

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING
Meeting on 04/22/2022

1

2

3

4

5

6

7

8

---o0o---

9

TRANSCRIPT OF ZOOM PROCEEDING

10

Friday, April 22, 2022

11

9:00 A.M.

12

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

13

FLOOD SAFETY STAKEHOLDER TECHNICAL WORKSHOP

14

HOSTED BY THE CALIFORNIA NATURAL RESOURCES AGENCY

15

---o0o---

16

17

18

19

20

21

22

23

24

25

Reported Stenographically by: Anne Bryant, CA CSR No.
13516

1 PRESENTERS:

2 Gary Lippner, DWR

3 Dr. Michael Anderson, DWR

4 Joe Forbis, U.S. Army Corps of Engineers

5 Rick Poeppelman, U.S. Army Corps of Engineers

6 John Yarbrough, State Water Project

7 Wade Wylie, DWR

8 Eric Simmons, Federal Emergency Management Agency

9 Dr. Rune Storesund, UC Berkeley Center for Catastrophic
Risk Management

10

11 Cindy Matthews, National Weather Service

12 Elizabeth Bryson, DWR

13 Casey Meredith, California Office of Emergency Services

14 Mike Mierzwa, DWR

15

16

17 ALSO PRESENT:

18 Nick Saffold, Kearns & West

19 James Pearce, California Natural Resources

20 Matt Mentink

21 Ron Stork

22 Patrick Porgans

23 Robert Bateman

24 David Sarkisian

25 Ariya Balakrishnan

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

AGENDA

- ITEM 1: Introductions
- ITEM 2: Extreme Precipitation
- ITEM 3: Designing for and Managing Large Floods
- ITEM 4: Role of Oroville Dam in Flood Management
- ITEM 5: Inspection and Channels
- ITEM 6: Flood Plain Mapping
- ITEM 7: Proposed Risk Planning Study
- ITEM 8: Forecasting and Noticing Flood Events
- ITEM 9: Flood Operations Center
- ITEM 10: Emergency Action Plan
- ITEM 11: Opportunities for Engagement and Mitigation
- ITEM 12: Public Comments
- ITEM 13: Closing/Next Steps

1 P R O C E E D I N G S

2 Friday, April 22, 2022, 9:00 A.M.

3 (Court Reporter's access to Zoom hearing
4 begins.)

5 MR. LIPPNER: Good morning, all. Welcome to
6 the Flood Safety Stakeholder Technical Workshop. My
7 name is Gary Lippner, and I am DWR's Deputy Director of
8 Flood Management and Dam Safety. I am joined here today
9 by representatives from the various federal and state
10 agencies that work together before, during, and after
11 flood events to reduce flood risks in the region.

12 Our facilitator today is Nick Saffold, who also
13 facilitates the reoccurring Oroville Citizens Advisory
14 Commission meetings. The purpose of the workshop today
15 is to allow you to both hear from the flood risk
16 management experts and ask them questions related to
17 downstream flood safety.

18 Next slide, please.

19 You are looking at an artist's rendition of a
20 watershed, much like the Feather River Watershed, where
21 you can see headwaters; a large, multipurpose reservoir;
22 rivers downstream of the reservoir; and various
23 landings' activities. And today's focus is on the
24 downstream flood safety elements of this watershed.

25 Today our speakers will generally be sharing

1 information about their agency's role in flood safety.
2 They will focus on three key areas. First, there are
3 activities we do before a flood event that focus on
4 understanding extreme events and how to build, maintain,
5 and operate systems to safely handle these events.

6 Second, there are activities we do during a
7 flood event, such as forecasting and emergency response
8 coordination.

9 Finally, there are activities we do after a
10 flood event to recover from damages and prepare for the
11 next flood event through activities such as mapping and
12 investment planning. All of these activities are done
13 with a specific watershed and its associated land use in
14 mind.

15 Next slide.

16 So this is the part -- downstream side of the
17 watershed we are talking about and some of the
18 communities. And, of course, above this slide would be
19 Oroville.

20 I want to mention there are a few topics that
21 we do not have presentations for today. These include
22 dam safety inundation mapping, evacuation planning, and
23 forecast-informed reservoir operations. We do have
24 experts from DWR's Division of Safety of Dams on hand to
25 answer any questions about dam inundation mapping you

1 might have at the end of today's presentations. Local
2 law enforcement has the responsibility for evacuation
3 planning, and many of the activities that you will learn
4 today -- about today will help law enforcement in this
5 effort. Unfortunately, they are not able to participate
6 today.

7 And, though we'll talk about forecasting, we
8 will not focus on a specific forecasting-related topic
9 that has been shared at previous Oroville Citizens
10 Advisory Commission meetings, forecast-informed
11 reservoir operations, or FIRO. Updates on how forecasts
12 are used to inform reservoir operations will continue to
13 be discussed at the Oroville Citizens Advisory
14 Commission meetings that reoccur. For today,
15 discussions on forecasts will be in the context of how
16 they are used to inform downstream flood emergency
17 response and flood mitigation planning activities.

18 Please note that a recap of our dialogue today
19 will be shared at our next Oroville Citizens Advisory
20 Commission meeting that is scheduled for this summer.
21 Thank you again, and I'll turn it over to our
22 facilitator, Nick Saffold.

23 MR. SAFFOLD: Thank you, Gary. Hello,
24 everyone, and thank you for joining. Yes, I'm Nick
25 Saffold with Kearns & West. I'll be helping support

1 today's workshop. In just a minute, we're going to
2 start our presentations, many of which have been
3 pre-recorded to help ensure we stay on time. However,
4 some of today's presentations will be live.

5 So, after each presentation, we're going to
6 have five minutes for stakeholder questions and
7 comments. There will also be 30 minutes of time for
8 further comments and questions following all of today's
9 presentations. And I just want to note: If there isn't
10 sufficient time to ask all of the questions wanted from
11 stakeholders, we can take down email contact
12 information, and we'll follow up with you offline to
13 ensure everyone's questions are captured and answered.

14 We are, of course, doing our best to
15 accommodate everyone today. We realize there's a lot to
16 cover, and we're trying to do our best to both try and
17 address previous questions or themes that come up at
18 Oroville commission meetings. We'll also kind of
19 creating opportunities for space and questions from the
20 public here today.

21 So, if you would like to ask a question or make
22 a comment following one of the presentations or during
23 the public comment period, you can do so in a few ways.
24 If you are using the Zoom platform, you can raise your
25 hand to indicate you'd like to speak. To do so, you'll

1 just click the hand icon which should be located at the
2 bottom of your screen, or you may click the Q and A
3 button to type a question. And, if you're participating
4 by phone today instead of Zoom, you will need to press
5 "pound two" to raise your hand to speak following the
6 presentations.

7 The last thing I'll mention is this is a
8 three-hour meeting, pretty long, so we're going to have
9 a five-minute health break around the two-hour mark.

10 So I think that's it for me. James, I'll turn
11 it back to you to start our presentations. And, first
12 up, we'll hear from Dr. Michael Anderson, State
13 Climatologist.

14 DR. ANDERSON: Hello. Welcome to our
15 presentation on atmospheric rivers, major flooding, and
16 the 100-year flood. I'm Michael Anderson, your State
17 climatologist with the California Department of Water
18 Resources. This topic will look at atmospheric rivers
19 and their relationship to California water. We'll look
20 at components of major floods, from atmospheric rivers
21 to snow and runoff; and, finally, we'll take a quick
22 look at the concept of a 100-year flood statistical
23 estimate.

24 So let's start with atmospheric rivers. They
25 were first identified in 1998 with a new satellite

1 technology that could see water vapor in the atmosphere.
2 Discovered that these features are hundreds of miles
3 wide, thousands of miles long, and how 90 percent of the
4 water vapor moves through the atmosphere in only 10
5 percent of the area. These features, then, are really
6 important when they interact with thunderstorms, that
7 causes heavier rains and snow in California, which are
8 key to our water supply, and flooding.

9 So how do we characterize an atmospheric river?
10 We start by how much water vapor is moving in an
11 atmospheric river. To do that, we use a variable called
12 the integrated vapor transport. It integrates the
13 amount of water vapor in the vertical and multiplies it
14 by the winds moving that water vapor along. And that
15 gives us a sense of where the most water vapor is moving
16 because that relates to where precipitation is going to
17 be the heaviest.

18 Duration is the second characteristic. How
19 long the atmospheric river is overhead is really key in
20 how much runoff is generated.

21 And, finally, the third element, freezing
22 elevation, where the rain turns to snow. In a cold
23 storm, that elevation might be 2- to 4,000 feet, meaning
24 most of the watershed is getting snow. If that freezing
25 elevation is near 10,000 feet, then most of the

1 watershed is contributing runoff during that storm, and
2 the flood peak will be higher.

3 So, working with my counterparts at the Scripps
4 Institution of Oceanography and the Center for Western
5 Weather and Water Extremes, there was a study done that
6 looked at flood damages in the western U.S. and
7 discovered that 84 percent of all flood damages in the
8 western U.S. were associated with atmospheric river
9 storms. But, if we zoom in to Northern California, we
10 find more than 95 percent of flood damages are
11 associated with these storms. This is why atmospheric
12 rivers are a key element to understanding floods in
13 California.

14 Another thing that the group did was to develop
15 an atmospheric river scale very similar to the way that
16 hurricanes have a scale. And the idea here was to take
17 that innovated vapor transport, or how strong the
18 atmospheric was, how long it was, and create a scale
19 that goes from 1 to 2 -- which are mostly beneficial,
20 providing much-needed moisture to California -- to then
21 3, 4, and 5, which were transitioned to where there's
22 more hazard because there's too much coming at one time.
23 And you can see that the longer the duration, the
24 stronger or the more moisture being transported moves
25 you into those higher numbers.

1 You also see that we have names associated with
2 different thresholds of how much water vapor is moving
3 through the atmosphere and going from not an AR, weak to
4 moderate, to strong, to extreme, and to exceptional.

5 So how do we translate, then, from an
6 atmospheric river into a flood flow? Well, first and
7 most important are the prior conditions of the
8 watershed, including snow.

9 A really good example of this is the
10 atmospheric river that we had this past October which,
11 at the Golden Gate, was a Category 5 atmospheric river.
12 But it's falling on the watershed that has been dry from
13 a previous year record dry year and a very long, dry
14 summer. So, while there was quite -- or, rather,
15 short-term increase in those flows, it wasn't the same
16 type of response as might have happened had the
17 watershed already been wet. And we were in winter,
18 where there is already snow in the watershed that could
19 melt and contribute to that flood flow.

20 So one of the other things we look at is how
21 large the atmospheric river is, or are there multiple
22 atmospheric rivers, which we call atmospheric river
23 families. It might be one event that moves through,
24 that's really big, or it could be a repeated series of
25 storms impacting the region without much of a break.

1 And, for that, you can think of the February '86 flood,
2 which had multiple storms over nine days leading to that
3 flooding.

4 So we really look at the timing: When the AR
5 happens in the year, the pace of the ARs, how quickly
6 they're coming, and the scale of those atmospheric
7 rivers to really understand, then, the timing; when did
8 the streams come up, the pace of that increase, does it
9 increase rapidly, or is it building slowly, and then the
10 scale. In this case, where does it peak? Does it peak
11 above a flood stage, or does it not quite get there?

12 And then the more we understand with both
13 observations and forecasts, that improves our ability to
14 manage flood response by better understanding the
15 drivers of that flood in the atmospheric river and to
16 provide enough lead time to take those actions that can
17 mitigate the consequences.

18 So now we are going to pivot the talk a little
19 bit here to talk about sizing the flood with statistics.
20 This is a concept used when we're trying to evaluate how
21 good is your flood management system. And so the
22 concept that everybody hears about, because it's part of
23 the National Flood Insurance Program, is that 100-year
24 flood.

25 Well, a 100-year flood is really a flood that

1 is estimated to have a 1-percent or a 1-in-100 chance of
2 being equaled or exceeded in any given year. 1-in-100
3 in any given year leads you to that notion of a 100-year
4 flood. It's sized based on the statistics of the
5 largest flows for a given year with as many years as you
6 have data. So, the more years you have data, the more
7 peak flows you have, the bigger your sampling is to try
8 and estimate the size of that flood.

9 So we take that 100-year flow. There are that
10 1-percent chance of a flood peak or volume being equaled
11 or exceeded in any given year, meaning that that
12 percentage chance of exceeding always stays the same,
13 and we use that as a threshold. That threshold, based
14 on our historical and what we've seen in the history,
15 guides engineering design, and there are actually
16 federal guidelines that outline the methodologies to do
17 this that is called the Bulletin 17C -- Bulletin 17.
18 We're currently on Bulletin 17C or a third revision of
19 those guidelines.

20 So let's talk about using those in terms of how
21 we evaluate a flood system. Well, we can start with a
22 systematic evaluation, where we use the statistical
23 methods to get different-sized floods that help us
24 establish a threshold, or how good -- what is the level
25 of protection of my system. And we use this to meet

1 regulatory or statutory requirements. Can you -- Say,
2 for the past 100-year flood.

3 Now, there's another way of doing it, where we
4 take a scenario. It's either a real storm, say, the
5 storm or record, or on constructed events that you
6 create with plausible atmospheric conditions. Or maybe
7 you want to look at a potential future flood and
8 evaluate how the system works in response and how a
9 flood response community would handle that event during,
10 maybe, an exercise. You may have heard of an ARkStorm,
11 a concept launched by the United States Geological
12 Survey. And they're a group of folks who do sustain
13 that after a decade to create such a scenario both for
14 current conditions and potentially future conditions.

15 All right. So, as we get to the end of the
16 talk here, we want three key points for you to take
17 home. First off, atmospheric rivers, or ARs, are key to
18 our floods and our water supply. The timing of them,
19 the pace, how quickly they come, and the scale of how
20 big they are determine that -- that benefit versus
21 hazard.

22 Observations and forecasts, really key to
23 making sure we maximize the benefit and minimize the
24 hazard of any given AR event. And those flood
25 evaluations that help us understand how our system is

1 doing, you can mainly use that systematic evaluation
2 with those statistics, a.k.a. the 100-year flood, as
3 well as a specific scenario meant to really dig in to
4 some of the details and try to identify where we can
5 improve.

6 Thank you for your time and attention. I'll be
7 happy to answer questions when we get to that part of
8 the workshop.

9 MR. SAFFOLD: Great. Well, thank you so much,
10 Dr. Anderson. And are there any questions from the
11 public at this time?

12 Great. It looks like we have one question from
13 Mr. Matt Mentink.

14 MR. PEARCE: Matt, you should be able to unmute
15 yourself. And just a reminder: Once you've raised your
16 hand, you don't need to lower it and raise it again
17 multiple times. But, Matt, you should be able to unmute
18 yourself.

19 MR. MENTINK: Thanks, Nick. I just want to
20 make sure I get a couple of questions in here.

21 It seems like a part of the message there, or a
22 big part of the message, was to establish a 100-year
23 flood as a standard of acceptability there. And I'm
24 reading from the liability assessment of the FIRO for
25 Yuba Feather River System, I think it's Section 8, Page

1 2, and it says the corner stored -- the cornerstone of
2 these objectives is to achieve a high level of flood
3 protection and reliable equivalent to protection against
4 a 1- and 500-year event.

5 I was of the understanding that Oroville and
6 Bullards Bar was going into this FIRO in a joint effort.
7 In reading the viability statement, shouldn't we be
8 looking at a 1-in-100-year flood?

9 Second is the '86 flood was said to have been a
10 1-in-70-year flood; and, yet, we had three of those in a
11 70-year period. So don't we really also have to
12 question our forecast probabilities on top of planning
13 for the 500-year flood?

14 DR. ANDERSON: All right. Thank you, Matt. A
15 lot of good questions there, and we'll wade through them
16 here.

17 First off, when we talk about 100-year versus a
18 500-year flood, that's part of that systematic
19 evaluation where you pick different-sized floods and
20 check on that performance. In the document that you
21 referred to there with the forecast-informed reservoir
22 operations, it's really looking at how far can we push
23 the capabilities of the benefit of FIRO to get as much
24 out of the flood protection as possible. And, to do
25 that, you really have to push beyond a single target and

1 really look at a range of value. So that's where those
2 two ideas kind of line up.

3 Now let's get back to that notion that you had
4 there that if you have three 100-years in a 70-year
5 period, how is that a 100-year event? Well, remember, a
6 100-year event is a 1-percent chance in any given year.
7 So the fact that that 1-percent chance was realized
8 three times in 70 years will eventually, when you
9 revisit and redo the statistics, correct itself in those
10 flood estimates. And that's why you will see a
11 revisiting of the flood statistics through a project
12 like the Central Valley Hydrology Study, which was an
13 update to the comprehensive study.

14 Those are done periodically because that's how,
15 when you get a new large flood, you can add it into the
16 statistical mix and see how, then, the sizing works out.
17 It's a statistical measure. It's not based on physics.

18 So the one important point there to keep in
19 mind -- and it's an analysis tool that's not looking at
20 the forecasting, which is trying to figure out what is
21 actually going to take place. Hopefully, that kind of
22 clears up a few of the ideas there. There's a lot
23 there. I'll be happy to follow up with you on any of
24 those, if you'd like.

25 MR. SAFFOLD: Yeah. James, let's open it back

1 up to Matt and make sure that answered his question or
2 if he has a follow-up.

3 MR. MENTINK: Yeah, I think I've got several
4 questions. I just don't know how much time I want to
5 take on this. It would be what -- what is Oroville
6 targeting their performance level at for a 100-year or
7 500-year and how that's going to affect the selection of
8 the Comprehensive Needs Assessment alternative plans.

9 And, two, I understand what you say about
10 statistical 100-year floods, but factual is something
11 that I can grasp and understand. And, when we get three
12 of those 70-year floods in a 70-year period, you have to
13 question the statistical --

14 DR. ANDERSON: Well, yeah. What I question is
15 the naming methodology. Really rather unfortunate
16 because a 100-year flood gives you the sense that it
17 only happens once in 100 years. So really unfortunate
18 naming convention there that does cause this exact
19 confusion. I'd love to find a new way to describe that
20 methodology because it is frustrating to all parties
21 involved.

22 MR. MENTINK: Yeah. You're probably familiar
23 with the Great Flood of 1861 in the -- What's his name?
24 Derringer, from USGS study.

25 DR. ANDERSON: Yeah.

1 MR. MENTINK: That that was not a one-off
2 event, that that happens about every 200 years?

3 DR. ANDERSON: Yeah.

4 MR. MENTINK: And what would you call that
5 flood? Would you call that a 1-in-1,000 flood when it
6 happened every 200 years?

7 DR. ANDERSON: I am not quite sure where that
8 flood sits in the statistical distribution. That's
9 actually a topic that gets visited to try and figure out
10 the sizing because we try and piece together that flood
11 from the historical accounts that we have. I know
12 there's some work going on where they found a high-water
13 mark in the American River from that flood from a
14 newspaper photograph and are trying to recreate what
15 might have been to better understand kind of what was
16 happening then.

17 There are huge challenges when we try and work
18 with historic floods, particularly a flood of record
19 like that. And that's what I would call the 1862 flood
20 is that it's our flood that stands as our one in history
21 that we point to and say that's the one that really was
22 disruptive, and you can go through the history and look
23 at all of the things that it did. But, yeah, like I
24 said, there's a lot of work that goes on to try and
25 figure out how big it was, how it might look if it

1 happened today, because a lot of the river channels are
2 very different now than they were back then. The
3 American River doesn't join the Sacramento in the same
4 place as it did back then.

5 MR. MENTINK: Right.

6 DR. ANDERSON: So a lot of really interesting
7 components to that. Yes, I do get the good fortune of
8 talking with Dr. Dettinger, Dr. Daniel Schlenk down at
9 UCLA to work with him to better understand these
10 elements.

11 MR. MENTINK: One last comment for Nick. Are
12 we taking the notes of the comments and questions that
13 need later follow-up and put them on, like, a meeting
14 recommendation log like we do at the CAC meeting so that
15 comments from these stakeholders today can be followed
16 up on?

17 MR. SAFFOLD: Yeah, Matt. That's a great
18 question. We're going to make sure that all of the
19 comments are captured. There's also going to be an
20 official transcript that's going to be posted online so
21 that everyone can see what was said here today. But
22 there will also be a meeting summary, to your point.

23 MR. MENTINK: Great. I appreciate that. And
24 the thing about hooking up later through email
25 conversations to do one-offs with each other I think was

1 an excellent suggestion. Thank you.

2 MR. SAFFOLD: Yeah. Not a problem. Great
3 questions, Matt.

4 Why don't we turn to Ron Stork with Friends of
5 the River.

6 MR. PEARCE: Ron, you should be able to unmute
7 yourself.

8 MR. STORK: There you go. Thank you. Good to
9 see you, Michael.

10 DR. ANDERSON: Hey, Ron. Good to hear you.

11 MR. STORK: The -- The reservoir design flood
12 for Oroville was not based on statistical probabilities.
13 It was a -- as you call it, a scenario-based event, in
14 those days called the Standard Project Flood. Actually,
15 it's still called the Standard Project Flood.

16 DR. ANDERSON: Yeah.

17 MR. STORK: The interim operations at Oroville,
18 according to John Leahigh -- Both Matt and I were on the
19 DWR ad hoc for Oroville, where we had extensive
20 conversations with the department.

21 But, anyhow, John -- DWR's John Leahigh said
22 that the interim operations for Oroville was based on,
23 still, the Standard Project Flood as determined back in
24 the '60s, and they accomplished that by having a lower
25 carryover cutoff conservation pool during the flood

1 control season.

2 The question that I have for you -- and this is
3 in your world -- is, at least according to
4 correspondence that we've seen with FERC and the
5 department, there appears to be a new estimate for the
6 PMF in the Feather River watershed that, somehow or
7 another, is working its way through the process that may
8 affect, of course, the spillway design flood. But is
9 there -- is the department or FERC or anyone attempting
10 to revise the Standard Project Flood estimate since
11 things have happened in the last 50 years, 60 years, 70
12 years?

13 DR. ANDERSON: All right. Well, we work in the
14 Standard Project Flood and the Frequency Based Flood and
15 have those aspects. We work with our good partners at
16 the Corps, and I'm staring at Joe Forbis' little square
17 right now. Hopefully he's -- Yeah, there he is.

18 MR. STORK: I'm assuming -- I'm assuming,
19 Michael, that the Standard Project Flood still will be a
20 scenario-based --

21 DR. ANDERSON: It is a -- It is a scenario,
22 again, sized relative to those historical events that
23 shaped the region. And they're based on the information
24 that they have from those floods. And so you have those
25 elements, and you have then the Bulletin 17 framework.

1 And how those are -- are --

2 MR. STORK: This is statistical framework
3 now --

4 DR. ANDERSON: Right, it is a statistical --
5 Right. You're right there. And, again, I -- I don't
6 fully understand all of the regulatory world, so I will
7 happily defer to Joe to correct me on these points. But
8 different policy guidelines or rules will dictate which
9 facet or way you look at the flood from the particular
10 thing that you mentioned, the PMP and the PMF. Those
11 are used to design and make sure that the structure of
12 the facility itself can safely pass that flood.

13 As for the others, like I say, I'm going to
14 happily defer to Joe and others at the Corps; that --
15 that's really more their world that they live in. I
16 just try and help them with how big things are.

17 MR. STORK: Thanks, Michael. We will no doubt
18 follow up on that question.

19 DR. ANDERSON: I'm just happy to talk with you,
20 Ron.

21 MR. SAFFOLD: Joe, I can give you a minute, if
22 you want to jump in here real quickly, but we also have
23 another -- another question as well.

24 MR. FORBIS: Sure. So, at this point -- Great
25 questions, by the way. At this point, there's not an

1 intent to update the Standard Project Flood, but there
2 is the plan and the expectation that we will be using
3 that event, plus the other types of events that some of
4 you have already been referencing, whether it's, you
5 know, frequency events like 100, 200 years, or, like,
6 PMFs and -- and approaching it from a more -- like a
7 robustness and sensitivity testing as we're going
8 throughout the FIRO, as well as the water control manual
9 update process.

10 So we wouldn't be basing any sort of update to
11 operations solely on just one event. It would be a
12 range of events to make sure that the shape of a
13 hydrograph or the -- or in combination with the inflow
14 of volume works in through Oroville's operations in one
15 sense, but with a different shape it struggles more so.
16 It's -- It's with a more risk and uncertainty and
17 robustness and sensitivity approach. It's -- It's going
18 to be more wide-ranging in the analysis than what it
19 was, you know, decades ago.

20 MR. STORK: So you expect that the department
21 will have a new reservoir design flood, which is a
22 deterministic, scenario-based flood for when it changes
23 from interim -- interim operations to future operations?
24 And does that -- You know, do you expect that the
25 resulting reservoir design flood will be larger or

1 smaller?

2 MR. FORBIS: That's a good -- I don't know the
3 answer to the second one, if a specific design flood
4 would be larger or smaller than the Standard Project
5 Flood, but what I can say is that the events using the
6 analysis will be based off the most current information
7 we have available. So was it Ron or Mike or Matt -- I
8 apologize.

9 There's mention of a new PMF information in the
10 FERC process. They're going through some process with
11 FERC that whatever is the most current information we
12 have, we would want to use that in the analysis to
13 ensure that whatever changes to the water control
14 diagram or the emergency spillway release diagram are
15 using the best and most recent -- the info that we have.

16 MR. STORK: Thank you. Obviously, that means
17 more conversations ahead.

18 MR. FORBIS: Absolutely. Yes.

19 MR. SAFFOLD: Great questions, Ron. And thank
20 you, Joe. Okay. We're going to keep it moving on to
21 our next presentation.

22 Next up is Rick Poepelman and Joe Forbis with
23 the U.S. Army Corps of Engineers, and they're going to
24 be presenting to us live.

25 Do we have Rick?

1 MR. POEPPelman: Yeah, this is Rick. I'm on --

2 MR. SAFFOLD: Okay. Yeah. Go for it, Rick.

3 MR. POEPPelman: Joe, do you want to lead it
4 off?

5 MR. FORBIS: Yeah. Absolutely. Thanks, Rick.
6 So Rick might be showing up as Joe Forbis; so, to many
7 people's disappointment, there is two Joe Forbises here.
8 And I'll start off with the talking, and then -- and
9 then Rick will be jumping in and adding stuff in as we
10 go along.

11 So, first, I wanted to start off and make sure
12 that people were aware of, just real quickly, why the
13 Corps of Engineers is involved with the operations at
14 Oroville. And it's because of the 1944 Flood Control
15 Act where, in the seventh section of that legislation,
16 it talks about how, essentially, the Corps of
17 Engineers --

18 Back then, they were using different terms,
19 like "Secretary of War." But, essentially, the Corps of
20 Engineers are going to be prescribing the rules as
21 they -- and regulations as it pertains to flood control
22 for reservoirs where flood control is an authorized
23 purpose and federal funds, either partially or wholly,
24 were used for the construction of said reservoir. And
25 so that applies to many reservoirs within the Corps'

1 portfolio; and, within the Sacramento District, Oroville
2 is one of those.

3 New Bullards Bar is another example. So that
4 essentially takes the form of a water control plan or
5 the water control manual that describes how the
6 operations should be as it pertains only to flood
7 control.

8 Next slide, please.

9 So a couple of examples of how that looks with
10 our partnership and coordination and collaboration with
11 the Department of Water Resources is we oversee flood
12 operations and coordinate and collaborate with the
13 Department of Water Resources on those operations at
14 Oroville. We establish those rules for flood control,
15 updating water control manuals, which I think many of
16 you are aware that that process is underway for both
17 Oroville and New Bullards Bar right now.

18 And then a fourth thing to highlight is the
19 preparation of deviation packages, which would be
20 temporary modifications to flood control operations,
21 which can be done for many different reasons, maybe to
22 respond to a drought, to respond as a -- as a
23 modification to operations due to construction going on
24 in the watershed. So we're involved in that process as
25 well.

1 Next slide, please.

2 MR. POEPPelman: Hey, Joe. This is Rick. I
3 just wanted to say, so that situation is not unique to
4 Oroville. There's a number of other reservoirs, whether
5 they're federal regulation by Folsom, where the Corps is
6 also involved in a similar fashion. Then we have our
7 own reservoirs that we own and operate, and they have a
8 water control manual that governs the -- you know, the
9 operation of those projects, too, so -- And at the
10 State --

11 MR. FORBIS: Right.

12 MR. POEPPelman: -- and reclamation, for
13 instance, are all on board and kind of cooperate in
14 operation of the reservoirs in the system. Over.

15 MR. FORBIS: Correct. Great -- Great thing to
16 add there, Rick. Yeah. Within the Sacramento District
17 specifically, we have 45 reservoirs that are -- that
18 have water control manuals that are in the states of
19 California, Colorado, and Utah, and Oroville is one of
20 those. So, of those 45, I believe 31 are Section 7
21 projects, like Oroville, New Bullards Bar, and Folsom
22 are. Shasta is another example that you guys may be
23 familiar with.

24 Okay. Thanks for that. The next slide, if you
25 could advance it, I think there's another image that

1 shows up right next to it. Yeah. Great.

2 So we kind of were talking about a little bit
3 earlier, during Mike's question-and-answer portion
4 about, like, the sizing a reservoir or designing a
5 reservoir as well as when developing, like, the flood
6 operating rules -- the flood control operating rules.
7 They're often connected to the size of a flood event or
8 events that the project is intended to manage. So
9 there's not a set -- at least on the Corps' side,
10 there's not a set, single event that projects, like,
11 have to do because they can vary geographically in
12 watershed behaviorally on -- on what a project is
13 intended to -- how it's intended to function and
14 perform.

15 So, whether it's a 100-year event, 200-year
16 event, Standard Project Flood, probable maximum flood,
17 something else -- and there's a slew of different ways
18 to characterize flood events. And it's really those
19 types of events that are used to design the -- the
20 reservoir as well as developing the flood control
21 operating rules.

22 And those things are decided, like, at the
23 beginning, initially through the design process, as,
24 like, within, like, a Corps study process that leads to
25 the project authorization that Congress then authorizes.

1 Nowadays, that's in the form WRDAs, W-R-D-As. So these
2 oppositions for the long know, and then some -- some now
3 changes would be in the form of changing the operations
4 after construction, where appropriate.

5 And, in terms of operating a reservoir for
6 flood control, there's multiple, like, components
7 that -- or factors and parameters that are used when
8 developing those rules. Those set of rules, I think I
9 mentioned before, are called or labeled the "water
10 control plan," which is a portion of the water control
11 manual, and those components would lay out or talk about
12 what the flood control space requirements are. And, you
13 can see, on the right side of the slide, what the flood
14 control -- There's a trapezoid there that indicates the
15 space that's allocated for flood control. There's also
16 downstream control points that you want to make sure
17 that you are operating, too, that certain flows or
18 stages aren't exceeded.

