AGENDA

COYOTE CREEK FLOOD RISK REDUCTION AD HOC COMMITTEE MEETING

THURSDAY, AUGUST 31, 2017
4:00 p.m.

Santa Clara Valley Water District
Headquarters Building Boardroom
5700 Almaden Expressway
San Jose, CA 95118

Time Certain 4:00 p.m.	**1.**	**Call to Order/Roll Call**
	2.	**Election of Committee Chair and Vice Chair** Elect Committee Chair and Vice Chair
	3.	**Time Open for Public Comment on Any Item Not on the Agenda** *Comments should be limited to two minutes. If the Committee wishes to discuss a subject raised by the speaker, it can request placement on a future agenda.*
	4.	**Approval of Minutes** 4.1 Approval of Minutes – August 24, 2017, Meeting and Tour
	5.	**Action/Discussion Items** 5.1 Short-Term Flood Risk Reduction for Coyote Creek (Afshin Rouhani) **Recommendation: Receive information and provide direction to staff.** 5.2 Identify Potential Future Short-Term Flood Risk Reduction Topics and Identify Committee Meeting Schedule to Review Identified Topics (Afshin Rouhani) **Recommendation:** **A. Discuss and identify potential future short-term flood risk reduction topics for Committee input and review; and** **B. Develop a Committee meeting schedule to review identified topics.**
	6.	**Clerk Review and Clarification of Committee Requests and Recommendations** *This is an opportunity for the Clerk to review and obtain clarification on any formally moved, seconded, and approved requests and recommendations made by the Committee during discussion of item 5.*
	7.	**Adjourn**

REASONABLE EFFORTS TO ACCOMMODATE PERSONS WITH DISABILITIES WISHING TO ATTEND COMMITTEE MEETINGS WILL BE MADE. PLEASE ADVISE THE CLERK OF THE BOARD OFFICE OF ANY SPECIAL NEEDS BY CALLING (408) 630-2277.

Meetings of this committee will be conducted in compliance with all Brown Act requirements. All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, that are distributed to a majority of the legislative body will be available for public inspection at the same time that the public records are distributed or made available to the legislative body, at the following location:
Santa Clara Valley Water District, Office of the Clerk of the Board
5700 Almaden Expressway, San Jose, CA 95118

COYOTE CREEK FLOOD RISK REDUCTION AD HOC COMMITTEE Purpose: Develop short-term/immediate solutions associated with the Coyote Creek flood event and project.

THURSDAY, AUGUST 24, 2017
8:55 AM

(Paragraph numbers coincide with agenda item numbers)

A meeting and tour of the Coyote Creek Flood Risk Reduction Ad Hoc Committee (Committee) was held on August 24, 2017, at the Coyote Creek Rock Springs Park, Rock Springs Drive and Needles Drive, San Jose, CA 95112.

1. CALL TO ORDER/ROLL CALL

A meeting and tour of the Coyote Creek Flood Risk Reduction Ad Hoc Committee was called to order at 8:58 a.m. by Director Richard P. Santos.

Board Members in attendance were: Director Tony Estremera - District 6, Director Barbara F. Keegan - District 2; and Director Richard P. Santos - District 3.

Staff members in attendance were: Gina Adriano, Rechelle Blank, Glenna Brambill, Rick Callender, Norma Camacho, Michelle Critchlow, Rachael Gibson, Vincent Gin, Melanie Richardson, Afshin Rouhani, and Cheryl Togami.

U.S. Army Corps of Engineers in attendance were: Mr. Tab Brown, USACE Chief, Planning and Policy Division – HQ; Ms. Josephine Axt, Chief of Planning, South Pacific Division; Mr. Tom Kendall, USACE Chief of Planning, San Francisco District; and Mr. Jay Kinberger, USACE Project Management Branch B Chief, San Francisco District.

2. TIME OPEN FOR PUBLIC COMMENT ON ANY ITEM NOT ON AGENDA

There was no one present who wished to speak.

Director Santos called a brief recess at 9:06 a. m.

Director Santos called the meeting back to order at 9:16 a. m.

Opening remarks were made by Directors Estremera, Keegan and Chief Executive Officer, Ms. Norma Camacho.

3. ACTION/DISCUSSION ITEMS

3.1 BRIEFING ON THE COYOTE CREEK FLOOD PROTECTION PROJECT

Mr. Afshin Rouhani gave an overview of the project and conducted a tour of the flood area.

4. ADJOURNMENT

Director Santos adjourned the meeting at 9:45 a.m. to the next scheduled meeting on Thursday, August 31, 2017, at 4:00 p.m., in the Santa Clara Valley Water District Headquarters Building Boardroom.

