

Idaho's Water: Supply, Quality in a Time of Growth

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Andrus Center for Public Policy

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1 **Opening**

2 *JF=John Freemuth*

3
4 JF: That worked. First thing- I'm John Freemuth, the Executive of the Andrus Center for
5 Public Policy and a professor here at Boise State University. I'd like to thank you all for
6 coming. This is a topic we have done once before called Troubled Waters. We talked
7 about another water conference for a couple of years and we're planning on doing it and
8 it came to fruition, and it obviously is and was something that Governor and Secretary
9 Andrus spent a lot of time on, thinking about, and working on. And on behalf of the
10 Center and the Andrus family, we'd like to thank the Water Users Association for the
11 memorial they passed honoring Governor Andrus for his work on water. So, thank you. If
12 you- if you paid two dollars for parking, you weren't supposed to. So if you've got the
13 receipt, if you hand it off in the back, we'll- we'll take care of your parking here. We'll
14 fix your ticket, whatever it takes, okay?

15
16 Now, the goal of this conference, as all Andrus conferences, is to get the people in the
17 room that either have an interest in the topic or are major actors in the topic to get people
18 talking, to see where there is agreement, where there is disagreement, and what maybe
19 needs to be done to further the conversation. We've been successful of that in the past.
20 The National Fire Plan really got jump-started at one of our conferences on wildland fire.
21 It was the people in the room, the people that went out into the hall, that got the
22 conversation going. And that's- that's our goal here. We never come to these conferences
23 with any sort of agenda except deliberation, civility, and trying to move forward on a
24 public policy problem.

25
26 What I'd like to do now is we have a nice short five or six minute video that starts the
27 conference off that Public Television has done that sets the stage for, really, the issues,
28 where we're at, and will start our conversation for the rest of the day. So, video? Yeah, it
29 worked.

30
31 Vid: *Idaho's very fortunate to have an abundant water supply. Treasure Valley is particularly*
32 *fortunate to have the Boise River running through it.*

33
34 *Water is the economic engine of our region. Treasure Valley residents divert about 1.5*
35 *million acre feet of water from the Boise River and the Treasure Valley Aquifer each*
36 *year. That flow feeds more than 1,100 miles of major irrigation canals, supports more*

37 *than 450,000 acres of agricultural land, and provides a home for wildlife and all the*
38 *water needs for one of the fastest-growing regions in the country.*

39
40 *With some years we have too much—flooding—some years we have not enough due to*
41 *drought. So the challenge is to work within those extremes, recognizing that on average*
42 *we have a very nice supply.*

43
44 *It's a water supply that's the envy of our neighbors in the west, because right now we*
45 *don't have to use everything we get.*

46
47 *We only actually are using about 600,000 acre feet, or about a third of that water we're*
48 *actually using. The rest of it is effectively being wasted—that is, it's infiltrating the*
49 *ground, it's going to the aquifers, it's flowing back into the Boise River. And so that is a*
50 *potential pile of water, almost a million acre feet of water, that we could use differently*
51 *and it could potentially be the source and supply that we need going forward.*

52
53 *For nearly a hundred years, we've been building and maintaining a water infrastructure*
54 *to support our agricultural systems. But over the next 50 to a hundred years, the*
55 *population in the Treasure Valley is set to explode. By the turn of the next century, the*
56 *Treasure Valley could grow by as much as 160 percent, and much of that growth will be*
57 *at the expense of agricultural land.*

58
59 *We're talking all the area between Boise and Nampa being completely filled in.*
60 *Urbanization all the way out to Parma. So it's pretty incredible. And the amount of ag*
61 *loss was like 52 percent, if not more there, so that's very- over half of our land would be*
62 *gone.*

63
64 *Nampa farmer Glen Edwards sees the effects of growth in the Treasure Valley today.*

65
66 *It's so hard to get a piece of equipment up and down the road, and even just to get out on*
67 *the Amity sometimes during rush hour is really ridiculous.*

68
69 *He spends time teaching his new urban neighbors about Idaho's water.*

70
71 *These people don't understand how the water system works, how water is measured, and*
72 *they don't know a lot about sending the water down the roads and when they're supposed*
73 *to be changed.*

74

75 *Edwards wonders what it will mean to support an urban population on top of what is a*
76 *rural irrigation system. Growth isn't the only challenge facing the future of water use in*
77 *the Treasure Valley. Another is climate change.*

78
79 *In February, if we have a big warm spell or rain event, giant rain event, that's the future,*
80 *is that we'll have these events in the middle of winter. We'll have large runoff events and*
81 *we won't know how to deal with them. Do we let 'em all through? Because winter's not*
82 *over. We don't know how much water we're going to get. And so do we let that water*
83 *come through the system and flush it down the river, or do we hold onto it?*

84
85 *Scientists expect change in both the upper and lower basins. For example, warming*
86 *temperatures mean more water loss due to evaporation.*

87
88 *And so it means everywhere that we use water, we're gonna need more water. So whether*
89 *it's on our crops or our soccer fields, we're gonna need more water because when we*
90 *water our lawns, more of it's gonna come off and leave the system. And in fact, if we look*
91 *at kind of the climate change projections for the future where we haven't done anything*
92 *to fix the problem and we have kind of worst-case scenario, we're going to need 30*
93 *percent more water in the Treasure Valley just in terms of how we use water.*

94
95 *And with change coming, land use policy makers and other public officials will have*
96 *questions to answer, like what kinds of changes to our infrastructure, our laws, and our*
97 *institutions will have to take place over the next few years to meet the needs of the future?*
98 *Social scientists at Boise State asked Treasure Valley residents what they want.*

99
100 *Despite the fact that a fairly large percentage of people that live in the Treasure Valley,*
101 *and particularly Ada County, weren't born here, over- I think it was over 79 percent of*
102 *people reported that they were concerned with the loss of farmland and over 90 percent*
103 *see agriculture and farming as an important part of the culture of the region.*

104
105 *For Canyon County planner Patricia Nelson, having good scientific research helps her*
106 *and her commissioners ask the right questions.*

107
108 *Do you like this, or would you prefer a different future for this area? And how much are*
109 *you willing to actually pay to have a different future?*

110
111 *But sometimes, getting answers to tough questions is difficult when there isn't a crisis.*

112
113 *But there's a lot of people spending a lot of time managing the water in the Treasure*
114 *Valley all the time. And it wouldn't take much effort to develop a more holistic view of the*

115 *problem and develop plans and think about what should we start doing now to prepare*
116 *for the future?*

117
118 *And that's the challenge: recognizing the needs of a growing urban population and*
119 *decreasing agricultural acreage while still respecting Idaho's water heritage.*

120
121 *My observation is that Idaho has always been interested in water. It forms a major part*
122 *of our constitution, yet the statutes have been very well-conceived and have been adjusted*
123 *over the years. And I see an ongoing discussion that is needed to account for the changes*
124 *that are happening.*

125
126 *If you were to compare our city to anywhere else in the West, you would see a city that is*
127 *sitting on a really rich water supply, and we are not fighting with each other yet. Every*
128 *other major city in the West is fighting about water. We have the potential to start*
129 *thinking about it now and avoid that. We house this really unique opportunity to*
130 *essentially do it right in a way that almost no Western city has ever done before.*

131
132 JF: I think that sets the stage for the day pretty well. Now, what we're gonna do with our first
133 panel—which I'll introduce our moderator in a second—is to treat it as much as we can
134 as a conversation, not just stand-alone presentations. Our speakers have been given some
135 questions ahead of time to think about that are important. But also a little later during the
136 panel, there are question cards on your tables. If you've got a question, we'll collect them
137 and bring them up to our moderator to ask. So you'll have your chance to ask your
138 questions. This we found over the years doing these conferences that that works better
139 than giving somebody a mic to ask a question because we can get more done this way I
140 think. So it's my pleasure now to introduce a colleague of mine at Boise State. She's a
141 Boise girl. She went to Boise High and College of Idaho. She does a lot of environmental
142 policy work like I do, has written a couple of books, just got full professor last month
143 here. She came to us actually from Colorado School of Mines, and she is one of the I
144 guess you could say co-leaders of the Idaho EPSCoR project, does a lot of work on water,
145 is a colleague of Shawn Benner, who's here, who's the superstar in the video there. Hi,
146 Shawn. And then she's got an announcement about a new data source that's coming. So
147 it's my pleasure to introduce Dr. Jen Schneider.

148
149 [applause]

150
151 **Panel: How is water supply affected by the continued reduction in acres of irrigated**
152 **agricultural land?**

153 *JS=Dr. Jen Schneider, MC=Michael Creamer, MW=Mat Weaver, AW=Andrew Waldera*
154

155 JS: Good morning, everyone. Thanks so much to John and to Katie and for rest of the Andrus
156 Center Board for organizing the meeting today. EPSCoR has been proud to be a
157 cosponsor of this event, and I want to welcome all of you here today. So I'm hopeful that
158 at some point today or when you leave the conference, you're going to go home and
159 you're going to Google these words: The Treasure Valley Water Atlas. Jill, can you raise
160 your hand real quick? Jill has these cards with her—Jill is a postdoctoral researcher with
161 us in the School of Public Service—that have more information about the Treasure
162 Valley Water Atlas. So after I'm done speaking if you want to hear more, learn more
163 from her, please seek her out and get one of these cards. If you do Google the Treasure
164 Valley Water Atlas, it's gonna take you to a website and you're going to find a collection
165 of six narratives there, or story maps, that have to do with Treasure Valley water. They
166 answer what might seem like basic questions: Where does our water come from? How do
167 we use water? What does water look like into the future? And indeed, we've tried to
168 make it pretty accessible to laypersons who may be new to the Valley or who don't have
169 a deep understanding of our water system, but we also hope to make it data-rich and
170 visualization-rich. We think it's a pretty website. So for those of you who are experts, we
171 think there's something there for you as well. So if you have time, please go check that
172 out. And we're still at a stage where we would love to hear your feedback, so if you see
173 things that you don't like or you disagree with, folks have already been letting us know
174 and we would love to hear from you. There's a "Contact Us" link on that website. If you
175 like what you see, the greatest compliment you could pay would be to share that with
176 your friends or on your social media and get the word out. And just real quickly before
177 we introduce our first panel, could I have the Treasure Valley Water Atlas team stand?
178 There's Shawn Benner, who's my colleague in Geosciences who you saw in the video—
179 they're so nervous to stand. You can stand. Jillian Moroney is the postdoctoral
180 researcher, Curtis Crandall a master's student in Geosciences, and Chris Torres a PhD
181 student in Public Policy and Administration. We've been working for two years on this
182 project, so thank you so much.

183

184 [applause]

185

186 And thank you to many of you in this room who helped us build that website by allowing
187 us to interview you or participate in focus groups or review the website. All right, I'm
188 going to go ahead and ask the panelists for the first panel to come up and join me, and I'll
189 give a quick introduction and then we'll get started. So that's Michael Creamer, Mat
190 Weaver, and Dan Steenson. And where'd John go? Hey, John Freemuth. Are we just
191 having them project, or do we have mics?

192

193 JF: [Inaudible]

194

195 JS: I thought these were my juggling batons. [laughter] Okay. And then whoever is in charge
196 of the visuals, if you could bring up Michael's PowerPoint. He just wants us to see them.
197

198 MC: Right there. Perfect.
199

200 JS: Are we good there? Okay. All right, I'm going to ask the panelists to say a little bit more
201 about what they do, but just by way of quick introduction: We have Michael Creamer,
202 who is an attorney at Givens Pursley, specializes in environmental and natural resources
203 law; Mat Weaver, who's the Deputy Director of the Idaho Department of Water
204 Resources; and Dan Steenson, who's an attorney representing the Treasure Valley Water
205 Users Association. Oh, last minute change, it's actually Andy Waldera.
206

207 AW: I'm a shorter, younger, balder version of Dan.
208
209 [laughter]
210

211 JS: Okay. Excellent. All right. Great. So um if you wouldn't mind just saying a few words
212 about yourself and why you're here today by way of introduction, and then we'll get
213 started with some of our questions.
214

215 MC: Thank you. I'm Mike Creamer, and I'm an attorney with the Givens Pursley Law Firm
216 here in Boise. I've worked as a water attorney with my partner Jeff Fereday for 29 years,
217 and we've been very much involved in water development, water rights, acquisitions and
218 transfers throughout the state, but especially here in the Boise Valley, and we've had a
219 real strong interest and involvement in what's happening both with the surface water
220 supplies in the- and ground water development in the basin.
221

222 MW: Good morning. My name is Mat Weaver. I'm with the Department of Water Resources. I
223 have a background in engineering and hydrologic sciences by education and private
224 sector practice. I've now been with the Department for about 10 years and currently I
225 coordinate the efforts of the department's water compliance bureau, its information
226 technology services bureau, and its hydrology section.
227

228 AW: And my name's Andy Waldera. I'm a partner at Sawtooth Law Offices in our Boise
229 office. And we are involved in water predominantly from the agricultural water delivery
230 entity sphere, represent a number of canal companies, ditch companies, irrigation
231 districts, predominantly here in Southwest Idaho. Our niche practice is pretty much
232 geared towards if it's something that has to do with a farm, we can do it. But a large
233 focus of that obviously is water resources issues.
234

235 JS: Okay, thank you. So the first question we're going to get started with has to do with one
236 of the pressures we saw articulated in that opening video, the increasing urbanization of
237 land in the Treasure Valley and the implications for water supply as a result. So I wonder
238 if you had some general comments about what that sort of rapid land use change might
239 mean for water supply in the Treasure Valley. Any of you can start.

240

241 MC: I thought you were going to ask a question.

242

243 JS: Do you have any thoughts about the implications for rapid urbanization?

244

245 MC: Well, now that you mention it, yes.

246

247 [laughter]

248

249 MC: You know, I think one of the questions that had been posed was what effects does
250 increased urbanization have on our water supply, and when I looked at that question I
251 thought, well I don't think urbanization has its own effect on the supply. We have a finite
252 amount of storage space in the basin, about 1.6 to 1.7 million acre feet of storage. We
253 have an aquifer that sits below our valley, and those supplies don't necessarily change as
254 a result of urbanization. What we do see is that the allocations of the developed water
255 supply have- are likely going to have to change to accommodate urbanization and to
256 account for the changes in land use from agriculture to rural- or more urban development.
257 The supply won't change, it's how we make use of the available supply in the future that
258 is gonna have to change.

259

260 JS: Okay, thanks. Mat or Andy? Thoughts on that? Question?

261

262 MW: Well, I'm glad Michael said that, because I thought I was missing the boat when I read
263 that question because my first thought was, well how is urbanization affecting supply if
264 our supply is predominantly precipitation in the form of rain and snow? There's not a
265 very direct and immediate effect between urbanization and that water supply. However,
266 as I thought about it a little bit more thoroughly perhaps, I thought about, well water
267 supply could also mean where the water is available in the system at a given time and in a
268 given location. And I think if you take that maybe broader view of water supply, then
269 urbanization could possibly have an effect on water supply when you consider things
270 such as carryover in the reservoir from one year to the next, available reach gains in the
271 river, in say the regulated section of the Boise River as opposed to the unregulated
272 section of the Boise River. So in the unregulated section water supply there is primarily
273 being being made up from return flows to the river from the surface water and ground
274 water systems. So potentially urbanization could affect water supply of those return

275 flows. And then of course another piece of the water supply equation is the aquifer itself,
276 and in the Treasure Valley- I guess that was another question I have. Are we focused just
277 on the Treasure Valley, or statewide?

