. Although the work of TRLIA has been recognized by the flood protection engineering community and won awards and accolades, there can never be a 100% guarantee a levee will not fail.

F5. Audits, budgets, contracts, and myriad documents and presentations are available and accessible on the TRLIA web site.

RECOMMENDATIONS

R1. The Grand Jury recommends the 2011-2012 Grand Jury investigate TRLIA and RD784 after the Phase 4 levee improvement project is complete. The Grand Jury’s’ focus will evaluate the possible need for a Performance and Compliance audit. This audit should be performed by an entity not previously involved in TRLIA auditing and include TRLIA monies in the Yuba County Treasury.

REQUEST FOR RESPONSES

Pursuant to Penal Code section 933.05, the Grand Jury requests responses as follows:

From the following governing bodies:

- None

The governing bodies indicated above should be aware that the comment or response of the governing body must be conducted subject to the notice, agenda and open meeting requirements of the Brown Act.
COMMISSIONS

The Grand Jury wishes to commend TRLIA, the Yuba County Board of Supervisors, Reclamation District 784 and the Yuba County Water Agency for their diligence and forethought in recognizing the need for improved levee protection.

BIBLIOGRAPHY


2. The Yuba County Water Agency web site: http://www.ywca.com

3. The Three Rivers Levee Improvement Authority web site: http://www.trlia.org


5. “TRLIA Levee Improvement Projects”, Brochure created and distributed by Three Rivers Levee Improvement Authority.


Reports issued by the Civil Grand Jury do not identify individuals interviewed. Penal Code Section 929 requires that reports of the Grand Jury not contain the name of any person, or facts leading to the identity of any person who provides information to the Civil Grand Jury. The California State Legislature has stated that it intends the provisions of Penal Code Section 929 prohibiting disclosure of witness identities to encourage full candor in testimony in Civil Grand Jury investigations by protecting the privacy and confidentiality of those who participate in any Civil Grand Jury investigation.