Michelle Critchlow
Office of the Clerk of the Board

Approved:

Committee:	Coyote Creek Flood Risk Reduction
Meeting Date:	08/31/17
Agenda Item No.:	5.1
Unclassified Manager:	Afshin Rouhani
Email:	arouhani@valleywater.org
Est. Staff Time:	20 minutes

COMMITTEE AGENDA MEMO

SUBJECT: Short-term Flood Risk Reduction for Coyote Creek

RECOMMENDED ACTION:

Receive information and provide direction to staff.

SUMMARY:

This item provides background information on short-term flood risk reduction options for Coyote Creek for Committee discussion and direction to staff. Some of the options discussed herein have previously been presented to the Santa Clara Valley Water District (District) Board. Coyote Creek debris and vegetation management activities progress was presented to the Board at the August 8, 2017 meeting, while an Emergency Action Plan update and a recommended Flood Barrier project were presented to the Board at the August 22, 2017 meeting. Reservoir operation options for enhanced flood protection have not been formally discussed with the full Board and are, therefore, described in detail in this memo.

The two reservoirs in the Coyote Creek watershed (Anderson Reservoir and Coyote Reservoir), which were originally constructed for water supply purposes, already provide significant incidental flood protection benefits under their current operating conditions. These flood protection benefits could be enhanced by increasing the ability to release water from Anderson Dam (through pumping) and/or by increasing the available flood storage volume behind the dam during the winter season. However, these options have significant risks, costs, water supply impacts, and other implications; if pursued, they will likely trigger a significant and lengthy environmental review and permitting effort.

BACKGROUND:

The Coyote Creek flood of February 21, 2017 was a tragic event for our community resulting in damages to residents and businesses and the temporary evacuation of many community members from their homes. On June 13, 2017, the Board conducted a public hearing on proposed modifications to the Coyote Creek Flood Protection Project (Project) of the Safe, Clean Water and Natural Flood Protection Program (SCW). The Board directed staff to extend the upstream Project limit by 2.9 miles (from Interstate 280 to Tully Road). The revised proposed Project, extending from Montague Expressway to Tully Road, includes the Rock Springs neighborhood, which was impacted by the February 21, 2017 flood event.

In addition to extending the Project limits upstream to Tully Road, the Board also:

- Approved changing the proposed flood protection level from the 1%, or 100-year event, to a 20- to 25-year event (equivalent to the February 21, 2017 flood event), which would allow for implementation of a more moderate project with fewer environmental impacts;

- Directed staff to immediately develop short-term project flood risk reduction solutions to be implemented prior to the 2017-2018 winter season; and
- Directed that Project funding* be made available for the Rock Springs neighborhood area.

Focusing on the provision of short-term flood risk reduction solutions to the areas at highest risk along Coyote Creek, available actions may include the following:

a. Emergency Action Planning (EAP): One of the main lessons learned from this past winter was that the development of a detailed and fully operational joint District/City of San Jose EAP is essential for future emergency events on Coyote Creek. A detailed update on the development of this EAP was presented to the Board at its August 22, 2017 meeting.

b. Reservoir operation options: Whether by use of pumps or through other reservoir management techniques, reservoir operation options could reduce the risk of downstream flooding. These options are described in detail below.

c. Creek management: Invasive vegetation, litter, and debris barrier removal could also reduce the risk of flooding along waterways. The District is currently conducting this type of work in parts of the Coyote Creek watershed via the District's Stream Maintenance Program, SCW projects, and by other District habitat enhancement efforts. A summary of this work was presented to the Board at the August 8, 2017 meeting.

d. Flood barriers: Flood barriers increase channel capacity by elevating a channel's banks or providing a means to wall-off vulnerable areas from flood flows. Options to reduce flood risk using this method were presented to the Board at its August 22, 2017 meeting.

The remainder of this memo provides background information on potential reservoir operation options to reduce flood risk for Coyote Creek. Note that this analysis is only for the remaining years until Anderson Dam's seismic retrofit project construction is underway. After the dam has been rebuilt, options for reservoir operations will be very different from those presented today, and will require additional analysis.

A. System Description

Coyote Creek watershed hydrology is strongly influenced by the two water supply reservoirs built by the District in the mid-20th century. Anderson Reservoir, built in 1950, and Coyote Reservoir, built in 1935 (Attachment 1 - Figure 1: Watershed Map) capture and store rainfall runoff from the upper watershed to be used for water supply and groundwater recharge operations. As Anderson Reservoir is much larger in volume and located downstream of Coyote Reservoir, it is the focus of the dam operation options discussed below.

Anderson Reservoir is the largest of the 10 District reservoirs, with a total storage capacity of 90,373 acre-feet (AF), and is a critical element of Santa Clara County's local water supply. When full, this reservoir provides about 25 percent of the county's annual water supply. Water is also released year-round from Anderson Reservoir to Coyote Creek, where it recharges the groundwater basins through the creek bed and downstream percolation ponds, and provides for aquatic habitat. Currently, Anderson Dam can release up to a maximum of 425 cubic feet per second (cfs).