278

279 JS: Well, let's stay with the Treasure Valley for a little bit and then we can go statewide if we
280 need.

281

282 MW: Well, certainly aquifer is recharged based on the land use that's occurring on the surface,
283 and depending on the land use you can have various degrees of recharge. So I think
284 urbanization could potentially affect the aquifer system, and specifically the shallow
285 aquifer system.

286

287 JS: So Mat, can we just stay with you for one second. When you talk about what's happening
288 on the surface, um, sort of irrigation behaviors for example, can you explain what you
289 mean by the recharge, the connection between surface and ground water supplies, for
290 those who are new to the system?

291

292 MW: Well certainly I'll speak about the Eastern Snake Plain Aquifer, 'cause that's a system
293 I'm very familiar with. And we saw with the advent of surface water irrigation
294 development on the Eastern Snake Plain in the early twentieth century that as we diverted
295 surface water out of the Snake River system, put it out on the plain, ran it through canals
296 and ditches and laterals, and then flood irrigated with it, we saw the incidental recharge
297 associated with that land use practice increase the storage content of that aquifer
298 significantly over the course of decades. Similarly, at the turn of the twentieth century,
299 there were additional changes in land use practice, and maybe more importantly,
300 irrigation practice, that led to declines in the incidental recharge to that aquifer. And so I
301 think again, depending on irrigation practices and land use, you can control how much
302 water you're putting on the land and how much of that water is infiltrating or percolating
303 down to the aquifer system.

304

305 JS: Andy?

306

307 AW: Thank you. And thank you for the entrée, Mat, to that idea. I- couple of things. I'm going
308 to go a little off script just because of the video primer that we just watched. If I heard
309 correctly, and I scribbled down in my notes the PB- excuse me, PBS production spoke in
310 terms of "public policy problem." I scribbled conflict. And then used the term "wasted"
311 upwards of one million acre feet. Getting to the public policy problem comment, I
312 disagree. And I don't- I also disagree a little bit with what Mr. Creamer had to say, that
313 we might be looking at the need to reallocate water supply or sources. Where is it that
314 development occurs in this valley? The development occurs on the lands that are

315 supported by stable senior water rights. They are the most secure, they're perfected, and
316 they're protected under the prior appropriation doctrine. This water is not just irrigating
317 farm fields, as you saw in the video, soccer fields, parks, schools, golf courses, homes,
318 subdivisions, everywhere you folks live and recreate. Anybody who tubes down the
319 Boise River in the summer is dependent on the stored water supplies and is riding on top
320 of water, storage water, that is being sent downstream largely to satisfy downstream
321 irrigation diversions. So, it's all interconnected and I don't think it's necessarily- it's not-
322 I mean, it maybe a supply issue as population continues to grow, but currently I'm not so
323 sure it's an allocation issue, and I don't think there is a conflict or a public policy
324 problem. Because when it comes to irrigation, you want to maximize the use of available
325 surface water supplies. Groundwater is largely used in this valley for public potable water
326 supplies. So you want to use your surface irrigation water to not deplete groundwater.
327 And the idea that one million acre feet is potentially being wasted—and Mat just
328 mentioned incidental recharge—groundwater levels in this valley, with the advent of
329 flood irrigation in the early 1900s, rose in some place as high or as far as almost 200 feet.
330 So all of the groundwater development in this valley, or the lion share of it, is dependent
331 on historical flood irrigation practices. And the unintended consequences of losing
332 seepage and switching to sprinkler from flood irrigation, you need to be mindful of that.
333 So seepage is very beneficial. It is in no way waste. It makes the groundwater system go.
334 Return flows back to the river, promote fisheries and recreation, and one thing—and Mat,
335 you'll be able to speak to this—flood irrigation practices and return flows drive a very
336 important water right administrative balance in this valley. There's a break at Star Bridge.
337 There are some very senior surface water rights downstream of Star Bridge for some
338 other irrigation and small ditch companies and irrigation districts. And those senior water
339 rights are by and large served by upstream return flows back through the drain system,
340 particularly on the north side of the river to the tune of about 100 cfs. If those drain flows
341 decline and those credits no longer accrue in the river to sustain upstream irrigation, you
342 could have more senior water rights downstream calling on more junior rights upstream,
343 and that affects everybody. That affects your parks, your schools, your golf courses, your
344 farmers, what have you. So you know, be careful what you wish for and please don't
345 leave the conference thinking that incidental recharge and flood irrigation practices is
346 waste.

347
348 JS: Michael?

349
350 MC: I agree with Andy that words like “waste” can have connotations- negative connotations.
351 They are kind of loaded words. At the same time, a word “reallocation” for Andy's
352 clients is an inflammatory word. They don't like the word “reallocation.” When I use that
353 word, I mean a- not a grand theft, not a taking, not a forceful removal of water, of senior
354 vested water rights from the people who hold those and are beneficially using those.

355 What I'm talking about is what I hope develops out of this conversation today, which is a
356 process for looking at the way water is used for irrigation and urban uses, including
357 parks, football fields, school- school campuses, fountains in the downtown area, and look
358 at all of those uses and find out, is there some additional wa- is there a place- is there
359 water looking for a home? Do we have to go build another 400,000-foot- 400,000-acre
360 foot reservoir to meet our growing demands, or there are adjustments that can be made in
361 a free market by changes of institutions and the way we think of water use in the valley?
362 And so I agree some words are loaded and probably not the best for starting off a
363 conversation. I think "waste" is one of those words. I don't think "reallocation" should be
364 if we think about it in the concept of taking a hard look at the way water is allocated and
365 used today and asking ourselves whether there are ways institutionally, practically,
366 physically, we can make sure that that water goes to the highest and best uses in a- in a
367 willing buyer willing seller basis.

368

369 JS: Okay, thank you. I want to circle back to that issue of market-based responses to
370 allocation in a moment. But just sticking with the question of urbanization for one more
371 minute. So, we talked a little bit about supply. What differences do you anticipate, if any,
372 in terms of demand moving forward?

373

374 MC: Well, gee. I just happen to have a few thoughts on that, too.

375

376 JS: I thought you might.

377

378 MC: Yeah, there have been several- numerous, I would say- numerous studies done looking
379 at- trying to project what the urban growth is going to- you know, how many people
380 we're going to have in this valley over varying periods of time. And I think we have
381 some reasonable projections about what that's gonna be in 2060, 2065, in 2100. And it's
382 gonna be a lot more people than we have today if those assumptions, which I think are
383 reasonable and seem to generate the same types of projections, actually play out. And
384 those studies have basically said we could have 1.75 million people in this valley living
385 in homes, driving on highways that we're going to have to widen, shopping in shopping
386 centers that we haven't built yet, and working in both in their homes and in the
387 downtown areas in high-rises or sprawled business parks. We're gonna have to find the
388 water for those folks. And I think those studies are fairly consistent in those projections.
389 But I would submit that none of those studies that I've seen have taken the hard look at
390 options other than building a reservoir, conservation, going down to the Snake River or
391 the lower end of the Boise River and pumping surface water back up to the metropolitan
392 area that's developing. None of those have looked at the concept of reallocation, have
393 looked at the water that could be freed up as a result of the conversion of land from
394 irrigated agriculture to urban uses. Those studies have, I think, consistently estimated that

395 the amount of water that currently goes to irrigated agriculture in the Treasure Valley by
396 2065 or the end of the century there will be upwards of 655,000 acre feet of irrigation
397 water looking for a home. If you add on- and those studies have all made those estimates
398 based on projections of growth, the percentage of that growth that might occur in
399 irrigated- currently-irrigated areas, the percentage of that growth that might occur in non-
400 irrigated areas down near Kuna and out near the penitentiary, those high desert areas.
401 And the numbers come in about the same. And those studies are looking at typically start
402 at in the late mid-90s or early 2000s and move forward. They don't look at the 70s' 6,000
403 acres of irrigated farmland in Canyon County and Ada County that were dried up
404 between 1978 and 2007. If we use the same metrics in terms of the amount of water that
405 could be freed up from those now non-irrigated acres compared to the amount of water
406 that that same acre in an urban setting is going to require- that generates another 86,
407 87,000 feet of water looking for a home. And that is essentially just a little bit less than
408 half of the total storage capacity at the three reservoirs we have above the city. So, I'm
409 not saying that all that water needs to be diverted or assigned to urban development, I'm
410 saying there's an opportunity there. It may not be 750,000, it may not be 650,000 acre
411 feet, but I bet you there's a few thousand acre feet, and if there is and we can avoid
412 building reservoirs or doing other, you know, taking other steps that don't have as long-
413 term beneficial effects but may have long term environmental effects, if we don't look at
414 that now, then we're not going to have the opportunity later as development continues.
415 And I agree with the premise in the video this morning that now's the time to be thinking
416 about it because as the infrastructure and institutions crystalize on the- in a scenario of
417 what we have today, we won't have the opportunity to make those decisions in the future.

418
419 JS: Yup. Mat?

420
421 MW: I think there's some good thoughts there, Michael. When I first heard you question, the
422 first thing I thought was demand means different things to different people. Diversions at
423 a head gate, diversions into a pressurized irrigation system, to a lot of people that's
424 demand. Consumptive use or the evapotranspiration of water, that water that's actually
425 physically lost from the water budget—to a lot of people, that's demand. And leading up
426 to this conference I met with Mark Zersky at Pioneer, people in charge of irrigation
427 delivery systems with the Boise Project, folks in the Eagle Middleton area who run
428 irrigation delivery systems, and to them demand is always diversions. And when they
429 look back and reflect on the decades of urbanization that they've already lived through,
430 they don't see a real change in demand because to them demand is the diversions. And
431 the water used after urbanization has occurred is demand in the delivery of the same
432 volume of water from their perspective that was required before it was urbanized.
433 However, we think about demand from the aspect of consumptive use, which is maybe a
434 little bit more rigorous way to think about it, it seems obvious that if you take an acre of

435 ground that's flood-irrigated and you harden it with rooftops and asphalt up to 50 percent,
436 that you're going to see a reduction in consumptive use off of that land. However, I think
437 it's much more complicated than that when you look at a city or a service area of an
438 irrigation delivery system for a number of reasons. One thing that confounds it is not all
439 of that ground is irrigated and not all of that ground is irrigated with surface water. You
440 have a patchwork of nonirrigated, partial irrigation, or semi-irrigation and irrigation in
441 that system. In addition, you've had a historical sweep of crop that had been grown there
442 that might use a variant amount of consumptive use and might change from year to year
443 depending on the water supply. When you come in and urbanize that, there is more
444 uniformity in the water consumption that's coming off lawns and landscapes, the demand
445 for that water and the consumptive use of that water can start earlier in the irrigation
446 season than historical practices, and it can end later. And so it is not obvious what the
447 area under a season-long consumptive use curb looks like between a large subdivision
448 when it was irrigated and after it was urbanized. In addition, historically farmers rely on
449 rotations of water, which is something that's not typically palatable to subdivisions in
450 cities, and they simply use less water during times of scarcity, which too is something
451 that isn't always acceptable in subdivisions. So I think it is very complicated to
452 understand how consumptive use is changing, especially in the Treasure Valley on a wide
453 scale. I'll close with those thoughts for now.

454

455 JS: Thanks, Mat. Andy?

456

457 AW: Thank you. In a matter of disclosure, Pioneer Irrigation is one of my clients, so I'm- Mat
458 and I aren't teaming up here, but I know Mat did speak with Mark. You know, the
459 question is is there a demand shift or have we seen a demand shift with urbanization? In
460 theory it makes sense, you know, hardscapes, rooftops, driveways, roadways, whatnot,
461 you know, removing something from an irrigable condition should lead to- or leads to the
462 presumption that less water's being used. In some cases that's true, in other cases, where
463 we've monitored pump stations, it's not. In a lot of situations, pump stations use more or
464 less their full entitlement. Some use a little less and some use far more. People—Mat's
465 point is well-taken—people in subdivisions, and many of you live in subdivisions and
466 your HOAs probably have a horrendous time trying to enforce a watering schedule to the
467 extent you have one. Most subdivisions don't have them. People have, unfortunately in
468 my experience, including my own subdivision, very much a me-first attitude and you
469 know flip the switch is like, you know, on your irrigation system's like flushing a toilet or
470 turning on the sink, it needs to be there ready for your use when you want it to the full
471 extent you want to use it. And frankly, you know, at application rates that are usually far
472 more than you need for your lawn, people growing mushrooms and have you know soft
473 spots all over their lawns. At least in our experience, we're not seeing a decreased
474 demand from the diversion standpoint. One example is, at least within Pioneer, whenever

475 we're approached by developers, the question is never you know what do we expect
476 when we develop this ground to be our irrigation need or consumptive use? It's the
477 reverse, which is what's our entitlement in your district? And we design our pump
478 stations to that full entitlement. So in Pioneer Irrigation district, for example, it's an inch
479 to the acre. If it's a 40-acre subdivision, folks are asking that question and they're not
480 saying, "Well we think we're going to have two thirds in rooftops and hardscapes and
481 another third in lawns and common area, so you know, we'll give up the one third and
482 we'll just design our pump station- excuse me, we'll give up the two thirds and design
483 our pump station for the one third." That's not how it happens. They design their pump
484 station for the full head. And there are a couple of reasons for this, at least with respect to
485 irrigation districts more so than private canal companies. But we- irrigation districts are
486 organized on a legal premise of a portion then a benefit. You know, this is long ago,
487 hundred years ago plus, that has nothing to do with urbanization and it was judicially
488 confirmed in an in rem proceeding binding those lands. And you live within an irrigation
489 district, you have your entitlement—it's not always an inch to the acre, it depends on the
490 district—but that is an impertinence and binding on those lands and you know short of
491 some legal statutory changes and a heck of a lot of retrofitting from a practical standpoint
492 that would have to go in—I mean, these are gravity-based systems—you need to be able
493 to push water in a surface gravity flow system all the way to the end user, not just to the
494 people up at the beginning. And so they're continuous flow through systems. So you
495 can't just put in pipes, you can't just line, you can't just design for the one-third
496 theoretical use. There needs to be a continuous spill through the system to make the rest
497 of the system go. And you know one of the practical consequences of these irrigation
498 systems from a gravity flow standpoint is for the most part urbanization is occurring kind
499 of higher up or in the middle of these districts, it's not really on the outskirts. The
500 outskirts tend to be predominantly agricultural and rural. Again, you need to push the
501 water. It's also not a cliché that you know one person's tail water is another person's live
502 water for irrigation purposes. Much of the system as you work your way down the valley
503 is dependent on these return flows as being the live flows for others. For example,
504 Riverside Irrigation District: their primary canal the Riverside Canal accepts the entirety
505 of Indian Creek as well as the West End Drain, which is a massive drain about three or
506 four other federal drains tie into. Quite literally, Riverside Irrigation District is
507 dependent—largely dependent—on return flows, drain flows. And that's not uncommon.
508 So from a demand perspective, in the instant on mentality—and perhaps it's an
509 educational issue, it's an enforcement issue, and HOAs only have so many powers in
510 their CCNRs and there are known enforcement policies but—it really is an instant on
511 mentality, like brushing your teeth and flushing the toilet. And that's not the way the
512 system is best geared. And you know Mat raises a good point with respect to farmers
513 rotating water. There's a- there tends to be a more efficient use in an agricultural setting
514 than a subdivision setting. I'm not saying that's a bad thing, it's just a reality. So from a

515 demand standpoint, I don't think you're going to see decreasing demand. It just- it isn't
516 bearing out to this point, and you know maybe with some education, some legislative
517 changes, we can see that. But again the first question we get asked on a daily basis is,
518 "What's our entitlement?" Not what we think we're going to be irrigating, but what's our
519 entitlement, 'cause that's what we're going to design. And frankly, it's helpful because
520 it's gotta flow through the system. Can't just stop at a subdivision pump station, you
521 gotta get all the way to the tail end of the system.