19 Then there's also aspects related to release
20 requirements, where -- whether it's those flows or
21 stages that you're not exceeding, but also random rates
22 that you're not increasing releases too quickly or
23 decreasing releases too quickly. And, definitely, water
24 control plans for different reservoirs of -- have
25 different details within them. But those three tend to

1 show up in every single one, whether it's Oroville or
2 some other reservoir.

3 And so the water control plan, again, it's just
4 looking at the flood control operations aspect.

5 Obviously, for multipurpose reservoirs like Oroville, it
6 has other authorized purposes that the -- that need to
7 be met. But the water control manual and the water
8 control plan included in that only specify the
9 regulations as it pertains to flood control. So --

10 MR. SAFFOLD: Joe?

11 MR. FORBIS: Yes?

12 MR. SAFFOLD: Yeah, I just wanted to do a quick
13 time check. We're --

14 MR. FORBIS: Sure. Sure. Yes. I was going to
15 ask Rick to see if he had anything to add, and then I
16 was going to skip ahead to the last couple of slides.

17 MR. POEPELMAN: Yeah, I guess I would just
18 comment on this. So kind of from this diagram you can
19 see kind of where the flood control -- flood control
20 pool sits in relationship to the top of the dam and the
21 lower level outlet. So a majority of the flood --
22 flood-offs, you know, when we get to large -- large
23 events that we can safely pass through the dam, we're
24 counting on the main spillway, and the main spillway is
25 near the top. Right? So -- So that pool -- And that's

1 how the pool -- the spillway is designed and how the
2 water control manual, the flood-offs is built around
3 that.

4 So kind of the -- A lot of similarities to our
5 Folsom Dam, just if you're aware of that. But the main
6 discharge for large flood events comes out of that --
7 comes out of the spillway -- the gated spillway, and
8 that sits near -- that crest is near the top of the
9 overall reservoir. It's an important -- important
10 point. Over.

11 MR. FORBIS: Great. Thanks, Rick. Go ahead
12 and go to the next slide, please.

13 MR. SAFFOLD: So, Joe, let's be concise, we're
14 running pretty low on time now. Sorry.

15 MR. FORBIS: Okay. No, that's fine. Actually,
16 go to two slides from now, where it shows a map, because
17 we can talk about the same sorts of things on that.

18 So there's -- Downstream of Oroville, there are
19 a few different spots that are of utmost -- not concern
20 but attention for operating the reservoir. At different
21 points there are different downstream capacities that
22 should not be exceeded, if possible. And so, upstream
23 of the confluence with the Yuba, downstream, that
24 confluence; and then downstream of the confluence with
25 the Bear, have different objective flows that, as you're

1 balancing the space in the reservoir and the flows in
2 the downstream channels, you are trying to make sure you
3 are passing the -- as much water as possible, with a
4 flood -- during a flood event, without exceeding
5 anything unnecessarily.

6 And the last slide here is a graphical
7 representation of the water control diagram at Oroville,
8 which has all of those details and space requirements
9 and aspects to the operations that are needed as you go
10 through the decision-making process for determining what
11 flood releases to make.

12 So I think that's the best I can do, Nick.

13 Rick, I don't know if there's anything else
14 that you wanted to add real quick since I took up too
15 much time already. But I want to give you the last
16 words there.

17 MR. POEPELMAN: Yeah. Just to make sure you
18 connect the dots between the discharge -- the flood
19 control discharge from Oroville and the levee channel
20 system below. Those levees are sized to handle the
21 design discharge, so about 180,000 from Oroville. So
22 the size of those levees, the height is based on that.

23 And, if you know, there's been a lot of work to
24 strengthen those levees so that there's -- they don't
25 fail before they hit their design -- design flows. So

1 that's the physical constraints on the capacity and how
2 it's tied back to the Oroville Dam. They have to work
3 together; and FIRO, for instance, is a way to try to
4 maximize the current infrastructure. You can make
5 improvements to the infrastructure, bigger, stronger
6 levees, and it can even affect the discharge out of
7 Oroville at a lower elevation, for instance, that --
8 that would also help -- help with the passing larger
9 events. Over.

10 MR. SAFFOLD: Great. Well, thank you. We're
11 going to go to a question that came up. And it looks
12 like it was intended for the first presentation. So
13 we're going to open it up for Patrick Porgans, and it
14 looks like Matt Mentink has a question as well.

15 Matt, we're just going to hold that question.
16 I'm assuming that's for the U.S. Army Corps; so we'll
17 hold your question, and we'll take that first in the
18 queue during the public comment period.

19 So, James, if we could open it up to Patrick.

20 MR. PORGANS: Can you hear me?

21 MR. SAFFOLD: Yes, we can hear you.

22 MR. PORGANS: Okay. First of all, I think it's
23 important that the public understands what the Standard
24 Project Flood is, as it's, you know, outlined in the
25 manual. The Standard Project Flood is 440,000 cubic

1 feet a second coming in, with a 72-hour runoff of 1.5
2 million acre feet. And the maximum probable rain storm
3 is -- hold on here -- it's 720,000 cfs coming in, and it
4 has a 72-hour runoff of 2.51 million acre feet.

5 Now, we have never had the Standard Project
6 Flood in Oroville. It just hasn't happened yet. So
7 when you're talking about these downstream channel
8 capacities, that's still weighing, according to the
9 manual, is permitted to push out 250,000 cfs; and as
10 much as 600,000 can be pushed out through that
11 reservoir, according to the manual.

12 Now, you just mentioned what -- and you didn't
13 go into detail on downstream capacity. The downstream
14 capacities from Oroville are the Achilles heel here.
15 The maximum amount of flow that's come into Oroville was
16 back in 1997, on New Year's Day. It was 302,000 cfs.
17 And reading that significant downstream -- And we
18 exceeded that, you know, the required flow standards
19 that they set here in the manual; 180,000 from the
20 Feather River above the Yuba, and 300,000 below the
21 confluence at the Yuba on the Feather. We were up at
22 that 350,000. So the amount of water that was being
23 pushed out of Oroville back in 1997 was 167,000 cfs
24 without a Standard Project Flood.

25 So my point is, are we talking about ARkStorms?

1 And, you know, if we would have had that ARkStorm that
2 we had in October 24th of 20- -- what was it -- 2021,
3 and wet conditions appear in the watershed, we could
4 have had a catastrophe. And I'm concerned about that,
5 and I do not see where --

6 MR. SAFFOLD: Patrick, thank you.

7 MR. PORGANS: I'm almost done. It comes to
8 what you guys are dealing with, that real -- that
9 reality. Thank you.

10 MR. SAFFOLD: Great. Well, thank you for your
11 question, Patrick.

12 Does anyone want to hop in and quickly make a
13 comment on -- on Patrick -- to Patrick? Otherwise, we
14 can kind of table that potentially and move that to the
15 public comment period. We'll have a little bit more
16 time.

17 MR. FORBIS: Nick, this is Joe. I think I --
18 Hopefully I can respond real quick and -- to Patrick.
19 That's a good question.

20 A couple of things to keep in mind is that most
21 dams, including Oroville, have the ability to release
22 more water than what the downstream capacity is. And
23 their design or the rules are such that that should be
24 happening if there's a concern with -- or the dam safety
25 concerns are exceeding the flood control concerns at the

1 time. So, if it's a question of Oroville overtopping or
2 something, then that's when releases would be exceeding
3 downstream capacities because you would want larger
4 releases in that sense, more so than a large slug of
5 water coming downstream due to some sort of dam failure.
6 So, yes, the rules will say to go up to releases that
7 high but only in the most extreme circumstances.

8 And then the other thing is that -- that we're
9 in a better position now than before. It's not just the
10 knowledge of the data and have decades of hydrologic
11 data to look at. But the forecasting skill is so much
12 better than the '60s and '70s that the ability to
13 release water before those inflows actually start
14 occurring at the reservoir is now in play that wouldn't
15 necessarily have been in play 30, 40 years ago. So the
16 ability to respond to something even that sizable is
17 better; and the space being able to be created at
18 Oroville, that skill is better as well. So I'm not
19 saying that it could handle any event that ever comes,
20 but the -- the methodologies and understanding are
21 better today, so that hopefully put us in a better
22 position than we were earlier in the, you know, 20th
23 century.

24 MR. SAFFOLD: Thanks, Joe. Unfortunately,
25 we're going to have to move on from this section so we

1 can get all of the presentations in.

2 Matt Mentink, Ron Stork, and Robert Bateman, I
3 noted that you had your hands up, and we will get to
4 you. We're just going to have to wait until we get to
5 the public comment period where we're going to have a
6 little bit more time. But we'll go into that order that
7 I captured it in terms of hands raised. So thank you.

8 Okay. James, we're going to need to move to on
9 to John Yarbrough, his presentation from Department of
10 Water Resources.

11 MR. YARBROUGH: Hi. I'm John Yarbrough. I'm
12 the Assistant Deputy Director for the State Water
13 Project, and I'm going to talk about the role of the
14 Oroville Dam in flood management.

15 Oroville Dam is able to provide a flood
16 management benefit by being operated such that the
17 reservoir elevation is kept lower during certain times
18 of the year. And, in doing so, this creates some extra
19 space so that if you have large winter flood events
20 coming into the reservoir, that water can be stored
21 behind the dam, and a much reduced amount of flow can be
22 passed downstream. And, in doing so, this greatly
23 reduces the downstream flow rates and therefore the
24 stress on the downstream levee system.

25 The figure in the upper left shows a picture of

1 this as the reservoir elevation is reduced, creating
2 this flood space or this flood reservation behind the
3 dam. And the figure downstream shows how this has the
4 effect of buffering this inflow, this very peaky inflow
5 storm event coming into the lake. And, instead of
6 passing the very peaky flow downstream, that peak just
7 captured the water stored behind the dam, with that
8 greatly reduced outflow hydrograph, so much lower cubic
9 feet per second of water being passed downstream and,
10 again, greatly reducing the amount of stress placed on
11 the downstream system.

12 The size of the flood reservations or how much
13 lower that water elevation is kept, that's determined by
14 the operations of the Oroville facility as they're
15 described in the Oroville Dam Flood Control Manual,
16 prepared by the U.S. Army Corps of Engineers. And that
17 reduction, the size of that flood reservation was
18 designed and set by the Army Corps during the
19 development of the facility, as the Army Corps looked at
20 how much flood control benefit they needed from the
21 reservoirs versus what would be provided from the
22 downstream levee system.

23 And, in the case of Oroville, the -- that flood
24 spacing, that flood reservation is designed such that a
25 storm with a peak end flow of around 440,000 cfs can be

1 captured behind the dam, while only 150,000 is passed
2 downstream of the dam. And so this sizing of the flood
3 reservation, this became the basis for the amount of
4 investment the Army Corps made in the Oroville Dam when
5 it was being developed and then constructed. And,
6 again, how these operations occur, the details that
7 create this flood reservation is captured in the Army
8 Corps Flood Control Manual.

9 This figure shows how this has happened in
10 practice at the Oroville Dam. So, on the far left, see
11 the storm event in 1955? So that had an inflow of
12 203,000 cfs and resulted in devastating flooding in the
13 Yuba City area and resulted in the loss of 38 lives
14 because of that flood event.

15 Moving right to the right, we can see, then,
16 again, how the Oroville Dam is designed to operate, what
17 the flood operations are. So taking an inflow of up to
18 440,000 cfs and storing that extra water in -- behind
19 the dam so that the outflow can be limited down to
20 150,000 cfs. The operations of the dam are designed
21 such that if there's a storm that produces an inflow
22 larger than 440,000 cfs, this would mean that that empty
23 space has been filled with water, and so additional
24 water coming into the lake will have to be released in
25 order to prevent the dam from being overtopped. And so

1 that would result in the outflow increasing over that
2 150,000 cfs because this would be a storm larger than
3 what the flood benefit at Oroville was designed to
4 accommodate.

5 Looking at the right, we can then see how
6 Oroville Dam has performed over four years in the fairly
7 recent history. So, starting in 1964, you can see the
8 inflow, 250,000 cfs, all the way up to 302,000 --
9 302,000 cfs in 1997, and see, then, the blue bars, how
10 those inflows were attenuated down to around the 150,000
11 cfs amount.

12 The exact amount being released out of the dam
13 will vary around 150,000, and that really depends on the
14 real-time conditions occurring at each of those storm
15 events and is determined with real close coordination
16 between the DWR reservoir operators, other reservoir
17 operators elsewhere, and then overseen by the Army Corps
18 of Engineers. It's because the facility is designed --
19 the flood management is designed to -- up to this
20 440,000 cfs amount, with the outflow being limited to
21 150,000 cfs, and that's why that 150,000 cfs is what's
22 used in a lot of the downstream planning studies.
23 Because, again, that is the flood benefit that the
24 Oroville facility is designed to provide.

25 Thank you, and I look forward to answering any

1 questions you might have.

2 MR. SAFFOLD: Great. We're running a little
3 bit behind on schedule, so I want to make sure any
4 questions, right now, are specifically around the
5 presentation that John Yarbrough just gave.

6 So, Matt Mentink, I'll turn it to you. Do you
7 have a question specifically for John?

8 MR. MENTINK: Yes, I do. Oroville's Dam's role
9 in flood protection. You know, the FIRO operating
10 strategy in which Oroville has joined Yuba River with
11 considers the existing and future reservoir conveyance
12 and structure projects, reflecting the absence of
13 Marysville Dam, which was designed to provide 260,000
14 acre feet of flood storage. And the FIRO's target goal
15 is to provide a functional equivalent of 260,000 acre
16 feet of flood storage space to protect the downstream
17 communities.

18 Now, the original plan had Oroville at 200- --
19 excuse me -- 750,000, Bullards at 170, and Marysville at
20 260, which was 22 percent of the total flood -- flood
21 control storage space. Of that 260, Bullards just added
22 that we're short, and we're trying to make up 260
23 through a FIRO-type operation. Bullards is in the
24 process of a second spillway, which is going to meet 44
25 percent or 87,000 percent of that 260,000 equivalent.

1 So Oroville's share of that, 66 percent, is still
2 173,000 acre feet of storage that we need to come up
3 with.

4 As we look back at the Comprehensive Needs
5 Assessment plans, there was several of those plans that
6 had a recommendation for a low level outlet at 435 feet,
7 which I believe had 20,000 k capacity. In a rough
8 estimate of taking that 20,000 k capacity to meet that
9 700 -- or that 173,000 would be four-and-a-half days at
10 full capacity. So, when we choose that --

11 MR. SAFFOLD: Matt, we need to make sure we
12 have time for everyone's questions. Matt, I don't mean
13 to cut you off; but, if you could get to the end of your
14 question so that John can respond, that would be great.
15 Thank you.

16 MR. MENTINK: Okay. The plan that they're
17 leading to in the Comprehensive Needs Assessment would
18 take four-and-a-half days. Right now, our best
19 forecasting is at three days. There's a lot of
20 guesswork there on when to open up that capacity to meet
21 Oroville's obligation on that other 173,000 of temporary
22 storage.

23 Another plan that's in there is a gated
24 spillway shoot; that's on five of the plans. But yet,
25 coming out of the Comprehensive Needs Assessment in

1 their final report, it says that it may be that no
2 further risk reduction is needed beyond the interim
3 plans, and other measures will not be warranted for the
4 near future or even for the foreseeable future,
5 particularly if there are other --

6 MR. SAFFOLD: Matt --

7 MR. MENTINK: -- major safety operations needed
8 elsewhere in the facility.

9 MR. SAFFOLD: Thanks, Matt. Joe --

10 MR. MENTINK: I think we've got a lot to talk
11 about in the next meeting in June, when we talk about
12 asset management for Oroville's previous role when it
13 comes to flood reduction.

14 MR. SAFFOLD: I'm going to turn it to John now
15 for a quick response, and then I note -- I'm noting all
16 of the other hands that are raised, and we're just going
17 to have to get through those at the public comment
18 period.

19 MR. YARBROUGH: I can get off mute there. I
20 guess just a real quick comment -- And there's a lot to
21 unpack there. I think the quick comment would be that
22 the -- what the -- really, the question is, is there
23 additional flood benefit that Oroville should be
24 providing. As Matt noted, Marysville. And so that's
25 really something that DWR would look to the Army Corps

1 to say, "Hey, there's an additional flood benefit that
2 we really need from your facility," and then that would
3 set up those discussions about what kind of
4 infrastructure is needed for that flood benefit.

5 Different than the CNA that was looking at --
6 for dam safety needs or other needs for projects. So
7 those are two different potential reasons why you might
8 add infrastructure. If we're looking at additional
9 flood benefit, that's really -- you know, DWR would be
10 looking for the Army Corps and looking through the water
11 control manual process for identification of, hey,
12 there's an extra flood we need to have provided and then
13 discover -- or work on how to provide that.

14 MR. SAFFOLD: Great. Thanks, John. Okay.
15 We're going to move to our next presentation from George
16 Wylie with Department of Water Resources. And, again,
17 I'm noting the folks that have their hands raised, and
18 we'll get to you. Thank you.

19 If we can go to the next presentation, James.

20 MR. WYLIE: Hello. My name is Wade Wylie. I'm
21 the manager for DWR's Flood Project Inspection and
22 Assessment Section. Our team performs inspections of
23 levees, channels, structures, public plants, and
24 designated floodways throughout the Central Valley. We
25 are also the primary resource for flood fight

1 specialists in the city, and they provide technical
2 assistance to local maintaining agencies during the
3 flood fight. We also provide high-water safety when
4 necessary, after a high-water event has occurred.

5 Our staff inspect the state plan of flood
6 control levees, which include those levees downstream of
7 the Oroville Dam. Inspections are done four times a
8 year. DWR inspectors do the spring and fall
9 inspections, and the local maintaining agencies do the
10 winter and summer inspections. The inspectors look for
11 issues that might impact the integrity of the levee or
12 impair the ability of the inspector to see issues along
13 the levees and channels.

14 They look for and report on erosion sites,
15 accidental levees, animal burrows, slough stability
16 issues, trash and debris, and overgrowth of vegetation.
17 The resulting reports are provided to the local
18 maintaining agencies who are responsible for
19 maintenance. Those same reports are provided to the
20 Central Valley Flood Protection Board and the U.S. Army
21 Corps of Engineers.

22 We also have an inspection team that is focused
23 on the utilities that go through the levees. These
24 inspectors do external inspections on pipes that
25 penetrate the levees at least once every five years.

1 During their inspections, they look for breaks or
2 ruptures, severe corrosion, missing or broken closure
3 devices, and leaks that might cause erosion of the levee
4 slopes. Their findings are also provided to the Central
5 Valley Flood Protection Board, the local maintaining
6 agencies, and the U.S. Army Corps of Engineers.
7 Findings are also available to maintaining agencies at
8 any time via our Flood Emergency Response Information
9 Exchange Portal, also known as FERIX.

10 The Flood Project Inspection and Assessment
11 Section also does an annual review of aerial imagery for
12 the designated floodways. These 31 specifically
13 delineated areas are reviewed for unauthorized
14 encroachments. The inspectors use the aerial imagery to
15 locate things like new buildings, earth and fill sites,
16 debris and garbage piles, orchards, and other items that
17 can have a detrimental impact on the capacity of the
18 floodway. Items that are not permitted are documented
19 and results are provided to the Central Valley Flood
20 Protection Board for further analysis and possible
21 enforcement action. This effort helps to reduce the
22 impact to the capacity of the floodways that
23 unauthorized development can have.

24 When there is a high-water event within the
25 floodways, there can be impacts to the levees that must

1 be addressed. To ensure the local maintaining agencies
2 that patrol the levees during high water are prepared
3 for those occasions, DWR teaches flood fight training
4 courses. Our inspectors regularly provide these
5 hands-on courses to local maintaining agency, California
6 Conservation Corps, and CalFire personnel; and that
7 ensures that they have the basic skills needed to
8 perform a flood fight.

9 When there is a flood fight, we have trained
10 flood fight specialists that are ready at a moment's
11 notice to head out to support the locals that are
12 performing that action. Our specialists can help ensure
13 the flood fight is performed appropriately and offer
14 additional technical support if it's needed. They are
15 also able to assess incidents for advanced flood fight
16 measures.

17 After a high-water event, it can be important
18 to collect locations and elevations of high-water marks
19 throughout the affected reach of the river. This is
20 especially important if the impacts were greater than
21 what we expected for that event flow. Our inspectors
22 will deploy to a river at the request of DWR modelers to
23 place markers along the high-water line that will later
24 be captured by our survey crews. The survey data will
25 then be used to validate our hydraulic models. Our most

1 recent surveys were conducted along Cache Creek in 2019
2 and along the Kings and Feather River in 2017. All of
3 these activities, including inspections, flood fight
4 courses, and high-water staking help to ensure the
5 levees and those that maintain them are ready for the
6 next high-water event.

7 MR. SAFFOLD: Great. All right. Let's --
8 Let's have questions specifically for Mr. Wylie and his
9 presentation.

10 Mr. Stork, I'm going to open it up to you.
11 Hopefully you have a question for Mr. Wylie.

12 MR. STORK: No, I don't. I have questions for
13 the earlier --

14 MR. SAFFOLD: Okay. I appreciate that. I'm
15 going to hold your question, then, for the public
16 comment period, and then you can ask your question of
17 whatever expert you'd like.

18 Let's see -- How about Patrick? Patrick, do
19 you have a question for Mr. Wylie?

20 MR. PORGANS: Yes. During the 1997 flood
21 event, there was litigation, and the litigation
22 indicated that the -- Mr. Wylie's department failed to
23 properly inspect and ensure the downstream capacities
24 for those channels were up to speed, and that's in the
25 court record. So, you know, these things happen.

1 MR. SAFFOLD: Mr. Wylie, any response?

2 MR. WYLIE: Well, I was wondering what the
3 question was there.

4 MR. PORGANS: The question was very simple. It
5 has to do with, yes, you do hold these inspections. But
6 when, you know, you fail or something fails when you
7 haven't done an adequate inspection, which was in 1997,
8 what happened there?

9 We had, you know, a levee break. And, when you
10 have these levee breaks, you know, for lack of
11 maintenance, whatever the reason, or too-excessive flows
12 in the river, the DWR doesn't pay for those damages.
13 Those damages are paid for by the public. So that's my
14 question. It happened, but sometimes you don't do
15 anything to ensure the protections, and it's in the
16 court record.

17 MR. YARBROUGH: Hey, Nick. This is John
18 Yarbrough. And for this one, I think we're really
19 talking about, as we're looking forward, how all of
20 these different pieces come together. And I think,
21 going through, you know, past litigation, just we really
22 don't have the right folks here on this workshop to
23 delve into those topics. So I'm hoping we can really
24 keep our discussion really focused on our current
25 practices and how we're looking forward. Thank you.

1 MR. PORGANS: Excuse me. One last comment.

2 MR. SAFFOLD: Patrick, I apologize. We're
3 going to unfortunately have to move on. But I'm going
4 to -- I'm going to take down your information, if that's
5 okay with you, and maybe we can connect with you
6 offline. Or you can have some time during the public
7 comment period, if we have time at the end. Okay.
8 We're going to, unfortunately, have to move on to the
9 next presentation. Thanks again, Mr. Wylie.

10 Next up is Eric Simmons with FEMA.

11 MR. SIMMONS: Hello. I'm Eric Simmons, an
12 engineer with the Federal Emergency Management Agency,
13 or FEMA. Today I'm going to highlight a couple of
14 aspects in FEMA's flood map revision process, especially
15 those related to outreach. FEMA creates and revises
16 flood hazard maps to reduce future losses and damage.
17 Flood maps are a foundation of all flood risk management
18 strategies.

19 Each year, my office starts flood map projects
20 in a few watersheds due to current resources, and the
21 process has evolved to be more interactive under FEMA's
22 risk map program. FEMA floodplain mapping begins with
23 planning and a discovery process to get input from local
24 and state officials. This includes discussions on how
25 FEMA can help communities reduce future damage during

1 disasters. Watershed is reviewed to determine if there
2 are needs and update -- updated flood map or other flood
3 risk product. Current and historic flood-related data
4 is reviewed to get a picture of local needs and the
5 scope of any needed projects.

6 A critical component of floodplain mapping is
7 topography. FEMA has provided the most funding
8 nationally for the acquisition of updated topographic
9 data. A technology called LiDAR, or Light Detection and
10 Ranging, is typically used.

11 The center of this first slide shows a website
12 for the FEMA's National Flood Hazard Layer, or NFHL.
13 The NFHL is a geospatial database containing flood
14 hazard information from digital flood maps. The flood
15 hazard data supports the National Flood Insurance
16 Program and floodplain management in general. One can
17 use this information to better understand your level of
18 flood risk. Contact information for FEMA's map
19 insurance, toll-free call center is provided.

20 As we've seen on this slide, there are many
21 milestones to update a FEMA flood map. The longest and
22 most involved step is with data and product development.
23 FEMA contracts with consultants to develop new hazard
24 studies. Progress is coordinated regularly with
25 impacted communities, for example, when draft hydrologic

1 analyses are available, when the hydraulic models are
2 developed, after floodplain mapping is produced, and
3 during a flood risk review week. This gives community
4 officials a chance to provide early feedback on draft
5 mapping. In addition, using the new information allows
6 community officials to identify mitigation measures and
7 communicate about changes in flood hazards.

8 Preliminary flood maps are formally distributed
9 to community officials and posted publicly through
10 FEMA's website. Several due-process steps follow,
11 including publications in the government journal called
12 the "Federal Register," FEMA letters, local newspaper
13 notices, and a 90-day appeal period.

14 During this time, communities or the public can
15 submit data to improve the preliminary flood map. After
16 the resolution of any appeal, FEMA sends community
17 officials a letter of final determination six months
18 before the revised flood maps become effective for flood
19 insurance purposes. Revised flood maps are designed to
20 help communities effectively plan to mitigate flood
21 risk. The numerous steps, meetings, and review
22 opportunities allow FEMA and its partners to provide
23 guidance to local officials to help them identify
24 opportunities that work for their community.

25 The most used layer in FEMA's map products is

1 the high hazard zone, which is often called the
2 1-percent annual chance floodplain. FEMA flood maps
3 affect floodplain development criteria and the
4 requirement for flood insurance in that high hazard
5 zone. For all projects, a strong emphasis is placed on
6 community engagement and partnerships. A whole
7 community approach is needed to reduce flood risk and
8 build more sustainable communities. Again, the goal of
9 FEMA floodplain mapping is to increase resilience and
10 reduce future flood losses. Thank you.

11 MR. SAFFOLD: Okay. Any questions specifically
12 for FEMA, Mr. Eric Simmons? Okay. I'm not seeing any
13 questions in the queue for Mr. Eric Simmons at FEMA.
14 We're going to move on, then, to our next presenter,
15 Dr. Rune Storesund.

16 And, Dr. Storesund, the floor is yours. Again,
17 reminder: You have 20 minutes and then hopefully five
18 minutes for Q and A.

19 DR. STORESUND: All right. Thanks. Sorry. I
20 did a personal wellness break, so I just got back to my
21 computer. James, is this the corrected slide set? I
22 know when I looked at the --

23 MR. PEARCE: This was the one that was given to
24 me last night. Yes.

25 DR. STORESUND: All right. Cool. All right.

1 So good morning and greetings to everyone from
2 Berkeley, California. I'm excited to have the
3 opportunity to share with you some concepts and ideas
4 related to safe and reliable flood management. The
5 topic of flood management in the face of climate change
6 turns out to be fairly complex. It requires more than
7 one presentation to explore and understand all of the
8 nuances. The presentation today is intended to provide
9 a very high-level overview and a basic introduction to
10 what I see as untapped resources to help ensure safe and
11 reliable flood management of the future.

12 Next slide, please.

13 So a little about me. I have a unique
14 perspective that's systems-based. It looks at the whole
15 life cycle of a system, with consideration of both the
16 physical aspects as well as the human and organizational
17 factors.

18 My educational background consists of a
19 dual-degree program, where one can choose from any
20 humanities degree at UC Santa Cruz, and they are
21 essentially guaranteed transfer to UC Berkeley, in your
22 choice of engineering disciplines, assuming, of course,
23 you show up and pass your classes at Santa Cruz. I
24 received a BA in Anthropology from UC Santa Cruz and a
25 BS in Engineering from UC Berkeley.

1 I worked for a little bit, went back to
2 Berkeley, got my master's, worked a little bit more, and
3 then went back and got my Doctorate of Engineering in
4 Civil Systems at UC Berkeley. And today, I'm wearing
5 the hat of Executive Director of UC Berkeley's Center
6 for Catastrophic Risk Management, or CCRM.

7 Next slide, please.

8 I have a varied register of disaster research
9 and forensic engineering, and my focus includes the
10 human and organizational factors rather than just focus
11 on the physical aspects. This broad disaster research
12 has identified some cross-cutting phenomena related to
13 the safety and reliability of critical infrastructure
14 systems. While the industry sectors may differ, they
15 all share one common feature: They're managed by
16 people. My goal here today is to share some of these
17 cross-cutting themes with you in hopes of leveraging
18 them to enhance the safety and reliability of flood
19 management throughout California.

20 Next slide, please.

21 There are a number of terms I hear people use,
22 and they use them in various ways and contexts.

23 Extreme events. Well, what really makes these
24 events "extreme"? What's the period of record being
25 considered? What's the confidence interval? To

1 reliably estimate the 100-year flood, for example, we
2 really need 1,000 years of data.

3 Risk. Risk is typically comprised of a
4 consequence of failure and associated likelihood of
5 failure. What actual consequences are we talking about,
6 and how are the associated likelihoods of failure
7 evaluated? Far too frequently, these are based on
8 beliefs rather than any sort of reliable information.

9 "Residual risk" is another loaded term used
10 frequently. What does "residual" mean? Is it a
11 remainder, some small little thing not to be concerned
12 about, or is it referring to all of the things you
13 haven't looked at or thought too much about? If that's
14 the case, is it really residual?

15 For much of my forensic work, when I look at
16 the conditions that lead to an infrastructure's failure,
17 rarely is the case it was overloaded. The far majority
18 are situations where the systems were in fact
19 underwhelmed. The problem is either we didn't look at
20 something or just believed it wouldn't happen and didn't
21 investigate it further.

22 Next.

23 Yeah. My favorite question to ask is, "What is
24 safe?" Typical responses include, "Well, that depends,"
25 or, "Huh, that's a good question. I'm not really sure,"

1 or "I just dealt with a small aspect of the safety," or,
2 "Well, I was told to design for the 100-year event." I
3 find this quite curious because, if we don't know what
4 constitutes "safe," how can we say anything meaningful
5 about safety? I think we need to be more explicit about
6 what "safe" means, and we know how to do this.

7 Next.

8 The first tool or strategy I'd like to
9 highlight is that of high-reliability organizations.
10 This concept has been around since the 1980s and is
11 demonstrated in part by organizations who routinely
12 practice proactive risk reduction. They leverage their
13 workforce to be the eyes and the ears, always alert and
14 mindful of potential disasters. A key attribute of HROs
15 is that they have a very clear and explicit concept of
16 what reliability or safety is. This clear and explicit
17 concept empowers the workforce to flag warning signs
18 well in advance of any major disaster.