Anderson Reservoir is one of only two District reservoirs that are connected to the District's raw water pipeline distribution system and its treatment plants. Imported water from the federal Central Valley Project, stored at

* Current Project funding is not sufficient to complete the planning, design, and construction phases for the entire Project reach; however, additional funding may become available through collaboration with Federal, State, and local entities.

San Luis Reservoir, is conveyed directly to the District's treatment plants but can also be diverted to Anderson Reservoir for storage and later use. Water stored in Anderson Reservoir can be used when other supplies may not be available due to drought, planned facility shut downs, or during emergency outages. If there are planned projects or operations that will make imported water unavailable or unsuitable for treatment, the District can store more water in Anderson Reservoir in advance of such outages.

Due to seismic stability issues discovered at Anderson Dam about ten years ago, a reservoir storage restriction has been in place since 2009. Until earlier this year, a 45-foot restriction below the Anderson dam crest was in place, with concurrence from the California Division of Safety of Dams (DSOD) and the Federal Energy Regulatory Commission (FERC). The Anderson Dam Seismic Retrofit Project was initiated in 2012 and is currently in the design phase. Due to findings from extensive geotechnical and geologic investigations (2013–2016), the District recently increased the restriction to 55 feet below the Anderson dam crest, limiting the total storage capacity to 52,553 AF. The District and the dam regulatory agencies believe that this restriction will prevent the uncontrolled release of water if the dam is structurally damaged by a major earthquake before the retrofit work is completed.

B. Flood Hydrology

Flooding has occurred along portions of Coyote Creek in 1911, 1917, 1931, 1958, 1969, 1982, 1983, 1997, 1998, and 2017. The largest flow recorded on Coyote Creek was estimated at 25,000 cfs in 1911, prior to construction of the two reservoirs. Since the construction of Anderson and Coyote Dams, the largest spillway discharge at Anderson Dam was approximately 7,000 cfs on February 21, 2017. Coyote Creek overtopped its banks at numerous locations downstream.

Anderson and Coyote Dams were built and are operated mainly for water supply purposes. However, both provide incidental but significant flood risk reduction benefits for downstream areas. When the reservoirs have storage volume available, they capture rainstorm runoff from the upper watershed areas. But even when full, they significantly reduce the storm surge runoff, delaying and buffering the flood peak downstream. For example, even though Anderson Reservoir was full by the time of peak watershed runoff during the record flood event of February 21, 2017, it reduced the peak flows downstream from about 10,000 cfs flowing into the reservoir to about 7,000 cfs peak discharge via the dam's spillway (Attachment 1 - Figure 2).

C. Reservoir Operations to reduce Downstream Flood Peaks

As described above, reservoirs can be operated to reduce flood peaks downstream. Two options investigated to date are:

1. Installing pumps in the reservoir to increase releases of stored water and provide more storage volume for future runoff; or
2. Lowering the reservoir storage level significantly below the current restriction before the winter season, and maintaining that lower level to provide more storage volume (with no pumps) through the winter season.

To determine the effectiveness of these two options, the flood peak reduction effect of each option is compared with the current operation plan for three scenarios: a dry year (1977 water year), an average year (1981 water year), and the 2017 water year. Preliminary costs and operational/water supply impacts are described for each concept.

1. Current Anderson Reservoir Operations

As described above, until Anderson Dam is retrofitted, the reservoir will be operated based on the 55-foot restricted level. As shown in Attachment 1 - Figure 3, by October 1 of each year, the District will lower

reservoir storage volume to approximately 40,000 AF, and use a "rule curve" to discharge stored water via the existing outflow pipe. The timing of opening the outlet pipe will be based on upper watershed conditions and the pattern of rainfall and runoff throughout the winter season, with a target of ending the winter season at or below the restricted water surface level.

Based on this current operational rule curve, Attachment 1 – Figures 4, 5, and 6 trace the anticipated reservoir storage levels for the three (dry, average, and 2017) scenarios.

Current Operations-Flood Impacts:
Dry Year: Reservoir would not spill.
Average Year: Reservoir would not spill.
2017 Season: Reservoir peak spillway discharge would be 5,700 cfs [compared to last year's operation (based on a 45-foot restriction), which resulted in a peak spillway discharge of about 7,000 cfs].

Current Operations-Water Supply Yield Impacts:
Dry Year: No significant change in water yield compared to past operations.
Average Year: Approximately 2,400 acre-ft less water yield than past operations.
2017 Season: No significant change in water yield compared to past operations.

The current reservoir operation may result in some impacts to water supply reliability.