522

523 JS: Okay, so we have a couple of related audience questions. So, one has to do with what
524 Mat was saying about consumptive use and ET and- that we don't understand that
525 problem very well as we move to urbanization. Would you agree with that, the three of
526 you, that we don't understand consumptive use?

527

528 MC: I agree with that, and I say why don't we figure it out.

529

530 JS: Yeah. How-

531

532 MC: It seems like it's an important enough issue we ought to figure that out.

533

534 JS: How can we figure it out?

535

536 AW: Through education of course, and I think the Water Atlas—I recall reviewing some of
537 those modules early on—addresses this very issue of consumptive use through the water
538 budget and to the delivery system.

539

540 JS: And then one more question that has to do with diversion. So this is a- it's just a
541 provocative yes/no question, so it'll be fast. We'll see. Are you aware that irrigation
542 districts end up delivering more water to subdivisions than to ag land?

543

544 MC: Yes. And if you give me the clicker on the PowerPoint, I'd like to show that to you. I
545 picked a location in the Treasure Valley. This happens to be in Meridian. This is what it
546 looked like in 1992. It was all farm ground. This is what it looked like last year. If we
547 drill in a little bit on this area, now we can see again back what it looked like in 1992.
548 This is what it looks like today. The 90 acres on the right is entirely parking lot. The 80
549 plus acres in the middle is entirely a turf farm. And the 80 plus acres on the left is a mix
550 of intense developed subdivision and some mixed commercial development. Each one of
551 these properties, each one of these three sections of ground, is entitled to the same
552 amount of water. The 40-acre subdivision, which has about 10 acres- I'm sorry, about 20
553 acres of irrigation is entitled to receive 40 inches of water. And it does receive 40 inches
554 of water. So where the land in the middle gets one inch to the acre, the land in the 40-acre

555 piece gets two inches to the acre. And what happens when they're entitled to take the full
556 amount that was on historically allocated to that ground is this: We see if we were-
557 they're getting two inches to the acre on 40 acres instead of one inch on 80, we see that
558 the use of water goes up and down. All of these folks irrigate at night in these
559 subdivisions 'cause they want to play on those lawns during the daytime. What that
560 means is that the two inches of water per acre that are going by that pump station during
561 the day misses the pump station, isn't diverted, and runs on down to the Boise River, hits
562 the Snake, and it belongs to Washington and Oregon. The subdivisions that I've worked
563 on as a water attorney working with engineers and consultants in this valley using surface
564 water have been designed to this lower mid level, which is an inch to the acre. All of
565 those subdivisions using private rights—because we can't do that with irrigation district
566 water because of the statutes and the institutions that they have—but when we're using
567 private surface water rights on these subdivisions, we design those to deliver an inch to
568 the acre, and every one of those subdivisions is on a schedule. Internally, they might be
569 able to irrigate for six hours per zone in the subdivision, maybe eight hours, maybe the
570 large common areas get a little bit more, but they all operate within an inch to the acre
571 and they're basically irrigating using that water 24 hours a day instead of 12. So all of
572 that water is going to beneficial use on the subdivision. So what my point is, if we can
573 say that it's complicated, I agree. I agree with Mat and Andy on that. Sure, it's
574 complicated. But is it too complicated for us to figure out? I don't think so. I use the
575 analogy of the Apollo 13. They had an explosion, and all of a sudden they were filling up
576 with CO2, and this guy walks into a room with a bunch of really smart people with slide
577 rules, he throws it down and he says, "They've got some tubing, they've got some wire
578 mesh, they've got some duct tape and some pantyhose. We gotta figure out how we're
579 going to change CO2 into oxygen for these guys and we only have so much time." I think
580 we have enough smart people in this room and in this valley that we can work through
581 these complicated issues. We can take that water off the top and put it back in the
582 reservoir system and make it available for our future uses.

583
584 JS: Andy?

585
586 AW: Thank you. I see subdivisions irrigating during the daytime all the time. I think it's a bit
587 of a generalization to say they irrigate at night. And I think it's a bit of an
588 oversimplification to suggest that spills running past pump stations, don't happen to be
589 on, return to the river, and are lost to Washington, Oregon, and whoever else might be
590 downstream. In fact, particularly as you progress down to lower ends of the valley as you
591 head west, these systems are all interconnected. So I'll give you an example that's
592 Pioneer Irrigation District specific. The flood irrigation in the district's upgrading of it,
593 which are largely Boise Project Border Control districts, so Nampa Meridian irrigation
594 district, Boise Kuna irrigation district, New York irrigation district, leads to drain flows

595 that ultimately return largely through Pioneer, given where we sit geographically. We are
596 about a 34,000-acre district. The middle 10,000 acres is roughly the city of Caldwell, the
597 eastern third of the district is largely occupied by the city of Nampa, and the panhandle
598 heading west is still largely agricultural and ends right around Pipe Gulch about Green
599 Leaf. And we have a series of feeder canals where instead of making diversions of water
600 from the Boise River, we dam up and divert through feeder canals water from Fivemile
601 Drain, Tenmile drain, Wilson Drain, other districts around us from Elijah Drain and
602 Wilson Drain, and that water's not lost to the river. That water's actually reused, leaving
603 water supplies up in the reservoirs for other opportunities and leaving water in the Boise
604 River for other opportunities. You know, we prefer to use the closest source available to
605 us and based on the reuse plumbing that we have in our system, a lot of that is drain flow
606 water. We have several water rights that are- with a dedicated source of the drains,
607 numbering you know in excess of 100 cfs. That's a significant water use. So I don't want
608 people left with the impression that you know somehow water flowing past a pump
609 station in subdivision isn't picked up and used elsewhere in the system, and even it may
610 not be in the same irrigation district where it's picked up and used again through a right
611 to recapture, which Nampa and Meridian for example does a lot of with subdivision
612 pump stations built on the drains. We use it downstream, Riverside Irrigation District
613 uses it downstream, Farmer's Cooperative Ditch Company uses it downstream. It's
614 constantly recycled and reused, and I think if I remember correctly the Bureau estimates
615 that the level of water we used from head to tail of the Boise River is about- is reused and
616 recycled about seven times. So it doesn't just go out of state and it's not just lost to the
617 system.

618
619 JS: Okay, Mat I just wanted to give you a chance to respond. The question was about
620 diversion and our- is developed land diverting more than irrigated land did or does.

621
622 MW: Diverting more consumptively, using more-

623
624 JS: The question's about diversion, not about consumption.

625
626 MW: Yeah, okay. I guess the question- or my answer to that would be, I'm not sure. I'm
627 certain that there must be examples in the Valley where that does occur, perhaps
628 examples in the Valley where it doesn't occur. Leading up to this, I did work with some
629 people in the hydrology section of the Department, Dan Stanaway, who's here today, Liz
630 Cresto, the supervisor of our hydrology section, and Shawn Vincent. And we did look at
631 a number of existing data sets in the system to try and see if there was any compelling
632 trends or obvious trends in consumptive use of water or diversion of water in the system,
633 and I applaud Dan on his efforts, but in everything that he brought me there was nothing
634 very compelling there that said, yes, clearly we're Valley-wide, say, consuming less

635 water. In fact, it looked like there wasn't a lot of trends in the analysis that we did, and I
636 think that that's kind of remarkable, because in 1970, Ada and Canyon County had
637 174,000 people, roughly, and today we have roughly 630,000 people. And in that 30 to
638 40 year time period, there's no obvious trend that consumptive use has gone up or down
639 even though we've brought all of those people under the system and urbanized that
640 system. I've talked a little bit with Dr. Benner at BSU and he's done similar analysis, and
641 in what he shared with me, although it's not final and it's exploratory at this point, I
642 wasn't seeing any compelling trends in his data as well. That doesn't mean that it's not
643 happening, but it means that the data that we have doesn't reflect it, and something that
644 perhaps would be more useful would be to look at the actual evapotranspiration that
645 comes off of the ground and then have some understanding of the land use that's
646 occurring on those same pieces of land that you're generating ET data sets for. In 2016,
647 the legislature funded the development of a groundwater model for the Treasure Valley
648 through the Idaho Water Resource Board and the department staff and board staff are
649 actively pursuing that. We're in year one of a five-year development plan, and included
650 in the development of that groundwater model is the development of time-series data sets
651 dating back to approximately 1986 that will look at evapotranspiration spatially
652 distributed across the Treasure Valley for specific years to be calculated by a process
653 called metric, and then intervening years filled in between, looking at the irrigation
654 practices and changes in irrigation practices of the land over that period of time, looking
655 at drain flow or return flows to the Boise River, looking at changes in water surface
656 elevation at the underlying shallow aquifer. And I think with all of those datasets you
657 have the ability to evaluate and create the water budget from year to year and then look at
658 how that water budget has changed with changes in land use practice. So that might be a
659 more interesting data set to consider with respect to this question. We're probably still
660 several years out from having that data available and published.

661
662 JS: So Andy, I just want a quick follow-up question for you from the audience. We have two
663 questions that have to do with drainage water and recharge. So the question has to do
664 with as we develop more, create more of these subdivisions, isn't it likely that we'll have
665 less reuse of drainage water, less recharge, and that that might affect the system? Might
666 actually increase flow to the river, somebody asks. Decrease recharge.

667
668 AW: Well, that's a- that's a question with two sides of that coin. One is is, there a demand
669 change with urbanization, which again, we - and I, I think Mat's last comment kind of
670 hits on that, which is we haven't seen a demand change necessarily, though you know
671 one might expect it. I mean, that's pretty interesting. What do you- about 175,000 people
672 in the 70s or so and you know upwards of 630,000 now, yet you're not seeing a spike in
673 the river, you know, at the western end of the Valley, which if you had decreasing
674 demand and decreasing use you would expect to see. What we instead are seeing on the

675 other side of the coin from a supply standpoint, one of the impacts of urbanization is
676 decreasing drain flows in some, not all the drains. But that's partly a consequence of
677 sprinkler irrigation—you know, subdivisions aren't using flood irrigation practices,
678 everybody has their own little pop-up sprinklers and rotors—and increased localized
679 demand where pump stations are being built on drains. And so you're not getting the
680 infiltration but then you're also reusing water from the drains to serve these subdivision
681 systems where it makes sense to build these pump stations to you know put your intake as
682 close to the source as possible, just from a, you know, engineering efficiency standpoint.
683 So, I don't think, particularly based on what Mat said, you're going to see a bunch of
684 water returning to the river because you're using drains as reusable sources of water to
685 begin with to feed this development and you're also not seeing it because you're not
686 seeing an overall demand or consumptive use change. The same amount of water is still
687 being used.

688
689 JS: Okay, I want to just switch gears a little bit because I now have three questions that want
690 more information about what a water market could look like. So we've heard sort of two
691 responses to some of the issues that have been raised. One is increased storage, maybe
692 raising the dams or creating more storage, and the other would be reallocation or the
693 development or markets. So, the sort of most straightforward question that came in was
694 how would reallocation work? A simple question, probably a 30-second answer on that.
695 I'm kidding, I'm kidding. It's a complicated question, right? But how might reallocation
696 work for those of us who are just starting to think about water markets?

697
698 MC: Well, my thoughts about that are we had some reallocation that occurs in this valley and
699 elsewhere in this state, either temporarily or permanently. And when I think of permanent
700 reallocations in this valley, it's typically been with transfers of shares of water rights in
701 mutual ditch companies, where one person has no further need for the water on their land
702 and they can transfer those to someone else who does, and there are transfer procedures
703 within the canal company and through the Department of Water Resources that can allow
704 that to happen. That's typically on a willing buyer willing seller basis. With irrigation
705 districts, which are under a comprehensive set of statutes that have been around for many
706 years, I think the process could be developed where water rights that are within districts
707 can be moved more easily to provide easier exclusions of lands, to provide differential
708 rates for lands that are no longer going to receive water but that are- for example, the
709 paved acres within a subdivision are charged higher rates than the farm grounds to
710 maintain the assessments for the irrigation districts but provide the incentives for them to
711 allow, to change the entitlements for an 80-acre piece of ground that's converted to 40
712 acres of hardscape. So those types of institutional changes could come about that would
713 provide the- and it's money, it's- it's, you know, money is what provides the biggest
714 incentive that needs to be money to make- pay the O&M costs of these irrigation entities.

715 Needs to be money to make it worthwhile of the water users who don't need the water to
716 turn it loose and the people who do need it to pay a fair price for it.

717

718 JS: Thank you. Mat, do you want to weigh in on the question of water markets?

719

720 MW: Well, from the perspective of the Department, our authorities are grounded in the statutes
721 in Idaho, and the statutes do specifically allow for reallocation of water through specific
722 processes. You've got the transfer process, where you can permanently change elements
723 of the water right. You've got the water supply bank and rental pools, where you can
724 temporarily change the elements of water rights and transact that water from one party to
725 another, and then you also have the condemnation process that maybe is envisioned in
726 our Constitution under Article 15 and 1, whereby there seems to be preference given—
727 I'm on a panel with two attorneys, so that always gives me a little bit of reserve when I
728 enter into discussions of the Constitution—but certainly as I read the Constitution, it
729 seems to envision that there is a preferential use for domestic or municipal use, but that
730 you have to condemn that as private property and pay a fair market value for that. So, do
731 we see a lot of transfers in the state? We absolutely do, and across the four corners of the
732 state. Do we have active water supply bank and rental pools? Yes we do. Again, the
733 water supply bank is active across the four corners of the state. We have rental pools that
734 are active in the upper Snake Basin in Basin 65, the Payette Basin. But perhaps less
735 active in Basin 63 than in other places in the state. Do we see a lot of condemnation of
736 water rights to municipal use? I would say that I'm not familiar with that happening very
737 often, certainly while I've been at the department, so as I think about reallocation, I think
738 we have specific processes in place in our statutes, in our Constitution, that allow for
739 those kinds of transactions. I see that those processes are being used robustly across the
740 state from my perspective and the perspective of the Department of Water Resources.

741

742 JS: Andy?

743

744 AW: Here's that nasty word reallocation again, and I'm not attributing it to some sinister
745 definition for purposes of the discussion, but I guess the question it raises in my mind is
746 what is it we're suggesting be reallocated? I mean, within an urbanizing irrigation
747 district, we are supplying irrigation water at the apportioned benefit entitlement to
748 farmers just as we are to urbanized landscapes—parks, playgrounds, golf courses, and so
749 on—so the urbanized needs are being met. We do have, you know, a water bank system.
750 My personal opinion of this valley is we're relatively water rich. I think the PBS film at
751 the beginning mentioned that. You know, an example of that is the going rate for an acre-
752 foot of storage on the rental bank, lease rate is currently 20 dollars an acre foot. You
753 know, you go to California, particularly during the drought years a couple years ago, and
754 they were horse-trading acre feet of water for 15 hundred dollars an acre foot. The supply

755 is largely there. What are we trying to reallocate, and is it a suggestion that municipal
756 providers have an interest in switching from their groundwater supplies? Probably not,
757 because groundwater supplies provide them with close-looped systems that are
758 comparatively cleaner higher water quality, particularly the deeper you go with a well, in
759 a location where you can serve, you know, instantaneous demand. So I guess I'm not sure
760 what reallocation would look like and whether it's necessary. If reallocation is taking
761 water off some ground and putting it somewhere else where it's currently dry ground,
762 sure. The transfer process allows for that. And all of- or the acquisition of senior water
763 rights, and you move them and you transfer them. I mean, it's all driven by the free
764 market, but right now the free market's telling us that 20 dollars an acre foot's the going
765 rate, and that alone, there's just not much incentive because, fortunately, we're relatively
766 water rich.