19 Next.

20 Another attribute of high-reliability
21 organizations is a positive and mature safety culture.
22 There was an excellent report published by the National
23 Academies after the Deepwater Horizon incident in the
24 Gulf of Mexico that listed nine attributes. Some of
25 these attributes are having an inquiring attitude,

1 having an environment of raising concerns, personal
2 accountability, and continuous improvement throughout
3 the organization.

4 Next slide.

5 Okay. So how can all of this be helpful?

6 Well, there are really three risk management frameworks
7 at play all at once. The first and foremost,
8 foundational and -- is integrity management. This is
9 one that explicitly defines what is acceptable or,
10 actually, what's unacceptable because it's easier to do
11 this. We know what we want to avoid.

12 Once you've built out the integrity of the
13 system, you can now leverage your workforce through the
14 "prevention through people" technique. This leverages
15 your workforce, is a risk-reduction resource. Your
16 people have the ability to foresee potential problems
17 while they're still small and manageable. They can
18 prevent small things from escalating to large,
19 catastrophic disasters.

20 Finally, we all know and are aware of
21 regulation. Regulation should really be a double-check.
22 By its nature, regulation is always going to be largely
23 reactive in nature. The combination of integrity
24 management, prevention through people, and regulation is
25 a powerful trifecta to help ensure safe and reliable

1 infrastructure.

2 Next slide.

3 This gives us the different types of events.
4 For today, my focus will be on those events we've
5 considered to be knowable and preventable. There are
6 techniques to tackle the harder stuff, but I'm going to
7 save that for another day. So, again, today the focus
8 is going to be on the knowable and the preventable.

9 Next slide.

10 As I briefly mentioned before, the systems
11 we're talking about are socio-technical systems.
12 They're imagined, designed, constructed, managed, and
13 operated by people. And I think this cartoon does a
14 masterful job of communicating our typical approach to
15 risk management today.

16 We recognize a potential hazard here, a boulder
17 about to fall on the two individuals at the base of a
18 cliff. Upon recognition of a hazard, there's analysis,
19 debate, and evaluation as to the likelihood of the
20 hazard becoming a real threat. And it's not until the
21 boulder actually starts falling that the two individuals
22 take action and get out of the way.

23 So, while this is a typical approach, it's not
24 the only approach. For example, the individuals could
25 have scooted a little bit to the left or to the right

1 so they weren't in direct alignment with the boulder
2 coming down the hill. They could have secured the
3 boulder to the top of the ledge. The point is there are
4 a number of available options, but they didn't do any of
5 them. And this highlights some research that was done
6 back in the 1960s and '70s relative to subjective
7 probabilities.

8 The graph in the lower left-hand corner -- and
9 I'm not expecting you to be able to read that -- just
10 basically highlights that cognitively, us humans have a
11 hard time differentiating between very rare events and
12 more routine occurrences.

13 Next slide.

14 Another strategy or tool we can use is to look
15 at the total costs over the life cycle of the flood
16 management system. I hear a lot of talk about the
17 100-year and the 200-year events. But, if you ask the
18 question "How much more would you need to pay to get
19 500- or 1,000-year protection?" the answer, very
20 frequently, is "Huh. That's a good question. I'm not
21 sure." In my opinion, I think this is potentially a
22 missed opportunity.

23 Next slide.

24 For example, if you look at the difference in
25 the 24-hour precipitation amounts for the 100-year

1 event, which is just under seven inches, and the
2 1,000-year event, which is about eight-and-a-half
3 inches, that's a difference of about one-and-a-half
4 inches. It might be worse in cost calculations to see
5 what future cost from flooding and inundation could be
6 avoided by spending a bit more up front.

7 Next slide.

8 Risk is classically defined as PMF times CMF,
9 where PMF is the probability of failure, and these are
10 situations where the demands imposed on the system are
11 greater than the system's capacity to resist them. And
12 CMF are the associated consequences of failure. While
13 this may seem like a very simple and straightforward
14 definition, explicitly delineating what constitutes
15 failure can be very challenging, as well as ensuring
16 consistency in units across the considered consequences,
17 differences between financial consequences,
18 environmental consequences, and knowable and preventable
19 loss of life.

20 I also note that this definition of risk relies
21 on failure scenarios that can be specified or imagined.
22 By default, this approach is limited to the known
23 universe of failures and omits unknown failure roads.
24 As a result, it should be understood and appreciated
25 that it will only inform us to a subset of risk exposure

1 rather than the full exposure.

2 Next slide.

3 So not only is there vagueness and ambiguity in
4 terms of what failure is, failure also changes with
5 time. This is known as the bathtub curve. You have a
6 higher failure rate in the early stages of a new system;
7 these are referred to as burn-in failures. You then
8 have an extended period of time with more or less
9 constant failure rates. Then, as you approach the end
10 of the service line for the structure, the failure rate
11 starts to increase as a result of wear-out failures. In
12 almost all risk analyses, only one probability of
13 failure of value is given, and this is a problem because
14 it completely neglects the increasing failure rates with
15 wear-out failures and is blind to when the wear-out
16 failures start occurring. This is not safe.

17 Next slide.

18 We should also discuss the difference between
19 statistics and probability. As I present these terms
20 here, statistics is focused on the past. These are
21 events that have actually occurred. There's empirical
22 data. Probability, on the other hand, is a
23 forward-looking perspective that uses the past as a
24 guide but also requires judgment to extrapolate
25 occurrence into the future. This concept is especially

1 important and innovative of merging technologies because
2 there is no existing information or statistics. These
3 events have yet to happen.

4 Next.

5 If we look at modeling projections for sea
6 level rise, we can fairly easily see that the estimates
7 for the future are quite different from those in the
8 past. Even the very low estimate for the sea level rise
9 projections are different from the past observations, so
10 we should be prepared that the past is not a perfect
11 predictor of the future. Otherwise, we'll be surprised,
12 which is a bit ironic because it was both knowable and
13 preventable for us to be surprised.

14 Next slide.

15 As I've noted before, the current risk
16 approaches rely on the imagination of experts to develop
17 failure scenarios and then estimate their likelihood.
18 That's the substantial basis by which safety is
19 described. The problem -- and I'll represent to you
20 this is a substantial problem -- is that an expert's
21 imagination is limited. You just can't imagine all of
22 the possible failure scenarios.

23 Does this mean we should not be doing these
24 exercises? No, I'm not saying that at all. What I am
25 saying is we need to do that and more. You need to

1 cross-check with multiple techniques. If you're
2 evaluating using six different methods from six
3 different perspectives and disciplines and you see
4 convergence, you're probably close to the mark. If all
5 six give you different answers, that should tell you
6 more work is needed. If you rely solely on one
7 technique, you'd never know you had a problem until it's
8 too late. That is not safe.

9 Next.

10 Additional uncertainty is injected into the
11 process of all of the life cycle stages just by the
12 limitation of knowledge. Examples of these knowledge
13 limitations include elements listed in this diagram,
14 such as simplifications, incompleteness, ambiguity, and
15 inconsistencies. All of these factors contribute to
16 uncertainty in the safety and reliability of civil
17 works. Many of these factors are omitted from current
18 risk analyses.

19 Next.

20 So this is a busy slide, but what I'm trying to
21 show here at the very high level is that we have
22 different ways to deal with different degrees of
23 uncertainty. We should have multiple tools in our
24 toolbox to tackle these different uncertainties with
25 different tools. As I'm sure you've heard before, if

1 all you have in your toolbox in the hammer -- is a
2 hammer, then everything becomes a nail.

3 Now, it turns out we don't need to imagine new
4 tools. We just need to pick up some tools that have
5 been cast to the side and include them in our toolbox.
6 High-reliability organizations and organizations with
7 mature, positive safety cultures have capabilities
8 across all four of these boxes.

9 I recently hosted a workshop at UC Berkeley on
10 safety culture and high-hazard dams and showcased three
11 different other operators across the United States as
12 positive role models in this area. These concepts are
13 not just ideas; they're in practice today.

14 Next.

15 Another challenge we face in the climate change
16 context is the lack of crispness in the problem.
17 Climate change is kind of a mess. It's ill-defined with
18 lots of stakeholder disagreements or no clear answers.
19 Very different, and on the opposite side of the
20 spectrum, are exercises. Us engineers love exercises.
21 They're bounded, structured, well-defined, and you can
22 use the existing formulas to find the answer. However,
23 we should be careful to avoid what we call E3 errors, or
24 solving the wrong problem precisely. Sometimes messy
25 problems have messy answers.

1 Next.

2 If I overlay the problem crispness onto the
3 different degrees of uncertainty, you'll see that
4 there's -- that where there's a lot of uncertainty,
5 you're often in mess land. Where there's very little
6 uncertainty, you're in exercise world. My point here is
7 that there's a spectrum of situations. If you treat
8 everything like an exercise, you're going to be
9 surprised. This is knowable and preventable.

10 Next.

11 To illustrate this with a cartoon, what I
12 typically hear people refer to as "residual risk" is a
13 little bit of vulnerability in a larger universe of
14 known calculated risk. A calculated risk is pretty
15 solid.

16 Next.

17 However, there is an underlying layer of
18 vulnerabilities that were believed to be possible but
19 not very credible, so they were discounted and ignored.

20 Next.

21 And it turns out the ignored vulnerability set
22 atop a whole set of what I call "unimagined risk," or
23 scenarios not even considered because of a lack of
24 imagination.

25 Next.

1 Governor Newsom was at Oroville on Tuesday and
2 commented on a number of these concepts that we talked
3 about this morning. I've included a QR code as well as
4 the URL to his YouTube video of the press conference.
5 What struck me in his talk was the statement, "The fact
6 that this facility shut down last August, that never
7 happened before, just never happened before. It was
8 imagined, but we never thought it would be realized in
9 our lifetime."

10 I think that stigma nicely illustrates the
11 challenge in front of us. The challenge is not
12 necessarily imagining more scenarios. The challenge is
13 overcoming our belief about the credibility of something
14 occurring. I might suggest, instead of focusing on what
15 we hope will happen, there's an opportunity for us to
16 prepare ourselves for a whole sweep of potential
17 scenarios. This approach builds in resilience and
18 sustainability, embraces integrity management, leverages
19 our workforce to be mindful of potential surprises, and
20 frees us from having to rely solely on the past to guide
21 our future.

22 Next.

23 This slide is just a recap of the strategies
24 and tools I briefly talked about this morning. I'm
25 happy to provide more information or detail on any one

1 of these topics and, honestly, sometimes it's hard to
2 get me to stop talking about them.

3 Next.

4 This is just another busy slide. But what I
5 wanted to leave you with is a mapping of the
6 high-reliability organization attributes and how they
7 can be deployed to confront a wide variety of
8 situations, i.e., more tools in the toolbox.

9 Next.

10 I'm also actively developing some online tools
11 to widen the imagination within organizations and to
12 leverage their workforce to help brainstorm what I call
13 "scenarios of concern." These scenarios can be
14 aggregated and used to shape future risk workshops, mock
15 emergency drills, and workforce trainings. This
16 resource will be available to all 16 critical
17 infrastructure categories as defined by Homeland
18 Security and will enable organizations to benchmark not
19 just within their own internal organization but across
20 their peer organizations and the same critical
21 infrastructure category, as well as across all of the
22 other critical infrastructure categories as well.

23 Next.

24 And, finally, we're working with a number of
25 the groups in the workshop here today to broaden our

1 imagination by looking at possible elevated release
2 scenarios from Oroville Dam and what potential
3 inundation impacts we may see downstream, so we can
4 better evaluate the need for potential enhanced
5 evacuation protocols and benefit costs associated with
6 increased flood conveyance.

7 Next.

8 And I'll end with this example, which is a very
9 real example, and it was a surprise. During the Golden
10 Gate Bridge 50th anniversary, the event organizers
11 closed the bridge to vehicular traffic and anticipated a
12 crowd of about 80,000 people to walk across the bridge.
13 In actuality, we had about 800,000 people show up and
14 cross the bridge, which actually physically stretched
15 the bridge due to the weight of all of the pedestrians.
16 So this leads me to my concluding thought for today:
17 Expect surprises. Thank you.

18 MR. SAFFOLD: Thank you, Dr. Storesund. Any
19 questions on that presentation? We've got five minutes
20 for Q and A from any attendees.

21 Okay. It looks like Robert Bateman has a
22 question. Go ahead, Robert.

23 MR. BATEMAN: My question is what work has been
24 done in the area of high releases from Oroville. And a
25 subsidiary question is, how do the releases measured,

1 and how the flow is measured. Because there seems to be
2 some ambiguity about what's happened in the past.

3 DR. STORESUND: Robert, you're asking me
4 questions I don't have answers to. I'll have to defer
5 to one of the State Water Project folks from the
6 department to answer that question.

7 MR. SAFFOLD: Yeah. John Yarbrough or someone
8 from the DWR side, is that something you want to comment
9 on?

10 MR. YARBROUGH: Sure. So the question was
11 what -- what studies have -- So DWR has done the
12 inundation studies that are done as part of the Cal OES
13 process, that they become part of the emergency action
14 plan. So that's what's --

15 MR. BATEMAN: Was that bent on to the question
16 on what work's been done on higher releases in the study
17 of high releases from the 180,000 to whatever. 150,000
18 is what I think the levees are -- are designed to
19 protect.

20 MR. YARBROUGH: No. Those are based on the
21 probable maximum flood, and so that goes into the
22 emergency action plan.

23 And then additionally, at the last OCAP
24 meeting, I think we discussed some of the other
25 inundation study work that had been done, looking at

1 different releases. Also talked about the different --
2 oh, what types of events that would lead to a release,
3 looking at some of the different pertinent structures,
4 if those had failures and did releases. So that was
5 what we were talking about at the last OCAP, that range
6 in different -- looking at different facilities and then
7 also looking at different levels of releases out of --
8 out of the facilities.

9 MR. BATEMAN: And there are studies showing the
10 results of those?

11 MR. YARBROUGH: Right. Right. That's what,
12 yeah, produces an inundation map.

13 MR. BATEMAN: The ones we saw around Oroville
14 were not convincing. The one on -- on 235,000 cubic
15 feet per second, when the inundation shown was less than
16 it was in '97 or '98, whichever it was. And that brings
17 in question about the measurement of the flows in '98 or
18 the accuracy of the map showing 225,000 feet per second.

19 MR. SAFFOLD: Why don't we take it over to Gary
20 Lippner at DWR.

21 MR. BATEMAN: Okay.

22 MR. MIERZWA: Hi. I want to introduce myself.
23 I'm one of the speakers who will be later today, and my
24 name is Mike Mierzwa. I'm a State Floodplain Manager.

25 It's a good question, Mr. Bateman, and I wanted

1 to cover that there are five things that we do from the
2 downstream perspective in a real-time basis, as well as
3 a planning basis, kind of leaning into Rune's
4 presentation to monitor sort of both the expected and
5 the unexpected.

6 The first, we do have the State plan of flood
7 control facility inspections, some of which Mr. Wylie
8 described. There are some other ones. I'm not going to
9 get into the detail right now.

10 Something we will be talking with the next
11 speaker, so I'm stealing a little bit of Cindy Matthews'
12 thunder from the National Weather Service, is the
13 24-hour, seven days a week, 365-day river forecast
14 operations. And then Wade talked a little bit about
15 some of the downstream channel capacity assessments.

16 I will just highlight out there that those
17 documentations are provided to the Central Valley Flood
18 Protection Board, both through the five-year updates in
19 regard to the protection plan I'm talking about, as well
20 as annual reports, so that there are public records as
21 to the capacity of the channels. And then there are a
22 number of activities that we do for the flood management
23 community to prepare for high water events, the most
24 important of which, of course, are where we bring
25 together a lot of the experts you have here today to go

1 through and provide the exercises that Rune was talking
2 about.

3 And, in those exercises, there are a class of
4 people called controllers, whose job is to literally go
5 through and throw wild cards out there so that everyone
6 who is running through the exercise prepare both for
7 what they should expect to see and then occasionally
8 something they wouldn't expect to see. And that kind of
9 leads to sort of the last of the foundational activities
10 we do, which is the flood emergency response planning.
11 A little bit of that you'll see in a couple of
12 presenters here, when Liz Bryson speaks to the nature of
13 the flood operation center and how we coordinate in
14 real-time.

15 Each of those topics can be described in more
16 depth, but I just wanted to let you know that from a
17 real-time basis, there are eyes on the ground at the
18 federal, the state, and the local levels, and
19 coordination between all of those entities before,
20 during, and after flood events. Thank you.

21 MR. SAFFOLD: Okay. We're going to go to Dave
22 Sarkisian, who has his hand raised also. Dave, if you
23 can be brief.

24 MR. SARKISIAN: Sure. Thank you. To get to
25 part of the question from Mr. Bateman about controlling

1 the releases, you know, in Oroville, we've got rating
2 curves for the radial gates. And so our operators, they
3 just need to know the water surface elevation of the
4 lake and the gate opening, and they can set a target
5 release.

6 Same thing at the diversion dam downstream.
7 And then we have the ability at the Fish Barrier Dam to
8 validate the release going down the river, as well as
9 other points down the river. And so all of that ties
10 together in real term, you know, operations to validate
11 that we're releasing what we want to release.

12 The other point about our modeling in 2017,
13 with that 100,000 cfs release, there were the high-water
14 mark mapping that was described before conducted, and
15 we've incorporated that into our model to help calibrate
16 the model. And so we feel, you know, pretty confident
17 that all of the results are accurate. You know, they're
18 not going to be perfect in match, but Mother Nature can
19 cause; and, of course, the river is a dynamic system,
20 but all of that being said, we think that we've got a
21 pretty solid model. Thank you.

22 MR. SAFFOLD: Thank you, David. We're going to
23 have to leave it there and keep rolling in terms of
24 presentations. I see a few hands raised, and we'll get
25 to those later.

1 Now we're going to turn it over to Cindy
2 Matthews with the National Weather Service.

3 MS. MATTHEWS: Good day. I am Cindy Matthews,
4 the Senior Service Hydrologist for the National Weather
5 Service Sacramento office, and today I'm going to talk
6 to you about forecasting and notification from the two
7 sister Weather Service offices that cover parts of Yuba
8 County. There are ten Weather Service offices that
9 cover all aspects of weather interfacing with the media,
10 the public, and the emergency managers. You happen to
11 be under the National Weather Service Sacramento office.
12 Our sister office is the California Nevada River
13 Forecast Center, where our hydrologic expertise for
14 California rivers and reservoirs resides in California.

15 At the Weather Service office, we share weather
16 information through a variety of means. Our partner
17 emails gives a three to five-days outlook for impactful
18 weather that will affect you. It's a great planning
19 purposes tool.

20 Our watch warning and advisory program is how
21 is the storms are arriving or the event is arriving that
22 we share information with the public. "Watch." "Heads
23 up." "Pay attention." "Be prepared." "Warning, it's
24 here." "It's happening." "Take action immediately to
25 save your life." That's where those emergency alert

1 system and wireless emergency alert messages come in,
2 and advisories for the nuisance-type flooding. But, if
3 you use your brain, you're not going to get hurt.

4 When we issue those products out to the public,
5 those go out through some of our traditional long-line
6 services, family of services, things of that sort. But,
7 more and more these days, we see that social media has a
8 better distribution network, so we're on Facebook and
9 Twitter. And the Weather Service has its web page;
10 weather.gov/sacramento. For life-threatening events, we
11 will activate the Emergency Alert System and the
12 Wireless Emergency Alert System on your cell phones.
13 And, of course, those partner emails are invaluable for
14 information coming in.

15 Our sister office, the California Nevada River
16 Forecast Center, has a much larger geographic domain,
17 but their expertise is a little narrower. They are the
18 hydrologic expertise within the agencies. They deal
19 with mainstem rivers, reservoir inflows, reservoir
20 releases, snow pack, water supply.

21 The experts at the River Forecast Center are
22 the ones who issue our deterministic river forecasts.
23 More than likely, the graphic on the right-hand portion
24 of this screen is what you have been looking for. And
25 looking at the left-hand five days is what happened on

1 the river at that location. The right-hand five days,
2 in green and pink, are what we are forecasting to happen
3 and what we think will be happening in the longer term.

4 So those hydrologic experts sit down every
5 morning; and they look at their observation networks,
6 what happened, how much rain fell overnight, what did
7 the river do. They look at the current conditions in
8 the basin, along with the graphic there. How dry is the
9 soil? How big is the snowpack? Is it melting off?
10 What are the reservoir levels? What are the streamflow
11 levels? Things of those sorts. All of those get
12 ingested into hydrologic models as a starting point for
13 what's going to happen today.

14 And, to the river forecast center, they look at
15 the forecast. This is where they generate how much rain
16 is going to fall within the next five days, in what time
17 period will it fall. What are the temperatures going to
18 be? What are the freezing levels going to be? If it's
19 going to snow down to 4,000 feet, we are not going to
20 see much in the way of inflows into Oroville Reservoir.
21 But, if the snow level is at 12,000 feet, we will see a
22 much larger inflow into the reservoir.

23 When that deterministic forecast is issued by
24 the River Forecast Center, it gets sent out in a
25 plethora of ways. Traditionally, the local Weather

1 Service office is how that gets out to the media, the
2 emergency managers, and to the public.
3 Weather.gov/sacramento is where you will find on the map
4 if there is a flood warning for Feather River at Gridley
5 a shape on the map for where the flooding will be
6 occurring.

7 Because of our close working relationship with
8 the Department of Water Resources, those deterministic
9 forecasts are shared immediately on the California Data
10 Exchange Center website, under the "River Forecast" tab.
11 And on the right-hand side of the page is the California
12 Nevada River Forecast Center page, cnrfc.noaa.gov. If
13 there is one website you should bookmark and be using
14 for river forecasts, it should be this website.

15 On that River Forecast Center web page, there
16 is a plethora of information. The right-hand side of
17 the map has a bunch of blue tabs. You should be
18 exploring those blue tabs to find the sort of
19 information that you're needing. Right up top, "Rivers
20 and Reservoirs," that's where you get your deterministic
21 forecast. That's also where you get your probabilistic
22 forecast or your ensemble forecast for forecast points
23 above the reservoirs. You could get your observed
24 precipitation in a picture value there, or how about the
25 forecast precipitation that went into the forecast for

1 today. Amazing amounts of information. Use that web
2 page.

3 I do want to point out something new since the
4 pandemic. At the bottom of their front web page, they
5 are posting on a daily basis their daily briefing. It's
6 their thought process and a couple of pictures and
7 graphics of what went into the forecasting of those
8 rivers and reservoirs as things progress.

9 In addition to our traditional distribution of
10 our weather products, there is a lot that happens behind
11 the scenes that's never seen by the media and the
12 public. We communicate often frequently, and sometimes
13 maybe a little much, without emergency managers, hourly,
14 daily, weekly. We're on the phone with them; we give
15 them videos; we text via private cell phones type stuff.
16 The Weather Service has an experimental INWS, where
17 those emergency managers can get text notifications when
18 we issue warnings so they don't have to go looking for
19 them. They will appear on their cell phones.

20 When Cal OES's state operation center is
21 activated, the Weather Service has a representative in
22 that EOC to help and share expertise. We can be
23 deployed to County EOCs. We give state and local
24 briefings. And, most importantly, the National Weather
25 Service office is available 24 hours a day, seven days a

1 week. We're there for response. We are there for
2 recovery for months afterward. We're there for
3 mitigation for months afterward, and we are always eager
4 to participate in exercise and preparedness to get us
5 all ready for the next emergency.

6 And I am available for questions if you have
7 any.

8 MR. SAFFOLD: Great. Any questions for --
9 specifically on that presentation for Cindy Matthews at
10 Weather Service? Okay. It looks like Patrick Porgan.

11 Patrick, go ahead. You've got one minute to
12 ask your question or make a comment. Thank you.

13 MR. PORGANS: Thank you. My comment is this:
14 I have a statement here from the Office of Emergency
15 Services during that 1997 flood, and it was Cindy
16 Matthews from the -- her office, talking about it would
17 be an anticipated 400,000 cfs coming into Oroville on
18 the 1st of January, and to expect -- they expect to have
19 releases of 240,000 cfs. But this information was not
20 available to the public. And, when they were supposed
21 to have a meeting down in Marysville about those
22 conditions, right here in this document it says DWR
23 never showed up. I'll provide anyone that wants a copy
24 of this particular report at any time.

25 MR. SAFFOLD: Cindy, any -- any response?

1 MS. MATTHEWS: What you are sharing, sir, is an
2 internal conversation that went on based on forecast
3 precipitation and forecast reservoir conditions. In
4 1997, you know that the precipitation that came from
5 that discussion stalled to the west of the Feather River
6 Basin, and that rain did not appear over the basin, thus
7 the runoff did not. So those conditions never showed up
8 in the Feather River Basins because the weather did not
9 show up and the rain did not.

10 MR. SAFFOLD: Okay. Any other questions for
11 Cindy Matthews at the National Weather Service? Any
12 other questions?

13 Okay. We're going to stop right here, and
14 we're going to do -- we'll call it a three-minute health
15 break, since we're running a little bit behind. So
16 we'll meet you all back here in three minutes, so 10:56
17 by my clock. We'll see you soon.

18 (Interruption in proceedings.)

19 MR. SAFFOLD: Thank you.

20 MS. BRYSON: Good morning. My name is Liz
21 Bryson, manager of the Flood Operations section with the
22 Department of Water Resources Division of Flood
23 Management. My presentation will cover the roles and
24 responsibilities of the state-federal Flood Operations
25 Center and briefly cover some of the work we do during a

1 high water or flood event.

2 The Department of Water Resources is the state
3 agency for flood emergency response, and the Flood
4 Operations Center's role is to coordinate DWR's response
5 to flooding statewide. The Flood Operations Center is
6 co-located with the National Weather Service to meet
7 their shared goals of protecting life and property.
8 Flooding can happen at any time of year, so DWR and the
9 National Weather Service coordinate year round, not just
10 when there are forecasted storms. Examples of the types
11 of events that the Flood Operations Center responds to
12 are high water and flooding, large or intense storms,
13 flooding caused by earthquakes and tsunamis, and dam
14 incidents. For dam incidents, the Flood Operations
15 Center's focus is on the potential downstream flooding
16 impacts.

17 The Flood Operations Center's primary function
18 is to manage DWR's overall flood emergency response,
19 which requires that we maintain year-round readiness.
20 Key items that the Flood Operations Center provides are
21 situational awareness to emergency managers, law
22 enforcement, and government agencies; information to the
23 media and public; technical and direct assistance to
24 support local levee maintaining agencies in counties.
25 Technical assistance is typically providing a flood

1 fight specialist who evaluate an area of concern and
2 recommend mitigation measures.

3 And direct assistance is typically providing
4 flood fight materials like sandbags and plastic sheeting
5 for performing mitigation work under our emergency
6 contracting authority. And the key function is
7 coordinating local and county requests for technical and
8 direct emergency assistance from the U.S. Army Corps of
9 Engineers under Public Law 8499. DWR is the only State
10 agency that can make this request. We have a memorandum
11 of understanding in place with the Army Corps of
12 Engineers describing the process and assistance that is
13 provided.

14 Some important items that the Flood Operations
15 Center does not do are declare emergencies or order
16 evacuations. We don't have the authority to do this, so
17 we leave that up to the locals. Also, the Flood
18 Operations Center does not permanently repair levees.
19 The assistance provided is intended to be a temporary
20 measure to get through the immediate threat of flooding.
21 There are other programs within DWR and the Division of
22 Flood Management that can assist with permanent repairs.

23 As part of that situational awareness I
24 mentioned, and in joint collaboration with the National
25 Weather Service's California Nevada River Forecast

1 Center, DWR provides year-round daily forecasts of
2 reservoir inflows, river flows, and water levels
3 throughout California. We also issue river and tide
4 forecasts for over 260 locations in California, parts of
5 Nevada, and parts of Oregon, and the Flood Operations
6 Center uses those forecasts issued by the California
7 Nevada River Forecast Center to inform our partner
8 agencies, the media, and the public of current
9 conditions and potential impacts and also to make
10 operational decisions.

11 Other users of this information include
12 cooperating agencies like the Army Corps of Engineers,
13 the U.S. Bureau of Reclamation, and Yuba Water Agency;
14 local levee maintaining agencies along the Yuba and
15 Feather Rivers; as well as State and county offices of
16 emergency services, the media, and the public.

17 The Flood Operations Center also uses this
18 official forecast information to make high water
19 notification calls to our flood emergency response
20 partners, which include local, city, county, state, and
21 federal agencies. These high water notification calls
22 are not evacuation orders but, rather, information that
23 is used by these agencies to make operational decisions
24 and, in some cases, take action.

25 As mentioned earlier, during a dam emergency,

1 the Flood Operations Center's focus is on the potential
2 flooding impacts downstream with that dam. This
3 responsibility applies to all dams across the state.
4 The Flood Operations Center notifies and informs
5 downstream emergency response agencies of current
6 conditions and potential impacts, providing assistance
7 and coordination as needed. Again, the Flood Operations
8 Center does not order evacuations, but local agencies
9 use this information to make decisions.

10 The Flood Operations Center also participates
11 in regular meetings and exercises to improve
12 communication and coordination year round so we are all
13 better prepared to respond during an emergency. We
14 follow the belief that in emergency response, it is
15 better to make a friend before you need a friend.

16 That is all I have today. Here is the contact
17 information for the Flood Operations Center, as well as
18 links to the California Data Exchange Center and the
19 California Nevada River Forecast Center. Thank you.

20 MR. SAFFOLD: Great. So we'll go to Q and A
21 now. Any questions for Elizabeth Bryson or her
22 presentation? We'll give it one more minute here. Any
23 questions for Elizabeth Bryson? Okay. Let's keep
24 rolling, then, so we have time during the public comment
25 period for lots of questions and comments.

1 Next, we're going to go over to Casey Meredith,
2 with the Office of Emergency Services.

3 MR. MEREDITH: Hello. My name is Casey
4 Meredith. I'm with the California Governor's Office of
5 Emergency Services Dam Safety Planning division, and I'm
6 here today discuss EAPs, or emergency action plans.

7 The purpose of our program is to review and
8 improve dam owners' EAPs in order to strengthen
9 California's preparedness and planning for dam
10 incidents. In 2017, legislation was passed in the Water
11 Code and the Government Code regarding EAPs. Water Code
12 Section 6160 and 6161 state that dam owners of
13 State-regulated, jurisdictional dams must submit an EAP
14 to Cal OES if a dam is classified as extremely high,
15 high, or significant. Low-hazard dams do not have this
16 requirement.