2. Current Operations Plus Pump-Over Capability

As stated earlier, the maximum outflow from the existing Anderson Dam outlet is 425 cfs. Per the above-described outcomes for a dry, average, and 2017 season using the current operational rule curve, a spillway discharge is likely during very wet years. To increase the volume of water that can be released from Anderson Reservoir, the concept of a pump-over system that would discharge via the existing spillway has been considered as a means to reduce the probability and/or volume of spillway discharges in very wet years.

Staff has contacted multiple pump vendors to obtain conceptual configuration and costs to operate a pump-over system that would increase reservoir operational discharges by 400 cfs to a total of 825 cfs. The conceptual configuration and operation of a pump-over system would include:

- An array of portable pumps (12-14) would be installed before the rainy season on a floating platform near the spillway to pump a maximum of 400 cfs.
- Multiple pipes would be installed on the upstream face of the dam to convey the pumped water to the spillway sidewall.
- Multiple generators and pump controls would be located on the dam crest. When operating, personnel would have to monitor the pumping 24/7 to shut the system down in case of pump malfunctions, pipe leaks, or other hazard triggers.
- When not in service, the pumps, generators, and associated equipment would require regular maintenance for operational readiness.

The following are the preliminary cost estimates for seasonal leasing of a 400-cfs capacity pump-over system:

- System Delivery and Installation: $160,000
- Standby Cost (periodic maintenance and readiness testing): $750,000/month.
- Pumping Cost: $33,000/day; or about $1,000,000/month
- System Removal and Demobilization: $100,000
- Other Costs: barge rental, incidentals

As an example, if such a pump-over system would be used for flood risk reduction, it would likely be installed by November 1st and would be kept in place until April 1st of the following year (5 months). If, during that period, the system was on stand-by for 3 months and operated daily for 2 months, the total cost for that winter season would be about $4.5 million plus barge rental and other incidental costs. If, after the pumps were installed, the winter season exhibited a normal or dry rainfall pattern, it's very likely that the pumps would not be used because the existing dam outlet operation would be adequate to maintain desired reservoir levels through the winter. However, the cost for installing and maintaining the pump-over system on stand-by mode would be about $4 million—only slightly less than a winter when the pumps were activated.

Current Operations Plus Pump-Over-Flood Impacts (see Attachment 1 – Figures 4, 5, and 6):
Dry Year: Reservoir would not spill.
Average Year: Reservoir would not spill.
2017 Season: Reservoir would not spill.

Current Operations Plus Pump-Over-Water Supply Impacts:
Adding a pump-over capability to the current reservoir operations would not significantly impact the reservoir's water supply yields.

In addition to the equipment rental and operations costs for a pump-over system, other considerations and concerns include:

- Risk to integrity of dam embankment and spillway: per staff discussions with DSOD staff, pumping from the reservoir in the proposed manner would include the potential for erosion of the dam embankment (from pipe breaks or leaks) and damage to the spillway (through inadequate pump discharge velocity dissipation as well as pump equipment accidentally washing over the spillway).
- DSOD staff has previously indicated that a temporary exceedance of the dam storage restriction is acceptable when compared to the potential risks to dam/spillway integrity with a pump-over system.
- DSOD staff would analyze and evaluate a formal request for pump-over system installation for the purpose of downstream flood risk reduction. The District would have to prepare detailed design plans for DSOD review and address all concerns to obtain DSOD approval. Since Anderson Dam is also regulated by FERC, that agency would also have to review and approve any such changes in planned operation.
- The pump-over activity would require an environmental impact assessment of the pumps' installation and operation, including the potential for less available water to support aquatic habitats during the dry season. The appropriate level of California Environmental Quality Act (CEQA) documentation would have to be prepared.
- Resource agencies' permits would have to be acquired prior to installation and operation of a pump-over system.
- Installation of a pump-over system at Anderson Reservoir may result in other communities downstream of other District dams requesting similar flood risk reduction measures.

3. Reduced Storage Operations

This option would increase the storage volume available in the reservoir during the winter season by 1) reducing the storage volume below the current rule curve at the beginning of the rainy season; and 2) maintaining a lowered operation curve throughout winter by releasing flows via the existing outlet pipe more aggressively. Figures 4, 5, and 6 in Attachment 1 present the flood impact and water supply outcome for a dry, normal, and 2017 year scenario. The advantage of this option is the lower operational risks (no pumps), and, as shown in Figure 4, a reliable reduction of downstream flood risk. The key detriments of this option would be a significant loss in water supply yields and loss of operational flexibility that the current operation (Option 1) provides.

Reduced Storage Operations-Flood Impacts:
Dry Year: Reservoir would not spill.
Normal Year: Reservoir would not spill.
2017 Season: Reservoir would not spill.

Reduced Storage Operations-Water Supply Impacts:
Dry Year: Approximately 3,900 AF less water supply yield than past operations.
Average Year: Approximately 9,500 AF less water supply yield than past operations.
2017 Season: No significant change in water supply yield compared to past operations.