767

768 JS: Okay, we have a couple of questions that have to do with governance of water in the
769 Valley, and along the lines of collaboration versus competition or conflict. So in other
770 mid-sized cities, large cities in the West, as a result of shortages and conflict, there have
771 been the development of collaborative governance spottles, or the development of new
772 organizations that have emerged in order to provide a more holistic view of water
773 management. What do you see as the potential or possibility for something like that
774 evolving in the Treasure Valley if it doesn't already exist?

775

776 AW: I'll pat Mat and the Department of Water Resources on the back in this regard. I think
777 Idaho does a really good job for the most part—can't be unequivocal—for the most part
778 you know managing and stewarding the water resource. A good example is, you know,
779 people have come to Idaho from all over the West looking at the Snake River Basin
780 Adjudication as a model of how to get a major adjudication done. It took 35 plus years,
781 but there are states or private decrees and adjudications going on in other states that have
782 been going on for more than 50 that are, you know, less than a third of the size and they
783 still can't get it done. So you have a water rights inventory against which, you know, to
784 administer and plan that a lot of other places don't have. Idaho has long managed the
785 groundwater resource, the Groundwater Act and the need to apply for a dedicated water
786 right for groundwater withdrawals. California just did that I think two legislative sessions
787 ago. I mean, it used to be a situation where the richest farmer in that drought who could
788 go 600 feet with a well with a 10-inch casing would put all the other local smaller famers
789 out of business because they had the luxury and the money to mine the water with no
790 state oversight or control. So are there additional opportunities for collaboration? Sure,
791 there always are, and but I frankly I think the Valley does a pretty darn good job of it.
792 There was the Treasure Valley CAMP process, which was one of comprehensive aquifer
793 management process, which was one of several across the state. I'm not sure we
794 necessarily needed it here because we're blessed with a pretty robust aquifer, again,

795 we're relatively water rich given our surface irrigation uses, but I don't know what those
796 models would look like. I mean, the city of Boise—and maybe Steve Burgos would be a
797 good person to answer this—has taken a really proactive role and created almost entirely
798 a new position within its environmental division that is a, I guess I'll call it a water tsar, a
799 blend of legal and technical expertise for purposes of managing the city's water rights
800 portfolio and looking forward and future planning, not just from water supply side but
801 water quality side. I mean, it's rather shocking to me that a city of its size didn't have that
802 position before. So there are opportunities, and the cities are recognizing this and they are
803 doing that, but you know frankly we do a pretty good job as it is as far as I'm concerned.
804

805 JS: Are there comments on collaboration, governance, organization?
806

807 MC: I would have to say that collaboration is essential to anything we do in this valley,
808 including addressing water needs. I think that when we do collaborate, when we finally
809 do sit down and start thinking about what we're gonna do to meet the future needs, then
810 all options need to be on the table and all stakeholders need to be there and we need to be
811 committed to go get the information that we need. We've talked about a lot of anecdotal
812 information today. Lots of my- you know, the information that I have that I make
813 decisions on is anecdotal. Mat has described some studies that they're doing looking at
814 ET and consumptive use. There's a lot of tools out there today that we didn't have in the
815 past to analyze what's going on with the water in this valley. I think a collaborative
816 process that uses all those tools takes advantage of the universities and their experts and
817 the Department of Water Resources and looks at all options and answers all the questions
818 we need to make an informed decision's the way to go. Not one that as I think I've seen
819 in the past that have left some options off the table.
820

821 JS: Comments, Mat?
822

823 MW: Well, I generally agree with both Andy and Michael on this, and just the piece that I
824 might add to this is another example of collaboration that's currently going on will be the
825 Treasure Valley Groundwater Model Development. There's a technical advisory
826 committee that's made up of a cross-section of cities and other stakeholder groups, water
827 user community, that's guiding that development. But one thing I'll note as an
828 observation as the Deputy Director, I've been in this chair for five years now, is how
829 many people come to the Department of Water Resources or pick up the phone and call
830 the deputy and expect the Department of Water Resources or sometimes the Idaho Water
831 Resource Board to do things that they don't have the statutory authority to do. And when
832 we talk about this type of collaborative process, of course it's needed, of course the
833 Department and the Idaho Resource Board need to participate, but we also need to think
834 about what statutory changes need to change or what authorities we need to put in place

835 so that everyone can fully participate in that type of collaboration. Because right now we
836 have authorities outlined in the statute, and those are the duties and responsibilities that
837 we need to carry out. And I know that people often come frustrated to the Department
838 that we're not working outside of those authorities.

839

840 JS: Okay, thank you. All right, we'll go ahead and end on this question. I think it's a good
841 one. To truly drive the more efficient use of water, there needs to be an unmet need. Are
842 any of the panelists aware of projects that have failed or not started because of lack of
843 available water?

844

845 MC: I'm not aware of any particular project. I think that there may be, for some industries that
846 might come to this state, to this valley, there may be concerns about whether or not there
847 be sufficient water for say industrial or commercial needs.

848

849 JS: So projecting into the future, that remains an open question? Certain parts of the Valley?

850

851 MC: I think we need to keep that in mind that to attract new businesses here, we're going to be
852 able to- we need to be able to assure them that there will be a water supply for their
853 needs.

854

855 MW: Specific to the Treasure Valley, I'm not aware of any projects. I think if you look towards
856 Southeastern part of Idaho out on the Eastern Snake Plain, I think arguably there are
857 needs there that aren't being met currently and the conjunctive administration delivery
858 calls that are going on there. But I think part of the problem, or part of the opportunity, is
859 people aren't quite used to paying the appropriate value or cost of water. And so they
860 might come and be frustrated that the water's not there or it's not there as quickly as they
861 want it. But they're frustrated not so much that the water's not there. The water's not
862 there at a price they're willing to pay for it. And so I think there is some reluctance on the
863 part of people in Southern Idaho in our semi-arid environments to pay the actual cost of
864 the water.

865

866 AW: In short direct answer to your question, I'm not aware of any projects, at least in the
867 Treasure Valley, that have failed due to lack of water. And I think even under, you know,
868 current statutory provisions and operations, there've been success stories. For example,
869 Micron, a large portion of its water use, industrial water use, is actually met by an
870 application for transfer involving Nampa Meridian Irrigation District, where Nampa
871 Meridian Irrigation District, [annexed and] included Micron within its footprint to supply
872 it with water. So, you know, again, you're using already available water supplies for
873 arguably non-traditional uses, but the fact of the matter is even with our current arguably
874 archaic infrastructure and perhaps legal regime, it can get done. Where there's a will,

875 there's a way. And- but again, the short answer, I'm not aware of any projects that have
876 failed.

877
878 JS: Okay. We're a little bit ahead of schedule, so maybe I can convince you three to stick
879 around for a few minutes in case people have questions or comments for you. Otherwise,
880 please join me in thanking these gentlemen for participating in the panel today.

881
882 [applause]

883
884 **Panel: How are other states dealing with changes in water use and growth?**

885 *JF=John Freemuth, R=David Robbins, K=Doug Kenney*

886
887 JF: Okay, everybody. Excuse me. If we can start to reassemble.

888
889 Okay everybody. I think we saw in our first panel is what we exactly wanted to come out
890 of that panel. We know there's points of agreement, we know there are points of
891 disagreement. I think we also found that we- there's a lot of common agreement that more
892 and better data, which Mat mentioned that some of that's ongoing, is really necessary
893 before we jump to conclusions that- that may not be substantiated by the data. So the
894 Center is certainly glad to help facilitate if there's a need to get more money for more
895 research to develop better data. We are certainly glad to be part of helping get that money
896 where it should be to the right scientists to do that. Okay? So our second panel—and this
897 one'll be a little different, there's just two folks up here—so they will have some opening
898 remarks and- and a slide or two or more, and then we'll have plenty of time for questions
899 as we did the last panel. This panel takes a look at what goes on in other states, obviously
900 in the West. Patty Limerick and I were talking at dinner that we like to talk about the
901 West being arid as opposed to the rest of the country, and it is, but not all parts of the rest
902 are indeed arid compared to other parts. Idaho apparently in some ways is at least water
903 rich. So our two panelist, and you've got their bios again in the program, but I do want to
904 mention a few things about our two speakers. The first one will be Doug Kenney from
905 the Western Water Policy Program at- it's part of the Law School in the Getches-
906 Wilkinson Center at the University of Colorado Boulder. I've met Doug in the past, and I
907 know he has worked on water for a long time. Has written *In Search of Sustainable*
908 *Water Management: International Lessons for the American West and Beyond*, the
909 *Water-Energy Nexus in the Western United States*, he served on as a consultant on a
910 number of local state, multi-state, and federal agency groups, presentations in 21 states,
911 eight nations and nine- five continents—and I get excited when I get to give a
912 presentation in Winnemucca, so good for Doug. [laughter] He's got a BA in Biology from
913 the University of Colorado, and MS in Natural Resource Policy and Administration from
914 the University of Michigan, and a PhD in Renewable Natural Resources from the
915 University of Arizona. Our second speaker is David Robbins, President and Co-founder
916 of Hill & Robbins, where his practice emphasizes the fields of water and natural
917 resources law, water quality, and environmental law. Prior to entering private practice, he
918 served in the U.S. Army, he was a captain, with EPA, he then went to the Colorado
919 Attorney General's Office as First Assistant Attorney General, and was later appointed to

920 the Deputy Attorney General position. He represented the state of Colorado in a variety
921 of interstate water matters and served as counsel to the state engineer in adjudication
922 processes- proceedings and trials. So we have a lot of experience on water. Yes, the
923 mother water state I guess I'm told in many cases is Colorado, which is good in terms of
924 water law. So with that, Doug, we'll turn it over to you, and then David, and then we'll
925 have plenty of time for questions from you guys and some we have already developed. So
926 thank you.

927
928 K: Thank you. Everybody get their taxes filed today? Don't do it. I'm going to start by
929 saying I think you have a- a panel, if you can call two people a panel, that's already been
930 thrown for a loop, because I don't think either of us ever work with groups of people who
931 preface their remarks by saying, "You know, we actually have a lot of water. You know?
932 And what should we do with the extra? You know?" I can't recall ever having that. And
933 I've consulted- I did consulting in Vietnam where they were getting 80 inches of rain a
934 day and they thought they were- did not have enough water so. It's a- I'm a bit thrown for
935 a loop, but I'm gonna power through here. I am one of these people that when I think of
936 the West, I tend to think of the semi-arid West, because that's again where I end up doing
937 a lot of my work. And in the semi-arid West, people are concerned about growth, they're
938 concerned about water. I even wrote a book many years ago called *Water in Growth in*
939 *Colorado* back in around 2000, 'cause that's what everyone was talking about. And then
940 the world has really changed for me in the last 15 to 20 years. Most of the people I deal
941 with don't worry about growth anymore. I mean, they worry a bit, but it's not what keeps
942 them up at night. What keeps them up at night is the warming climate and what that's
943 doing to the hydrology that they have to deal with. Most of my work is in the Colorado
944 River Basin. That basin is two degrees warmer than it was when I was a kid. I mean, just
945 in my lifetime it's two degrees warmer. What is that- why is that important? Evaporation.
946 More water evaporates than it used to. Growing seasons are longer than they used to.
947 They start earlier, they run later. Not nearly as much water, as much of the snow and rain,
948 makes it to the rivers anymore. The stream flow in the Colorado River is about 20 percent
949 lower this century than last century. I mean, 20 percent. Think of a river system, a major
950 river system, drains a large section of the West—this is a river that doesn't make it to the
951 ocean, hasn't made it to the ocean in decades—and boom. In just a couple of decades you
952 lop 20 percent off of that, and there's another 20 percent coming in the next- off of that
953 probably in the next 30 or 40 years. I mean, that's the- that's the context that I deal with a
954 lot, and so it's again it's a- it's a challenge that overwhelms a lot of water management.
955 Now, you have the same atmospheric forces certainly at work as you move out to the
956 Northwest. It is getting warmer here as well, it is causing problems for water
957 management, especially as you get to some of your lower elevation mountain ranges like
958 up toward- through the Cascades and so on where you get snow melt that in some places
959 is three or four weeks earlier than it was three or four decades ago. I mean, that's a big
960 difference. That's- the earlier that snow melts, the, you know, it changes how you operate
961 your reservoirs, it changes how much- how long growing seasons are, it changes a lot of
962 things. It changes your flood control regimes, makes life complicated. But it also makes
963 life complicated in that you don't have a natural reservoir of snow- water stored as
964 snowpack. So the extent that you see calls for new storage, I think you're going to see a
965 lot more of that, more dams and reservoirs in the Northwest than you do in the

966 Southwest. In the Southwest we got plenty of dams and reservoirs, we just don't have any
967 water to put in them, you know? And it's this great irony that people say, "Oh, you're
968 running out of water. You should build more reservoirs." I'm like, "If you're running out
969 of clothes, you don't build more closets." [laughter] I mean, we have reservoirs. We don't
970 have water to put in them. The other thing that really keeps a lot of people up at night that
971 I find is this variability between wet and dry years. And again, that's increasing. The wet
972 years are wetter, the dry years are dryer, it causes a lot of challenges in how you manage
973 your infrastructure, when you store water, when you don't store water, what sort of flood
974 risks exist, what sort of risks from extreme drought exist. And again, this is a global
975 phenomenon. It affects every community differently, but as people like to say you know
976 in the West we have nineteenth century law, twentieth century infrastructure, and now
977 twenty-first century water management challenges. And you see that in these extreme wet
978 periods and extreme dry periods. You see that challenge. All right, so let me get back to
979 population growth and the concern there. You know, a lot of people don't talk about this,
980 but you could have a lot of population growth and not worry about water. I mean, Seattle,
981 let me see if I can do this, Seattle, San Francisco, LA, San Diego, Las Vegas, Denver,
982 Albuquerque, I could go on, all those places have had extreme growth in the last 25
983 years. They don't use more water than they did 25 years ago. And it wasn't difficult. As a
984 person that lived in these places for the last 25 years, it wasn't difficult. It was invisible,
985 really. You go to one of those towns and you tell them, "Do you know that your city uses
986 the same or less water than they did three or four decades ago?" And they- they'll- most
987 of them won't even know that. They're like, "Oh, I didn't know that. I didn't do
988 anything." It's not that difficult. Growth is- that sort of growth is pretty easy to deal with.
989 What's hard to deal with, and I think this speaks more to your growth challenges here, is
990 not the growth in the big cities, but small communities that grow up to mid-size cities,
991 'cause these are communities that don't have a big base of developed water to conserve
992 from. They don't have that base to work from. And to the extent that these are younger
993 cities, that means they probably have junior water rights and they have water systems
994 where they didn't get the first choice as to where they built the reservoirs and the
995 infrastructure. So those are the towns, those small towns becoming mid-sized towns,
996 where growth is a challenge. It's not the big places. And of course those are the towns
997 whose growth is so closely tied into agriculture and taking water from agriculture. And I-
998 clearly that's what we want to talk about here. As far as solutions, I think our title system,
999 what are people doing about this, what are the solutions, and of course again the solutions
1000 depend on where you're at. There's a lot of, you know, the- water managers as a whole
1001 are some of the craftiest people I know, and I mean that in the nicest sense of the word.
1002 There's a lot of clever things being done by the water engineers out there, you know, and
1003 it's all stuff that, you know, it's not like some trick technologies. It's using storage,
1004 operating storage a little differently, you know, pumping in different schedules and
1005 routing water differently. There's a lot more and more efforts to connect water systems. If
1006 you have a community where there's four or five water systems, people find if you build
1007 some interconnections in terms of pipes and ditches and so on, that gives you some
1008 flexibility. And so you see a lot of things like that going on throughout the West. Again,
1009 I've talked about conservation and how that's really easy. It's not only really easy, it's
1010 really cheap. And most places that I looked at in the West serving new growth- serving
1011 an acre foot of- taking care of an acre foot of demand, let me phrase it that way. Taking