17 Each EAP must have an approved Department of
18 Water Resources inundation map. It's now 2022, so all
19 deadlines for EAPs have now passed and must have been
20 submitted to Cal OES. Regarding Cal OES review
21 timelines, we have 60 days to review an initial EAP that
22 is submitted to us. If it's returned for revisions and
23 then submitted back to us, we have 30 days to review
24 that revision. Dam owners must update their EAP at a
25 minimum of every ten years.

1 Government Code Section 8589.5 says that local
2 public safety agencies must be consulted in the EAP
3 development process. The EAP must adhere to FEMA 64,
4 Federal Guidelines for Dam Safety. There are six
5 elements of an EAP that must be included for approval.

6 One, our emergency notification flowcharts.
7 Two, our responsibilities as the dam owner and
8 responding agencies and a description of what they are
9 responsible for. Three are activities the dam owner can
10 conduct to prepare for emergencies. Four, each EAP is
11 required to have an inundation map, and these maps are
12 crucial in showing which jurisdictions would be
13 effective in a dam emergency. Five, a description of
14 the response process once a dam safety incident has
15 begun. And, lastly, any additional information should
16 be included in the appendices.

17 Examples of information for the appendices
18 would include plans for updating and distributing the
19 EAP, forms and log sheets, site-specific concerns, and
20 the California State Warning Center Dam Incident Form.
21 Lastly, every dam owner is required to conduct an EAP
22 notification exercise with local public safety agencies
23 annually.

24 The purpose of an EAP is to protect lives and
25 reduce property damage. An EAP identifies potential

1 emergency conditions and hazards for a dam. The EAP
2 should describe how each emergency level applies to that
3 dam and contain information assisting the dam owner
4 during an emergency.

5 Cal OES requires dam owners to reach out to
6 every jurisdiction who will be affected by a dam
7 incident. At a minimum, for the local level, this is
8 every county and/or city law enforcement, fire
9 department, and OES. At the state and federal level, we
10 require input from National Weather Service, DWR's
11 Division of Dam Safety, the Flood Operations Center, and
12 the Cal OES Warning Center.

13 This outreach can be done through email, phone
14 calls, group meetings, one-on-one consultations,
15 whatever best fits the requirements for the dam. It is
16 important for dam owners to start the outreach process
17 early, as it is time consuming. It's also good to have
18 the process started to share with the agency so there is
19 something to develop together.

20 Notification flowcharts are one of the main
21 required elements in an EAP. These charts identify who
22 needs to be contacted in a dam safety emergency, who is
23 doing the contacting, and the best order to conduct the
24 notifications. Sometimes there will be up to four
25 notification flowcharts per dam, based on the emergency

1 level.

2 Here is an example of a notification flowchart
3 in our Cal OES example EAP for the fictional Santa Luisa
4 Dam. This chart is in a tree format, and each cell has
5 the individual who will be contacted and a 24-hour
6 contact number. You will notice the dam owner does not
7 have to contact each agency. After they have contacted
8 the Santa Luisa County Sheriff's Department, that agency
9 will make further contact to speed the process along.
10 This is quite common but varies among jurisdictions. No
11 two places are the same.

12 That concludes my presentation on EAPs. Please
13 let me know if you have any questions.

14 MR. SAFFOLD: Great. Let's open it up for Q
15 and A for Casey Meredith at OES.

16 It looks like Ron Stork has his hand raised.
17 Ron, go ahead.

18 MR. STORK: Hopefully this is a quick question.
19 Are the emergency action plans or the dam safety --
20 sorry -- the dam failure inundation maps or both --
21 either or both, are they available to the public? And,
22 if there is some Water Code restriction or Government
23 Code restriction on distribution or availability to the
24 public that was passed in recent legislation, what was
25 the governor's position on that bill that was -- may

1 have been signed by him?

2 MR. MEREDITH: Hi. Thank you for the question.
3 I'll let somebody from DWR answer about the inundation
4 maps. But, as far as the EAPs go, some of them are
5 restricted. And it's kind of by the dam owner about
6 what can be released to the public, and an outreach to
7 the dam owner can answer that question. But each dam
8 owner has a different justification for that.

9 MR. STORK: I think they're widely restricted.

10 MR. MEREDITH: Yeah.

11 MR. LIPPNER: Then, on the second question,
12 Ariya has his hand up and will be able to speak on
13 behalf of the department's dam safety purpose. Thank
14 you, Ariya.

15 MR. BALAKRISHNAN: Thank you. So, in the
16 Division of Safety of Dams, we have as occurred by
17 California Water Code. We published the approved
18 inundation maps on our website. Those are for sunny day
19 inundation map in most of those dams, and sometimes they
20 have floodplain used inundation maps.

21 Whatever we published, the information we
22 received from the dam owner when they submitted the
23 inundation map, and we publish those after we approve
24 those maps. You can see those maps by going into
25 California Division of Safety of Dams' website and

1 clicking into "Inundation Maps" tab. That will take you
2 to the maps published on the website.

3 MR. STORK: Excellent. Thank you.

4 MR. YARBROUGH: Hey, Nick. This is John
5 Yarbrough. Maybe I'll just add real quickly that our --
6 Ron, at our last OCAP meeting, we also had a brief
7 discussion on the inundation maps, emergency action
8 plans. And one of the things we talked about at that
9 meeting was the reason why the emergency action plans,
10 why those are not publicly available is they're really
11 made to be an operational document they use in
12 emergencies, so a big part of that is communication. So
13 it has contact information for -- you know, for the
14 sheriffs, for their deputies, for -- you know, all of
15 that direct contact information type of stuff that you
16 really don't want out in the public.

17 The second reason why the emergency action
18 plans are not made public is if -- if someone was
19 wanting to disrupt the response to an emergency, this
20 would be the game plan for what all of the different
21 agencies will be doing, so that's the second reason why
22 those documents are not -- not made publicly available.
23 But, again, the inundation maps, those are available.

24 MR. SAFFOLD: All right. Thanks, John.

25 Mike Mierzwa, let's go to you real quick.

1 MR. MIERZWA: Thanks. I just wanted to add one
2 thing that was included by Casey's presentation, and
3 Ariya talked about it briefly. But it's a point that
4 Casey's predecessor, Jose Lara, and I often found people
5 didn't understand is the maps that the State releases
6 for dam inundation maps, which include Oroville, are for
7 only State-regulated dams, so federal facilities are not
8 necessarily provided out there. So I just wanted you to
9 know, in this instance you're covered, but not always.

10 MR. SAFFOLD: Great. Thanks, Mike. Okay.

11 We're going to turn to Patrick Porgans. It
12 looks like he has a question. Go ahead, Patrick.

13 MR. PORGANS: Thank you. Yes. I understand
14 that the emergency action plans are not available to the
15 public which, you know, unfortunately, a lot of the
16 times, when there is an emergency taking place, such as
17 the 2017 and the 1997 Flood, people were given only a
18 matter of hours to evacuate.

19 Now, on that issue with regards to the
20 inundation map that EWR put together was under a sunny
21 day type of scenario. I think people need to look at
22 the USGS inundation map, which is widely different and
23 shows that, you know, with an ARkStorm and the dam
24 intact, that there be 1.5 million people that will be
25 evacuated, 725 billion dollars' worth the assets are in

1 harm's way, and over 200,000 people are going to have to
2 be permanently located.

3 DWR is required under FERC to provide
4 information as to what the level of dangers are
5 associated with, whether it be an ARkStorm or that
6 breach, and we don't have that data yet. So I'm going
7 to hold off now because I don't want to take too much
8 time. I do have one more point to make later.

9 MR. SAFFOLD: Thank you, Patrick. I appreciate
10 that. DWR, any -- any response?

11 MR. MIERZWA: This is Mike Mierzwa again from
12 the Department of Water Resources. Mike Anderson might
13 be able to help me out here on the old ARkStorm.

14 I just wanted to point out that there is a new
15 ARkStorm 2 effort that the department is working a
16 partnership with the USGS and other partners to develop
17 the data. But, in the older ARkStorm, one of the issues
18 was the information that was provided was based on
19 composites. This is the standard of practice. It's
20 something that we have also done for our flood risk
21 notification flyers.

22 We actually look at what we call "composite
23 floodplains." So we stitch together multiple unlikely
24 scenarios, going back to Rune's presentation, to get a
25 maximum area of effect so we can have the greatest

1 awareness and greatest amount of participation and
2 planning in event of the emergency. But it doesn't
3 necessarily represent what Dr. Storesund would call one
4 of the more likely scenarios. So it's really to
5 exercise us in how we're thinking.

6 I believe that might be the case for the old
7 ARkStorm, but I -- I could be off, so I'll let Mike
8 correct me if he's here. Over.

9 DR. ANDERSON: I'm here. Hey, everybody. So
10 the original ARkStorm, we did not have the resources to
11 engage the National Weather Service to run through a
12 forecasting and inundation modeling exercise. Instead,
13 it took a frequency-based approximation; in other words,
14 look at where the constructed storm sat in the frequency
15 world, and then pulled the equivalent or interpolated
16 return period flood maps that were available from the
17 flood mapping program at the time.

18 So they were -- Our maps that were already
19 available in part because there wasn't the resources to
20 create something new. Working on a really interesting
21 component with the ARkStorm 2.0, in looking at -- Right
22 now, we're working on the scenario of construction,
23 which is the storm scenario. The next step is to look
24 at how that storm scenario manifests in terms of how
25 often.

1 For that, they are planning to engage Oak Ridge
2 National Laboratory, which has funding from -- The
3 Airforce developed a national scale inundation map. And
4 this will be the first hydraulic analysis that has been
5 done with any ARkStorm scenario, so that will eventually
6 fold in and will build slowly.

7 Again, there's no defined resourcing for the
8 ARkStorm beyond a very small amount of money that the
9 USGS has offered each year, somewhere in the
10 neighborhood of only \$60,000. So we're working with
11 them, looking at opportunities where the State can help
12 the process along. So we've helped with some of the
13 funding from the construction of that storm scenario,
14 both present and a climate change one, which then we'll
15 be able to use in our flood exercises. We will work
16 with Mr. Mierzwa's team there with the floodplain group
17 so that they can learn the tools that Oak Ridge National
18 Lab has at the national scale and see what can be
19 leveraged and brought into the program here at the State
20 scale. So a lot of work going on in that area, and I'm
21 really looking forward to seeing how things can be
22 improved upon past efforts.

23 MR. SAFFOLD: Great. Thank you, Dr. Anderson.

24 Okay. We're going to keep it rolling and go to
25 the next presentation from Mike Mierzwa at DWR.

1 MR. MIERZWA: Hello. My name is Michael
2 Mierzwa, and I am California's State Floodplain Manager.
3 Today I will briefly introduce the general approach we
4 use to make investments to buy down flood risk.

5 The image you see on this slide is a cover of
6 the 2017 Central Valley Flood Protection Plan. This
7 plan is an example of a large-scale flood risk
8 assessment and investment strategy. I'll talk more
9 about that later.

10 I will cover four topics today. First, I will
11 share how we buy down risk. Second, I will provide an
12 overview of the Central Valley Flood Protection Plan,
13 a.k.a. "The Plan." Next, I will discuss how the State
14 uses the Central Valley Flood Protection Plan to inform,
15 not decide, future investments. And, finally, I will
16 show one example of a flood risk assessment from the
17 plan.

18 This U.S. Army Corps of Engineers graphic is a
19 great example of how we can buy down flood risk. The
20 most important takeaway is there is no single action
21 that you can take to reduce risk; in other words, there
22 is no silver bullet. Instead, managing risk involves
23 three components. One, understanding the risk. Two,
24 preparing and planning to manage the risk. And, three,
25 having the capacity to respond when something big or

1 something unexpected and small happens, a.k.a. managing
2 the residual risk. The basic idea is that it takes a
3 portfolio of actions; and, with each investment in an
4 action, you can only buy down a portion or increment of
5 risk.

6 The first step is understanding risk, which is
7 shown in red, and you've seen some of that today from
8 the other speakers. This involves extensive mapping,
9 data collection, computer modeling, and economic
10 analysis. I'll talk more about that last part later.
11 Once we have a basic understanding of risk, we then
12 invest in a suite of actions, shown in blue. The
13 Orville Citizen Advisory Commission has featured
14 presentations on reservoir storage operations and using
15 forecasts to inform these operations. I won't repeat
16 that or go into detail on that issue here today.

17 As a State Floodplain Manager, I am responsible
18 for some of the other actions you see in blue. First,
19 the floodplain management and land use planning aspects.
20 Second, insurance. And, three, on the far right, flood
21 infrastructure development. Most operations and
22 maintenance responsibilities are done at the local level
23 due to the need to have boots on the ground; but there
24 are some exceptions for large scale system features,
25 where DWR has some responsibility here. Finally, the

1 last step shown in green is managing the residual risk.

2 Many of the presentations you've seen today
3 focused on collecting and sharing information during
4 emergencies, during after emergencies. My own team is
5 used to help provide, interpret a forecast, and
6 facilitate communications at the federal, state, and
7 local levels. The reason we focus only on response and
8 recovery today is, despite our best intentions, there
9 will always be some level of risk, especially in light
10 of population growth, development in floodplains, and
11 climate change.

12 Given the same pressures of changing flood
13 risk, the California legislature recognized the need for
14 the State to develop a strategic plan to manage risk.
15 Back in 2008, with the Central Valley flood Protection
16 Act, also known as Senate Bill 5, the law requires that
17 DWR prepare an update that states vision for managing
18 flood risks in California's Central Valley once every
19 five years. The plan covers a land area the size of
20 Florida or England and protects one of the highest net
21 agricultural production regions in the United States.

22 Over 1600 miles of levees protect over 1.3
23 million people who live in floodplains, and many more
24 work or depend on these floodplains. The graphic to the
25 right shows the rivers and bypasses of the northern

1 portion of the plan, including the project levees shown
2 in red, better known as State-funded flood control
3 levees. Discussions about the plan are held monthly at
4 the public Central Valley Flood Protection Board
5 meetings, and local agencies responsible for land use,
6 levee construction, and levee maintenance have been
7 critical to development of this plan.

8 While the value to the flood management
9 community lies in the discussions made to develop the
10 plan updates, the plan is really a blueprint for how
11 much funding we need at the federal, the state, and the
12 local levels to buy down flood risk. In 2017, the plan
13 estimated that together, we need 17 to 21 billion
14 dollars over the next 30 years. This investment
15 includes funding from the state, federal, and local
16 entities responsible for maintaining and building flood
17 defense systems or flood risk reduction actions, as
18 previously shown in the stair-step risk graphic.

19 The investment need is also divided into
20 ongoing annual needs and one-time capital investment
21 needs. These numbers help the legislature understand
22 the short-term and long-term needs and abilities of the
23 flood management community to buy down risk. These
24 investment numbers were based on detailed risk
25 assessments.

1 The graphic you are looking at is an example of
2 one of these risk assessments of life safety analysis,
3 using computer models and approaches developed by the
4 U.S. Army Corps of Engineers and FEMA. My team
5 accounted for extreme events, levee performance, and
6 emergency response, both warning and evacuation, to
7 estimate, on average, how many lives might be lost. My
8 team then simulated the plan recommendations such as
9 levee improvements and better land use planning, to show
10 that by working together, we can reduce the future
11 expected life loss.

12 The first part of the blue line represents the
13 effectiveness of actions already taken to reduce risks
14 between 2007 and 2017. The second part of the blue line
15 shows that if we do not increase investments, that
16 climate change and development in floodplains will
17 slowly result in increased life safety risk. In
18 contrast, the green line shows that if we continue to
19 increase investments, we can slow the rate that residual
20 risk increases. However, even with aggressive
21 investments, climate change and population growth will
22 still result in an increase in residual risk.

23 People ask me why can't we change the direction
24 of this trend. The short answer is, we've been
25 investing in the low-cost options. But, with each

1 five-year update of the plan, it is possible that new
2 approaches of reducing risk might change the trend.

3 I would like to encourage you to join the
4 monthly discussions related to this plan at the Central
5 Valley Flood Protection Board's public meetings. Thank
6 you.

7 MR. SAFFOLD: Great. Let's open it up for
8 questions for Mike Mierzwa.

9 Okay. Patrick Porgan, go for it.

10 MR. PORGANS: Yes. I was involved in the
11 formulation of that plan, and I had to withdraw my
12 support because there was three primary mitigation
13 measures that could have relieved of the downstream
14 pressures on those levees.

15 As he indicated in his graph, showing that they
16 were closed, above the Yuba would be at 180,000, with a
17 release of 150,000 at Oroville and 300,000 just above
18 the confluence of the Yuba. The 1997 Flood, the flood
19 flows with the 167,000 coming out of Oroville at -- at
20 the -- above the confluence of the Yuba was close to
21 200,000. That's almost 200,000 cfs above the 180. And,
22 below the Yuba, it was about 365 to 370,000 cubic feet a
23 second. It overwhelmed the entire Sacramento flood
24 control system, which has the capacity of 600,000 cfs.

25 What I'm saying here is we needed to have the

1 bypass system to take some of those flows and pressures
2 off the downstream. They took that out at the last
3 minute. I said make more room at the Oroville reservoir
4 for flood control space, especially in view of the
5 climate changes that we're experiencing. That was the
6 2017 update. And then I also said to them that we need
7 to remove certain materials that are obstructing flows
8 in the river with other agencies that brought DWR's
9 attention, which it has failed to do. Thank you.

10 MR. SAFFOLD: Thank you, Patrick.

11 Mike, do you want to jump in there?

12 MR. MIERZWA: Yeah, briefly. I want to add
13 to -- I do understand what Patrick is referring to, and
14 one of the things I wanted to point out there is the
15 Central Valley Flood Protection Plan of 2017 set a
16 30-year horizon. And part of the justification on that
17 is, is when we're going through and calculating what we
18 want to do, we have limited capacity at the federal, the
19 state, and particularly the local level financially and
20 through experts to move into a lot of the large scale
21 construction projects, including the bypasses that he
22 was speaking, which -- which the plan does embrace.

23 And so we adopted both in the 2012 Flood Plan
24 and carried forth that recommendation from the 2017
25 plan. They need to go through and develop the capacity

1 in the downstream reaches of that flood control system
2 for the Sacramento River Basin first. And so if you go
3 conceptually back to my graphic, you will see that we
4 have been focusing on working right now, in the near
5 term, in the Yolo Bypass.

6 And there has been a lot of success through the
7 partnership that we've had with regional agencies, and
8 I'll mention one name. The Sacramento Area Flood
9 Control Agency has brought Solano, Yolo, and Sacramento
10 Counties to the table to help us in that project. But
11 there will be opportunities through each five-year cycle
12 for us to reassess those channel capacities in a
13 document that we call our State Plan of Flood Control
14 Descriptive Document, and we have a second document
15 called the Flood Systems Status Report Document that
16 account for the performance of the -- the anticipated
17 performance of the levees, as well as the channel
18 capacities, using information coming from Wade's team,
19 and then allow the department's planners to go through
20 and look at what they actually think can be done from
21 both a structural and a nonstructural perspective out
22 there.

23 So I really do appreciate Patrick listing out
24 the importance that bypasses have. That is the
25 foundational concept of what plain management is,

1 literally getting the water away from people and also
2 keeping people away from the water, and it does both of
3 those at the same time. So it's something that I just
4 wanted to reassure you, the State hasn't lost vision.
5 Just because it's not in the immediate versions of the
6 plan out there doesn't mean it's something that won't be
7 carried forth in the future.

8 MR. SAFFOLD: Let's go over to Rune Storesund.

9 MR. STORESUND: Hey, Mike. Great overview. Is
10 it possible to go back one slide, James?

11 MR. PEARCE: Yeah.

12 MR. STORESUND: Mike, I guess what caught my
13 eye -- And I just wanted to get a little more
14 information. The green line at the bottom, from 2017 to
15 2067, the number there is 22 and then 43. Is that --
16 That's your anticipated loss of life, 22 people in 2017
17 and 43 in 2067? Can you talk a little bit more about
18 the assumptions that go into that? That seems to me
19 like one of those knowable, preventable types of things.
20 So, you know, what -- what sort of elements prevent you
21 from getting those numbers down to closer to zero?

22 MR. MIERZWA: Thanks, Rune. And that's
23 definitely the end goal. That's -- Our desire is to, if
24 not get to zero, definitely get that trend in the green
25 line going down as opposed to slightly up.

1 So I want to first talk about that 66 and 22.
2 We are seeing that in 2017, we estimated that if we just
3 stopped investments, that we would lose on average 66
4 lives per year. That number is really scary because it
5 doesn't mean that you're losing just 66 lives per year.

6 We all know that the major floods have a
7 recurrence period that's roughly about a decade within
8 both the Sacramento and San Joaquin Basins. So that
9 means, about once every ten years, we're having
10 potential for a catastrophic failure with a number much
11 larger than that's averaged down. That drop of 44 lives
12 per year is basically the effectiveness of the
13 coordination programs that Cindy and Liz were talking
14 about through the Weather Service and the Flood
15 Operations Center just to get evacuations and warnings
16 out.

17 Now, the second half of your question is, is
18 what can we go to change that number from 22 to
19 something lower, not 43, within both the Sacramento and
20 San Joaquin Basins. And those are some of the harder
21 investments that we start getting into, which come,
22 really, into a lot of the floodplain management
23 principals and actions. It's not just about structural
24 fixes and levees, because they aren't always a perfect
25 situation.

1 Your own graphic showed that over time, just
2 like people, levees get old and they need
3 rehabilitation; and that costs time and money, which
4 tends to be a very difficult political conversation.
5 Whereas, if we go through and start elevating buildings,
6 if we start flood-prepping buildings, if we don't build
7 in some of the greatest risk areas, some of our deeper
8 floodplains, we believe that we can actually change that
9 trend to approach zero.

10 MR. SAFFOLD: Great. Okay. Why don't we move
11 on to open public comment. And there have been some
12 great questions and comments throughout the day, but I
13 just want to create the last 25 or 30 minutes or so here
14 for public comment and give everyone two minutes, if
15 anyone wants to say something now. So let's just open
16 it up. Any -- Anyone in the queue?

17 Okay. Back to Patrick. Let's do Patrick, and
18 then we'll go to Mr. Stork.

19 MR. PORGANS: There's two things. I want to
20 make it clear that I appreciate all of the efforts that
21 have been undertaken thus far by the various agencies
22 involved to reduce the risk of, you know, damages and
23 loss of life.

24 Have been on that river since 1985, monitoring
25 the operation of Oroville Reservoir during flood season.

1 EWR has the propensity to store more water in the
2 reservoir during the flood season when it's allowable,
3 and I have all of the documents to substantiate that
4 from the U.S. Army Corps of Engineers.

5 The second thing I want to make clear is that
6 although the Corps does establish the regulations, once
7 they do that, monitoring and compliance responsibility
8 rests with the Department of Water Resources, as the
9 Department of Water Resources has an inherent conflict
10 of interest. It's a water purveyor. And, at the same
11 time, as it was pointed out earlier, it is involved in
12 providing flood protection.

13 So, the until we get to the bottom line here --
14 and the bottom line is that when they cut off the
15 natural bypasses there on the Feather River near the San
16 Marino back bay, that water used to go across the basin,
17 flood the entire base center basin, and even broke a
18 levee on the west side of the Sacramento River. I have
19 all of that data. So what we're talking about here is
20 that until we can find out what the impacts are going to
21 be from the ARkStorm in relationship to the inundation
22 levels we are operating in a vacuum. So we need to get
23 at that, and I mean -- and I'm saying soon. I trust
24 USGS's data more than anyone else's. Thank you.

25 MR. SAFFOLD: Great. Thank you for your

1 question. I'm going to go to Mike Mierzwa.

2 MR. MIERZWA: Just wanted to respond on the
3 second half of your question, which is the perception of
4 the conflict of interest in decision-making on behalf of
5 the State for the Department of Water Resources.

6 There is another entity that I consider to be
7 very important, particularly within the Central Valley,
8 which is the Central Valley Flood Protection Board.
9 When it comes to the transparency of things related to
10 our data collection as well as our flood risk reduction
11 improvements, that infrastructure I talked about, in the
12 Central Valley, we go through the monthly public
13 meetings of the Central Valley Flood Protection Board,
14 where their number is seven, I believe,
15 governor-appointed board members to provide that
16 oversight of transparency.

17 The second thing I wanted to point out with
18 respect to the mapping of the floodplains as well as the
19 emergency response coordination, we do have regulations
20 from other federal entities, and those partners are here
21 today. That's FEMA, the Federal Emergency Management
22 Agency. So we're following in a compliance with federal
23 guidelines, as well as laws, when we're going through,
24 and those interactions -- And I'll come back to that in
25 a sec.

1 And then, of course, the Weather Service.
2 California is the only state where you actually have
3 state employees who are actually issuing those federal
4 forecasts at the large river forecast level, and that is
5 because the State of California and the federal
6 government have an MOU that dates back to the 1955 Flood
7 on the Feather River. Both the federal government and
8 the State recognize the need for collaboration and
9 issuing one unified voice as to what those forecasts
10 are. And the benefit to the people is is that there is
11 a larger pool of resources issuing forecasts within this
12 particular area.

13 Now, with respect to FEMA, I'm a big champion.
14 FEMA's process is very slow, but Eric talked a little
15 bit about this -- is that in going through and
16 periodically updating the flood inundation maps, they do
17 bring back the local floodplain managers. And there are
18 over 530 communities in the state of California, and
19 FEMA literally provides money from my team to go through
20 and find those interactions. That's another thing that
21 you're not seeing in the pre-event risk assessment
22 planning world is that we wear both a state hat. But
23 then, per our MOU and contract, my team is to really
24 take instructions also from FEMA. Thank you.

25 MR. SAFFOLD: Okay. We're going to go to

1 Mr. Stork and then Mr. Bateman. Ron, do you want to go?

2 MR. STORK: Sure do. I'm not sure if I can
3 keep it to two minutes, but I'll give it a try.

4 The conversation early on, I think, reflects
5 the failures of the ad hoc group. There are three
6 members of the ad hoc group on this call, at least. We
7 didn't have sufficient time for mutual understanding.
8 We didn't have the relevant conversations that were
9 critical to have. And there were deferred decisions or
10 deferred or, perhaps, unavailable information from the
11 department that caused the ad hoc to -- to fail in some
12 of its goals.

13 Also, I'd just like to comment that the flood
14 manuals are generally unavailable, and they are helpful
15 in understanding these things. And, also, that lack of
16 access to FIRO development conversations by members of
17 the old ad hoc or members of the interested public makes
18 these conversations difficult, as we're having today,
19 in -- in mutual understanding and relevant
20 conversations.

21 I want to thank John Yarbrough for clarifying
22 that the reservoir design flood and Standard Project
23 Flood is meant to control or make a regulated release of
24 150,000 cfs. That's designing for 180,000 cfs at the
25 confluence of the Yuba. But the reservoir design flood,

1 as it currently exists, does not use the emergency
2 auxiliary spillway in the interim operations, but who
3 knows what they'll be in the future. And the use of the
4 reservoir design flood -- sorry -- the auxiliary
5 spillway is pretty dangerous and causes a lot of
6 disruption of flood operations.

7 And that -- that status up there is pretty
8 significant with regard to the confidence of the
9 facility in regulating the existing reservoir design
10 flood, though not currently, because the interim
11 operations don't envision the need to use that. So,
12 hopefully, this conversation can move forward and have
13 more time and set aside for deeper conversations. Thank
14 you.

15 MR. SAFFOLD: Thank you, Ron. Appreciate your
16 comments. I just want to open up space, if anyone from
17 any of the panelists or DWR wants to respond to that.

18 Okay. Let's move on to Mr. Bateman.
19 Mr. Bateman, go ahead.

20 MR. BATEMAN: Yes. I got into this in 1997,
21 when our home was evacuated for the second time --
22 sorry, the first time, and then there was problems which
23 don't get to be fixed in terms of the levees in
24 Oroville. But, it seems to me, everything I've heard
25 suggests -- and everything I've heard today that we are

1 going to have an emergency of some sort when the water
2 control from Oroville Dam is -- is uncontrolled -- the
3 water coming out of Oroville Dam is uncontrolled. And
4 one of the reasons of that will be maintenance. And as
5 Ron was mentioning, the CNA process had certain
6 shortcomings and has not really gotten -- we do not have
7 a lot of confidence in the results. And Rune Storesund
8 gave a presentation mentioning quite a few of the
9 problems, and certainly those need to be addressed if it
10 can be. It's not just the weather changing. It's the
11 fact that the dam is not being properly maintained over
12 the years. That needs to be addressed.

13 Secondly, in terms of the opening up the levees
14 and having flood releases, why is -- the Oroville
15 Wildlife Area has not been opened up? There seems to be
16 every reason why it should be, and it's a very
17 inexpensive fix. And the DWR had a report several years
18 ago which showed that it would be highly beneficial, and
19 then nothing has happened. That's my comments.

20 MR. SAFFOLD: Thank you, Mr. Bateman.

21 Any response from DWR around the facilities?
22 Go ahead, Mike.

23 MR. MIERZWA: Yeah. And I'm going to work
24 backwards, and I'll do two of those.

25 First, SBFC, the Sutter Butte Flood Control

1 Agency, has been working with the Department of Water
2 Resources on a project that has been developed on that
3 particular area with the Oroville Wildlife Area Stage
4 Reduction Project, so it is something that has been
5 included in the blueprint of the Central Valley Flood
6 Protection Plan. These things, with experience, sadly
7 take years to go through and conceptualize and move
8 forward. So I appreciate the comment; and I would
9 encourage you to keep bringing it up, put pressure on
10 there.

11 MR. BATEMAN: Certainly.

12 MR. MIERZWA: Great. We'll keep the eye on the
13 ball.

14 The second thing on the maintenance issues,
15 that is a really big hot topic, too, that was covered in
16 the Central Valley Flood Protection Plan series. I'm
17 only going to speak to the levee maintenance issues.

18 When my team went through in 2017 and worked
19 with local agencies on what funding they have available
20 to go through and provide what maintenance to have and
21 then work with what the current standards are. So what,
22 basically, the state and federal government would expect
23 to go through and do for maintenance, we found that
24 basically, there was a multi-hundred-million-dollar
25 deficiency. And, in the graphic that I provided on the

1 investment strategy, you will see, in 2017, we estimated
2 that there was an annual need of 300 million dollars per
3 year for both the Sacramento and San Joaquin Basins to
4 provide maintenance.

5 And, getting back to Rune's question earlier of
6 what are the things that we can do to reduce risk, we
7 need to continue to go through and provide more funding
8 to go through to do other maintenance. Now, with that,
9 I'm happy to say that the administrations and the
10 legislature recognized that. And, after the adoption of
11 the 2017 Central Valley Flood Protection Plan, the State
12 has been successful in increasing funds for maintenance
13 activities. And some of that immediate benefit has
14 already happened. Some of it will be forthcoming in the
15 future through local assistance programs the State will
16 be granting.