The reduced storage reservoir operations may impact water supply reliability in average and dry years.

In addition to the anticipated water supply losses for this option, other considerations and concerns include:

- Environmental impacts could include loss of water for beneficial uses (municipal, industrial, recreational, environmental, etc.)
- Operating the dam for flood protection purposes would require permits from resource agencies and dam regulatory agencies (DSOD, FERC). This process may take several years to complete.
- Operational flexibility would be diminished. As described earlier, Anderson Reservoir is a very important element of the District's local water portfolio--not only for its annual water supply, but also because it provides additional storage for emergencies and shutdowns of other segments of the District's water supply system.
- Anderson Reservoir serves as a recreational boating and fishing resource. A minimum 40,000 AF storage level is necessary to allow these recreational activities. This option would preclude such activities under most water year scenarios.
- Operating Anderson Reservoir in a reduced storage manner may set a precedence, and communities downstream of other District dams may request similar operations to reduce the risk of flooding.

Conclusions

The analyses conducted to date on various reservoir operation options are summarized as follow:

- Operating Anderson Reservoir at a higher restriction (55 feet vs. 45 feet below the dam crest) will result in potential loss of about 2,500 AF in an average rainfall year. In very wet years, the dam spillway may still be activated and could discharge substantial flow volumes to Coyote Creek.

- Based on modeling performed to date, a pump-over system could significantly reduce the occurrence or magnitude of spillway discharges in very wet years. If approved, a pump-over system would cost between $4 million and $5 million every year. It may take one to two years to obtain the necessary permits to install and operate such a system.

- Reducing the storage level of Anderson Reservoir to its emergency pool level (20,000AF) at the beginning of the rainy season and proactively releasing stored runoff via the existing outlet pipe would significantly reduce the probability of spillway discharges in very wet years. However, water supply reliability may be compromised in years of average or low rainfall.

ATTACHMENT(S):

Attachment 1 – PowerPoint Presentation

Short-term Flood Risk Reduction for Coyote Creek

Reservoir Operations

Coyote Creek Flood Risk Reduction
Ad Hoc Committee
August 31, 2017

Santa Clara Valley Water District

Short-term Flood Risk Reduction Options

Means to reduce the risk and impact of floods in short term:

- Emergency Action Plan
- Reservoir Operation Options
- Creek Management
- Structural Repairs
- Flood Barriers