1012 care of an acre foot of new urban demand costs, if you do that through conservation,
1013 essentially offsetting or eliminating demand, that costs you about a third as much as it
1014 does to build new infrastructure and develop new water. It costs about half as much
1015 usually as buying out farmland in places where that's done. It's easy. I won't talk about
1016 the legal conflicts, 'cause I'm with an expert here on my panel, but you know, we're
1017 good at that, you know? We're good at going to court, we're good at suing each other.
1018 And those things are expensive and they're not terribly efficient and they can get kind of
1019 ugly and so on and so forth, but those things get worked out, you know? Conflicts
1020 between seniors and juniors, between pumpers and surface water users, between
1021 upstream and downstream, these things get worked out. But where we have challenges, I
1022 guess—and again this is a theme I think- a major theme of this conference- is about how
1023 do we use markets to do some of this reallocation of water, some of this shifting of
1024 water—and I think that's where our tools are the weakest. I think that's where we
1025 struggle the most. In part- largely in part because it becomes very much a social issue.
1026 It's not an engineering issue. Engineering issues are easy 'cause we have good engineers,
1027 and legal issues are easy because we have good lawyers. These social issues about what
1028 happens when cities grow into rich agricultural areas and chew up that land and change
1029 how the water moves around, that's difficult. And that's really where a lot of people in
1030 the West struggle. It's interesting- I think one of the questions I'm supposed to answer is
1031 how do markets function in the West, and my short answer is, poorly. They function
1032 poorly in part because they have all these rules and regulations layered upon these
1033 processes, which you hear the word water markets, you think people buying and selling,
1034 that's pretty simple. It's anything but simple. But if you go to the state legislature and you
1035 look at the bills that are considered about water marketing—and I've done this in a few
1036 states—oh I'm sorry. Okay, I'm sorry. Let me know if this is better. If you go and look at
1037 the legislation about water marketing, what you'll find is for every bill that's being
1038 considered to try to make markets function better—smoother, easier, you know, less
1039 lawyers and engineers involved—for every bill that tries to do that, there's another bill
1040 that tries to restrict how markets work—to put on more protections, more hoops to jump
1041 through—because people have this love-hate relationship with markets. There's this idea
1042 that, you know, as a country we believe in markets, we believe in capitalism, we believe
1043 this is an efficient way to the extent that some water needs to be reallocated, we believe
1044 that's the way- markets are the way to do that. But markets are feared, especially in the
1045 very arid parts of the West. Markets are feared as a way for cities to take advantage of
1046 agriculture and to take whole communities and essentially wipe them off the map. I mean
1047 that can- it's a little dramatic, but that's the fear out there. You have this dichotomy when
1048 you talk to the farmers, it's like every farmer I talk to says it's a bad thing when water
1049 leaves agriculture. It's a bad thing when water rights are sold to cities. But every one of
1050 them tells me also, "But I want to be able to sell my water right, you know, if I so want
1051 to. You know, don't put restrictions on that. Put restrictions on everybody else's ability to
1052 sell if you can figure out how to do that, but not mine." And I had a wonderful
1053 conversation once with a guy from the Farm Bureau. I was at a meeting, we were talking
1054 about water markets, and he was silent. And I said, I asked him, "Why doesn't the Farm
1055 Bureau have a policy on this?" And he explained to me this dichotomy, this love-hate
1056 relationship with markets. So that's where a lot of the West is really struggling, this idea
1057 that some of the- especially the smaller communities that are growing up to mid-sized

1058 communities, their only available water supply is out of the agricultural sector. They're
1059 willing to pay the money to get the water but the farming communities are concerned.
1060 And the cities don't want to be the bad guys. The cities aren't looking to drive
1061 agriculture, create problems for agriculture. They're not looking to dry up farms and
1062 they're not looking to dry up some of these problems that we've heard talked about, these
1063 problems of, you know, if too much water shifts hands, then you know ditches don't
1064 function the way they were originally designed. You know, those sort of problems. Cities
1065 don't want to be the source of that, those sort of issues, either. So, a lot of the activity in
1066 the West regarding markets and growth and this relationship between cities and farms
1067 surrounds something called ATMs, which is a horrible acronym 'cause you think of
1068 ATMs as the Automatic Trans- what is it the Automated Teller Machine. ATMs in much
1069 of the West now mean Alternative Transfer Methods, and this is ways- it's an alternative
1070 of a city going to a farm, buying out a farm, taking the water, and the farm going dry.
1071 Alternative Transfer Methods are aren't there ways that urban areas and agricultural areas
1072 can get along. And some of these methods are things like transfers that are temporary—
1073 maybe the water only flows to the city in two years out of 10, the two driest years. These
1074 are transfers on a small scale. These are transfers that are more about managing the risk
1075 of running out of water than about actually increasing an urban area's water supply,
1076 because most growing areas, as I say, don't necessarily need more water, but they need
1077 more reliability of the water supply they have. So you see a lot of deals like deals based
1078 on rotational fallowing. So you'll have an irrigation district where they agree that in any
1079 given year 20 percent of the lands will be fallowed and 20 percent of the water that would
1080 have been used, that 20 percent that is saved, then goes to the city which then pays those
1081 farmers those 20 percent that don't have a crop that year. Those sort of deals. There's no
1082 net increase in the amount of water used in those deals, but it's shifted in at least that
1083 given year between farm and city. But the farms still stay in business, again, it's
1084 rotational, it moves from one farm to the next, one plot of land to the next, there's various
1085 schemes. A lot of things like that are happening in the West. And in Southern California
1086 for example these happen on a scale that's pretty stunning. You have big irrigation
1087 districts like the Imperial Irrigation District and the Palo Verde Irrigation District who
1088 have deals with big cities like Los Angeles and San Diego, and these are arrangements
1089 that are in place—some of these arrangements go 30 or 40 years—and over the course of
1090 these arrangements, we're talking millions of acre feet moved, we're talking hundreds of
1091 millions, if not billions, of dollars changing hands. But yet the irrigation areas still
1092 continue to irrigate, crop yields haven't dropped any in any of these places. I mean,
1093 people get a little better you know with how they're farming in part because they're
1094 getting a nice check from the cities, which helps finance some repairs and infrastructure
1095 improvements and that sort of thing. So that's the sort of relationship that I end up
1096 working on a lot, and it's interesting that some of that cooperation or working together,
1097 certainly those principle are universal. They could transfer to the discussion here. Some
1098 of the other parts of this just don't transfer, this idea that you can have urban growth and
1099 still have farming- you know, it's not an either-or here. You have water for both. You
1100 know, the land itself might be more of a limiting characteristic than the water. So it's a
1101 different challenge. So let me just wrap this up, what other states doing? It varies a lot
1102 from region to region, and we even heard it today, it varies a lot just from Treasure
1103 Valley to the Upper Snake Valley next door. Which way is east? I don't know my

1104 directions here. So, you know, context matters, but there's almost always a mix of
1105 strategies that I'm seeing and improved engineering, making systems- trying to get some
1106 more flexibility into these systems because they're being asked to do different things,
1107 strong focus on urban water conservation—much more so than agricultural, and there's
1108 reasons for that—, still the occasional lawsuit but it's, you know, I don't know if it's any
1109 more lawsuits than we had before. I mean, people talked about water conflicts, but as
1110 someone mentioned earlier, there's really a lot of negotiation and deal-making and
1111 collaborative action more so than litigation, at least from what I see. You know, and
1112 again, markets. Everyone's struggling to figure out how to use markets in a more skillful
1113 way, a way that makes these- that makes arrangements efficient but that doesn't, you
1114 know, and that protects the fundamental interests of both urban and rural areas but that
1115 doesn't cost too much money in terms of legal and regulatory hurdles. So that's where
1116 people are working. So I'll stop there. Thanks.

1117

1118 [applause]

1119

1120 R: Thank you, Doug. I'd like to start this morning by thanking Professor Freemuth as well
1121 as Doug and the speaker who will speak later today Professor Patty Limerick. These-
1122 they are both Coloradans, they are both students of this Science of Water Management.
1123 And although Doug suggests that he doesn't want to get into the legal aspects, I assure
1124 you he understands them in a very sophisticated way. By comparison, I guess you would
1125 call me a mud-on-the-boots lawyer. I represent individuals and most predominantly
1126 public entities in the matter of water resource allocation. I worked for six years for the
1127 Environmental Protection Agency and for the Colorado Attorney General, and for the last
1128 40 years I have been in private practice, but I principally represent states like the state of
1129 Colorado and the state of Wyoming and large basin-wide water conservation districts and
1130 large municipalities in determining how best to protect the water supplies and how best to
1131 make changes to the water supplies as are required. I spent a significant part of my career
1132 in litigation. I end up being brought in on cases where it's actually gonna go to trial, and I
1133 have the pleasure of crossing swords with fine lawyers in an effort to ensure that any
1134 proposed change in the state's water resources has been appropriately vetted and terms
1135 and conditions in place to ensure that the remaining water-using community is not
1136 impacted adversely by the change. I've spent a significant amount of time either
1137 preparing for litigation, litigating, or trying to figure out what to do with the results of
1138 litigation on Colorado's rivers, eight of the nine compacts have been involved in that
1139 activity and I have been involved in all of those. I think Idaho and Colorado are very very
1140 similar in some ways and very different in others. They- our states are similar in a very
1141 important way in that we are two of the Western states who actually believe in science
1142 and attempt to mold our laws and interpret our constitution in ways that respect scientific
1143 principles that are accepted in the engineering scientific professions throughout the
1144 world. By that, I mean we have priority systems which we understand to give a greater
1145 benefit to water rights that are more senior or were developed earlier in times of shortage,
1146 but more importantly, we also acknowledge that the great percentage of groundwater in
1147 our states is in direct hydrologic connection to surface streams and that the pumping of
1148 wells has an impact on the surface flows and has an impact on the water budget, however
1149 you want to measure it. Most of our neighboring Western states and our friends in those

1150 states have struggled mightily to figure out how to avoid that piece of scientific
1151 knowledge. Texas believes that the right of capture should apply. They basically pretend
1152 that groundwater is like oil and gas and that if you own land you can drill a well and get
1153 as much as you can get, and too bad if more senior water rights are impacted. Similarly,
1154 California doesn't really regulate groundwater. Arizona has a claim that it regulates
1155 groundwater; I can't see it from my perspective, but that brings us together. 'Cause we
1156 understand at the end of the day how much water is available coming out of our snow
1157 packs and our sources of water is being consumed, whether it's from groundwater or
1158 surface water, is vitally important. We're also similar because we treat water as being a
1159 public resource subject to the right of citizens to acquire a portion of it and to use it
1160 beneficially, and we are similar in that we have preferences in the constitution that allow
1161 domestic uses, municipal domestic uses, to have a preference in times of shortage over
1162 other uses. And we are similar in that we do not insist upon those preferences. We treat
1163 them as a right of condemnation, not simply a right to stand up and say, "I'm taking your
1164 water because I want to." There are differences though, and the biggest difference has
1165 been discussed today. Doug put his finger on it. And that is that Idaho has a significant
1166 amount of water, an embarrassment of riches. Colorado's rivers have been effectively
1167 over-appropriated for 75 to a hundred years. There maybe an exception on the Colorado
1168 River depending on which hydrologist you talk to or which perspective you take, but
1169 there is no question that our other rivers are all fully and completely over-appropriated.
1170 And that is for the second reason that we're very different. Colorado is a signatory to nine
1171 compacts and is the recipient of limitations in two Supreme Court equitable
1172 apportionment decrees. Compacts do one thing and only one thing. When you strip off all
1173 of the rhetoric and you strip off all of the effort to avoid saying that this is what they're
1174 doing, what they do is they constrain and allocate the right to consume water. They don't
1175 constrain the right to divert water, they don't constrain what you do with the water, but
1176 they specifically limit how much a state is entitled to consume from an interstate
1177 resource. Consume. That's an important word. As a result, Colorado doesn't pay a whole
1178 lot of attention in water management decisions to what size a decree might be in terms of
1179 a diversion rate. The easiest example would be to look at a 10-acre tract of land on, let's
1180 say the Yampa River, which is in Northwestern Colorado and does not have as much
1181 pressure on it as some others. And hypothetically a rancher has a hundred cfs right to
1182 divert from the Yampa River. And he can run all 100 cfs under that 10-acre tract or he
1183 could cut that back to half a cfs. And in doing so, he would not change the value of his
1184 water right one iota. That 10-acre tract in our hypothetical's, growing native hay, and it
1185 will consume 1.8, 1.9 acre feet per acre throughout the growing season and that is all the
1186 water that that farmer or rancher has to use for other purposes or to sell to another
1187 individual. So, we don't pay as much attention as some people think we do on what our
1188 decree books have to say. We pay very detailed attention on how people are actually
1189 applying the water to beneficial use. And in my Yampa example, what's happening to the
1190 other 99 point whatever cubic feet per second? It is being diverted out of the river,
1191 washing across that hay field, probably killing the hay in the process, rusting the lower
1192 wire on the fence below, and roaring right back into the Yampa River where it is
1193 immediately doing one of two things: it is becoming a water supply for a downstream
1194 neighbor, or more importantly, it is serving to assist Colorado in meeting its obligations
1195 for delivery to its neighbors, the Yampa is a tributary to the Colorado, which would be