17 And I want to also acknowledge that
18 particularly within your area -- I'm going to give a
19 shout-out to Sutter County -- the communities have been
20 going through and successfully passing increases to
21 their assessments, which means the message of flood risk
22 is well understood within your area of the state.
23 People who have lived there for a long time and
24 experience these floods do understand the importance of
25 maintenance, and we have been seeing, particularly

1 within your area, that that local cost share definitely
2 has been going up. And that, too, was reflected in our
3 updates for the Central Valley flood Protection Plan.

4 We provide, every cycle, an estimate of what
5 that funding cost share need is between federal, state,
6 and local. And, when you look at our pie charts out
7 there, you'll see that the state and local shares are
8 getting bigger with each increment. And I'm hoping that
9 over time we can rely on the federal government for more
10 of the first costs, those capital improvements where a
11 lot of the maintenance sits with us, who are closer to
12 keeping everything going at the state and local level.
13 Thank you.

14 MR. BATEMAN: Can I add a couple of questions?

15 MR. SAFFOLD: Yes, quickly. Thank you.

16 MR. BATEMAN: Quickly. The 150,000 cubic feet
17 per second for testing your letters does seem to be a
18 low number, and 180 would probably be better. And even
19 that would probably be low, given the likely
20 probabilities of releases in the future.

21 And the other thing is that the maintenance of
22 the dam is what I was really -- the infrastructure I was
23 referring to -- And I don't think anyone, even the DWR,
24 thinks that that's been properly done in terms of, say,
25 the spillway gates and -- and other aspects. Everything

1 seems to be done a bit late. And I suppose that will
2 continue, unless something changes in the way the
3 maintenance budgets are decided. And those, I think,
4 might be controlled by the state water contractors to a
5 large extent. Anyhow, that's a concern a lot of people
6 locally have.

7 MR. YARBROUGH: Nick, I can offer some thoughts
8 on that latter part there, and I guess I would start by
9 pointing to our next meeting at the OCAP, where we're
10 going to have -- this will be the second time we've done
11 this -- is go through the different maintenance
12 activities, our planned activities at the Oroville Dam
13 facility for the upcoming year. I think that's --
14 Again, that's the second time we've been doing this.

15 I think that's an important venue for everyone
16 to participate in and see what these activities are.
17 Because, on the DWR side, we feel very strongly that the
18 facility is absolutely maintained to very high
19 standards. And yet, me just saying that probably
20 doesn't do a lot of folks a lot of good, so that's why
21 we allocate that time and we bring in the folks that can
22 really talk in more detail about those activities so
23 that, you know, folks in the public can understand
24 why -- why I feel this way, that the facility is
25 maintained to very high standards.

1 So, to summarize there, I would encourage
2 everyone to join us for our next Oroville Citizens
3 Advisory Committee meeting where we delve deeper into
4 this topic.

5 MR. SAFFOLD: Thanks, John. And I can say that
6 currently, July 29th is the scheduled date for that, and
7 more information will be posted online closer to that
8 meeting date in terms of agenda.

9 Okay. Let's go to Matt Mentink. Matt, go for
10 it.

11 MR. MENTINK: Yeah. Thank you. I want to
12 start by thanking DWR for this meeting today. I think
13 it was an action-packed three hours. It felt like it
14 could have gone longer with the amount of questions that
15 were out there. I want to thank all of the subject
16 matter experts for your time, for showing up -- without
17 you, we'd really be in the dark on our safety down here
18 in the downstream communities -- and to the stakeholders
19 for taking their time.

20 One thing that I think is important is, is the
21 amount of information that was thrown out there today
22 was all captured in an audio recording. And, although
23 you've already committed to putting the pre-recorded
24 presentations on the website, I think it's important
25 that this audio recording -- all of the questions from

1 Patrick and from Ron and Robert and everybody -- should
2 be captured. And, earlier in the meeting, we committed
3 to capturing all of those things into, like, a
4 recommendation log so that it could be followed up.
5 That, I think we should continue to do as well.

6 As far as attendance of this, I think we can
7 greatly improve that by having an email address for
8 those stakeholders downstream who want to attend the
9 next meetings, that they can do so by signing up to be
10 email notified to participate in these. Because I
11 don't -- I can't see from my end what the attendance was
12 down here.

13 And then on the procedural end of it, it might
14 be beneficial to everybody involved, more efficient, is
15 if we break into subgroups around three or four
16 different topics where the stakeholders can choose which
17 subtopics they want to jump in with those three subject
18 matter experts and then spend a couple of hours doing
19 that, where you just have a few people talking to a few
20 people, with a lot more opportunity to make it a
21 workshop, "workshop" meaning two-way communication. And
22 we can, maybe, get as much of that two-minute
23 communication on the, quote, "technical things" that
24 this meeting was built to be. So those are all
25 procedural things that I think we should take and use

1 the next time we have one of these meetings.

2 The one question that I do have, though, or
3 comment that I do have, goes to the Army Corps of
4 Engineer regarding the development of a new water
5 control manual.

6 You know, it has to adhere to Code ER
7 11102-2-224, which reads that effective public
8 information programs will be developed and maintained so
9 as to inform and educate the public regarding Army Corps
10 of Engineers water control manual activities. Public
11 involvement in the development or significant revisions
12 of water control plans, as well as certain deviations
13 from the control plans, is required under this
14 regulation. Documents should be prepared that explain
15 the recommended water control plans or changes and
16 deviations, technical informations, and it should
17 describe a description of the plan's impact.

18 In this case, what they're doing is estimated
19 annual damage reports for the different FIRO plans that
20 are going on, which directly affect the public. And so
21 my question is, you know, with all of this going on, the
22 estimated damage with the alternative plans -- We're
23 halfway through the process -- the three-year process,
24 and the public hasn't been invited in yet. You know,
25 we're selecting the matrix in which we measure it,

1 nominate, and formulate alternative plans. We conduct
2 studies. We simulate performances. And --

3 MR. SAFFOLD: Matt, we're going to need to wrap
4 it up, unfortunately. But --

5 MR. MENTINK: Yeah. If I can get a response
6 from the Army on when the public will be going into the
7 process under this recommendation.

8 MR. FORBIS: Yes. I'll be happy to answer
9 that, Matt. Great question. Because one of the unique
10 situations here in the Yuba Feather is that we have a
11 water control manual update process underway that is
12 concurrent and similar but still separate from the FIRO
13 R&D project that's going on in the watersheds.

14 And so the FIRO-specific document, that's them
15 looking into the more R&D aspect of it, like looking
16 into improving forecasts and having a goal, but not
17 necessarily like an authorized purpose tied to
18 functional equivalent to the Marysville Dam. That is
19 not part of the water control manual update process.
20 Those are obviously considerable overlaps. So, for the
21 FIRO effort, there -- with it being R&D in nature, it is
22 not -- it doesn't have the same sort of public
23 involvement that the water control manual update process
24 does.

25 And you are correct to expect public

1 involvement as part of that official Corps of Engineers
2 process. There's -- Later on, towards the end of the
3 summer, we're expecting to have sort of a public
4 information meeting to discuss exactly what you're
5 talking about, and that's separate than the required
6 NEPA process public involvement that is also going to be
7 included in the water control manual update process. So
8 there's going to be a couple of different initiatives or
9 steps in the process that is going to absolutely require
10 public engagement. We just haven't gotten to those
11 steps yet.

12 MR. SAFFOLD: Thanks, Joe. Yeah. And that, I
13 would just say in terms of your first part of your
14 question or comment, we're always looking at ways to be
15 more transparent and more engaging with the community,
16 and we'll absolutely take this under consideration.

17 We are getting pretty close to noon here. I
18 just want to give Ron Stork one last chance to make a
19 comment, and then I think we're going to turn it over to
20 Gary Lippner to close out the meeting.

21 Go ahead, Ron.

22 MR. STORK: Just to answer Robert's comments
23 really quickly, the major issues that have troubled the
24 basin since the construction of the levees and Oroville
25 Dam, and for that matter, New Bullards, have been design

1 and construction problems, not maintenance problems.
2 So, essentially, was the underlying system design
3 reliable? And experience has proven that it was not,
4 and they're at the major upgrades to the levee systems
5 to begin to address that the lack of emergency spillway.
6 A complete emergency spillway at Oroville has not yet
7 been addressed and apparently deferred indefinitely by
8 the department.

9 MR. SAFFOLD: Okay. Thank you for your
10 comment. Does anyone else want to respond to that?

11 Go ahead, Mike.

12 MR. MIERZWA: I'm only going to, of course,
13 speak towards the levees, the downstream flood system
14 out there.

15 You know, Ron, you're correct. It
16 definitely -- I want to hark back to what Rune was
17 talking about out there is, you know, sometimes there
18 has been what we might consider a little bit of a
19 failure of imagination. But, in this case, it's
20 understandable in that the levees that were really
21 inherited, that we're basically managing out here, were
22 originally mounted -- mounds of dirt that were pulled
23 together when the original system was constructed. Over
24 time, they have been incrementally improved.

25 But our thoughts as to the processes that

1 basically put the communities behind these levees and
2 the other assets at risk has evolved and as our
3 understanding has, as we've had, unfortunately, failures
4 both here in California and elsewhere in the United
5 States and the world. But your point is well taken out
6 there. It's that it's not likely to be an overtopping
7 failure but something else that has "I got you."

8 And the last thing I want to put out there is
9 that really reinforces the importance, not only the
10 planning inspections, but allowing to have some research
11 and development, which is something Joe was talking
12 about for the forecasting and what they're doing. And,
13 you know, we probably could do a better job of
14 advocating for, you know, just general levee safety.
15 But, typically, the State has relied on the federal
16 government to go through and kind of be that point of
17 the spearhead as to what are the future issues that we
18 might have out there. So I think we can add our voice
19 to theirs and allow them to have the resources to go
20 through and look at that.

21 But it's a great point, Ron. Over.

22 MR. SAFFOLD: Great. Mr. Gary Lippner is
23 available to close us out. Gary, I'll turn it over to
24 you, and I appreciate your final thoughts here.

25 MR. LIPPNER: Yeah, you bet. Thank you, Nick.

1 And thank you, everyone, for participating.

2 A few action items that, you know, I clearly
3 heard and want to make sure we follow up on. There was
4 just rich discussions from our subject matter experts,
5 as well as great questions from the stakeholders. So I
6 just want to make sure everyone knows, and we have a
7 commitment that we will be reviewing the transcripts of
8 this workshop and identify any follow-up actions, and we
9 will continue to work with Nick Saffold on those actions
10 to capture those responses and integrate into future
11 Oroville Citizen Advisory Commission meetings. There's
12 definitely some follow-up we need to do there.

13 And, most importantly, I just want to say thank
14 you to all of the presenters, the panelists, and all of
15 the stakeholder comments for participating in today's
16 flood safety stakeholder technical workshop. I feel
17 very good. It was packed tight. This was a very
18 valuable three hours for me to hear all of the different
19 aspects, to hear comments from the stakeholders, and to
20 just advance our knowledge of our public safety system
21 and how we work together. The one thing I certainly
22 want to make a point on, too, is to encourage all of you
23 to participate in Central Valley Flood Protection Board
24 meetings and the associated Feather River Regional
25 Management Plan meetings that help inform the flood

1 management decisions and efforts.

2 The public draft of the Central Valley Flood
3 Protection Plan update 2022 was just released yesterday.
4 So it's really an opportune time to tune in if you
5 haven't, re-engage with the update '22 Central Valley
6 Flood Protection Plan, and to be able to comment on the
7 plan that is really the blueprint of flood management --
8 the State's blueprint of flood management in the Central
9 Valley, moving forward. So I just certainly want to
10 encourage all to participate in those board meetings and
11 comment on our update '22 -- update 2022 that was just
12 released yesterday, the public draft.

13 And, in closing, just as a reminder, a workshop
14 summary will be presented at the next Oroville Citizens
15 Advisory Commission meeting that is now scheduled for
16 July 29th. Our hope is that the meeting will be able to
17 be held in person. And, again, the transcript from this
18 meeting will be posted to the Oroville Citizens Advisory
19 Commission website, and we will follow up on action
20 items with the transcript.

21 So, with that, thank you all again and -- for
22 joining today and all of the participation. Thank you.

23 MR. SAFFOLD: Thank you, Gary. Thanks,
24 everyone.

25 (Proceedings adjourned at 11:58 A.M.)

1 CERTIFICATE OF REPORTER

2

3 I, the undersigned Certified Shorthand Reporter,
4 holding a valid and current license issued by the State
5 of California, do hereby certify:

6

7 That said proceedings were taken down by me in
8 shorthand at the time and place therein set forth and
9 thereafter transcribed under my direction and
10 supervision.

11

12 I further certify that I am neither counsel for nor
13 related to any party to said action nor in any way
14 interested in the outcome thereof.

15

16 The dismantling, unsealing, or unbinding of the
17 original transcript will render the Reporter's
18 certificate null and void.

19


20 IN WITNESS WHEREOF, I have subscribed my name on
21 this date: May 9, 2022.

22

23

24

25



Anne Bryant
Certified Shorthand Reporter
No. 13516

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: \$60,000..2017

	100-year	170 42:19	
\$	8:16,22	173,000	2
\$60,000	12:23,25	43:2,9,21	2 10:19
96:10	13:3,9	17C 13:17,	16:1 94:15
	14:2 15:2,	18	2- 9:23
1	22 16:17	180 102:21	2.0 95:21
	17:5,6	116:18	2.51 35:4
1 10:19	18:6,10,16	180,000	20 54:17
1,000 57:2	29:15 57:1	33:21	20,000 43:7,
1,000-year	58:2	35:19	8
61:19 62:2	61:17,25	71:17	20- 36:2
	100-years	102:16	200 19:2,6
1- 16:4	17:4	111:24	24:5
1-in-1,000	10:56 82:16	1861 18:23	200,000 94:1
19:5	11102-2-224	1862 19:19	102:21
1-in-100	120:7	1944 26:14	200- 42:18
13:1,2	11:58 126:25	1955 40:11	200-year
1-in-100-year	12,000 78:21	110:6	29:15
16:8	150,000	1960s 61:6	61:17
1-in-70-year	40:1,20	1964 41:7	2007 101:14
16:10	41:2,10,	1980s 58:10	2008 99:15
1-percent	13,21	1985 107:24	2012 103:23
13:1,10	71:17	1997 35:16,	2017 49:2
17:6,7	102:17	23 41:9	75:12
54:2	111:24	49:20 50:7	87:10
1.3 99:22	116:16	81:15 82:4	93:17 97:6
1.5 35:1	16 69:16	93:17	100:12
93:24	1600 99:22	102:18	101:14
10 9:4	167,000	112:20	103:6,15,
10,000 9:25	35:23	1998 8:25	24 105:14,
100 18:17	102:19	1st 81:18	16 106:2
24:5	17 13:17		114:18
100,000	22:25		
75:13	100:13		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: 2019..750,000

115:1,11	21,22 85:4	38 40:13	530 110:18
2019 49:1	260,000		
2021 36:2	42:13,15, 25	<u>4</u>	<u>6</u>
2022 4:2	29th 118:6	4 10:21	60 22:11
87:18	126:16	4,000 9:23	87:21
126:3,11		78:19	600,000
203,000	<u>3</u>	40 37:15	35:10
40:12		400,000	102:24
2067	3 10:21	81:17	60s 21:24
105:15,17	30 7:7	43 105:15,	37:12
20th 37:22	37:15	17 106:19	6160 87:12
21 100:13	87:23	435 43:6	6161 87:12
22 4:2	100:14	44 42:24	64 88:3
42:20	107:13	106:11	66 43:1
105:15,16	30-year	440,000	106:1,3,5
106:1,18	103:16	34:25	
126:5,11	300 115:2	39:25	<u>7</u>
225,000	300,000	40:18,22	7 28:20
72:18	35:20	41:20	70 17:8
235,000	102:17	45 28:17,20	22:11
72:14	302,000		
24 80:25	35:16	<u>5</u>	70-year
24-hour	41:8,9		16:11 17:4
61:25	31 28:20	5 10:21	18:12
73:13 90:5	47:12	11:11	700 43:9
240,000	350,000	99:16	70s 37:12
81:19	35:22	50 22:11	61:6
24th 36:2	365 102:22	500- 61:19	72-hour
25 107:13	365-day	500-year	35:1,4
250,000 35:9	73:13	16:4,13,18	720,000 35:3
41:8	370,000	18:7	725 93:25
260 42:20,	102:22	50th 70:10	750,000

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: 8..adding

42:19	12:13	accuracy	101:13
	36:21	72:18	106:23
<hr/> 8	37:12,16	accurate	125:8,9
	46:12	75:17	activate
8 15:25	59:16 75:7	achieve 16:2	77:11
80,000 70:12	absence	Achilles	activated
800,000	42:12	35:14	80:21
70:13	absolutely	acknowledge	actively
84 10:7	25:18 26:5	115:17	69:10
8499 84:9	117:18	acquisition	activities
8589.5 88:1	122:9,16	52:8	4:23 5:3,
86 12:1	Academies	acre 35:2,4	6,9,11,12
16:9	58:23	42:14,15	6:3,17
87,000 42:25	acceptability	43:2	49:3 73:22
	15:23	Act 26:15	74:9 88:9
<hr/> 9	acceptable	99:16	115:13
	59:9	action 47:21	117:12,16,
90 9:3	access 4:3	48:12	22 120:10
90-day 53:13	111:16	60:22	actual 57:5
95 10:10	accidental	71:13,22	actuality
97 72:16	46:15	76:24	70:13
98 72:16,17	accommodate	85:24 87:6	ad 21:19
9:00 4:2	7:15 41:4	90:19	111:5,6,
	accomplished	92:7,9,17	11,17
<hr/> A	21:24	93:14	add 17:15
	account	97:20 98:4	28:16
a.k.a. 15:2	104:16	125:2	31:15
97:13 98:1	accountability	126:19	33:14 45:8
A.M. 4:2	59:2	action-packed	92:5 93:1
126:25	accounted	118:13	103:12
abilities	101:5	actions	116:14
100:22	accounts	12:16	124:18
ability	19:11	98:3,12,18	added 42:21
		100:17	adding 26:9

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: addition..amounts

addition 53:5 80:9	advanced 48:15	100:5 103:8 104:7	alert 58:13 76:25 77:1,11,12
additional 40:23 44:23 45:1,8 48:14 65:10 88:15	advisories 77:2	107:21 114:19	alignment 61:1
additionally 71:23	advisory 4:13 6:10, 13,19 76:20 98:13 118:3 125:11 126:15,18	agency 48:5 51:12 83:3 84:10 85:13 89:18 90:7,8 104:9 109:22 114:1	allocate 117:21
address 7:17 119:7 123:5	advocating 124:14	agency's 5:1	allocated 30:15
addressed 48:1 113:9,12 123:7	aerial 47:11,14	agenda 118:8	allowable 108:2
adequate 50:7	affect 18:7 22:8 34:6 54:3 76:18 120:20	aggregated 69:14	allowing 124:10
adhere 88:3 120:6	affected 48:19 89:6	aggressive 101:20	alternative 18:8 120:22 121:1
adjourned 126:25	afterward 81:2,3	agricultural 99:21	Amazing 80:1
administration s 115:9	agencies 4:10 46:2, 9,18 47:6, 7 48:1 77:18 83:22,24 85:8,12, 14,21,23 86:5,8 88:2,8,22 92:21	ahead 25:17 31:16 32:11 70:22 81:11 90:17 93:12 112:19 113:22 122:21 123:11	ambiguity 63:3 65:14 71:2
adopted 103:23			American 19:13 20:3
adoption 115:10			amount 9:13 35:15,22 38:21 39:10 40:3 41:11,12, 20 95:1 96:8 118:14,21
advance 28:25 58:18 125:20		Airforce 96:3	amounts 61:25 80:1

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: analyses..aspect

analyses	41:25	102:2	14 93:3
53:1 63:12	answers 65:5	approaching	ARKSTORM
65:18	66:18,25	24:6	14:10 36:1
analysis	71:4	appropriately	93:23
17:19	Anthropology	48:13	94:5,13,
24:18	55:24	approval	15,17
25:6,12	anticipated	88:5	95:7,10,21
47:20	70:11	approve	96:5,8
60:18 96:4	81:17	91:23	108:21
98:10	104:16	approved	ARKSTORMS
101:2	105:16	87:17	35:25
and/or 89:8	apologize	91:17	Army 25:23
Anderson	25:8 51:2	approximation	34:16
8:12,14,16	apparently	95:13	39:16,18,
15:10	123:7	April 4:2	19 40:4,7
16:14	appeal	AR 11:3	41:17
18:14,25	53:13,16	12:4 14:24	44:25
19:3,7	appears 22:5	area 9:5	45:10
20:6	appendices	40:13	46:20 47:6
21:10,16	88:16,17	66:12	84:8,11
22:13,21	applies	70:24 84:1	85:12
23:4,19	26:25 86:3	94:25	97:18
94:12 95:9	89:2	96:20	101:4
96:23	appreciated	99:19	108:4
animal 46:15	62:24	104:8	120:3,9
anniversary	approach	110:12	121:6
70:10	24:17 54:7	113:15	arriving
annual 47:11	60:14,23,	114:3	76:21
54:2 73:20	24 62:22	115:18,22	ARS 12:5
100:20	63:9 68:17	116:1	14:17
115:2	97:3 107:9	areas 5:2	artist's
120:19	approaches	47:13	4:19
annually	64:16	107:7	aspect 31:4
88:23	101:3	Ariya 91:12,	58:1
answering			121:15

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: aspects..balancing

aspects	89:3	attitude	59:20
22:15		58:25	
30:19 33:9	assuming		awareness
51:14	22:18	attribute	83:21
55:16	34:16	58:14,20	84:23 95:1
56:11 76:9	55:22	attributes	
98:19	assumptions	58:24,25	<hr/> B <hr/>
116:25	105:18	69:6	
125:19	atmosphere	audio	BA 55:24
assess 48:15	9:1,4 11:3	118:22,25	back 8:11
assessment	atmospheric	August 68:6	17:3,25
15:24 18:8	8:15,18,	authority	20:2,4
43:5,17,25	20,24 9:9,	84:6,16	21:23
45:22	11,19	authorization	26:18 34:2
47:10	10:8,11,	29:25	35:16,23
97:8,16	15,18	authorized	43:4 54:20
110:21	11:6,10,	26:22 31:6	56:1,3
assessments	11,21,22	121:17	61:6 82:16
73:15	12:6,15	authorizes	87:23
100:25	14:6,17	29:25	94:24
101:2	atop 67:22	auxiliary	99:15
115:21	attempting	112:2,4	104:3
asset 44:12	22:9	availability	105:10
assets 93:25	attend 119:8	90:23	107:17
124:2	attendance	average	108:16
assist 84:22	119:6,11	101:7	109:24
assistance	attendees	106:3	110:6,17
46:2	70:20	averaged	115:5
83:23,25	attention	106:11	123:16
84:3,8,12,	15:6 32:20	avoid 59:11	background
19 86:6	76:23	66:23	55:18
115:15	103:9	avoided 62:6	backwards
Assistant	attenuated	aware 26:12	113:24
38:12	41:10	27:16 32:5	BALAKRISHNAN
assisting			91:15
			balancing
			33:1

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: ball..board

ball 114:13	basis 40:3	67:18	bigger 13:7
Bar 16:6	64:18	benchmark	34:5 116:8
27:3,17	73:2,3	69:18	bill 90:25
28:21	74:17 80:5	beneficial	99:16
Barrier 75:7	Bateman 38:2	10:19	billion
bars 41:9	70:21,23	113:18	93:25
base 60:17	71:15	119:14	100:13
108:17	72:9,13,	benefit	bit 12:19
based 13:4,	21,25	14:20,23	29:2 36:15
13 17:17	74:25	16:23	38:6 42:3
21:12,22	111:1	38:16	56:1,2
22:14,23	112:18,19,	39:20	60:25 62:6
25:6 33:22	20 113:20	41:3,23	64:12
57:7 71:20	114:11	44:23	67:13
82:2 89:25	116:14,16	45:1,4,9	73:11,14
94:18	bathtub 63:5	70:5	74:11
100:24	bay 108:16	110:10	82:15
basic 48:7	Bear 32:25	115:13	105:17
55:9 98:2,	begin 123:5	bent 71:15	110:15
11	beginning	Berkeley	117:1
basically	29:23	55:2,21,25	123:18
61:10	begins 4:4	56:2,4	blind 63:15
106:12	51:22	66:9	blue 41:9
114:22,24	begun 88:15	Berkeley's	79:17,18
123:21	behalf 91:13	56:5	98:12,18
124:1	109:4	bet 124:25	101:12,14
basin 78:8	behaviorally	big 11:24	blueprint
82:6 104:2	29:12	14:20	100:10
108:16,17	belief 68:13	15:22	114:5
122:24	86:14	19:25	126:7,8
basing 24:10	beliefs 57:8	23:16 78:9	board 28:13
Basins 82:8	believed	92:12	46:20
106:8,20	57:20	97:25	47:5,20
115:3		110:13	73:18
		114:15	100:4
			109:8,13,

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Board's..California

15 125:23	briefings	107:6	bypass 103:1
126:10	80:24	building	104:5
Board's	briefly	12:9	bypasses
102:5	60:10	100:16	99:25
bookmark	68:24	buildings	103:21
79:13	82:25 93:3	47:15	104:24
boots 98:23	97:3	107:5,6	108:15
	103:12	builds 68:17	
bottom 8:2	bring 73:24	built 32:2	<hr/> C <hr/>
80:4	110:17	59:12	CAC 20:14
105:14	117:21	119:24	Cache 49:1
108:13,14	bringing	Bullards	Cal 71:12
boulder	114:9	16:6 27:3,	80:20
60:16,21	brings 72:16	17 28:21	87:14,20
61:1,3	broad 56:11	42:19,21,	89:5,12
bounded	broaden	23 122:25	90:3
66:21	69:25	bullet 97:22	calculated
boxes 66:8	broke 108:17	Bulletin	67:14
brain 77:3	broken 47:2	13:17,18	calculating
brainstorm	brought	22:25	103:17
69:12	96:19	bunch 79:17	calculations
breach 94:6	103:8	Bureau 85:13	62:4
break 8:9	104:9	burn-in 63:7	Calfire 48:6
11:25 50:9	Bryson 74:12	burrows	calibrate
54:20	82:20,21	46:15	75:15
82:15	86:21,23	busy 65:20	California
119:15	BS 55:25	69:4	8:17,19
breaks 47:1	budgets	Butte 113:25	9:7 10:9,
50:10	117:3	button 8:3	13,20
bridge	buffering	buy 97:4,	28:19 48:5
70:10,11,	39:4	11,19 98:4	55:2 56:19
12,14,15	build 5:4	100:12,23	76:12,14
briefing	54:8 96:6		77:15
80:5			79:9,11

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: California's..Central

84:25	37:3 49:23	cartoon	center 10:4
85:3,4,6	104:12,18	60:13	52:11,19
86:18,19		67:11	56:5 74:13
87:4 88:20	capacity		76:13
91:17,25	34:1 35:13	case 12:10	77:16,21
99:13	36:22	39:23	78:14,24
110:2,5,18	43:7,8,10,	57:14,17	79:10,12,
124:4	20 47:17,	95:6	15 80:20
	22 62:11	120:18	82:25
California's	73:15,21	123:19	83:5,11,20
87:9 97:2	97:25	cases 85:24	84:15,18
99:18	102:24	Casey 87:1,3	85:1,6,7,
call 11:22	103:18,25	90:15	17 86:4,8,
19:4,5,19	capital		10,17,18,
21:13	100:20	Casey's	19 88:20
52:19	116:10	93:2,4	89:11,12
66:23	capture	cast 66:5	106:15
67:22	125:10	catastrophe	108:17
69:12	captured	36:4	Center's
82:14	7:13 20:19	catastrophic	83:4,15,17
94:22 95:3	38:7 39:7	56:6 59:19	86:1
104:13	40:1,7	106:10	Central
111:6	48:24	categories	17:12
called 9:11	118:22	69:17,22	45:24
13:17	119:2	category	46:20
21:14,15	capturing	11:11	47:4,19
30:9 52:9	119:3	69:21	73:17
53:11 54:1	cards 74:5	caught	97:6,12,14
74:4	careful	105:12	99:15,18
104:15	66:23	caused 83:13	100:4
calls 85:19,	carried	111:11	102:4
21 89:14	103:24	CCRM 56:6	103:15
capabilities	105:7	cell 77:12	109:7,8,
16:23 66:7	carryover	80:15,19	12,13
capacities	21:25	90:4	114:5,16
32:21			115:11
35:8,14			116:3

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: century..code

125:23	106:18	circumstances	climate 55:5
126:2,5,8	107:8	37:7	66:15,17
century	changing	Citizen	96:14
37:23	30:3 99:12	98:13	99:11
cfs 35:3,9,	113:10	125:11	101:16,21
16,23	channel	Citizens	103:5
39:25	33:19 35:7	4:13 6:9,	climatologist
40:12,18,	73:15	13,19	8:13,17
20,22	104:12,17	118:2	clock 82:17
41:2,8,9,	channels	126:14,18	close 41:15
11,20,21	20:1 33:2	city 40:13	65:4 79:7
75:13	45:23	46:1 85:20	102:20
81:17,19	46:13	89:8	122:17,20
102:21,24	49:24	civil 56:4	124:23
111:24	73:21	65:16	closed 70:11
challenge	characteristic	clarifying	102:16
66:15	9:18	111:21	closer
68:11,12	characterize	class 74:3	105:21
challenges	9:9 29:18	classes	116:11
19:17	chart 90:4	55:23	118:7
challenging	charts 89:21	classically	closing
62:15	116:6	62:8	126:13
champion	check 16:20	classified	closure 47:2
110:13	31:13	87:14	CMF 62:8,12
chance 13:1,	choice 55:22	clear 58:15,	CNA 45:5
10,12	choose 43:10	16 66:18	113:5
17:6,7	55:19	107:20	cnrfc.noaah.
53:4 54:2	119:16	108:5	gov. 79:12
122:18	Cindy 73:11	clears 17:22	co-located
change 55:5	76:1,3	click 8:1,2	83:6
66:15,17	81:9,15,25	clicking	code 68:3
96:14	82:11	92:1	87:11 88:1
99:11	106:13	cliff 60:18	90:22,23
101:16,21,			91:17
23 102:2			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: cognitively..concern