Figure 1 – Watershed Map

Santa Clara Valley Water District

Anderson Reservoir

Dam built in 1950

90,353 Acre-Feet storage

Key water supply element

Ties into raw water system

Emergency water source

Fisheries and recreation

Incidental flood protection benefits

Santa Clara Valley Water District

Figure 2 - February 21, 2017 Anderson Dam Flood Peak Reduction

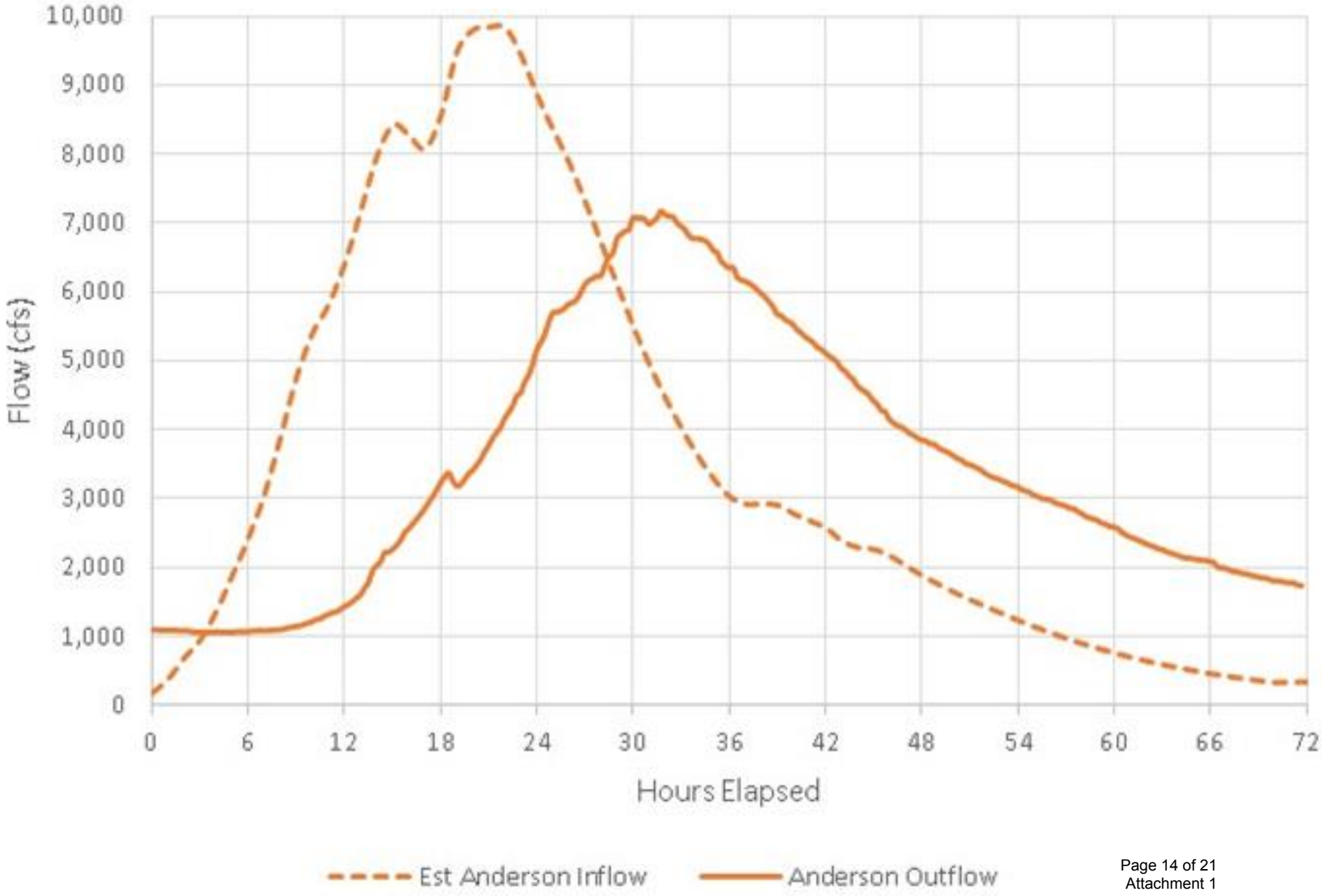
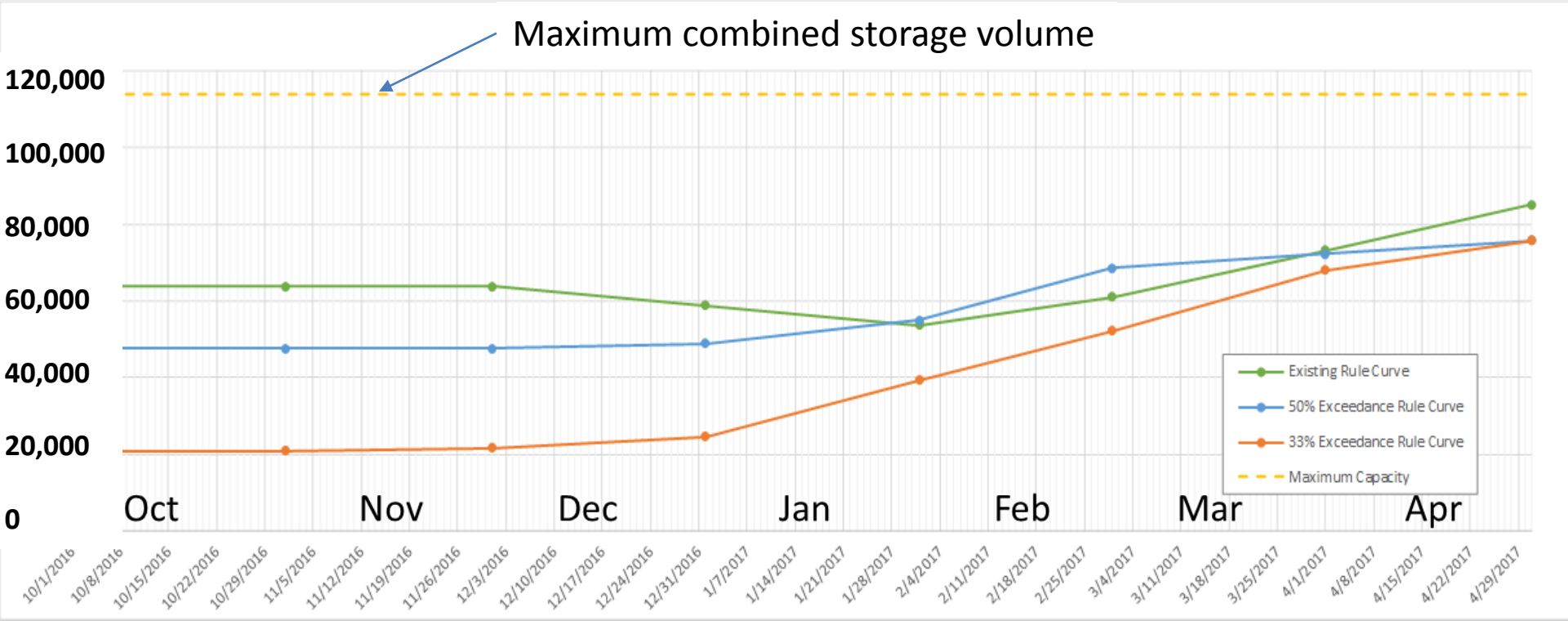