1196 our neighbors in Wyoming, Utah, New Mexico, California, Arizona, and Nevada. So,
1197 using my example, if my friend growing the hay wants to sell the water right, he is
1198 entitled to acquire through the water court a decree for 10, 18, 20 acre feet of transferable
1199 historical consumptive use that could be used for a different purpose or at a different
1200 location. As a result, every change in land use and every change in type and place of use
1201 is scrupulously monitored, and it is important because if a person were entitled to expand
1202 the use to reflect something that had to do with the rate of diversion versus the rate of
1203 use, that—and allowed to consume water over and above what was historically
1204 consumed—that means that the water had to come from someone else, because we are at
1205 our limit on each of our compacts. Every year, we struggle to deliver sufficient water to
1206 meet the obligations to our neighbors. And so if you increase in any way the consumption
1207 of existing water rights, that means someone else—another water right holder, or the state
1208 of Colorado’s obligations to the neighbors—are shorted. In terms- also in terms of
1209 conflicts, in terms of change of use, I guess I have some map- a map up on the board.
1210 This is the- a map of the state of Colorado. You can see the river basin shown on the
1211 map, and I- these are sort of cartoon maps. As you go along you’ll see why. But you can
1212 visualize, I hope, where our water basins are. And I will see if I’ve done this right, I
1213 promise you I’m not very good at doing these things. How do I switch? Maybe I do that.
1214 There we go. Okay, that’s the irrigated areas of the state of Colorado. I want you to
1215 understand that there’s more irrigation than is shown, this is where row crop irrigation is
1216 occurring. It’s not- it doesn’t represent any of the big hay meadow operations that exist in
1217 the mountains, okay? So you can get a sense of where we are using water and in high
1218 production commercial agriculture. All right, this is the South Platte Basin, and the South
1219 Platte Basin is- we have a compact on it with the state of Nebraska. There’s the irrigation
1220 activity that occurs in the South Platte Basin, sort of in lawyer-ese. I did these things and
1221 I’m terrible with this, so it gives you a sense. And that is basically the urbanized corridor
1222 in the Denver Basin. As you can see, that urbanized corridor sits right on top of irrigated
1223 farmland. So let’s then move on to the Arkansas Basin. The Arkansas Basin does not
1224 have as big an urbanized area. There’s the Arkansas Basin’s irrigated area, or principle
1225 irrigated area, and there’s the urban- the large area of urbanization, which is around
1226 Colorado Springs. The interesting thing about these two maps is that in the South Platte
1227 Basin, there is not significant conflict when land is taken out of agricultural production
1228 and shifted to urban production. And the reason for that is the farmer gets to sell the land
1229 to the developer and gets to sell the water to the developer or to the city in which the
1230 development will occur. So the farmer gets full value out of his process. In the case of the
1231 Arkansas Basin, that it’s very different because all of the irrigation is still going on and
1232 when a city comes down and proposes to use agricultural water, the farmer is left with
1233 dry land in a climate similar to here and no water. And so you go from irrigated ground
1234 with good tax return to the communities and the counties, implement dealers, seed
1235 dealers, all that sort of stuff, and all of that financial return to those communities goes
1236 away. So that takes me- I’m losing track here. Now what happens in the Arkansas Basin
1237 is that this explains why there’s now a push to use alternate transfer mechanisms as
1238 described by Doug. The effort is to figure out a way to keep water tied to land so that it
1239 can be used in a certain number of years going forward into the future while at the same
1240 time allowing cities to use the water in a limited number of years when they require
1241 additional water supplies. And that- the idea behind it is to keep the green area viable, to

1242 keep most of those farms operating, to keep those small communities viable and not
1243 allow their economic vitality and their success to be sucked up into the metropolitan area.
1244 In the case of this- in the case of the South Platte, the previous slide where I showed you
1245 how urbanization was right on top of irrigated agriculture, it's far less of a problem
1246 because the water is transferred through a water court process, either to the city that is
1247 going to serve those municipal needs or the water is- a determination is made of how
1248 much consumptive- beneficial consumptive use exists on the property and the water is
1249 used for purposes in other communities in other areas within the basin. There are a
1250 number of Colorado statutes that are designed to bridge the gap when water transfer
1251 occurs. There are statutes that require the acquiring city to pay a payment in lieu of taxes
1252 or a mitigation- transition mitigation payment. So if you're actually buying water out of
1253 agriculture and the land is changing type from irrigated to dry land, you have to pay a
1254 difference in value so the local community is not disadvantaged. There's a statute that
1255 requires the acquiring city to make payments to defease bonds—so if the county has
1256 issued bonds on the irrigated ground, the cities are expected to pay their share until those
1257 bonds have been fully paid off. There are statutes that deal with water quality. There are
1258 statutes that deal with a limitation on how much a change of water right can occur
1259 without additional constraints being applied, and that number is a thousand acre feet, and
1260 there is a statute that is called the Agricultural Protection Act, which has as its purpose to
1261 allow agriculturalists to go into court and change- and quantify their historic consumptive
1262 use and to change the potential uses from agricultural loan to agriculture plus municipal
1263 industrial and other uses so that those farmers are in a position in the future to rent, lease,
1264 or sell their water to a municipality or a third party user while at the same time preserving
1265 their right to stay in agriculture if they so choose. I'm almost- I'm about ready to wrap up
1266 here. I want to hit a couple of terms. In Colorado we talk about buy and dry. That means
1267 we're the- where a city comes in or a third party comes into a farmer, simply buys the
1268 farm, buys the water, and dries it up and move the historic consumptive use to another
1269 beneficial use at some other location. Or as Doug explained, alternative transfer
1270 mechanisms which tend to look at rotational fallowing—a farmer owns a thousand acres,
1271 what he does is make a commitment with a city or with a farm organization that two
1272 years out of 10, three years out of 10, five years out of 10, he will take some percentage
1273 of his ground completely out of production, let it lay fallow, and make that amount of
1274 water, that amount of consumption available to a third party, usually a city. I have been
1275 working on figuring out alternate transfer mechanisms for the last 15 or 18 years. They
1276 are very complicated. Farmers have a greater expectation of what the water is worth than
1277 cities do, but at the end of the day, we're all going to have to work together if it is our
1278 intention to allow agriculture to remain successful in these basins while at the same time
1279 ensuring that our population receives the water supply it needs. I want to end by
1280 emphasizing: Throughout the greater West, somewhere between 70 and 80, 85 percent of
1281 all water consumed in our river systems is consumed in agriculture. That means that
1282 somewhere between 25 percent down to 15 percent of the water is required to sustain our
1283 domestic municipal use. I hope you understand that you can add a whole lot of people
1284 and not really impact agriculture that much. It doesn't require a destruction of agriculture
1285 to find sufficient water to operate cities. I want to emphasize again: Our state of Colorado
1286 is very different from Idaho in that we have very limited water supplies that we're trying
1287 to make things happen on. The Rio Grande this year has- will have and a flow of around

1288 300 thousand acre feet of water total. Of that, about 140,000 acre feet will have to be sent
1289 downstream to New Mexico and Texas where Albuquerque, El Paso, Las Cruces also
1290 depend on it. So, ladies and gentlemen, you probably run 300,000 acre feet through this
1291 system every week, and that is all we have to deal with on the Rio Grande. So when
1292 we're talking about transfers, when we're talking about how agriculture can use or not
1293 use its water right, then we're missing a bunch of zeros. Finally, it doesn't matter whether
1294 you have surplus supplies, as you may hear sometimes, or have very low supplies, low
1295 levels of supply like we have in Colorado. Everything is tied together. There's nothing
1296 that goes for free. Water supply- volumes of water supply, large ones or small ones, are
1297 really as you analyze them, the critical issue is how much are you going to consume,
1298 where are you going to consume it, and how are you going to ensure that you don't over-
1299 consume to the detriment of either your neighboring states or your neighbors? I'm happy
1300 to answer questions if you have them and I want to thank you very much for letting me
1301 come today and chat with you about this stuff. I am honored and I wish you all a good
1302 conference. Thank you.

1303
1304 [applause]

1305
1306 JF: Okay, we have a lot of time for questions. Let me start with one. I think that we have sort
1307 of asked them already to think about it and they've touched on it a little, and that's sort of
1308 interstate water compacts. And for both of them, what is your experience with interstate
1309 water disputes and do you see the Treasure Valley ever having to contend with
1310 downstream states for Boise River or Snake River water? Here's some mics so you don't
1311 have to [inaudible].

1312
1313 R: I certainly have some experience with interstate disputes. I have been involved in the
1314 disputes under the South Platte Compact, the Republican River Compact, the Arkansas
1315 River Compact, the Rio Grande Compact, and the Colorado River Compact. In some
1316 instances, it is preparing for the inevitable conflict, in others it is defending the conflict,
1317 and in others it's trying to clean up after the conflict. I represented the state of Colorado
1318 for 23 years as its lead counsel in the Supreme Court conflict Kansas versus Colorado
1319 and the Arkansas, and so- and I've actually worked on the water quality issues both on
1320 the Colorado River, in addition to water quantity issues, since 1979. I personally don't
1321 see that your- that absent at a significant increase in consumption within Idaho that there
1322 is any significant likelihood that you will have a compact conflict on the Boise River or
1323 the Snake River. It just- the volumes of water are big enough that the likelihood that a
1324 shortage would become so severe that the lower basin states would either sue for an
1325 apportionment or seek the negotiation of a compact. I suppose it's possible, I suppose that
1326 the climate issues Doug has described, or endangered species issues, could result in that
1327 pressure if they- if flows were required that were so high that they needed to- that Idaho
1328 needed to curtail water rights in order to meet them, as in Colorado's case occurs on the
1329 Rio Grande. But absent those sorts of factors, I don't see it as a really significant threat.

1330
1331 K: I've worked on interstate water disputes probably more than any other issue in my career,
1332 to be honest with you. My first job out of college was working on the ACT-ACF dispute,
1333 and I'm guessing probably nobody knows what that is. Those are- that's the acronym for

1334 the Appalachia-Chattahoochee-Flint Alabama-Coosa-Tallapoosa River Basins shared
1335 between Alabama, Georgia, and Florida, of all places. You wouldn't think of a
1336 Southeastern U.S., but yeah. I was- I was hired in the, geez, mid 1990s to solve that
1337 dispute and it's still in front of the- well, I guess the Supreme Court made a significant
1338 ruling last year, I believe. But it's still not settled. So clearly I have a history of
1339 incompetence on this issue because I didn't make any progress at all there. I've done
1340 work in China and in Vietnam and in Korea and in Australia on- all in interstate disputes.
1341 In the U.S. I've- besides the one I mentioned, I've worked with between North Carolina
1342 and South Carolina interstate water disputes, most of my research now is on the Colorado
1343 River Basin and a lot of the dispute there is around the interstate compact there. So I've
1344 seen a lot of different flavors of interstate water conflict. I've seen the- how a lot of
1345 different compacts work, and I've seen how it works in places without compacts. And
1346 just as- I say all of that to then say, ditto. I agree with your analysis. I wouldn't worry
1347 about it here. There's just too much water here and just not enough pressing demand here
1348 for me to think that a conflict on the Boise or Snake with downstream neighbors is- I
1349 mean, that's way down the list of things you should be worried about.

1350
1351 JF: Okay, thanks. I don't know if this is yet relevant for us, but it's an interesting question to
1352 be asked. Fort Collins requires land developers to have some amount of water available
1353 for transfers out of agriculture. Is this an effective way to ensure adequate municipal
1354 supply? Either one of you, or both.

1355
1356 R: Yes. It is. It has spinoff social aspects, but as I showed you on that cartoon map, Fort
1357 Collins is within the red blob and it is- it is- the land developers are taking land around
1358 Fort Collins that were historically in irrigated agriculture and they're building houses on
1359 them, and so Fort Collins is simply ensuring that those individuals dedicate to the town a
1360 sufficient percentage of that formally used water- water used in agriculture to the city so
1361 that the city can provide sufficient supplies to those commercial establishments, single-
1362 family homes, and for lawn and garden irrigation.

1363
1364 JF: Doug?

1365
1366 K: I guess I'll just add that there's a lot of towns on Colorado's Front Range, including Fort
1367 Collins, that where the cities get really nervous about population growth because they
1368 know you know, that's a demand that they're going to be expected to meet. And so
1369 there's a lot of these—and they take different flavors—but there's a lot of these rules that
1370 say, where they put the pressure back on the developer that says we'll issue your building
1371 permit and we'll annex that land you want to build on and we'll do all those sort of
1372 things, but you gotta bring water to the city and to our system. And so it's just a- you
1373 know, again there's various mechanisms to do it, but it's just a way for cities to try to put
1374 the pressure on developers to find the water.

1375
1376 R: But this is easy to do, in my opinion. And the reason is because those farmers are
1377 growing crops like alfalfa, which consumes 2.8 to 3.2 acre feet per acre depending on
1378 how many cuttings you get. Potatoes 1.6, grains 1.4 to 1.6, native hay 1.7 to 1.8, and as
1379 you take each acre out you get that amount of historic consumptive use as a result of

1380 removing that land from irrigation. And what are you replacing it with? Houses, green
1381 grass, roads, and other things. And those generally use somewhere between .4 to 1.0 acre
1382 feet per acre. So the demand that you provide sufficient water for the development of
1383 those acres into a community isn't particularly onerous in most cases.

1384
1385 JF: So this is a bit of a can of worms question, but probably needs to be asked in terms of
1386 science because we discussed earlier that in some cases Idaho and Colorado, at least,
1387 approach things like conjunctive management the same way. But, there is a great deal of
1388 skepticism in Idaho when it comes to anthropogenic climate change. What impacts will
1389 that skepticism have on our ability, do you think, to plan for our water future?

1390
1391 R: Doug should start with that because he knows what it means.

1392
1393 [laughter]

1394
1395 JF: What's it mean, Doug?

1396
1397 K: You don't use that term, anthropogenic? Human-caused climate change? You know, it's
1398 funny to me that when I hear people talk about climate change as a controversy or as a
1399 political issue, because in the water management community, there's no ideology about
1400 climate change, or- it's just- this is just what they're doing with their- what they have to
1401 do with their lives. This is just the reality. The reality is the snow melts earlier than it
1402 used to. The reality is that you lose more to evaporation than you used to. The reality is
1403 that the soils dry out more and so more of that runoff gets captured by soils. I mean, the
1404 reality is that the first frost of the fall comes later, extending your growing season out on
1405 the other side. All these- you know, the reality is all the thermometers say it's two
1406 degrees warmer. They're thermometers, you know? So, you know. So you know, so the
1407 water managers that I deal with, you know, this is- I mean, I tell people this all the time. I
1408 got into this field 'cause I'm interested in water management and how farmers deal with
1409 cities and how you know upstream folks deal with downstream folks, all this sort of stuff.
1410 That was, I thought that was going to be my career. My career got hijacked by climate
1411 change, because every meeting I go to the things people are talking about are, "gee, this
1412 reservoir doesn't fill like it used to," or "it fills earlier than it used to," or "if we make the
1413 same schedule of releases from reservoirs that we used to, that's not enough to keep
1414 stream flows through the end of the summer season like it used to, 'cause it- things get
1415 stretched." And so that's- it's just the reality of what people have to deal with. Now, the
1416 political part is the anthropogenic word here, the human-caused word. I don't think
1417 there's any doubt it is human-caused, but you can throw that aside, I think, if you want to,
1418 if it makes you happy. Throw that aside and say we don't know what's causing it. You
1419 still gotta deal with it. I mean, we don't know what historically has caused a lot of things,
1420 but you still have to deal with things, you know? So. But let's just start thinking- and the
1421 other part of this is the world's going to get hotter the next two or three decades
1422 regardless of what we do. The greenhouse gases that trap heat are already in the
1423 atmosphere. They live up there for a couple of decades. The West is going to get hotter,
1424 here's going to get hotter for the next two or three decades, no matter what the world
1425 does regarding energy an other things. When you start thinking much longer term—50

1426 years, 100 years, so on and so forth—that’s when it gets important just whether or not
1427 you acknowledge the human role in what’s happening, because if you do acknowledge
1428 the human role then you’ll want to you know support things like the transition to
1429 renewable energy, that sort of thing. But in the short term, I mean, the stuff’s already
1430 happening and it’s going to continue to happen in the short-term. You can throw out all
1431 ideology and politics, that’s just the reality.