120:6	86:24	53:7 80:12	component
cognitively	107:11,14	communicating	52:6 95:21
61:10	111:13	60:14	components
cold 9:22	114:8	communication	8:20 20:7
collaborate	120:3	86:12	30:6,11
27:12	122:14,19	92:12	97:23
collaboration	123:10	119:21,23	composite
27:10	126:6,11	communications	94:22
84:24	commented	99:6	composites
110:8	68:2	communities	94:19
collect	comments	5:18 42:17	comprehensive
48:18	7:7,8	51:25	17:13 18:8
collecting	20:12,15,	52:25	43:4,17,25
99:3	19 86:25	53:14,20	comprised
collection	107:12	54:8	57:3
98:9	112:16	110:18	computer
109:10	113:19	115:19	54:21 98:9
Colorado	122:22	118:18	101:3
28:19	125:15,19	124:1	concept 8:22
combination	commission	community	12:20,22
24:13	4:14 6:10,	14:9 53:3,	14:11
59:23	14,20 7:18	6,9,16,24	58:10,15,
comment	98:13	54:6,7	17 63:25
7:22,23	125:11	73:23	104:25
20:11	126:15,19	100:9,23	concepts
31:18	commitment	122:15	55:3 66:12
34:18	125:7	complete	68:2
36:13,15	committed	123:6	conceptualize
38:5	118:23	completely	114:7
44:17,20,	119:2	63:14	conceptually
21 49:16	Committee	complex 55:6	104:3
51:1,7	118:3	compliance	concern
71:8	common 56:15	108:7	32:19
81:12,13	90:10	109:22	36:24
	communicate		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: concerned..contracting

69:13 84:1	112:8	55:15	consultations
117:5	113:7	122:16	89:14
concerned	confident	considered	consulted
36:4 57:11	75:16	56:25 60:5	88:2
concerns	conflict	62:16	consuming
36:25 59:1	108:9	67:23	89:17
88:19	109:4	considers	contact 7:11
concise	confluence	42:11	52:18
32:13	32:23,24	consistency	86:16
concludes	35:21	62:16	90:6,7,9
90:12	102:18,20	consists	92:13,15
concluding	111:25	55:18	contacted
70:16	confront	constant	89:22
concurrent	69:7	63:9	90:5,7
121:12	confusion	constitutes	contacting
conditions	18:19	58:4 62:14	89:23
11:7 14:6,	Congress	constraints	context 6:15
14 36:3	29:25	34:1	66:16
41:14	connect	constructed	contexts
57:16 78:7	33:18 51:5	14:5 40:5	56:22
81:22	connected	60:12	continue
82:3,7	29:7	95:14	6:12
85:9 86:6	consequence	123:23	101:18
89:1	57:4	construction	115:7
conduct	consequences	26:24	117:2
88:10,21	12:17 57:5	27:23 30:4	119:5
89:23	62:12,16,	95:22	125:9
121:1	17,18	96:13	continuous
conducted	conservation	100:6	59:2
49:1 75:14	21:25 48:6	103:21	contract
conference	considerable	122:24	110:23
68:4	121:20	123:1	contracting
confidence	consideration	consultants	84:6
56:25		52:23	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: contractors..county

contractors	121:11,19,	27:12	101:4
117:4	23 122:7	74:13	108:4,6
contracts	controlled	83:4,9	120:3,9
52:23	117:4	coordinated	122:1
contrast	controllers	52:24	Corps' 26:25
101:18	74:4	coordinating	29:9
contribute	controlling	84:7	correct 17:9
11:19	74:25	coordination	23:7 28:15
65:15	convention	5:8 27:10	95:8
contributing	18:18	41:15	121:25
10:1	convergence	74:19	123:15
control 22:1	65:4	86:7,12	corrected
24:8 25:13	conversation	106:13	54:21
26:14,21,	82:2 107:4	109:19	correspondence
22 27:4,5,	111:4	copy 81:23	22:4
7,14,15,20	112:12	corner 16:1	corrosion
28:8,18	conversations	61:8	47:2
29:6,20	20:25	cornerstone	cost 62:4,5
30:6,10,	21:20	16:1	116:1,5
12,14,15,	25:17	Corps 22:16	costs 61:15
16,24	111:8,16,	23:14	70:5 107:3
31:3,4,7,	18,20	25:23	116:10
8,9,19	112:13	26:13,16,	counterparts
32:2 33:7,	conveyance	19 28:5	10:3
19 36:25	42:11 70:6	29:24	counties
39:15,20	convincing	34:16	83:24
40:8 42:21	72:14	39:16,18,	104:10
45:11 46:6	Cool 54:25	19 40:4,8	counting
73:7 100:2	cooperate	41:17	31:24
102:24	28:13	44:25	county 76:8
103:4	cooperating	45:10	80:23 84:7
104:1,9,13	85:12	46:21 47:6	85:15,20
111:23	coordinate	48:6 84:8,	89:8 90:8
113:2,25		11 85:12	115:19
120:5,10,		97:18	
12,13,15			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: couple..dams

couple 15:20	credible	curious 58:3	42:13 45:6
27:9 31:16	67:19	current	46:7 70:2
36:20	Creek 49:1	14:14	75:6,7
51:13	crest 32:8	25:6,11	83:13,14
74:11 80:6	crews 48:24	34:4 50:24	85:25 86:2
116:14	crispness	51:20 52:3	87:5,8,9,
119:18	66:16 67:2	64:15	12,14,24
122:8	criteria	65:17 78:7	88:4,7,9,
courses	54:3	85:8 86:5	13,14,20,
48:4,5	critical	114:21	21 89:1,3,
49:4	52:6 56:13	curve 63:5	5,6,11,15,
court 4:3	69:16,20,	curves 75:2	16,22,25
49:25	22 100:7	cut 43:13	90:4,6,19,
50:16	111:9	108:14	20 91:5,7,
cover 7:16	cross 70:14	cutoff 21:25	13,22
73:1 76:7,	cross-check	cycle 55:15	93:6,23
9 82:23,25	65:1	61:15	113:2,3,11
97:5,10	cross-cutting	65:11	116:22
covered 93:9	56:12,17	104:11	117:12
114:15	crowd 70:12	116:4	121:18
covers 99:19	crucial	D	122:25
create 10:18	88:12	daily 80:5,	Dam's 42:8
14:6,13	Cruz 55:20,	14 85:1	damage
40:7 95:20	23,24	dam 4:8	51:16,25
107:13	cubic 34:25	5:22,25	88:25
created	39:8 72:14	31:20,23	120:19,22
37:17	102:22	32:5 34:2	damages 5:10
creates	116:16	36:24 37:5	10:6,7,10
38:18	culture	38:14,15,	50:12,13
51:15	58:21	21 39:3,7,	107:22
creating	66:10	15 40:1,2,	dams 5:24
7:19 39:1	cultures	4,10,16,	36:21
credibility	66:7	19,20,25	66:10 86:3
68:13		41:6,12	87:13,15
			91:16,19
			93:7

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Dams'..Deputy

Dams' 91:25	73:13	30:23	62:10
dangerous 112:5	77:7,25 78:1,16 80:25	deeper 107:7 112:13 118:3	demonstrated 58:11
dangers 94:4	87:21,23	Deepwater 58:23	department 8:17 21:20 22:5,9 24:20
Daniel 20:8	deadlines 87:19	default 62:22	27:11,13 38:9 45:16
dark 118:17	deal 65:22 77:18	defense 100:17	49:22 71:6 79:8 82:22
data 13:6 37:10,11 48:24 52:3,9,15, 22 53:15 57:2 63:22 79:9 86:18 94:6,17 98:9 108:19,24 109:10	dealing 36:8 dealt 58:1 debate 60:19 debris 46:16 47:16 decade 14:13 106:7 decades 24:19 37:10	defer 23:7, 14 71:4 deferred 111:9,10 123:7 deficiency 114:25	83:2 87:17 89:9 90:8 94:12,15 108:8,9 109:5 111:11 114:1 123:8
database 52:13	decide 97:15	defined 62:8 69:17 96:7	department's 91:13 104:19
date 118:6, 8	decided 29:22 117:3	defines 59:9	depend 99:24
dates 110:6	decision- making 33:10 109:4	definition 62:14,20	depends 41:13 57:24
Dave 74:21, 22	decisions 85:10,23 86:9 111:9 126:1	degree 55:20	deploy 48:22
David 75:22	declare 84:15	degrees 65:22 67:3	deployed 69:7 80:23
day 35:16 60:7 76:3 80:25 91:18 93:21 107:12	decreasing	delineated 47:13	depth 74:16
days 12:2 21:14 43:9,18,19		delineating 62:14	deputies 92:14
		delve 50:23 118:3	Deputy 4:7 38:12
		demands	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Derringer..direct

Derringer	42:13	79:8,20	deviation
18:24	53:19	detrimental	27:19
describe	60:12	47:17	deviations
18:19 89:2	71:18	Dettinger	120:12,16
120:17	designing	20:8	devices 47:3
describes	29:4	devastating	diagram
27:5	111:24	40:12	25:14
describing	desire	develop	31:18 33:7
84:12	105:23	10:14	65:13
description	detail 35:13	52:23	dialogue
88:8,13	68:25 73:9	64:16	6:18
120:17	98:16	89:19	dictate 23:8
Descriptive	117:22	94:16	differ 56:14
104:14	detailed	99:14	difference
design 13:15	100:24	100:9	61:24 62:3
21:11 22:8	details 15:4	103:25	63:18
23:11	30:25 33:8	developed	differences
24:21,25	40:6	40:5 53:2	62:17
25:3	Detection	96:3 101:3	different-
29:19,23	52:9	114:2	sized 13:23
33:21,25	determination	120:8	16:19
36:23 58:2	53:17	developing	differentiatin
111:22,25	determine	29:5,20	g 61:11
112:4,9	14:20 52:1	30:8 69:10	difficult
122:25	determined	development	107:4
123:2	21:23	39:19	111:18
designated	39:13	47:23	dig 15:3
45:24	41:15	52:22 54:3	digital
47:12	determining	88:3 98:21	52:14
designed	33:10	99:10	direct 61:1
32:1	deterministic	100:7	83:23
39:18,24	24:22	101:16	84:3,8
40:16,20	77:22	111:16	92:15
41:3,18,	78:23	120:4,11	
19,24		124:11	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: direction..due

direction	97:13	5:24 82:22	32:18,21,
101:23	122:4	84:21 87:5	23,24 33:2
directly	discussed	89:11	35:7,13,17
120:20	6:13 71:24	91:16,25	36:22
Director 4:7	discussion	Doctorate	37:3,5
38:12 56:5	50:24 82:5	56:3	38:22,23,
dirt 123:22	92:7	document	24 39:3,6,
disagreements	discussions	16:20	9,11,22
66:18	6:15 45:3	81:22	40:2 41:22
disappointment	51:24	92:11	42:16 46:6
26:7	100:3,9	104:13,14,	49:23 70:3
disaster	102:4	15 121:14	73:2,15
56:8,11	125:4	documentations	75:6 83:15
58:18	disrupt	73:17	86:2,5
disasters	92:19	documented	102:13
52:1 58:14	disruption	47:18	103:2
59:19	112:6	documents	104:1
discharge	disruptive	92:22	118:18
32:6	19:22	108:3	119:8
33:18,19,	distributed	120:14	123:13
21 34:6	53:8	dollars	draft 52:25
disciplines	distributing	100:14	53:4
55:22 65:3	88:18	115:2	126:2,12
discounted	distribution	dollars'	drills 69:15
67:19	19:8 77:8	93:25	drivers
discover	80:9 90:23	domain 77:16	12:15
45:13	District	dots 33:18	drop 106:11
discovered	27:1 28:16	double-check	drought
9:2 10:7	diversion	59:21	27:22
discovery	75:6	doubt 23:17	dry 11:12,
51:23	divided	downstream	13 78:8
discuss	100:19	4:17,22,24	dual-degree
63:18 87:6	division	5:16 6:16	55:19
		30:16	due 27:23
			37:5 51:20

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: due-process..emergency

70:15		120:9	elevated
98:23	E		70:1
due-process	E3 66:23	educational	elevating
53:10	eager 81:3	55:18	107:5
duration	EAP 87:13,	94:25	elevation
9:18 10:23	17,21,24	effective	9:22,23,25
DWR 21:19	88:2,3,5,	53:18	34:7 38:17
41:16	10,19,21,	88:13	39:1,13
44:25 45:9	24,25	120:7	75:3
46:8 48:3,	89:1,21	effectively	elevations
22 50:12	90:3	53:20	48:18
71:8,11	EAPS 87:6,	effectiveness	Elizabeth
72:20	8,11,19	101:13	86:21,23
81:22 83:8	90:12 91:4	106:12	else's
84:9,21	earlier 29:3	efficient	108:24
85:1 91:3	37:22	119:14	email 7:11
94:3,10	49:13	effort 6:5	20:24
96:25	85:25	16:6 47:21	89:13
98:25	108:11	94:15	119:7,10
99:17	115:5	121:21	emails 76:17
112:17	119:2	efforts	77:13
113:17,21	early 53:4	96:22	embrace
116:23	63:6 89:17	107:20	103:22
117:17	111:4	126:1	embraces
118:12	ears 58:13	eight-and-a-	68:18
DWR's 4:7	earth 47:15	half 62:2	emergencies
5:24 21:21	earthquakes	element 9:21	84:15
45:21	83:13	10:12	88:10
83:4,18	easier 59:10	elements	92:12 99:4
89:10	easily 64:6	4:24 20:10	emergency
103:8	economic	22:25	5:7 6:16
dynamic	98:9	65:13 88:5	25:14 47:8
75:19	educate	89:21	51:12
		105:20	69:15

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: emphasis..essentially

71:13,22	encourage	25:23	74:19
74:10	102:3	26:13,17,	100:16
76:10,25	114:9	20 39:16	109:20
77:1,11,12	118:1	41:18	entity 109:6
79:2	125:22	46:21 47:6	environment
80:13,17	126:10	66:20	59:1
81:5,14	encroachments	84:9,12	environmental
83:3,18,21	47:14	85:12	62:18
84:5,8	end 6:1	97:18	envision
85:16,19,	14:15	101:4	112:11
25 86:5,	39:25	108:4	EOC 80:22
13,14	43:13 51:7	120:10	EOCS 80:23
87:2,5,6	63:9 70:8	122:1	equaled
88:6,13	105:23	England	13:2,10
89:1,2,4,	119:11,13	99:20	equivalent
22,25	122:2	enhance	16:3
90:19	enforcement	56:18	42:15,25
92:7,9,17,	6:2,4	enhanced	95:15
19 93:14,	47:21	70:4	121:18
16 95:2	83:22 89:8	ensemble	ER 120:6
101:6	engage 95:11	79:22	Eric 51:10,
109:19,21	96:1	ensure 7:3,	11 54:12,
112:1	engagement	13 25:13	13 110:14
113:1	54:6	48:1,12	erosion
123:5,6	122:10	49:4,23	46:14 47:3
emphasis	engaging	50:15	errors 66:23
54:5	122:15	55:10	escalating
empirical	engineer	59:25	59:18
63:21	51:12	ensures 48:7	essentially
employees	120:4	ensuring	26:16,19
110:3	engineering	62:15	27:4 55:21
empowers	13:15	entire	123:2
58:17	55:22,25	102:23	entities
empty 40:22	56:3,9	108:17	
enable 69:18	engineers		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: establish..exists

establish	70:4 84:1	31:23 32:6	36:25 37:2
13:24		34:9 38:19	
15:22	evaluated	41:15	excellent
27:14	57:7	56:23,24	21:1 58:22
108:6	evaluating	60:3,4	92:3
	65:2	61:11,17	exceptional
estimate		63:21 64:3	11:4
8:23 13:8	evaluation	72:2 73:23	exceptions
22:5,10	13:22 15:1	74:20	98:24
43:8 57:1	16:19	77:10	
64:8,17	60:19	83:11	Exchange
101:7	evaluations	101:5	47:9 79:10
116:4	14:25		86:18
estimated	event 5:3,7,	eventually	excited 55:2
13:1	10,11	17:8 96:5	
100:13	11:23	everyone's	excuse 42:19
106:2	14:9,24	7:13 43:12	51:1
115:1	16:4 17:5,	evolved	Executive
120:18,22	6 19:2	51:21	56:5
	21:13	124:2	exercise
estimates	24:3,11	EWR 93:20	14:10
17:10 64:6	29:7,10,	108:1	67:6,8
evacuate	15,16 33:4	exact 18:18	74:6 81:4
93:18	37:19 39:5	41:12	88:22
evacuated	40:11,14	examples	95:5,12
93:25	46:4 47:24	27:9 65:12	
112:21	48:17,21	83:10	exercises
	49:6,21	88:17	64:24
evacuation	58:2 62:1,	exceeded	66:20
5:22 6:2	2 70:10	13:2,11	74:1,3
70:5 85:22	76:21 83:1	30:18	86:11
101:6	95:2	32:22	96:15
evacuations	events 4:11	35:18	existing
84:16 86:8	5:4,5 14:5	exceeding	42:11 64:2
106:15	22:22	13:12	66:22
	24:3,5,12	30:21 33:4	112:9
evaluate	25:5 29:8,		exists 112:1
12:20	18,19		
13:21 14:8			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: expect..fall

expect	118:16	Extremes	113:11
24:20,24	119:18	10:5	factors 30:7
70:17	125:4	eye 105:13	55:17
74:7,8	explain	114:12	56:10
81:18	120:14	eyes 58:13	65:15,17
114:22	explicit	74:17	factual
121:25	58:5,15,16		18:10
expectation	explicitly	F	fail 33:25
24:2	59:9 62:14	face 55:5	50:6
expected	explore 55:7	66:15	111:11
48:21 73:4	exploring	Facebook	failed 49:22
101:11	79:18	77:8	103:9
expecting	exposure	facet 23:9	fails 50:6
61:9 122:3	62:25 63:1	facilitate	failure 37:5
experience	extended	99:6	57:4,5,6,
114:6	63:8	facilitates	16 62:9,
115:24	extensive	4:13	12,15,21,
123:3	21:19 98:8	facilitator	23 63:4,6,
experiencing	extent 117:5	4:12 6:22	9,10,13,14
103:5	external	facilities	64:17,22
experimental	46:24	72:6,8	90:20
80:16	extra 38:18	93:7	106:10
expert 49:17	40:18	113:21	123:19
expert's	45:12	facility	124:7
64:20	extrapolate	23:12	failures
expertise	63:24	39:14,19	62:23
76:13	extreme 5:4	41:18,24	63:7,11,
77:17,18	11:4 37:7	44:8 45:2	15,16 72:4
80:22	56:23,24	68:6 73:7	111:5
experts 4:16	101:5	112:9	124:3
5:24 64:16	extremely	117:13,18,	fairly 41:6
73:25	87:14	24	55:6 64:6
77:21 78:4		fact 17:7	fall 46:8
103:20		57:18 68:5	60:17
			78:16,17

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: falling..five-minute

falling	51:12	101:4	98:25
11:12	53:12	109:21	financial
60:21	74:18	110:13,19,	62:17
familiar	85:21 88:4	24	financially
18:22	89:9 93:7	FEMA's	103:19
28:23	99:6	51:14,21	find 10:10
families	100:11,15	52:12,18	18:19 58:3
11:23	103:18	53:10,25	66:22
family 77:6	109:20,21,	110:14	79:3,18
fashion 28:6	22 110:3,	FERC 22:4,9	108:20
favorite	5,7 114:22	25:10,11	110:20
57:23	116:5,9	94:3	findings
feedback	124:15	FERIX 47:9	47:4,7
Feather 4:20	53:4	fictional	fine 32:15
15:25 22:6	feel 75:16	90:3	fire 89:8
35:20,21	117:17,24	fight 45:25	FIRO 6:11
49:2 79:4	125:16	46:3 48:3,	15:24
82:5,8	feet 9:23,	8,9,10,13,	16:6,23
85:15	25 35:1,2,	15 49:3	24:8 34:3
108:15	4 39:9	84:1,4	42:9
110:7	42:14,16	figure 17:20	111:16
121:10	43:2,6	19:9,25	120:19
125:24	72:15,18	38:25 39:3	121:12,21
feature	78:19,21	40:9	FIRO's 42:14
56:15	102:22	fill 47:15	FIRO-SPECIFIC
featured	116:16	filled 40:23	121:14
98:13	fell 78:6	final 44:1	FIRO-TYPE
features	felt 118:13	53:17	42:23
9:2,5	FEMA 51:10,	124:24	Fish 75:7
98:24	13,15,22,	finally 5:9	fits 89:15
February	25 52:7,	8:21 9:21	five-days
12:1	21,23	59:20	76:17
federal 4:9	53:12,16,	69:24	five-minute
13:16	22 54:2,9,	97:15	
26:23 28:5	12,13 88:3		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: five-year..floodplain

8:9	24:1,21,	53:3,7,8,	107:25
five-year	22,25	15,18,19,	108:2,12,
73:18	25:3,5	20 54:2,4,	17 109:8,
102:1	26:14,21,	7,10 55:4,	10,13
104:11	22 27:6,	5,11 56:18	110:6,16
fix 113:17	11,14,20	57:1 61:15	111:13,22,
fixed 112:23	29:5,6,7,	70:6 71:21	23,25
fixes 106:24	16,18,20	73:6,17,22	112:4,6,10
flag 58:17	30:6,12,	74:10,13,	113:14,25
flood 4:6,8,	13,15	20 79:4	114:5,16
11,15,17,	31:4,9,19,	81:15	115:11,21
24 5:1,3,	21 32:6	82:21,22,	116:3
7,10,11	33:4,11,18	24 83:1,3,	123:13
6:16,17	34:24,25	5,11,14,	125:16,23,
8:16,22	35:6,24	17,18,20,	25 126:2,
10:2,6,7,	36:25	25 84:4,	6,7,8
10 11:6,19	38:14,15,	14,17,22	flood-offs
12:1,11,	19 39:2,	85:5,17,19	31:22 32:2
14,15,19,	12,15,17,	86:1,4,7,	flood-prepping
21,23,24,	20,23,24	10,17	107:6
25 13:4,8,	40:2,7,8,	89:11	flood-related
10,21	14,17	93:17	52:3
14:2,7,9,	41:3,19,23	94:20	flooding
24 15:2,23	42:9,14,	95:16,17	8:15 9:8
16:2,8,9,	16,20	96:15	12:3 40:12
10,13,18,	44:13,23	97:4,6,7,	62:5 77:2
24 17:10,	45:1,4,9,	12,14,16,	79:5 83:5,
11,15	12,21,25	19 98:20	8,12,13,15
18:16,23	46:3,5,20	99:12,15,	84:20 86:2
19:5,8,10,	47:5,8,10,	18 100:2,	floodplain
13,18,19,	19 48:3,8,	4,8,12,16,	51:22
20 21:11,	9,10,13,15	17,23	52:6,16
14,15,23,	49:3,20	102:5,18,	53:2 54:2,
25 22:8,	51:14,16,	23 103:4,	3,9 72:24
10,14,19	17,19	15,23	91:20
23:9,12	52:2,12,	104:1,8,	96:16 97:2
	13,14,15,	13,15	
	18,21	106:14	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: floodplains..form

98:17,19	90:2	23:18	forecast-
106:22	flowcharts	53:10	informed
110:17	88:6	86:14	5:23 6:10
floodplains	89:20,25	125:3	16:21
94:23	flows 11:15	126:19	forecasted
99:10,23,	13:5,7	follow-up	83:10
24 101:16	30:17,20	18:2 20:13	forecasting
107:8	32:25	125:8,12	5:7 6:7
109:18	33:1,25	Folsom 28:5,	17:20
floods 8:20	50:11	21 32:5	37:11
10:12	72:17 85:2	Forbis 23:24	43:19 76:6
13:23	102:19	25:2,18,22	78:2 80:7
14:18	103:1,7	26:5,6	95:12
16:19	flyers 94:21	28:11,15	124:12
18:10,12	focus 4:23	31:11,14	forecasting-
19:18	5:2,3 6:8	32:11,15	related 6:8
22:24	56:9,10	36:17	forecasts
106:6	60:4,7	121:8	6:11,15
115:24	83:15 86:1	Forbis'	12:13
floodway	99:7	22:16	14:22
47:18	focused	Forbises	77:22
floodways	46:22	26:7	79:9,14
45:24	50:24	forecast	85:1,4,6
47:12,22,	63:20 99:3	16:12	98:15
25	focusing	73:13	110:4,9,11
floor 54:16	68:14	76:13	121:16
Florida	104:4	77:16,21	foremost
99:20	fold 96:6	78:14,15,	59:7
flow 11:6,	folks 14:12	23,24	forensic
19 13:9	45:17	79:10,12,	56:9 57:15
35:15,18	50:22 71:5	15,21,22,	foresee
38:21,23	117:20,21,	25 82:2,3	59:16
39:6,25	23	84:25	foreseeable
48:21 71:1	follow 7:12	85:7,18	44:4
flowchart	17:23	86:19 99:5	form 27:4

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: formally..get all

30:1,3	four-and-a-	83:17 84:6	Gary 4:7
88:20	half 43:9,	functional	6:23 72:19
formally	18	42:15	122:20
53:8	fourth 27:18	121:18	124:22,23
format 90:4	framework	funding 52:7	126:23
forms 88:19	22:25 23:2	96:2,13	gate 11:11
formulas	frameworks	100:11,15	70:10 75:4
66:22	59:6	114:19	gated 32:7
formulate	frees 68:20	115:7	43:23
121:1	freezing	116:5	gates 75:2
formulation	9:21,24	funds 26:23	116:25
102:11	78:18	115:12	gave 42:5
forthcoming	frequency	future 14:7,	113:8
115:14	22:14 24:5	14 24:23	general
fortune 20:7	95:14	42:11 44:4	52:16 97:3
forward	frequency-	51:16,25	124:14
41:25	based 95:13	54:10	generally
50:19,25	frequently	55:11 62:5	4:25
96:21	57:7,10	63:25	111:14
112:12	61:20	64:7,11	generate
114:8	80:12	68:21	78:15
126:9	Friday 4:2	69:14	generated
forward-	friend 86:15	97:15	9:20
looking	Friends 21:4	101:10	geographic
63:23	front 62:6	105:7	77:16
found 19:12	68:11 80:4	112:3	geographically
93:4	frustrating	115:15	29:11
114:23	18:20	116:20	Geological
foundation	full 43:10	124:17	14:11
51:17	63:1	125:10	George 45:15
foundational	fully 23:6	<hr/> G <hr/>	geospatial
59:8 74:9	function	game 92:20	52:13
104:25	29:13	garbage	get all 38:1
		47:16	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: give..half

give 23:21	114:22	28:15	29:1	98:23
33:15 65:5	116:9	32:11		group 10:14
80:14,23	124:16	34:10		14:12
86:22	Governor	36:10 42:2		89:14
107:14	68:1	43:14		96:16
111:3	governor's	45:14 49:7		111:5,6
115:18	87:4 90:25	76:18 81:8		groups 69:25
122:18	governor-	86:20		growth 99:10
goal 42:14	appointed	90:14		101:21
54:8 56:16	109:15	93:10		guaranteed
105:23	governs 28:8	96:23		55:21
121:16	granting	97:19		guess 31:17
goals 83:7	115:16	102:7		44:20
111:12	graph 61:8	105:9		105:12
Golden 11:11	102:15	107:10,12		117:8
70:9	graphic	108:25		guesswork
good 4:5	77:23 78:8	114:12		43:20
11:9 12:21	97:18	121:9		guidance
13:24	99:24	124:21,22		53:23
16:15 20:7	100:18	125:5		guide 63:24
21:8,10	101:1	greater		68:20
22:15 25:2	104:3	48:20		guidelines
36:19 55:1	107:1	62:11		13:16,19
57:25	114:25	greatest		23:8 88:4
61:20	graphical	94:25 95:1		109:23
72:25 76:3	33:6	107:7		guides 13:15
82:20	graphics	greatly		Gulf 58:24
89:17	80:7	38:22		guys 28:22
117:20	grasp 18:11	39:8,10		36:8
125:17	great 15:9,	119:7		
government	12 18:23	green 78:2		
53:11	20:17,23	99:1		
83:22	21:2 23:24	101:18		
87:11 88:1	25:19	105:14,24		
90:22		Gridley 79:4		
110:6,7		ground 74:17		
				H
				half 106:17
				109:3

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: halfway..highlight

halfway 120:23	happening 19:16 36:24 76:24 78:3	health 8:9 82:14	high 16:2 37:7 48:2 54:1,4 65:21 70:24 71:17 73:23 83:1,12 85:18,21 87:14,15 117:18,25
hammer 66:1, 2	happily 23:7,14	hear 4:15 8:12 21:10 34:20,21 56:21 61:16 67:12 125:18,19	
hand 5:24 7:25 8:1,5 15:16 63:22 74:22 90:16 91:12	happy 15:7 17:23 23:19 68:25 115:9 121:8	heard 14:10 65:25 112:24,25 125:3	high-hazard 66:10
handle 5:5 14:9 33:20 37:19	hard 61:11 69:1	hearing 4:3	high-level 55:9
hands 38:3,7 44:16 45:17 75:24	harder 60:6 106:20	hears 12:22	high- reliability 58:9,20 66:6 69:6
hands-on 48:5	hark 123:16	heavier 9:7	
happen 49:25 57:20 64:3 68:15 76:10 78:2,13 83:8	harm's 94:1	heaviest 9:17	
happened 11:16 19:6 20:1 22:11 35:6 40:9 50:8,14 68:7 71:2 77:25 78:6 113:19 115:14	hat 56:5 110:22	heel 35:14	high-water 19:12 46:3,4 47:24 48:17,18, 23 49:4,6 75:13
	hazard 10:22 14:21,24 51:16 52:12,14, 15,23 54:1,4 60:16,18, 20	height 33:22	
	hazards 53:7 89:1	held 100:3 126:17	
	head 48:11	helped 96:12	
	Heads 76:22	helpful 59:5 111:14	higher 10:2, 25 63:6 71:16
	headwaters 4:21	helping 6:25	
		helps 47:21	highest 99:20
		hey 21:10 28:2 45:1, 11 50:17 92:4 95:9 105:9	highlight 27:18 51:13 58:9 73:16

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: highlights..impacts

highlights 61:5,10	126:16	hydrologic 37:10 52:25 76:13 77:18 78:4,12	illustrates 68:10
highly 113:18	hopes 56:17 hoping 50:23 116:8	Hydrologist 76:4	image 28:25 97:5
hill 61:2	horizon 58:23 103:16	Hydrology 17:12	imagery 47:11,14
historic 19:18 52:3	hosted 66:9	Hydrology 17:12	imagination 64:16,21 67:24 69:11 70:1 123:19
historical 13:14 19:11 22:22	hot 114:15 hourly 80:13	<hr/> I <hr/>	imagine 64:21 66:3
history 13:14 19:20,22 41:7	hours 80:25 93:18 118:13 119:18 125:18	i.e. 69:8 icon 8:1 idea 10:16 98:2	imagined 60:12 62:21 68:8
hit 33:25	HROS 58:14	ideas 17:2, 22 55:3 66:13	imagining 68:12
hoc 21:19 111:5,6, 11,17	huge 19:17 human 55:16 56:10	identification 45:11	immediately 76:24 79:9
hold 34:15, 17 35:3 49:15 50:5 94:7	humanities 55:20 humans 61:10	identified 8:25 56:12	impact 46:11 47:17,22 120:17
home 14:17 112:21	hundreds 9:2 hurricanes 10:16	identifies 88:25	impacted 52:25
Homeland 69:17	hurt 77:3	identify 15:4 53:6, 23 89:21 125:8	impactful 76:17
honestly 69:1	hydraulic 48:25 53:1 96:4	ill-defined 66:17	impacting 11:25
hooking 20:24	hydrograph 24:13 39:8	illustrate 67:11	impacts 47:25 48:20 70:3 83:16 85:9 86:2,6
hop 36:12			
hope 68:15			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: impair..information