Figure 3 –Operational Rule Curves



2016 – 2017 Operation Curve

Current Operation Curve with or without pumping

Reduced Storage Operation Curve

Note: this is a combined rule-curve for Anderson and Coyote

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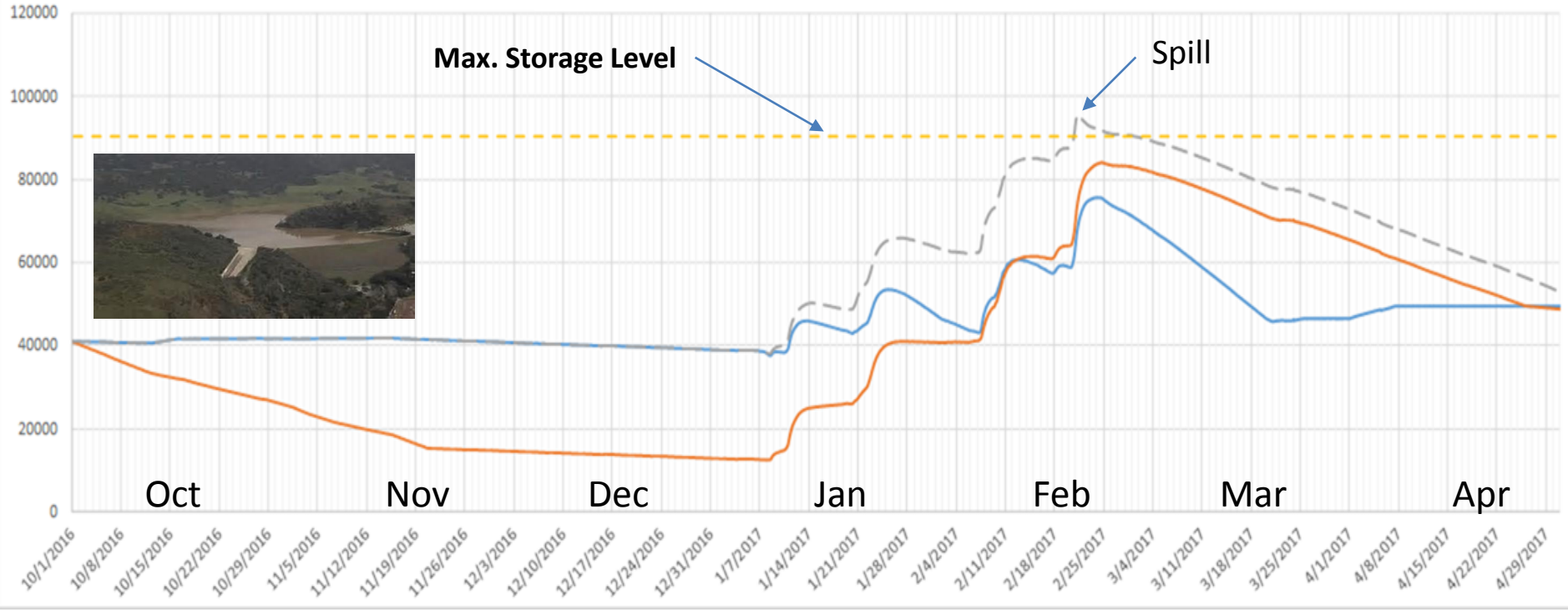
Figure 4 – Wet Year (2017) Operation Alternatives