1432
1433 R: I happen to agree fully with Doug in his response, at least to the extent that I say to water
1434 managers, “Don’t worry about why. Just accept the reality that things in the climate are
1435 changing, and they are changing in ways that are contrary to our interest as Westerners
1436 needing to use water to continue our success economically, socially, and in other ways.”
1437 Let me just give you a couple of examples that I think are instructive on the question of
1438 climate change or variability. In the state of Colorado in the 1960s and 70s, we had a
1439 snow pack where snow was on the ground for several months every year that covered
1440 about somewhere between half and two-thirds of our state. Everything above maybe
1441 7,000, 75 hundred feet. Today if you look at the satellites, there is only about a quarter to
1442 a third of the state that is covered throughout the winter, that’s 95 hundred and up, with
1443 snow. Snow is our watershed. Granted that in higher elevations snow is deeper, but if you
1444 cut out almost half of the former snow shed, that is a ton of water that is no longer
1445 coming out on the runoff curve. The second issue that we need to face is that in the Rio
1446 Grande, which gets approximately seven inches of precipitation in the agricultural area a
1447 year, the runoff peak has moved forward 30 days. That is really significant because the
1448 last frost has not moved forward 30 days, so where in the old days you planted a crop and
1449 the runoff got there right about when that crop really began needing a lot of water so you
1450 didn’t have to have a lot of storage, today you are getting that runoff before the crop is
1451 ready to start growing ‘cause it’s still freezing at night. Now it doesn’t make any
1452 difference to the farmer or to the water manager why, but it is a reality. The third thing
1453 that I would point out that has had a significant impact on this is what we call dust on
1454 snow. The Great Basin, Southern Utah, Northern Arizona, even in- actually all of
1455 Arizona and New Mexico, has significantly dried out and has been significantly impacted
1456 by man’s activities in significant part, four-wheelers and other off-road vehicles that now
1457 break the desert crust in long lines which allows the wind to get under the crust and begin
1458 to move dirt. And we are now seeing enormous dust storms with almost every major
1459 storm front coming through the deposits on the snow in Colorado’s mountains, and it
1460 changes the albedo from clean snow, which is close to a hundred down to 50 or so
1461 because of the darkening of the dust in the snow cover which causes it to melt even faster
1462 without regard to the temperature changes. So those are all things that you know you can
1463 say, “Oh well, I don’t believe that in orthopogenic impacts, climate change is you know
1464 whatever it is.” It doesn’t make any difference to any of us because we have to deal with
1465 when does the runoff start, how much is it, how fast does it come, and how can we use it.
1466 So, you know, let’s acknowledge that there’s change and plan to deal with it.

1467
1468 JF: Of course, the real cause of climate change is Planet X, which is due in about a week,
1469 right? So we have- and if you don’t know what I’m talking about, good actually. We have
1470 a couple of questions about technology and how it’s improved our ability to have better
1471 data in terms of water disputes and so forth and so on. Are we relying more on good

1472 science and satellite data and so forth rather than legal disputations affidavits and things
1473 like that? Is it improving our decision-making?

1474
1475 R: My answer is yes, it is. There are a whole number of ways in which that's true. At least in
1476 Colorado we now require meters on all wells in the state with reporting at least annually
1477 to the state of Colorado. That allows us to calibrate to a higher degree of certainty our
1478 groundwater surface water interchange models. We have groundwater models in on every
1479 major basin and we now understand how much actually is being pumped versus what was
1480 estimated to be pumped. In the old days when you build a model, you went to the FAO
1481 publications, the Food and Agricultural Organization, and you looked at the curves and
1482 then you looked at crop statistics and you figured out how much crop was being grown.
1483 Then you went to the FAO curves, you figured out how much water that took, and that's
1484 what you assumed was coming from a field that was watered with a well. We now have
1485 meters on all those wells so we know exactly how much is being used. We have satellite
1486 images now where we can actually look at what the health and vigor is of the crops so we
1487 can understand whether the crops are in deficit or not. There are just- it has been
1488 enormously helpful, and once we get more years of this data compiled, I'm confident we
1489 will do an even better job of tracking the actual fate of all of our water supplies.

1490
1491 K: I will agree with all that, and I'll just add the observation that in most places that I know
1492 of where there is a lack of data, monitoring data about how water is used, how much is
1493 used, what it's used for, the answer is always the same as to why. Because it's not a
1494 technical problem, it's because it's a political problem. People don't like having their
1495 water use habits monitored. They don't like having to report how much they use, they
1496 don't like agencies spending public monies to do that. That gets overcome slowly and
1497 incrementally. That's a constant struggle.

1498
1499 R: You cannot rationally and properly manage water resources without accurate data. It's
1500 absurd to say that the state shouldn't know how much water you're using because you
1501 interact with your neighbors, you interact with downstream states, you interact with the
1502 public in various views on how water should be used. We ought to have a data set that
1503 actually puts aside all of the impassioned breast-beating arguments that we go through
1504 where the facts actually matter so that we can make good rational public decisions about
1505 how we should move forward so that you all can armor yourselves if we go into an even
1506 drier time, and you are in a position to look back and say, "This is what we've been
1507 doing." And then it allows you to evaluate suggestions on how you should change to
1508 better respond to the new conditions. Without information, you are just making
1509 haphazard guesses, and they very rarely turn out as well as you'd hoped.

1510
1511 JF: Maybe time for one more question here, and it kind of underlies the discussion that
1512 happened in the first panel. And David, I think this is more for you, but Doug certainly
1513 you can weigh in. In Colorado, if an irrigation district's lands become urbanized and the
1514 district continues to supply irrigation water to the subdivided land, would there be any
1515 change in the amount of water the district would divert to the urbanized parcel?

1516

1517 R: We have very few irrigation districts, as the term, you know, public districts, that are in
1518 the middle of heavy urbanization. We have conservancy districts that provide units of
1519 water to land, but there are- all of these are publicly tradable, water marketable. And the
1520 irrigation district supply generally will go down as water is moved into municipal and
1521 urbanized uses. In part because, as Doug pointed out earlier, the cities like- or maybe like
1522 in your question, professor, like Fort Collins require that the shares that were associated
1523 with that land be transferred to the city of Fort Collins, and then Fort Collins provides the
1524 water supply. And the irrigation district delivers the water to Fort Collins. In other
1525 instances, you see that at some point in time the irrigation district is approached by the
1526 state engineer and it's suggested that they're diverting more water than they have a
1527 beneficial use for and they need to cut back or reassign their shares in a way that allows
1528 them to continue to be beneficially used.

1529
1530 JF: David, thank you. Doug, anything to add to that?

1531
1532 K: I'll just say that in principle, and any basin, any stream that's fully-appropriated, which
1533 describes the vast majority of Colorado if not all of Colorado- and there's a change in
1534 land use, so there's- and a corresponding change in water use, the principle always is
1535 there can be no net increase in consumption. I mean, it's- to the extent that some water is
1536 shifting uses, you're shifting the historic consumptive use to a new use, but you know. So
1537 to the extent that there's an increase in use for an urban use that has to be offset by a
1538 corresponding decrease in use by the agricultural use, the devil is in the details as it
1539 always is. But the principle is pretty clear that these sort of shifts from one type of
1540 landscape to another are expected to be done in a no-net increase of consumptive use.

1541
1542 JF: Okay, before we thank our panel, when we're done, there's two food stations behind you.
1543 There'll be plenty of time to assemble your meal, eat, and so forth before we have our
1544 lunch speaker. But before we all get up, join me in thanking our two panelists in this
1545 great presentation.

1546
1547 [applause]

1548
1549 **Lunch Speaker**

1550 *JF=John Freemuth, RS=Roland Springer*

1551
1552 JF: Okay everybody. Our lunch speaker is here. He has a pretty long complex presentation,
1553 and we want to make sure we have plenty of time for it, and then if we have time for
1554 questions we will certainly entertain them. I'm happy to introduce Mr. Roland Springer,
1555 the Snake River Area Manager of the U.S. Bureau of Reclamation. He oversees the
1556 facilities and activities throughout our Snake River Basin here from Eastern Oregon
1557 through Western Wyoming. He's worked for Reclamation in Salt Lake City, Boulder
1558 City, Nevada, and Washington D.C., and as a consulting water resource engineer and
1559 management consultant. He has a BS and MS degree in Civil Engineering from MIT and
1560 an MBA degree from Cornell and is a professional engineer and project manager
1561 professional. Join me in welcoming Roland Springer.

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[applause]

RS: Well, thanks John. I'm sure you guys all got excited when you heard him say I have a long, involved, and complex presentation. That's exactly what you want to have at one of these, it really helps the digestion during lunch. So, I will do my best to help you here. I do have a lot of slides. A lot of them will- I'll go through pretty quickly. One of the things I want to- basically I wanted to share with you some of the history of the Bureau of Reclamation, how we came to be, our history here in the Treasure Valley area on the Boise and Payette Rivers, and how we fit into this community and what we see coming up in future years, some of the challenges we're dealing with right now. I'm grateful to the Andrus Center for inviting me to give this speech. Given that this is a policy group here, I would like to delve a little bit into policy that formed Reclamation and kind of set the stage for where we are today. As you know, water is a dominating factor in the Western-American prehistory and history. You probably heard either today or other times about three percent of the earth's water supply is fresh and about 77 percent of that water is frozen. And here in the western U.S. we have a disproportionate lack of share in that water. And so it's- we have good land here, but we need to bring in water to make that land grow crops. And so we have to have agriculture, have to have irrigation for our agriculture here in the western U.S. So first, and okay let's see if I can figure this out. First a little bit of overview of Bureau of Reclamation. Here's- there's some stats on the slide, which I can't see very well, but we have nearly 500 dams, 58 power plants, 245 million acre feet of storage, and about nine billion dollars in agricultural benefits throughout the West. We are the largest water resource management agency in the United- in the West and the tenth largest utility in the United States. We service water to about one third of the irrigated agriculture in the West with 180 authorized projects. And when we talk about project, it's not what my project management professional brain would call a project, it's an authorized system of dams, hydropower plants, and other facilities, typically within a watershed; it might be one dam or it might be many dams. That's what we call a project. And each of them are individually authorized by Congress, and so we have to abide according to these authorizations as we work. Our staff is leveraged by irrigation district staff. We have contracts with many irrigation districts who actually manage a large amount of this federal infrastructure in Reclamation projects. I see a few folks here who work with irrigation districts who manage federal facilities, and they will say they love working with the federal government because we are very simple. [laughter] So, it is a challenge, but it's a valuable service, so Reclamation has a workforce of about 5,000 people throughout the West. So here's some photos of some of our benefits here. We have, I think that's- we store water. I'll just let you read them. There's just three here. You can look at what they say. I can't remember the exact order of them. So we do these things, we enable agriculture. We also generate power.

1602 Reclamation is a large force in hydropower. You see that we're second only to the core of
1603 engineers in total annual power production. We've got 58 hydroelectric power plants
1604 within installed capacity of around 15,000 megawatts. We have a residential load that we
1605 meet of about nine million people and about 700 million dollars in annual power
1606 generation, and that's renewable carbon-free energy, although I know some people might
1607 argue with that. So we are big in hydropower. This is a photo of Grand Coulee Dam. This
1608 is the largest power producer in the reclamation portfolio, and actually if you take that
1609 dam away, we lose half our power production right there. So Grand Coulee equals the
1610 sum of the other 50 some odd power plants in reclamation. It's huge. The scale of the
1611 photo doesn't- I don't know how many people here have been to Grand Coulee Dam, but
1612 it's giant. You can't tell by the scale. That dam is about a mile long and about 550 feet
1613 high. You see a power plant on either side of the spillway and another plant on the
1614 bottom of your screen. There's a total of 24 turbines there, and you see on the upper side
1615 of the dam you see a small pump generating plant. That's actually pretty big, but you see
1616 the lines going up towards the lake at the top of the screen. That lake is Banks Lake, and
1617 its water is pulled out of the Columbia River through that generating station. It's very big.
1618 Here's something to help you understand the scale. Those are people standing inside the
1619 scroll cage- the scroll case of the dam. That's what the water goes through just to reach
1620 one of those turbines. So Grand Coulee was a big part in the- even in the World War II
1621 effort as it produced the power to power the aluminum industry that enabled the aircraft
1622 industry in the Seattle area and helped us win World War II. So we operate big, we have
1623 big projects, and even the ones that are small seem pretty big. Big picture, Reclamation-
1624 the direct economic value of Reclamation's activities is about 19.6 billion dollars
1625 annually with a cumulative economic contribution of about 55 billion dollars. So the
1626 story of Reclamation is largely an economic one, and we- because it's that we often have
1627 conflicts within our water management. There's people who have a variety of interests
1628 that they represent. There's fisheries issues, environmental issues, people say our dams
1629 destroy rivers and kill fish, and- but we look back to history of why they're there. And
1630 actually, we think about that as we plan future projects. One of my pet peeves is
1631 oftentimes people confuse us with BLM. I tell folks, I work for Bureau of Reclamation,
1632 they say, "Oh, BLM. My uncle works there. How about them sage grass." And I say, no,
1633 it's Bureau of Reclamation. Now if you would have thought I worked for the FBI because
1634 I said Bureau, that would be okay and I'd just let you believe that. But I correct them.
1635 And we're called Bureau of Reclamation because we were enabled, we were put in place
1636 to you might say reclaim the desert by bringing irrigated agriculture to it. You can see,
1637 let's see, you can see our mission there on the screen to- now I can't remember it since
1638 I'm on the spot. You see it there. It talks about water and related resources in managing
1639 water and related resources in the public interest, benefitting the environment- I think I
1640 have it pretty close. So this mission was based on irrigation and dam building, but really
1641 it was much bigger. I would argue that it's- our mission is really related to climate and

1642 nation-building. So here you see the reclamation states we call them, it's the 17 Western
1643 states, basically west of the hundredth meridian. You see we're in the Pacific Northwest
1644 Region. We operate fairly independently among our different regions. This is a map of
1645 the rainfall distribution across the United States. You see at about the hundredth meridian
1646 it goes from greens to yellows and reds, and we know that's the way the climate works.
1647 Well back in 1902 when Reclamation formed, people had finally understood that, but
1648 back when the West was settled and the Midwest was settled and the Great Plains, that
1649 wasn't actually what people understood. So here's a slide relating to the concept that rain
1650 follows the plow. Now, you look at that and you say, "Wow, fake science." But back then
1651 it was real science, people really believed and they had scientific evidence saying that
1652 when you start moving to places that were formally dry and you started building systems
1653 and irrigating the land, well by golly, it starts raining. And that's what happened in the
1654 1870s and 1880s. And there were noted scientists who supported this. There was a Cyrus
1655 Thomas, a climatologist, after studying the history of Colorado in the recent years—there
1656 weren't many years of record—he concluded that the increase in moisture was permanent
1657 and that it coincided exactly with the first homesteaders cultivating the land. People
1658 really believed this, many folks did. Their explanations for this were- there were a variety
1659 of them. One of them was that plowing of the soil for cultivation exposed the soil's
1660 moisture to the sky. Also, smoke from trains, newly-planted trees and shrubs, and the
1661 metal from rails and telegraph wires increased rainfall. Another one, increased vibrations
1662 in the atmosphere due to human activity created additional clouds, of course, from which
1663 rain fell. And they even had widespread dynamiting of the air to increase these vibrations.
1664 So there was a lot of- there was science behind this, people really believed this. So that
1665 theory was partially responsible for the dramatic settlement, especially of the Midwest.
1666 There's the said- millions of people move west, they start farming, it's nice and moist for
1667 some reason, of course because of their activities, and then the 1890s come along and the
1668 climate reverts back to more of a normal pattern. According to a PBS series, they said
1669 during the 1870s and early 1880s, unusually heavy rainfall made these claims sound
1670 plausible that rain follows a plough, and within 10 years, nearly 2 million people had
1671 sunk their roots into the prairie soil. But when the wet years finally came to an end, the
1672 high plains became again became a place where only the most determined could hang on.
1673 So here you see some settlers in Nebraska in a short poem related to their experience and
1674 what brought them out there and how they could stay. It was just too dry for conventional
1675 agriculture. This might be analogous to some of today's climate challenge that we have.
1676 We have invested a lot in the West and we see it drying out. I worked on the Colorado
1677 River in the- around the turn of the current century, and we thought it was bad, and it's
1678 only gotten worse. And are we dealing with a new climate regime? What do we do? How
1679 do we deal with those factors? So these people developed irrigation, they sunk a lot of
1680 money into it, states and private entities started building systems, but they didn't have the
1681 financing, oftentimes the technical expertise, to make these work. And so lots of projects