108:20	116:10	65:14	inexpensive
impair 46:12	improves	inconsistencie	113:17
importance	12:13	s 65:15	inflow 24:13
104:24	improving	incorporated	39:4
115:24	121:16	75:15	40:11,17,
124:9	inches 62:1,	increase	21 41:8
important	3,4	11:15	78:22
9:6 11:7	incident	12:8,9	inflows
17:18 32:9	58:23	54:9 63:11	37:13
34:23	88:14,20	101:15,19,	41:10
48:17,20	89:7	22	77:19
64:1 73:24	incidents	increased	78:20 85:2
84:14	48:15	70:6	info 25:15
89:16	83:14	101:17	inform 6:12,
97:20	87:10	increases	16 62:25
109:7	include 5:21	101:20	85:7 97:14
117:15	46:6 57:24	115:20	98:15
118:20,24	65:13 66:5	increasing	120:9
importantly	85:11,20	30:22 41:1	125:25
80:24	88:18 93:6	63:14	information
125:13	included	115:12	5:1 7:12
imposed	31:8 68:3	increment	22:23
62:10	88:5,16	98:4 116:8	25:6,9,11
improve 15:5	93:2 114:5	incrementally	47:8 51:4
53:15	122:7	123:24	52:14,17,
86:11 87:8	includes	indefinitely	18 53:5
119:7	51:24 56:9	123:7	57:8 64:2
improved	100:15	individual	68:25
96:22	including	90:5	76:16,22
123:24	11:8 36:21	individuals	77:14
improvement	49:3 53:11	60:17,21,	79:16,19
59:2	100:1	24	80:1 81:19
improvements	103:21	industry	83:22
34:5 101:9	incompleteness	56:14	85:11,18,
109:11			22 86:9,17
			88:15,17

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: informations..inundation

89:3	91:21	injected	10:4	51:21
92:13,15		65:10	instructions	interest
94:4,18		innovated	110:24	108:10
99:3		10:17	insurance	109:4
104:18		innovative	12:23	interested
105:14		64:1	52:15,19	111:17
111:10		input 51:23	53:19 54:4	interesting
118:7,21		89:10	98:20	20:6 95:20
120:8		inquiring	intact 93:24	interfacing
122:4		58:25	integrate	76:9
informations		inspect 46:5	125:10	interim
120:16		49:23	integrated	21:17,22
informs 86:4		inspection	9:12	24:23 44:2
infrastructure		45:21	integrates	112:2,10
34:4,5		46:22	9:12	internal
45:4,8		47:10 50:7	integrity	69:19 82:2
56:13 60:1		inspections	46:11	interpolated
69:17,21,		45:22	59:8,12,23	95:15
22 98:21		46:7,9,10,	68:18	interpret
109:11		24 47:1	intended	99:5
116:22		49:3 50:5	29:8,13	interruption
infrastructure		73:7	34:12 55:8	82:18
's 57:16		124:10	84:19	interval
ingested		inspector	intense	56:25
78:12		46:12	83:12	introduce
inherent		inspectors	intent 24:1	72:22 97:3
108:9		46:8,10,24	intentions	introduction
inherited		47:14	99:8	55:9
123:21		48:4,21	interact 9:6	inundation
initial		instance	interactions	5:22,25
87:21		28:13	109:24	62:5 70:3
initially		34:3,7	110:20	71:12,25
29:23		93:9	interactive	72:12,15
initiatives		Institution		
122:8				

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: invaluable..keeping

87:18	102:10	17:25	joined 4:8
88:11	107:22	34:19 38:8	42:10
90:20	108:11	45:19	joining 6:24
91:3,18, 19,20,23	119:14	54:21	126:22
92:1,7,23	involvement	105:10	joint 16:6
93:6,20,22	120:11	January	84:24
95:12 96:3	121:23	81:18	Jose 93:4
108:21	122:1,6	Joaquin	journal
110:16	involves	106:8,20	53:11
invaluable	97:22 98:8	115:3	judgment
77:13	INWS 80:16	job 60:14	63:24
invest 98:12	ironic 64:12	74:4	July 118:6
investigate	issue 77:4,	124:13	126:16
57:21	22 80:18	Joe 22:16	jump 23:22
investing	85:3 93:19	23:7,14,21	103:11
101:25	98:16	25:20,22	119:17
investment	issued 78:23	26:3,6,7	jumping 26:9
5:12 40:4	85:6	28:2 31:10	June 44:11
97:8 98:3	issues	32:13	jurisdiction
100:14,19, 20,24	46:11,12,	36:17	89:6
115:1	16 94:17	37:24 44:9	jurisdictional
investments	114:14,17	122:12	87:13
97:4,15	122:23	124:11	jurisdictions
101:15,19, 21 106:3, 21	124:17	John 21:18, 21 38:9,11	88:12
invited	issuing	42:5,7	90:10
120:24	110:3,9,11	43:14	justification
involved	items 47:16,	44:14	91:8
18:21	18 83:20	45:14	103:16
26:13	84:14	50:17 71:7	<hr/>
27:24 28:6	125:2	92:4,24	K
52:22	126:20	111:21	<hr/>
		118:5	Kearns 6:25
	<hr/> J <hr/>	join 20:3	keeping
	James 8:10	102:3	
		118:2	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: key..levees

105:2	lack 50:10	78:22	leave 69:5
116:12	66:16	106:11	75:23
key 5:2	67:23	110:11	84:17
9:8,19	111:15	largest 13:5	ledge 61:3
10:12	123:5	lastly	left 38:25
14:16,17,	lake 39:5	88:15,21	40:10
22 58:14	40:24 75:4	late 65:8	60:25
83:20 84:6	land 5:13	117:1	left-hand
kind 7:18	67:5 98:19	launched	61:8 77:25
17:2,21	99:19	14:11	legislation
19:15	100:5	law 6:2,4	26:15
28:13 29:2	101:9	83:21 84:9	87:10
31:18,19	landings'	89:8 99:16	90:24
32:4 36:14	4:23	laws 109:23	legislature
45:3 66:17	Lara 93:4	lay 30:11	99:13
73:3 74:8	large 4:21	layer 52:12	100:21
91:5	11:21	53:25	115:10
124:16	17:15	67:17	letter 53:17
Kings 49:2	31:22 32:6	lead 12:16	letters
knowable	37:4 38:19	26:3 57:16	53:12
60:5,8	59:18	72:2	116:17
62:18	83:12	leading 12:2	levee 33:19
64:12 67:9	98:24	43:17	38:24
105:19	103:20	leads 13:3	39:22
knowledge	110:4	29:24	46:11 47:3
37:10	117:5	70:16 74:9	50:9,10
65:12	large-scale	Leahigh	83:24
125:20	97:7	21:18,21	85:14
<hr/>	largely	leaks 47:3	100:6
L	59:22	leaning 73:3	101:5,9
<hr/>	larger 24:25	learn 6:3	108:18
Lab 96:18	25:4 34:8	96:17	114:17
labeled 30:9	37:3 40:22	levees	123:4
Laboratory	41:2 67:13		124:14
96:2	77:16		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: level..locate

33:20,22,	100:12	64:17	lived 115:23
24 34:6	108:22	likelihoods	lives 40:13
45:23	leverage	57:6	88:24
46:6,13,	58:12	limitation	101:7
15,23,25	59:13	65:12	106:4,5,11
47:25 48:2	69:12	limitations	Liz 74:12
49:5 71:18	leveraged	65:13	82:20
84:18	96:19	limited	106:13
99:22	leverages	40:19	loaded 57:9
100:1,3	59:14	41:20	local 6:1
102:14	68:18	62:22	46:2,9,17
104:17	leveraging	64:21	47:5 48:1,
106:24	56:17	103:18	5 51:23
107:2	liability	links 86:18	52:4
112:23	15:24	Lippner 4:5,	53:12,23
113:13	Lidar 52:9	7 72:20	74:18
122:24	lies 100:9	91:11	78:25
123:13,20	life 55:15	122:20	80:23
124:1	61:15	124:22,25	83:24 84:7
level 13:24	62:19	listed 58:24	85:14,20
16:2 18:6	65:11	65:13	86:8 88:1,
31:21 43:6	76:25 83:7	listing	22 89:7
52:17	101:2,11,	104:23	98:22 99:7
64:6,8	17 105:16	literally	100:5,12,
65:21	107:23	74:4 105:1	15 103:19
78:21	life-	110:19	110:17
89:2,7,9	threatening	litigation	114:19
90:1 94:4	77:10	49:21	115:15
98:22 99:9	lifetime	50:21	116:1,6,7,
103:19	68:9	live 7:4	12
110:4	light 52:9	23:15	locally
116:12	99:9	25:24	117:6
levels 72:7	likelihood	99:23	locals 48:11
74:18	57:4 60:19		84:17
78:10,11,			locate 47:15
18 85:2			
99:7			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: located..make

located 8:1	losses 51:16	Low-hazard	50:11
94:2	54:10	87:15	98:22
location	lost 101:7	lower 15:16	100:6
78:1	105:4	21:24	113:4
locations	lot 7:15	31:21 34:7	114:14,17,
48:18 85:4	16:15	38:17	20,23
log 20:14	17:22	39:8,13	115:4,8,
88:19	19:24	61:8	12,25
119:4	20:1,6	106:19	116:11,21
long 8:8	32:4 33:23	Luisa 90:3,8	117:3,11
9:3,19	41:22		123:1
10:18	43:19	----- M -----	major 8:15,
11:13 30:2	44:10,20		20 44:7
115:23	61:16 67:4	made 40:4	58:18
long-line	73:25	92:11,18,	106:6
77:5	80:10	22 100:9	122:23
long-term	93:15	main 31:24	123:4
100:22	96:20	32:5 89:20	majority
longer 10:23	103:20	mainstem	31:21
78:3	104:6	77:19	57:17
118:14	106:22	maintain 5:4	make 7:21
longest	112:5	49:5 83:19	15:20 18:1
52:21	113:7	maintained	20:18
looked 10:6	116:11	113:11	23:11
39:19	117:5,20	117:18,25	24:12
54:22	119:20	120:8	26:11
57:13	lots 66:18	maintaining	30:16
lose 106:3	86:25	46:2,9,18	33:2,11,17
losing 106:5	love 18:19	47:5,7	34:4 36:12
loss 40:13	66:20	48:1,5	42:3,22
62:19	low 32:14	83:24	43:11
101:11	43:6 64:8	85:14	81:12
105:16	116:18,19	100:16	84:10
107:23	low-cost	maintenance	85:9,18,23
	101:25	46:19	86:9,15
			90:9 94:8
			97:4 103:3

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: makes..matter

107:20	100:8,23	map 32:16	markers
108:5	104:25	51:14,19,	48:23
111:23	106:22	22 52:2,	marks 48:18
119:20	109:21	18,21	
122:18	125:25	53:15,25	Marysville
125:3,6,22	126:1,7,8	72:12,18	42:13,19
makes 56:23	manager	79:3,5,17	44:24
111:17	45:21	87:18	81:21
making 14:23	72:24	88:11	121:18
manage 12:14	82:21 97:2	91:19,23	master's
29:8 83:18	98:17	93:20,22	56:2
97:24	managers	96:3	masterful
99:14	76:10 79:2	mapping	60:14
manageable	80:13,17	5:11,22,25	match 75:18
59:17	83:21	51:22 52:6	materials
managed	110:17	53:2,5	84:4 103:7
56:15	managing	54:9 69:5	matrix
60:12	97:22 98:1	75:14	120:25
management	99:1,17	95:17 98:8	Matt 15:13,
4:8,16	123:21	109:18	14,17
12:21	manifests	maps 51:16,	16:14 18:1
38:14,16	95:24	17 52:14	20:17
41:19	manual 24:8	53:8,18,19	21:3,18
44:12	27:5 28:8	54:2 88:11	25:7
51:12,17	30:11 31:7	90:20	34:14,15
52:16	32:2 34:25	91:4,18,	38:2 42:6
55:4,5,11	35:9,11,19	20,24	43:11,12
56:6,19	39:15 40:8	92:1,2,7,	44:6,9,24
59:6,8,24	45:11	23 93:5,6	118:9
60:15	120:5,10	95:16,18	121:3,9
61:16	121:11,19,	110:16	
68:18	23 122:7	Marino	matter 93:18
73:22	manuals	108:16	118:16
82:23	27:15	mark 8:9	119:18
84:22	28:18	19:13 65:4	122:25
98:19	111:14	75:14	125:4

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Matthews..Mierzwa

Matthews	measures	125:11,24,	91:2,10
76:2,3	44:3 48:16	25 126:10	merging 64:1
81:9,16	53:6 84:2	melt 11:19	mess 66:17
82:1,11	102:13	melting 78:9	67:5
Matthews'	media 76:9	members	message
73:11	77:7 79:1	109:15	15:21,22
mature 58:21	80:11	111:6,16,	115:21
66:7	83:23	17	messages
maximize	85:8,16	memorandum	77:1
14:23 34:4	meet 13:25	84:10	messy 66:24,
maximum	42:24	Mentink	25
29:16	43:8,20	15:13,19	met 31:7
35:2,15	82:16 83:6	18:3,22	methodologies
71:21	meeting 6:20	19:1,4	13:16
94:25	8:8 20:13,	20:5,11,23	37:20
meaning 9:23	14,22	34:14 38:2	methodology
13:11	44:11	42:6,8	18:15,20
119:21	71:24	43:16	methods
meaningful	81:21	44:7,10	13:23 65:2
58:4	92:6,9	118:9,11	Mexico 58:24
means 25:16	117:9	121:5	Michael
58:6 76:16	118:3,8,12	mention 5:20	8:12,16
106:9	119:2,24	8:7 25:9	21:9 22:19
115:21	122:4,20	104:8	23:17 97:1
meant 15:3	126:15,16,	mentioned	Mierzwa
111:23	18	23:10 30:9	72:22,24
measure	meetings	35:12	92:25 93:1
17:17	4:14 6:10,	60:10	94:11
84:20	14 7:18	84:24	96:25
120:25	53:21	85:25	97:1,2
measured	86:11	mentioning	102:8
70:25 71:1	89:14	113:5,8	103:12
measurement	100:5	Meredith	105:22
72:17	102:5	87:1,3,4	109:1,2
	109:13	90:15	
	119:9		
	120:1		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Mierzwa's..mute

113:23	minimum	101:3	mounted
114:12	87:25 89:7	moderate	123:22
123:12	minute 7:1	11:4	move 36:14
Mierzwa's	23:21	modification	37:25 38:8
96:16	81:11	27:23	45:15
Mike 25:7	86:22	modifications	51:3,8
72:24	103:3	27:20	54:14
92:25	minutes 7:6,	moisture	103:20
93:10	7 54:17,18	10:20,24	107:10
94:11,12	70:19	moment's	112:12,18
95:7 96:25	82:16	48:10	114:7
102:8	107:13,14	money 96:8	moves 9:4
103:11	111:3	107:3	10:24
105:9,12	missed 61:22	110:19	11:23
109:1	missing 47:2	monitor 73:4	moving 9:10,
113:22	mitigate	monitoring	14,15 11:2
123:11	12:17	107:24	25:20
Mike's 29:3	53:20	108:7	40:15
miles 9:2,3	mitigation	much-needed	126:9
99:22	6:17 53:6	10:20	
milestones	81:3 84:2,	monthly	
52:21	5 102:12	100:3	multi-hundred-
million	mix 17:16	102:4	million-dollar
35:2,4	mock 69:14	109:12	114:24
93:24	model 75:15,	months 53:17	multiple
99:23	16,21	81:2,3	11:21 12:2
115:2	modelers	morning 4:5	15:17 30:6
mind 5:14	48:22	55:1 68:3,	65:1,23
17:19	modeling	24 78:5	94:23
36:20	64:5 75:12	82:20	multiplies
mindful	95:12 98:9	Mother 75:18	9:13
58:14	models 48:25	MOU 110:6,	multipurpose
68:19	53:1 66:12	23	4:21 31:5
minimize	78:12	mounds	mute 44:19
14:23		123:22	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: mutual..numerous

mutual	37:15	NFHL	52:12,	76:6
111:7,19	68:12 93:8		13	85:19,21
	95:3	nicely	68:10	88:6,22
<hr/> N <hr/>	121:17	Nick	4:12	89:20,25
	needed 33:9		6:22,24	90:2 94:21
nail 66:2	39:20		15:19	notifications
names 11:1	44:2,7		20:11	80:17
naming	45:4 48:7,		33:12	89:24
18:15,18	14 52:5		36:17	notified
narrower	54:7 65:6		50:17 92:4	119:10
77:17	86:7		117:7	notifies
	102:25		124:25	86:4
national	needing		125:9	noting 44:15
12:23	79:19	night	54:24	45:17
52:12,15	neglects	nominate		notion 13:3
58:22	63:14		121:1	17:3
73:12	neighborhood	nonstructural		Nowadays
76:2,4,11	96:10		104:21	30:1
80:24	NEPA 122:6	noon	122:17	nuances 55:8
82:11	net 99:20	northern		nuisance-type
83:6,9	network 77:8		10:9 99:25	77:2
84:24	networks	note 6:18		number 28:4
89:10	78:5		7:9 44:15	56:21 61:4
95:11	Nevada 76:12		62:20	68:2 69:24
96:2,3,17,	77:15	noted 38:3		73:22 90:6
18	79:12		44:24	105:15
nationally	84:25		64:15	106:4,10,
52:8	85:5,7	notes 20:12		18 109:14
natural	86:19		48:11	116:18
108:15	Newsom 68:1	notice 48:11		numbers
nature			90:6	10:25
59:22,23	newspaper	notices		100:21,24
74:12	19:14		53:13	105:21
75:18	53:12	notification		numerous
121:21				
necessarily				

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Oak..operations

53:21	occurrences	51:24	opening 75:4
	61:12	53:4,6,9,	113:13
<hr/> o	occurring	17,23	operate 5:5
Oak 96:1,17	37:14	offline 7:12	28:7 40:16
	41:14	51:6	operated
objective	63:16	older 94:17	38:16
32:25	68:14 79:6	omits 62:23	60:13
objectives	Oceanography	omitted	operating
16:2	10:4	65:17	29:6,21
obligation	October	one-and-a-half	30:5,17
43:21	11:10 36:2	62:3	32:20 42:9
observation	OES 71:12	one-off 19:1	108:22
78:5	87:14,20	one-offs	operation
observations	89:5,9,12	20:25	28:9,14
12:13	90:3,15	one-on-one	42:23
14:22 64:9	OES's 80:20	89:14	74:13
observed	offer 48:13	one-time	80:20
79:23	117:7	100:20	107:25
obstructing	offered 96:9	ongoing	operational
103:7	office 51:19	100:20	85:10,23
OCAP 71:23	76:5,11,	open 17:25	92:11
72:5 92:6	12,15	34:13,19	operations
117:9	77:15 79:1	43:20	5:23 6:11,
occasionally	80:25	49:10	12 16:22
74:7	81:14,16	90:14	21:17,22
occasions	87:2,4	102:7	24:11,14,
48:3	offices	107:11,15	23 26:13
occur 40:6	76:7,8	112:16	27:6,12,
	85:15	opened	13,20,23
occurred	official	113:15	30:3 31:4
46:4 63:21	20:20		33:9 39:14
91:16	85:18		40:6,17,20
occurrence	122:1		44:7 73:14
63:25	officials		75:10
			82:21,24
			83:4,5,11,

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: operators..oversee

14,17,20	47:16	27:1,14,17	Orville
84:14,18	order 38:6	28:4,19,21	98:13
85:5,17	40:25	31:1,5	outflow 39:8
86:1,4,7,	84:15 86:8	32:18	40:19
10,17	87:8 89:23	33:7,19,21	41:1,20
89:11	orders 85:22	34:2,7	outlet 31:21
98:14,15,	Oregon 85:5	35:6,14,	43:6
21 106:15	organization	15,23	outline
112:2,6,11	59:3 69:6,	36:21	13:16
operators	19	37:1,18	outlined
41:16,17	organizational	38:14,15	34:24
66:11 75:2	55:16	39:14,15,	outlook
opinion	56:10	23 40:4,	76:17
61:21	organizations	10,16	outreach
opportune	58:9,11,21	41:3,6,24	51:15
126:4	66:6	42:10,18	89:13,16
opportunities	69:11,18,	44:23 46:7	91:6
7:19	20	68:1 70:2,	overcoming
53:22,24	organizers	24 72:13	68:13
96:11	70:10	75:1 78:20	overgrowth
104:11	original	81:17 93:6	46:16
opportunity	42:18	102:17,19	overhead
55:3 61:22	95:10	103:3	9:19
68:15	123:23	107:25	overlaps
119:20	originally	112:24	121:20
opposed	123:22	113:2,3,14	overlay 67:2
105:25	Oroville	114:3	overloaded
opposite	4:13 5:19	117:12	57:17
66:19	6:9,13,19	118:2	overnight
oppositions	7:18 16:5	122:24	78:6
30:2	18:5	123:6	oversee
options 61:4	21:12,17,	125:11	27:11
101:25	19,22	126:14,18	
orchards	26:14	Oroville's	
		24:14 42:8	
		43:1,21	
		44:12	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: overseen..people

overseen	80:4	participation	63:20,23
41:17		95:1	64:8,9,10
	panelists	126:22	68:20 71:2
oversight	112:17		96:22
109:16	125:14	parties	
		18:20	Patrick
overtopped	parameters		34:13,19
40:25	30:7	partner	36:6,11,
		76:16	13,18
overtopping	part 5:16	77:13 85:7	49:18 51:2
37:1 124:6	12:22		
	15:7,21,22	partners	81:10,11
overview	16:18	22:15	93:11,12
55:9 97:12	58:11	53:22	94:9 102:9
105:9	71:12,13	85:20	103:10,13
	74:25	94:16	104:23
overwhelmed	84:23	109:20	107:17
102:23	92:12		119:1
owner 88:7,	95:19	partnership	
9,21 89:3	98:10	27:10	patrol 48:2
90:6 91:5,	101:12,14	94:16	
7,8,22	103:16	104:7	pay 50:12
	117:8		61:18
owners	121:19	partnerships	76:23
87:12,24	122:1,13	54:6	
89:5,16		parts 76:7	peak 10:2
		85:4,5	12:10
owners' 87:8	partially	pass 23:12	13:7,10
	26:23	31:23	39:6,25
		55:23	
	participate		peaky 39:4,6
	6:5 81:4		PEARCE 15:14
pace 12:5,8	117:16	passed 38:22	21:6 54:23
14:19	119:10	39:9 40:1	105:11
pack 77:20	125:23	87:10,19	
	126:10	90:24	pedestrians
packages			70:15
27:19	participates	passing 33:3	
	86:10	34:8 39:6	peer 69:20
packed		115:20	
125:17	participating		penetrate
	8:3 125:1,	past 11:10	46:25
paid 50:13	15	14:2 50:21	people 26:12
pandemic			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: people's..plan

56:16,21	performances	personnel	79:24
59:14,16, 24 60:13	121:2	48:6	pictures
67:12	performed	perspective	80:6
70:12,13	41:6 48:13	55:14	pie 116:6
74:4 93:4, 17,21,24	performing	63:23 73:2	piece 19:10
94:1 99:23	48:12 84:5	104:21	pieces 50:20
101:23	performs	perspectives	piles 47:16
105:1,2,16	45:22	65:3	pink 78:2
107:2	period 7:23	pertains	pipes 46:24
110:10	16:11 17:5	26:21 27:6	pivot 12:18
115:23	18:12	31:9	place 17:21
117:5	34:18	pertinent	20:4 48:23
119:19,20	36:15 38:5	72:3	84:11
people's	44:18	phenomena	93:16
26:7	49:16 51:7	56:12	places 90:11
percent 9:3, 5 10:7,10	53:13	phone 8:4	plain 104:25
42:20,25	56:24 63:8	80:14	plan 24:2
43:1	78:17	89:13	27:4 30:10
percentage	86:25	phones 77:12	31:3,8
13:12	95:16	80:15,19	42:18
perception	106:7	photograph	43:16,23
109:3	periodically	19:14	46:5 53:20
perfect	17:14	physical	71:14,22
64:10	110:16	34:1 55:16	73:6,19
75:18	permanent	56:11	92:20
106:24	84:22	physically	97:6,7,12, 13,14,17
perform	permanently	70:14	99:14,19
29:14 48:8	84:18 94:2	physics	100:1,3,7, 10,12
performance	permitted	17:17	101:8
16:20 18:6	35:9 47:18	pick 16:19	102:1,4,11
101:5	person	66:4	103:15,22, 23,25
104:16,17	126:17	picture	
	personal	38:25 52:4	
	54:20 59:1		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: plan's..practice

104:13	120:12,13,	14 103:14	27:1 98:3
105:6	15,19,22	109:17	portion 29:3
114:6,16	121:1	124:5,16,	30:10
115:11	plants 45:23	21 125:22	77:23 98:4
116:3	plastic 84:4	pointed	100:1
125:25	platform	108:11	position
126:3,6,7	7:24	pointing	37:9,22
plan's		117:9	90:25
120:17	plausible	points 14:16	positive
planned	14:6	23:7 30:16	58:21
117:12	play 37:14,	32:21 75:9	66:7,12
planners	15 59:7	79:22	posted 20:20
104:19	plethora	policy 23:8	53:9 118:7
planning	78:25	political	126:18
5:12,22	79:16	107:4	posting 80:5
6:3,17	PMF 22:6	pool 21:25	potential
16:12	23:10 25:9	31:20,25	14:7 45:7
41:22	62:8,9	32:1	58:14
51:23 73:3	PMFS 24:6	110:11	59:16
74:10	PMP 23:10	population	60:16
76:18	Poeppelman	99:10	68:16,19
87:5,9	25:22	101:21	70:2,4
95:2 96:1	26:1,3	Porgan 81:10	83:15 85:9
97:24	28:2,12	102:9	86:1,6
98:19	31:17	Porgans	88:25
101:9	33:17	34:13,20,	106:10
110:22	point 17:18	22 36:7	potentially
124:10	19:21	49:20 50:4	14:14
plans 18:8	20:22	51:1 81:13	36:14
30:24	23:24,25	93:11,13	61:21
43:5,24	32:10	102:10	pound 8:5
44:3 87:6	35:25 61:3	107:19	powerful
88:18	67:6 75:12	Portal 47:9	59:25
90:19	78:12 80:3	portfolio	practice
92:8,9,18	93:3 94:8,		
93:14			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: practices..problems

40:10	120:14	54:14	previously
58:12			100:18
66:13	preparedness	presenters	
94:19	81:4 87:9	74:12	primary
practices	preparing	125:14	45:25
50:25	97:24	presenting	83:17
pre-event	prescribing	25:24	102:12
110:21	26:20	press 8:4	principals
pre-recorded	present	68:4	106:23
7:3 118:23	63:19	pressure	prior 11:7
precipitation	96:14	114:9	private
9:16 61:25	presentation	pressures	80:15
79:24,25	7:5 8:15	99:12	proactive
82:3,4	25:21	102:14	58:12
precisely	34:12 38:9	103:1	probabilistic
66:24	42:5	pretty 8:8	79:21
predecessor	45:15,19	32:14	probabilities
93:4	49:9 51:9	67:14	16:12
predictor	55:7,8	75:16,21	21:12 61:7
64:11	70:19 73:4	112:5,7	116:20
preliminary	81:9 82:23	122:17	probability
53:8,15	86:22	prevent	62:9
preparation	90:12 93:2	40:25	63:12,19,
27:19	94:24	59:18	22
prepare 5:10	96:25	105:20	probable
68:16	113:8	preventable	29:16 35:2
73:23 74:6	presentations	60:5,8	71:21
88:10	5:21 6:1	62:18	problem 21:2
99:17	7:2,4,9,22	64:13 67:9	57:19
prepared	8:6,11	105:19	63:13
39:16 48:2	38:1 75:24	prevention	64:19,20
64:10	98:14 99:2	59:14,24	65:7
76:23	118:24	previous 6:9	66:16,24
86:13	presented	7:17 11:13	67:2
	126:14	44:12	problems
	presenter		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: procedural..provide

59:16	40:21	100:1	73:18,19
66:25	72:12	104:10	97:6,12,14
112:22	product	111:22	99:15
113:9	52:3,22	114:2,4	100:4
123:1	production	121:13	102:5
procedural	99:21	projections	103:15
119:13,25	products	64:5,9	108:12
proceedings	53:25 77:4	projects	109:8,13
82:18	80:10	28:9,21	114:6,16
126:25	program	29:10	115:11
process 22:7	12:23	42:12 45:6	116:3
24:9 25:10	51:22	51:19 52:5	125:23
27:16,24	52:16	54:5	126:3,6
29:23,24	55:19	103:21	protections
33:10	76:20 87:7	propensity	50:15
42:24	95:17	108:1	protects
45:11	96:19	properly	99:20
51:14,21,	programs	49:23	protocols
23 65:11	84:21	113:11	70:5
71:13 80:6	106:13	116:24	proven 123:3
84:12	115:15	property	provide
88:3,14	120:8	83:7 88:25	12:16
89:16,18	progress	protect	38:15
90:9 96:12	52:24 80:8	42:16	41:24
110:14	project	71:19	42:13,15
113:5	17:11	88:24	45:13
120:23	21:14,15,	99:22	46:1,3
121:7,11,	23 22:10,	protecting	48:4 53:4,
19,23	14,19 24:1	83:7	22 55:8
122:2,6,7,	25:4 29:8,	protection	68:25 74:1
9	12,16,25	13:25	81:23 94:3
processes	34:24,25	16:3,24	97:11 99:5
123:25	35:5,24	42:9 46:20	109:15
produced	38:13	47:5,20	114:20
53:2	45:21	61:19	115:4,7
produces	47:10 71:5		116:4