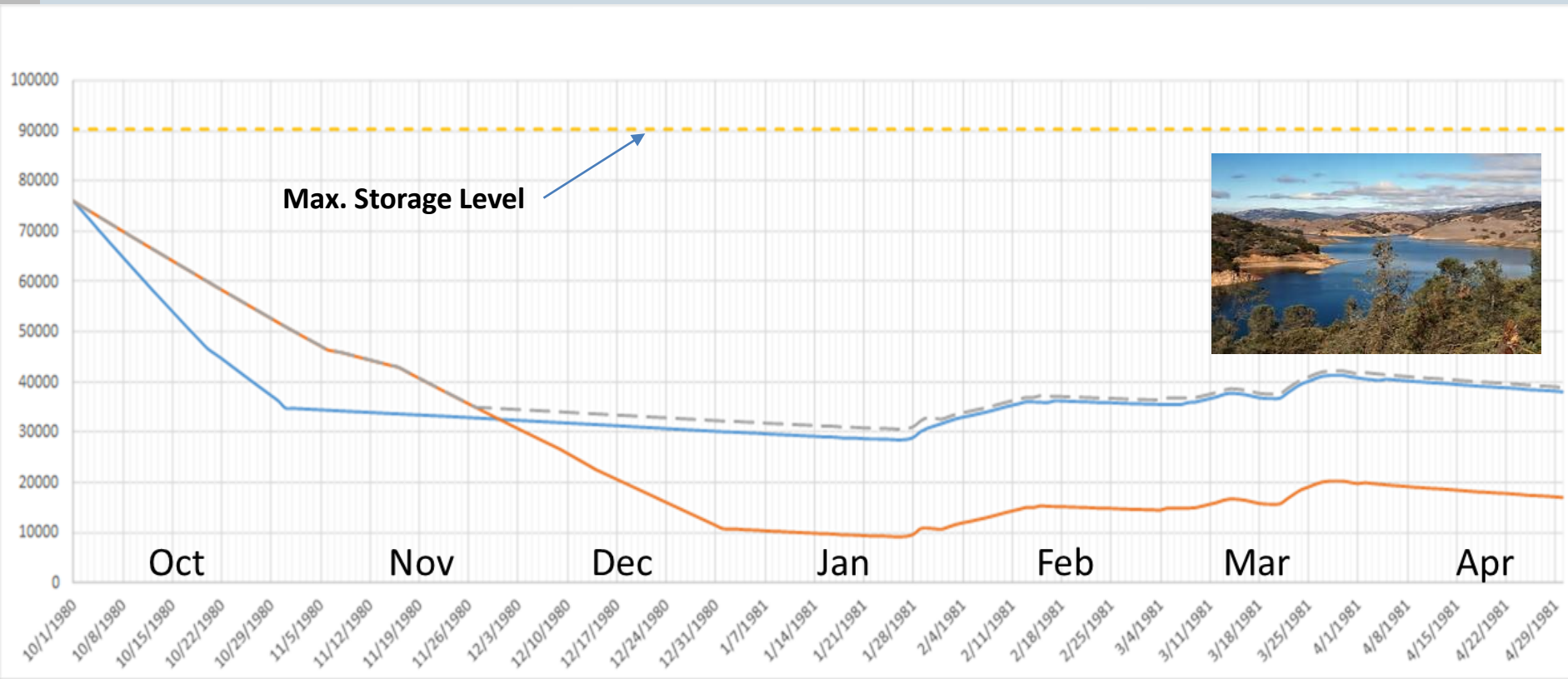
Anderson Storage Level Under Current Operation Curve no pump-over

Anderson Storage Level Under Current Operation Curve plus pump-over

Anderson Storage Level Under Reduced Storage Operation Curve

Santa Clara Valley Water District

Figure 5 – Average Rainfall Year (1981) Operation Alternatives



Anderson Storage Level Under Current Operation Curve no pump-over

Anderson Storage Level Under Current Operation Curve plus pump-over

Anderson Storage Level Under Reduced Storage Operation Curve

Santa Clara Valley Water District

Figure 6 – Dry Year (1977) Operation Alternatives

Max. Storage Level

Oct Nov Dec Jan Feb Mar Apr

Anderson Storage Level Under Current Operation Curve no pump-over

Anderson Storage Level Under Current Operation Curve plus pump-over

Anderson Storage Level Under Reduced Storage Operation Curve

Santa Clara Valley Water District

Flood Risk Reduction Summary

For a “wet” year such as 2016-17:

- Previous operation resulted in peak spill of approximately 7,000 cfs.
- Current operation plan would result in spill of approximately 5,700 cfs.
- Adding pump-over as proposed would eliminate spill.
- Operating at reduced storage would also eliminate spill.

For average winters and dry years, there would be no spill under any of the scenarios studied.

Santa Clara Valley Water District

Water Supply Impacts Summary

For a “wet” year such as 2016-17, there would be no water supply impact under any scenario studied.

For an “average” year, the scenarios studied indicate minor to significant water supply reliability impacts.

For a “dry” year, the reduced storage scenario would have water supply reliability impacts.

Santa Clara Valley Water District

Committee:	Coyote Creek Flood Risk Reduction
Meeting Date:	08/31/17
Agenda Item No.:	5.2
Unclassified Manager:	Afshin Rouhani
Email:	arouhani@valleywater.org
Est. Staff Time:	20 minutes

COMMITTEE AGENDA MEMO

SUBJECT: Identify Potential Future Short-Term Flood Risk Reduction Topics and Identify Committee Meeting Schedule to Review Identified Topics

RECOMMENDED ACTION:

A. Discuss and identify potential future short-term flood risk reduction topics for Committee input and review; and
B. Develop a Committee Meeting Schedule to review identified topics.

SUMMARY:

This items allows the Committee to identify additional short-term flood risk reduction topics for future Committee input and review, and allows the Committee to plan a meeting schedule for review of topics.

Once topics are identified, and a meeting schedule is developed, a Committee work plan can be created that allows for timely presentation of information.

ATTACHMENT(S):
None.