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: provided..questions

provided	93:15	purveyor	25 71:6 ,
39:21	100:4	108:10	10,15
45:12	102:5	push 16:22 ,	72:17,25
46:17,19	107:11,14	25 35:9	74:25
47:4,19	109:12	pushed	81:12
52:7,19	111:17	35:10,23	90:18
73:17	117:23	put 20:13	91:2,7,11
84:13,19	120:7,9 ,	37:21	93:12
93:8 94:18	10,20,24	93:20	106:17
114:25	121:6,22 ,	114:9	109:1,3
providing	25 122:3 ,	124:1,8	115:5
10:20	6,10	putting	120:2,21
44:24	125:20	118:23	121:9
83:25 84:3	126:2,12		122:14
86:6	publications		question-and-
108:12	53:11	<hr/> Q <hr/>	answer 29:3
public 7:20 ,	publicly	QR 68:3	questions
23 15:11	53:9	question	4:16 5:25
34:18,23	92:10,22	7:21 8:3	7:6,8,10 ,
36:15 38:5	publish	15:12	13,17,19
44:17	91:23	16:12	15:7,10,20
45:23	published	18:1,13,14	16:15 18:4
49:15	58:22	20:18 22:2	20:12 21:3
50:13 51:6	91:17,21	23:18,23	23:25
53:14	92:2	34:11,14 ,	25:19
73:20	pulled 95:15	15,17	42:1,4
76:10,22	123:22	36:11,19	43:12
77:4 79:2	purpose 4:14	37:1 42:7	49:8,12
80:12	26:23 87:7	43:14	54:11,13
81:20	88:24	44:22	70:19 71:4
83:23 84:9	91:13	49:11,15 ,	81:6,8
85:8,16	121:17	16,19	82:10,12
86:24	purposes	50:3,4,14	86:21,23 ,
88:2,22	31:6 53:19	57:23,25	25 90:13
90:21,24	76:19	61:18,20	102:8
91:6		70:22,23 ,	107:12
92:16,18			116:14

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: queue..record

118:14,25	45:17	35:17	received
125:5	74:22	reads 120:7	55:24
queue 34:18	75:24	ready 48:10	91:22
54:13	90:16	49:5 81:5	recent 25:15
107:16	raising 59:1	real 14:4	41:7 49:1
quick 8:21	random 30:21	23:22	90:24
31:12	range 17:1	26:12	recently
33:14	24:12 72:5	33:14	66:9
36:18	Ranging	36:8,18	reclamation
44:15,20,	52:10	41:15	28:12
21 90:18	rapidly 12:9	44:20	85:13
92:25	rare 61:11	60:20 70:9	recognition
quickly 12:5	rarely 57:17	75:10	60:18
14:19	rate 63:6,	92:5,25	recognize
23:22	10 101:19	real-time	60:16
26:12	rates 30:21	41:14 73:2	110:8
30:22,23	38:23	74:14,17	recognized
36:12 92:5	63:9,14	reality 36:9	99:13
116:15,16	rating 75:1	realize 7:15	115:10
122:23	re-engage	realized	recommend
quote 119:23	126:5	17:7 68:8	84:2
<hr/> R <hr/>	reach 48:19	reason 50:11	recommendation
R&d 121:13,	89:5	92:9,17,21	20:14 43:6
15,21	reaches	99:7	103:24
radial 75:2	104:1	113:16	119:4
rain 9:22	reactive	reasons	121:7
35:2 78:6,	59:23	27:21 45:7	recommendation
15 82:6,9	read 61:9	113:4	s 101:8
rains 9:7	readiness	reassess	recommended
raise 7:24	83:19	104:12	120:15
8:5 15:16	reading	reassure	record 11:13
raised 15:15	15:24 16:7	105:4	14:5 19:18
38:7 44:16	recap 6:18	recap 6:18	49:25
		68:23	50:16

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: recording..reliable

56:24	39:17	regular	relative
recording	44:2,13	86:11	22:22 61:6
118:22,25	58:12	regularly	release
records	100:17	48:4 52:24	25:14
73:20	109:10	regulated	30:19
recover 5:10	114:4	111:23	36:21
recovery	refer 67:12	regulating	37:13 70:1
81:2 99:8	referencing	112:9	72:2 75:5,
recreate	24:4	regulation	8,11,13
19:14	referred	28:5	102:17
recurrence	16:21 63:7	59:21,22,	111:23
106:7	referring	24 120:14	released
red 98:7	57:12	regulations	40:24
100:2	103:13	26:21 31:9	41:12 91:6
redo 17:9	116:23	108:6	126:3,12
reduce 4:11	reflected	109:19	releases
47:21	116:2	regulatory	30:22,23
51:16,25	reflecting	14:1 23:6	33:11
54:7,10	42:12	rehabilitation	37:2,4,6
88:25	reflects	107:3	70:24,25
97:21	111:4	reinforces	71:16,17
101:10,13	regard 73:19	124:9	72:1,4,7
107:22	112:8	related 4:16	75:1 77:20
115:6	region 4:11	30:19	81:19 93:5
reduced	11:25	51:15 55:4	113:14
38:21	22:23	56:12	116:20
39:1,8	regional	102:4	releasing
reduces	104:7	109:9	75:11
38:23	125:24	relates 9:16	relevant
reducing	regions	relationship	111:8,19
39:10	99:21	8:19 31:20	reliability
102:2	register	79:7	56:13,18
reduction	53:12 56:8	108:21	58:16
			65:16
			reliable
			16:3 55:4,

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: reliably..resource

11 57:8	11:24	89:21 94:3	39:1 41:16
59:25	report 44:1	120:13	42:11
123:3	46:14	122:5	77:19
reliably	58:22	requirement	78:10,20,
57:1	81:24	54:4 87:16	22 82:3
relied	104:15	requirements	85:2 98:14
124:15	113:17	14:1	103:3
relies 62:20	Reporter's	30:12,20	107:25
relieved	4:3	33:8 89:15	108:2
102:13	reports	requires	111:22,25
rely 64:16	46:17,19	55:6 63:24	112:4,9
65:6 68:20	73:20	83:19 89:5	reservoirs
116:9	120:19	99:16	26:22,25
remainder	represent	research	28:4,7,14,
57:11	64:19 95:3	56:8,11	17 30:24
remember	representation	61:5	31:5 39:21
17:5	33:7	124:10	76:14
reminder	representative	reservation	79:20,23
15:15	80:21	39:2,17,24	80:8
54:17	representative	40:3,7	resides
126:13	s 4:9	reservations	76:14
remove 103:7	represents	39:12	residual
rendition	101:12	reservoir	57:9,10,14
4:19	request	4:21,22	67:12 98:2
reoccur 6:14	48:22	5:23 6:11,	99:1
reoccurring	84:10	12 16:21	101:19,22
4:13	requests	21:11	resilience
repair 84:18	84:7	24:21,25	54:9 68:17
repairs	require	26:24	resist 62:11
84:22	89:10	29:4,5,20	resolution
repeat 98:15	122:9	30:5 31:2	53:16
repeated	required	32:9,20	resource
	35:18	33:1 35:11	45:25
	88:11,21	37:14	59:15
		38:17,20	69:16

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: resources..risk

resources	6:17 11:16	result	41:1 87:24
8:18	12:14	62:24	revisions
27:11,13	14:8,9	63:11	87:22
38:10	44:15 47:8	101:17,22	120:11
45:16	50:1 74:10	resulted	revisit 17:9
51:20	81:1,25	40:12,13	revisiting
55:10 79:8	83:3,4,18	resulting	17:11
82:22 83:2	85:19	24:25	rich 125:4
87:18	86:5,14	46:17	Rick 25:22,
94:12	88:14	results	25 26:1,2,
95:10,19	92:19	47:19	5,6,9
108:8,9	94:10 99:7	72:10	28:2,16
109:5	101:6	75:17	31:15
110:11	109:19	113:7	32:11
114:2	113:21	return 95:16	33:13
124:19	121:5	returned	Ridge 96:1,
resourcing	responses	87:22	17
96:7	57:24	review 47:11	right-hand
respect	125:10	53:3,21	77:23 78:1
109:18	responsibiliti	87:7,20,	79:11,16
110:13	es 82:24	21,23	rise 64:6,8
respond	88:7 98:22	reviewed	risk 4:15
27:22	responsibility	47:13	24:16 44:2
36:18	6:2 86:3	52:1,4	51:17,22
37:16	98:25	reviewing	52:3,18
43:14	108:7	125:7	53:3,21
86:13	responsible	revise 22:10	54:7 56:6
97:25	46:18 88:9	revised	57:3,9
109:2	98:17	53:18,19	58:12 59:6
112:17	100:5,16	revises	60:15
123:10	restricted	51:15	62:8,20,25
responding	91:5,9	revision	63:12
88:8	restriction	13:18	64:15
responds	90:22,23	51:14	65:18
83:11	rests 108:8		67:12,14,
response 5:7			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: risk-reduction..sadly

22 69:14	73:13	24:7,17	27:14
94:20	75:8,9,19	role 5:1	29:6,21
97:4,7,11,	76:12	38:13 42:8	30:8 36:23
16,19,21,	77:15,21,	44:12	37:6
22,23,24	22 78:1,7,	66:12 83:4	run 95:11
98:2,5,6,	14,24	roles 82:23	Rune 54:15
11 99:1,9,	79:4,10,	rolling	74:1
13,14	12,14,15	75:23	105:8,22
100:12,17,	82:5,8	86:24	113:7
18,23,24	84:25	96:24	123:16
101:2,17,	85:2,3,7	Ron 21:4,6,	Rune's 73:3
20,22	86:19	10 23:20	94:24
102:2	103:8	25:7,19	115:5
107:7,22	104:2	38:2	running
109:10	107:24	90:16,17	32:14 42:2
110:21	108:15,18	92:6 111:1	74:6 82:15
115:6,21	110:4,7	112:15	runoff 8:21
124:2	125:24	113:5	9:20 10:1
risk-reduction	rivers 4:22	119:1	35:1,4
59:15	8:15,18,	122:18,21	82:7
risks 4:11	20,24	123:15	ruptures
99:18	10:12	124:21	47:2
101:13	11:22 12:7	room 103:3	
river 4:20	14:17	rough 43:7	<hr/> s <hr/>
9:9,11,19	76:14	roughly	Sacramento
10:8,15	77:19	106:7	20:3 27:1
11:6,10,	79:19 80:8	round 83:9	28:16
11,21,22	85:15	86:12	76:5,11
12:15	99:25	routine	102:23
15:25	roads 62:23	61:12	104:2,8,9
19:13	Robert 38:2	routinely	106:8,19
20:1,3	70:21,22	58:11	108:18
21:5 22:6	71:3 119:1	rules 23:8	115:3
35:20	Robert's	26:20	sadly 114:6
42:10	122:22		
48:19,22	robustness		
49:2 50:12			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: safe..section

safe 55:4, 10 57:24 58:4,6 59:25 63:16 65:8	37:24 42:2 43:11 44:6,9,14 45:14 49:7,14 50:1 51:2 54:11 70:18 71:7 72:19 74:21 75:22 81:8,25 82:10,19 86:20 90:14 92:24 93:10 94:9 96:23 102:7 103:10 105:8 107:10 108:25 110:25 112:15 113:20 116:15 118:5 121:3 122:12 123:9 124:22 125:9 126:23	20 108:15 115:3 sandbags 84:4 Santa 55:20, 23,24 90:3,8 Sarkisian 74:22,24 sat 95:14 satellite 8:25 save 60:7 76:25 SBFCA 113:25 scale 10:15, 16,18 12:6,10 14:19 96:3,18,20 98:24 103:20 scary 106:4 scenario 14:4,13 15:3 22:21 93:21 95:22,23, 24 96:5,13 scenario-based 21:13 22:20 24:22	scenarios 62:21 64:17,22 67:23 68:12,17 69:13 70:2 94:24 95:4 scenes 80:11 schedule 42:3 scheduled 6:20 118:6 126:15 Schlenk 20:8 scooched 60:25 scope 52:5 screen 8:2 77:24 Scripps 10:3 sea 64:5,8 season 22:1 107:25 108:2 sec 109:25 Secretary 26:19 section 15:25 26:15 28:20 37:25 45:22
safely 5:5 23:12 31:23			
safety 4:6, 8,17,24 5:1,22,24 36:24 44:7 45:6 46:3 56:13,18 58:1,5,16, 21 64:18 65:16 66:7,10 87:5 88:2, 4,14,22 89:11,22 90:19 91:13,16, 25 101:2, 17 118:17 124:14 125:16,20			
Saffold 4:12 6:22,23,25 15:9 17:25 20:17 21:2 23:21 25:19 26:2 31:10,12 32:13 34:10,21 36:6,10	sampling 13:7 San 106:8,		

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: sectors..signing

47:11	82:11	shared 6:9,	showed 81:23
82:21	83:6,9	19 79:9	82:7 107:1
87:12 88:1	89:10	83:7	113:18
sectors	95:11	shares 116:7	showing 26:6
56:14	106:14	sharing 4:25	72:9,18
secured 61:2	110:1	82:1 99:3	88:12
Security	Service's	Shasta 28:22	102:15
69:18	84:25	sheeting	118:16
selecting	services	84:4	shown 72:15
120:25	77:6 81:15	sheets 88:19	98:7,12
selection	85:16	Sheriff's	99:1
18:7	87:2,5	90:8	100:1,18
Senate 99:16	set 29:9,10	sheriffs	shows 29:1
sends 53:16	30:8 35:19	92:14	32:16
Senior 76:4	39:18 45:3	shoot 43:24	38:25 39:3
sense 9:15	54:21	short 42:22	40:9 52:11
18:16	67:21,22	101:24	93:23
24:15 37:4	75:4	short-term	99:25
sensitivity	103:15	11:15	101:15,18
24:7,17	112:13	100:22	shut 68:6
separate	seventh	shortcomings	side 5:16
121:12	26:15	113:6	29:9 30:13
122:5	severe 47:2	shout-out	66:5,19
series 11:24	shape 24:12,	115:19	71:8
114:16	15 69:14	show 31:1	79:11,16
service	79:5	55:23	108:18
63:10	shaped 22:23	65:21	117:17
73:12	share 43:1	70:13 82:9	signed 91:1
76:2,4,5,	55:3	97:16	significant
7,8,11,15	56:15,16	101:9	35:17
77:9 79:1	76:15,22	showcased	87:15
80:16,21,	80:22	66:10	112:8
25 81:10	89:18		120:11
	97:11		signing
	116:1,5		119:9

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: spacing..State-funded

spacing 39:24	spend 119:18	staking 49:4	60:21
speak 7:25 8:5 91:12 114:17 123:13	spending 62:6	stalled 82:5	63:11
speaker 73:11	spillway 22:8 25:14 31:24 32:1,7 42:24 43:24	standard 15:23 21:14,15, 23 22:10, 14,19 24:1 25:4 29:16 34:23,25 35:5,24 94:19 111:22	state 4:9 8:12,16 28:10 38:12 46:5 51:24 71:5 72:24 73:6 74:18 80:20,23 83:2 84:9 85:15,20 86:3 87:12 88:20 89:9 93:5 96:11,19 97:2,13 98:17 99:6,14 100:11,15 103:19 104:13 105:4 109:5 110:2,3,5, 8,18,22 114:22 115:11,15, 22 116:5, 7,12 117:4 124:15
speakers 4:25 72:23 98:8	112:2,5 116:25 123:5,6	standards 35:18 114:21 117:19,25	
speaking 103:22	spots 32:19	stands 19:20	
speaks 74:12	spring 46:8	staring 22:16	
spearhead 124:17	square 22:16	start 7:2 8:11,24 9:10 13:21 26:8,11 37:13 63:16 89:16 106:21 107:5,6 117:8 118:12	
specialist 84:1	stability 46:15	starts 51:19	
specialists 46:1 48:10,12	staff 46:5	started 89:18	State's 126:8
specific 5:13 6:8 15:3 25:3	stage 12:11 114:3	starting 41:7 78:12	state-federal 82:24
specifically 28:17 42:4,7 47:12 49:8 54:11 81:9	stages 30:18,21 63:6 65:11	stair-step 100:18	State-funded 100:2
spectrum 66:20 67:7	stakeholder 4:6 7:6 66:18 125:15,16	stakeholders 7:11 20:15 118:18 119:8,16 125:5,19	
speed 49:24 90:9			

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: State-regulated..stuff

State-regulated	95:23 98:6	90:16,18	stretched
87:13 93:7	99:1	91:9 92:3	70:14
statement	steps 53:10,	107:18	strong 10:17
16:7 68:5	21 122:9,	111:1,2	11:4 54:5
81:14	11	122:18,22	stronger
states 14:11	stigma 68:10	storm 9:23	10:24 34:5
28:18	stitch 94:23	10:1 14:4,	strongly
66:11	stop 69:2	5 35:2	117:17
99:17,21	82:13	39:5,25	struck 68:5
124:5	stopped	40:11,21	structural
statewide	106:3	41:2,14	104:21
83:5	storage	95:14,23,	106:23
statistical	42:14,16,	24 96:13	structure
8:22 13:22	21 43:2,22	storms 10:9,	23:11
17:16,17	98:14	11 11:25	42:12
18:10,13	store 108:1	12:2 76:21	63:10
19:8 21:12	stored 16:1	83:10,12	structured
23:2,4	38:20 39:7	straightforward	66:21
statistics	Storesund	62:13	structures
12:19 13:4	54:15,16,	strategic	45:23 72:3
15:2 17:9,	19,25	99:14	struggles
11 63:19,	70:18 71:3	strategies	24:15
20 64:2	95:3	51:18	studies
status	105:8,9,12	68:23	41:22
104:15	113:7	strategy	52:24
112:7	storing	42:10 58:8	71:11,12
statutory	40:18	61:14 97:8	72:9 121:2
14:1	Stork 21:4,	115:1	study 10:5
stay 7:3	8,11,17	streamflow	17:12,13
stays 13:12	22:18	78:10	18:24
stealing	23:2,17	streams 12:8	29:24
73:11	24:20	strengthen	71:16,25
step 52:22	25:16 38:2	33:24 87:8	stuff 26:9
	49:10,12	stress 38:24	60:6 80:15
		39:10	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: subgroups..taking

92:15	suggestion	64:11,13	104:1
subgroups	21:1	67:9	123:2,13, 23 125:20
119:15	suggests	surprises	
subject	112:25	68:19	system's
118:15	suite 98:12	70:17	62:11
119:17	summarize	survey 14:12	systematic
125:4	118:1	48:24	13:22 15:1 16:18
subjective	summary	surveys 49:1	
61:6	20:22	sustain	systems 5:5
submit 53:15	126:14	14:12	56:4,14 57:18
87:13	summer 6:20	sustainability	60:10,11 100:17
submitted	11:14	68:18	104:15 123:4
87:20,22, 23 91:22	46:10 122:3	sustainable	
subset 62:25	sunny 91:18	Sutter	systems-based
subsidiary	93:20	113:25	55:14
70:25	supply 9:8	115:19	
substantial	14:18	sweep 68:16	<hr/> T <hr/>
64:18,20	77:20	system 12:21	tab 79:10 92:1
substantiate	support 6:25	13:21,25	table 36:14 104:10
108:3	48:11,14	14:8,25	
subtopics	83:24	15:25	tabs 79:17, 18
119:17	102:12	28:14	tackle 60:6 65:24
success	supports	33:20	takeaway
104:6	52:15	38:24	97:20
successful	suppose	39:11,22	takes 27:4 98:2
115:12	117:1	55:15	taking 20:12
successfully	supposed	59:13	40:17 43:8 93:16
115:20	81:20	61:16	
sufficient	surface 75:3	62:10 63:6	
7:10 111:7	surprise	75:19	
suggest	70:9	77:1,11,12	
68:14	surprised	98:24	
		102:24	
		103:1	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: talk..thought

118:19	talks 26:16	84:19	109:17
talk 6:7	target 16:25	ten 76:8	110:20
12:18,19	42:14 75:4	87:25	114:14
13:20	targeting	106:9	116:21
14:16	18:6	tend 30:25	118:20
16:17	teaches 48:3	term 57:9	124:8
23:19	team 45:22	75:10 78:3	125:21
30:11	46:22	104:5	things 11:20
32:17	96:16 99:4	terms 13:20	19:23
38:13	101:4,8	26:18 30:5	22:11
44:10,11	104:18	38:7 56:21	23:16
61:16 68:5	110:19,23	63:4,19	29:22
76:5 97:8	114:18	75:23	32:17
98:10	technical	95:24	36:20
105:17	4:6 46:1	112:23	47:15
106:1	48:14	113:13	49:25
117:22	83:23,25	116:24	57:12
talked 68:2,	84:7	118:8	59:18 73:1
24 72:1	119:23	122:13	77:6 78:11
73:14 92:8	120:16	testing 24:7	80:8 92:8
93:3	125:16	116:17	96:21
109:11	technique	text 80:15,	103:14
110:14	59:14 65:7	17	105:19
talking 5:17	techniques	thank 80:15,	107:19
20:8 26:8	60:6 65:1	118:12	109:9
29:2 35:7,	technologies	themes 7:17	111:15
25 50:19	64:1	56:17	114:6
57:5 60:11	technology	thing 8:7	115:6
69:2 72:5	9:1 52:9	10:14	119:3,23,
73:10,19	temperatures	20:24	25
74:1 81:16	78:17	23:10	thinking
106:13	temporary	27:18	95:5
108:19	27:20	28:15 37:8	thinks
119:19	43:21	57:11 75:6	116:24
122:5		93:2 108:5	thought
123:17			57:13 68:8
124:11			70:16 80:6

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: thoughts..Traditionally

thoughts	12:16	today 4:8,	76:19
117:7	15:6,11	12,14,25	toolbox
123:25	18:4 31:13	5:21 6:4,	65:24
124:24	32:14	6,14,18	66:1,5
thousands	33:15	7:15,20	69:8
9:3	36:16 37:1	8:4 20:1,	tools 65:23,
threat 60:20	38:6 43:12	15,21	25 66:4
84:20	47:8 51:6,	37:21	68:24
three-hour	7 53:14	51:13 55:8	69:8,10
8:8	61:11	56:4,16	96:17
three-minute	63:5,8	60:4,7,15	top 16:12
82:14	78:16	66:13	31:20,25
three-year	81:24 83:8	69:25	32:8 61:3
120:23	86:24	70:16	79:19
threshold	89:17 94:8	72:23	topic 6:8
13:13,24	95:17	73:25 76:5	8:18 19:9
thresholds	105:3	78:13 80:1	55:5
11:2	107:1,3	86:16 87:6	114:15
throw 74:5	108:11	97:3,10	118:4
thrown	111:7	98:7,16	topics 5:20
118:21	112:13,21,	99:2,8	50:23 69:1
thunder	22 115:23	109:21	74:15
73:12	116:9	111:18	97:10
thunderstorms	117:10,14,	112:25	119:16
9:6	21 118:16,	118:12,21	topographic
tide 85:3	19 120:1	126:22	52:8
tied 34:2	123:24	today's 4:23	topography
121:17	126:4	6:1 7:1,4,	52:7
ties 75:9	timelines	8 125:15	total 42:20
tight 125:17	87:21	told 58:2	61:15
time 7:3,7,	times 15:17	toll-free	traditional
10 10:22	17:8 38:17	52:19	77:5 80:9
	46:7 62:8	too-excessive	Traditionally
	93:16	50:11	78:25
	timing 12:4,	tool 17:19	
	7 14:18	58:8 61:14	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: traffic..understands

traffic	102:2	29:19 60:3	65:24
70:11	105:24	72:2 83:10	uncertainty
trained 48:9	107:9	105:19	24:16
training	trifecta	typical	65:10,16,
48:3	59:25	57:24	23 67:3,4,
trainings	troubled	60:14,23	6
69:15	122:23	typically	uncontrolled
transcript	trust 108:23	52:10 57:3	113:2,3
20:20	tsunamis	67:12	underlying
126:17,20	83:13	83:25 84:3	67:17
transcripts	Tuesday 68:1	124:15	123:2
125:7	tune 126:4	<hr/> U <hr/>	understand
transfer	turn 6:21	U.S. 10:6,8	12:7,12
55:21	8:10 21:4	25:23	14:25
transitioned	42:6 44:14	34:16	18:9,11
10:21	76:1 93:11	39:16	19:15 20:9
translate	122:19	46:20 47:6	23:6 52:17
11:5	124:23	84:8 85:13	55:7 93:5,
transparency	turns 9:22	97:18	13 100:21
109:9,16	55:6 66:3	101:4	103:13
transparent	67:21	108:4	115:24
122:15	Twitter 77:9	UC 55:20,	117:23
transport	two-hour 8:9	21,24,25	understandable
9:12 10:17	two-minute	56:4,5	123:20
transported	119:22	66:9	understanding
10:24	two-way	UCLA 20:9	5:4 10:12
trapezoid	119:21	unacceptable	12:14 16:5
30:14	type 8:3	59:10	37:20
trash 46:16	11:16	unauthorized	84:11
treat 67:7	80:15	47:13,23	97:23
tree 90:4	92:15	unavailable	98:6,11
trend 101:24	93:21	111:10,14	111:7,15,
types 24:3	types 24:3	uncertainties	19 124:3
			understands
			34:23

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: understood..video

understood	21:6	URL	68:4	116:3
62:24		users	85:11	125:23
115:22	unnecessarily			126:2,5,9
	33:5	USGS	18:24	
undertaken	unpack	44:21	93:22	valuable
107:21			94:16 96:9	125:18
	untapped			
underway	55:10	USGS's		vapor
27:16		108:24		9:1,4,
121:11	upcoming			10,12,13,
	117:13	Utah	28:19	14,15
underwhelmed				10:17 11:2
57:19	update	17:13	utilities	variable
	24:1,9,10		46:23	9:11
unexpected	52:2,21			
73:5 98:1	87:24	utmost	32:19	varied
	99:17			56:8
unfortunate	102:1	<hr/> v <hr/>		varies
18:15,17	103:6			90:10
	121:11,19,	vacuum		variety
unified	23 122:7	108:22		69:7
110:9	126:3,5,11			76:16
unimagined		vagueness		vary
67:22		63:3		29:11
	updated			41:13
unique	52:2,8	validate		vegetation
28:3		48:25		46:16
55:13	updates	75:8,10		vehicular
121:9	6:11			70:11
	73:18	Valley	17:12	venue
United	100:10	45:24		117:15
14:11	116:3	46:20		versions
66:11	updating	47:5,19		105:5
99:21	27:15	73:17		versus
124:4	88:18	97:6,12,14		14:20
units	110:16	99:15,18		16:17
62:16		100:4		39:21
	upgrades	102:5		vertical
universe	123:4	103:15		9:13
62:23	upper	109:7,8,		viability
67:13	38:25	12,13		16:7
	upstream	114:5,16		video
unknown	32:22	115:11		68:4
62:23				
unmute				
15:14,17				

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: videos..web

videos 80:15	105:4,13	13 40:18,	ways 7:23
view 103:4	109:2,17	23,24	29:17
vision 99:17	wanting	45:10,16	56:22
105:4	92:19	48:2 71:5	65:22
visited 19:9	War 26:19	73:23 75:3	78:25
voice 110:9	warning	77:20 79:8	122:14
124:18	58:17	82:22	weak 11:3
volume 13:10	76:20,23	83:1,2,12	wear 110:22
24:14	79:4 88:20	85:2,13,	wear-out
vulnerabilitie	89:12	18,21	63:11,15
s 67:18	101:6	87:10,11,	wearing 56:4
vulnerability	warnings	18 90:22	weather 10:5
67:13,21	80:18	91:17	73:12
	106:15	94:12	76:2,4,7,
	warranted	105:1,2	8,9,11,15,
	44:3	108:1,8,9,	18 77:9
W	watch 76:20,	10,16	78:25
W-R-D-AS	22	109:5	80:10,16,
30:1	water 8:17,	113:1,3	21,24
wade 16:15	19 9:1,4,	114:1	81:10
45:20	8,10,13,	117:4	82:8,11
73:14	14,15 10:5	120:4,10,	83:6,9
Wade's	11:2 14:18	12,15	84:25
104:18	24:8 25:13	121:11,19,	89:10
wait 38:4	27:4,5,11,	23 122:7	95:11
walk 70:12	13,15	watershed	106:14
wanted 7:10	28:8,18	4:20,24	110:1
26:11 28:3	30:9,10,23	5:13,17	113:10
31:12	31:3,7	9:24 10:1	Weather.gov/
33:14 69:5	32:2 33:3,	11:8,12,	sacramento
72:25	7 35:22	17,18 22:6	79:3
74:16	36:22	27:24	weather.gov/
93:1,8	37:5,13	29:12 36:3	sacramento.
94:14	38:10,12,	52:1	77:10
103:14	20 39:7,9,	watersheds	web 77:9
		51:20	
		121:13	

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: website..year

79:15	24:18	113:23	110:22
80:1,4	widely 91:9	114:21	124:5
website	93:22	125:9,21	worse 62:4
52:11	widen 69:11	work's 71:16	worth 93:25
53:10	wild 74:5	worked 56:1, 2 114:18	wrap 121:3
79:10,13, 14 91:18, 25 92:2	Wildlife 113:15	workforce 58:13,17	WRDAS 30:1
118:24	114:3	59:13,15	wrong 66:24
126:19	winds 9:14	68:19	Wylie 45:16, 20 49:8, 11,19
week 53:3	winter 11:17	69:12,15	50:1,2
73:13 81:1	38:19	working 10:3	51:9 73:7
weekly 80:14	46:10	22:7 69:24	
weighing	wireless	79:7 94:15	Wylie's
35:8	77:1,12	95:20,22	49:22
weight 70:15	withdraw	96:10	
well-defined	102:11	101:10	<hr/> Y <hr/>
66:21	wondering	104:4	
wellness	50:2	114:1	Yarbrough
54:20	words 33:16	works 14:8	38:9,11
west 6:25	95:13	17:16	42:5 44:19
82:5	97:21	24:14	50:17,18
108:18	work 4:10	65:17	71:7,10,20
western	19:12,17,	workshop	72:11
10:4,6,8	24 20:9	4:6,14 7:1	92:4,5
wet 11:17	22:13,15	15:8 50:22	111:21
36:3	33:23 34:2	66:9 69:25	117:7
whichever	45:13	119:21	year 11:13
72:16	53:24	125:8,16	12:5 13:2, 3,5,11
wholly 26:23	57:15 65:6	126:13	17:6 38:18
wide 9:3	70:23	workshops	46:8 51:19
69:7	71:25	69:14	83:8,9
wide-ranging	82:25 84:5	world 22:3	86:12 96:9
	96:15,20	23:6,15	106:4,5,12
	99:24	67:6 95:15	115:3

OROVILLE DAM CITIZENS ADVISORY COMMISSION MEETING

Meeting on 04/22/2022

Index: Year's..zoom

117:13 **zoom** 4:3
Year's 35:16 7:24 8:4
 10:9

year-round
83:19 85:1

years 13:5,6
17:8 18:17
19:2,6
22:11,12
24:5 37:15
41:6 46:25
57:2 87:25
99:19
100:14
106:9
113:12,17
114:7

yesterday
126:3,12

Yolo 104:5,
9

Youtube 68:4

Yuba 15:25
32:23
35:20,21
40:13
42:10 76:7
85:13,14
102:16,18,
20,22
111:25
121:10

Z

zone 54:1,5