1682 failed and what happens? They call their Congressman to help bail them out even though
1683 they're very free-loving, independent people. They realize they probably couldn't handle
1684 this on their own. So Congress passed- let's see, I think I'm at the right slide. Uh oh.
1685 Okay. So Congress passed a few laws to help deal with this irrigation problem. 1866, an
1686 act allowed canal rights of way over public land. You may have heard of the Desert Land
1687 Act, the Carey Act, the Canal Act all up through the 1890s but they didn't really fix the
1688 problem. Nationwide concern was expressed that the arid west was going to become the
1689 next Appalachia, a drain on national resources and not an asset. So people knew they had
1690 to reclaim the desert, so our irrigation projects would come to be known as reclamation
1691 projects; that's why we're called the Bureau of Reclamation today. A big champion of
1692 these projects and federal involvement in Western agriculture was found in Teddy
1693 Roosevelt. Even from Thomas Jefferson's time on, he- we heard about the agrarian ideal,
1694 which Roosevelt also espoused. And you see some of the quotes there about how
1695 important this agrarian ideal is to us as a nation. In Roosevelt's 1907 State of the Union
1696 Address, he stated that "the work of the Reclamation Service"—that's us, Reclamation—
1697 "in developing the larger opportunities of the western half of our country for irrigation is
1698 more important than almost any other movement." And he goes on to say how much it
1699 helps for family farms and homemaking, which meant putting homes on small plots of
1700 land for farming. And we still have that ethos in America today. We like the idea of the
1701 family farm, even though it's probably not economically viable. We never hear about the
1702 small family automobile factory or maybe the small family internet company. But there's
1703 in farming we seem to think that's a good thing, and of course we've seen that change
1704 even here in the Treasure Valley as we've seen small farmers sell out either to larger
1705 operations or to developments, which I think you probably is on many people's mind
1706 here. So, these western interests wanted federal help, and it was a big debate in
1707 Washington for many years. Of course we had arid but fertile land that wanted water, we
1708 had Western public opinion saying we should do it, there was precedent set by the federal
1709 government. They had invested in roads and lots and ports and other types of
1710 infrastructure in the east, and just like in the east, this is the infrastructure we need to
1711 build an economic base. So when Teddy Roosevelt became president in 1901 after the
1712 assassination of President McKinley, he became a big champion for this and he, in an
1713 address to Congress in 1901, he said, "It is right for the national government- it is as right
1714 for the national government to make the streams and rivers of the arid region useful by
1715 engineering works for water storage as to make useful the rivers and harbors of the humid
1716 region by engineering works of another kind." So pro-irrigation planks had found their
1717 way into both the Democrat and Republican parties around 1900. So this intersection of
1718 climate and nation-building coalesced to form the Bureau of Reclamation. The
1719 Reclamation Act was passed in 1902 and the house report accompanying that legislation
1720 had a few similar comments. And I quote, "To delay national aid in the reclamation of the
1721 arid West is to retard the healthful growth of our country, or to aid in the reclamation of

1722 the desert and establishing there a home-owning population will not only vastly increase
1723 the strength and prosperity of the nation, but it is a duty to which the government cannot
1724 escape, which is paramount in importance to every other duty now laid upon the
1725 American people.” So, great support for reclamation, this federal investment. And it was
1726 really up-front funding, as I’ll mention in a little bit. And we might contrast that now to
1727 the way Reclamation operates. If I need to participate in a project, typically the partner
1728 has to come with funding, typically 50 percent up to a hundred percent, and even for
1729 O&M work we deal with- that has to be up-front funded. So the times have changed in
1730 relation to the way we’re funded. So Reclamation was founded in 1902. It was part of the
1731 U.S. Geological Survey until 1907, and we were called the U.S. Reclamation Service.
1732 You see the Secretary of the Interior in the middle, and I think it’s on- yeah, on the left
1733 we have, what is that, Charles Wilcott over there? Yeah. I put Charles on the left we
1734 have- what is that, Charles Walcott over there? Yeah. I put Charles on the left. So he
1735 became the Director of the U.S. Reclamation Service and Frederick Newell was the Chief
1736 Engineer. That name Walcott might sound familiar if you’ve ever been to Lake Walcott,
1737 which is held behind Minidoka Dam near Rupert. And the name Frederick G. Newell
1738 might sound familiar if you’ve ever been to my building over by the Fort Boise
1739 Community Center, which is named after Frederick G. Newell. And interestingly enough,
1740 we share that building with the U.S. Geological Survey. So that building takes us back to
1741 our roots. Last summer, the Newell family came through on vacation. They actually
1742 stopped and they looked at the building and they had a picnic in front of it. It was really
1743 neat to see his grandchildren there at our office, and they have actually donated some of
1744 his memorabilia to the Bureau of Reclamation. So from 1902 to 1907 we built a lot of
1745 projects- we started building a lot of projects. We had about 30 projects that we began,
1746 and we also developed a robust study program for potential projects. As I said, in 1907
1747 Reclamation became independent from the U.S. Geological Survey, and then in 1923 we
1748 got our current name, the Bureau of Reclamation. So the basic principles we operate
1749 under are that federal monies spent on Reclamation project need to be repaid by the
1750 beneficiaries. And if you talk to any of our irrigation district friends here, they will say
1751 that is still the case. And the project should remain federal property, even when the users
1752 repay the federal costs because of the public benefit. Now that is not quite the case
1753 anymore. We do do title transfer a good amount. And then also, Reclamation generally
1754 contracts with the private sector to build our projects. So the Reclamation Act of 1902
1755 had established this precedent of social overhead, and Congress was willing to invest
1756 money in these enterprises in return for the social benefits that it would capture. Now
1757 hydropower came along a little later, and in the 20s and 30s. This is actually the Boise
1758 Diversion Dam power plant. That was built to help construct Arrowrock Dam upstream
1759 and provide the power. But there was a lot of debate around hydropower at Reclamation
1760 facilities, but that pretty much ended when Hoover Dam was built and provided that great
1761 power supply in the Southwest, and ever since we’ve been a great generator of

1762 hydropower. And the hydropower revenues have helped pay a large amount of the federal
1763 investment in these structures, so that helps in the other purposes. In summary, we've had
1764 about 70 Reclamation projects before World War II, and the majority of our 180 projects
1765 were authorized and billed afterwards. You might have heard of one of our
1766 commissioners Floyd Dominy, who was the Commissioner from 1959 to 1969. Under
1767 Mr. Dominy, Reclamation was really a construction juggernaut, and I've heard stories
1768 that senators would line up to see him and figure out how they could be part of the
1769 Reclamation program with all the money and the nation-building that was going on. So
1770 those might be- we might call that our glory years. Now our infrastructure's largely built
1771 and we need to maintain it, we need to find ways to use it better and to supplement it
1772 where we can. So as we leave the story of Reclamation, I will focus on the Boise Project
1773 and how- what we've done here in the Boise and Payette Rivers, because it's really a
1774 microcosm of the Reclamation story that's played out across the West. We have a pretty
1775 healthy project here with a lot of infrastructure built as part of it. You see here the Snake
1776 River Area Office which I manage—that's the geographic boundaries, you see we go
1777 over to Jackson Lake in the east and we go up to Lewiston and a little north in Idaho and
1778 we cover Eastern Oregon. The lighter green is really the Boise Project within the state of
1779 Idaho, and so I'm going to focus on that area. A little bit on the history: Lewis and Clark
1780 passed through the Snake River, that's probably the first recorded history of people going
1781 on the Snake, but they entered from the Clearwater up in the north and came out at
1782 Lewiston and went all the way down to the Columbia. That was in around 1805. The first
1783 recorded history of Euro-Americans passing through was in about 1811, when the
1784 William Price- the Wilson Price Hunt party came through. Has anybody heard the story
1785 of Wilson Price Hunt and the Astorians? Fascinating, fascinating story. But they came
1786 through working to build a fur empire in the Northwest. Mr. Hunt was from New York
1787 City. He was a self-made fur magnate, we might say, and he wanted to control the Pacific
1788 Northwest fur trading. And so he sent a ship around Cape Horn and he sent an overland
1789 party to meet up at the mouth of the Colombia in a place that they called Astoria. And
1790 one of the most hardy members of the group that Wilson Price Hunt put together for the
1791 overland expedition was this woman who you see here, her name is Marie Dorion. She
1792 was the wife of one of the French voyageurs who paddled the canoes up the Missouri
1793 River as part of this expedition, and she did this expedition with two young boys ages
1794 two and five, and it turned out she did a lot of the expedition pregnant as well. And she
1795 was a survivor. I happened to read a book last year, there's Mr. Hunt there, and you can
1796 see a book that was written about it called *Astoria*. It details the whole expedition and
1797 even prior to the expedition how they built the business case, how they founded the
1798 voyagers in Canada, and all the other- all their challenges as they crossed. You can see, I
1799 think it's in the black line, the route that they took. First they paddled up the Missouri,
1800 then they went over land, they ended up in the headwaters of the Snake River. They
1801 decided not to take the route that Lewis and Clark followed because it seemed he had

1802 some run-ins with the Blackfeet, probably of his own making. And so those folks weren't
1803 too friendly to the Easterners at that point. But they entered the Snake River from the
1804 Hoback and figured it would be a nice flat float all the way down to the Columbia and the
1805 Pacific Ocean. And I think probably most of you will probably realize it wasn't that easy.
1806 So they built 15 canoes out of logs, they started down the river, and they hit the rapids in
1807 the Snake River Canyon up in Wyoming, and after losing a few boats they decided to go
1808 over land and they headed north. They ended up spending winter in that area just a little
1809 while, and then they found the Henry's Fork and kept on going down. And then they
1810 thought it was smooth sailing. It was nice and flat, great plain. And they got as far as- the
1811 two names for it, the place is called Star Falls or it's called Caldron Linn. Who here has
1812 been to Star Falls slash Caldron Linn? Amazing place. I think it's cooler than Shoshone
1813 Falls. And it's about 10 miles west of Burley. So we were there- and by the way, it's
1814 running now. It doesn't often run, but we have enough runoff and we're releasing
1815 enough, so you should go see this this weekend. This is what they saw, this is looking
1816 upstream, and this is what they ran into. And just looking downstream over that falls, this
1817 is what they looked over. And they lost some of their canoes here and they lost some of
1818 their men here, and they decided they had to go over land from here on out. And so they
1819 went- they split into two parties. Marie Dorion stayed with Mr. Hunt in his party, they
1820 traveled to Boise, they found some good food there because it was really a trip of
1821 deprivation up to that point. So they finally end up making it out to the Columbia after
1822 crossing the Blues of course in the middle of the winter. And that's where Marie had her
1823 third child, which died about nine days later, probably from malnutrition. They were
1824 starving, but they made it. And about a quarter of that expedition didn't reach the
1825 Columbia River, didn't reach the mouth of the Columbia. So those are the first folks that
1826 passed through the area, and of course we know of the Oregon Trail, the people going
1827 towards Oregon, we know of the miners that came into Boise, and how that started
1828 building an agricultural economy. Here I have a slide of the Boise Project. You see the
1829 Arrowrock Division, they're on the Boise River, and you see the Payette Division- sorry-
1830 yeah, the Payette Division up on the northern part of it. So that's- this is a project that
1831 was authorized in early Reclamation years. Folks in the area realized they couldn't get
1832 much water out. That had the same problems I talked about before. The New York Canal
1833 was built; it had a width of about 14 feet and it could carry about 200 cubic feet per
1834 second, which doesn't supply a lot of land. [Adey Foot], who had developed the canal, he
1835 was out of options and so he wanted the federal government to help him on that canal as
1836 well. Pretty much all the irrigation we had was along the Boise River. So we had about
1837 148,000 acres of irrigation, which is not too bad, in the early 1900s. But the- with the
1838 formation of the Reclamation Service, folks went to Reclamation and said, "Hey, we
1839 could use a project here." And so that Boise Project was authorized. And there's a couple
1840 things that made it so we could invest here in the Boise area, and that's something that we
1841 see even now. The first one was that there- Reclamation has a hard time dealing with

1842 individual landowners and small canal companies, so one of the conditions was that they
1843 formed together as a single entity. And so people here got together and they incorporated
1844 into the Boise Payette Water Users- sorry, the Payette Boise Water Users Association,
1845 and that was the original group that was going to operate these projects. Now most of the
1846 canals here in the Boise area are operated by the Boise Project Board of Control, and they
1847 do a great job of it. And also, these canals had to be consolidated into a single operating
1848 entity and that would let Reclamation provide water according to existing water rights. So
1849 that happened as well. So I'm going to give you a quick overview of how you build a
1850 Reclamation project. And since I can't see too well from here, I'm gonna- yep, hey that
1851 worked. I'll turn this on and we'll start with- we'll look at how this project was
1852 developed. First of all, it takes a lot of money, it takes a lot of time, it takes a lot of
1853 planning, but it doesn't take as much planning as it takes now, you probably all realize.
1854 So the first facility that was built was the Boise River- Boise Diversion Dam, and that
1855 was made to lift water up to the New York Canal. I have some historical photos here.
1856 This is as they were beginning to put that diversion dam in. here's as it's nearly complete.
1857 And here's what that diversion dam looks like today, and you can see the power plant
1858 that was built a few years later on the right side of the photo. Looking down on this
1859 photo, you can see how this diversion dam lifts water up into the canal that's on the right
1860 side of the dam. That's the top of the New York Canal. So that was the main purpose, to
1861 lift the water up. Didn't have a lot of storage in it. Well, now you see we- after we built
1862 the diversion dam, we started working on the canal. This is just a couple pictures of-
1863 photos of construction of that canal. We increased the depth from 12 to 40 feet and we
1864 increased the capacity to the vicinity of 2,000 cubic feet per second. So that could
1865 provide a lot of water to those lands. There's what the New York Canal looks like today.
1866 It didn't go through homes at that point, it was all just empty land waiting to be irrigated.
1867 And sometimes bad things happen. This is in the upper reaches of the canal during a
1868 flood in the 1940s that washed out. Luckily, it was all in farmland at that point. And I'll
1869 say Boise Project Border Control continually lines canals, monitors the canal, takes good
1870 care of this canal, so I wouldn't worry too much. Okay, then we, then we build Deer Flat
1871 Reservoir to hold the waters from that canal, and also to supply waters further
1872 downstream. That had three embankments plus a dike, so that was a large construction
1873 project within itself, again, built by the Bureau of Reclamation. Here they are working
1874 with their modern machinery of the time building one of those embankments, and some
1875 more modern machinery, and there's the finished product. Here is it looking today. This
1876 is an embankment on the north side and this is the one on the west side, and you see the
1877 canal leaving to provide waters further downstream. So now we have a dam, we can
1878 divert into the New York Canal, we have a lake further downstream that holds this water
1879 so we have a lot of agriculture we can supply. The problem is, we don't have a reliable
1880 supply of water. There's no storage behind that Boise Diversion Dam. So along came
1881 Arrowrock- the Arrowrock Division, and Arrowrock- within the Arrowrock Division, the

1882 Arrowrock Dam, which we built in 1911 to 1915 I believe. And there's a theme that goes
1883 through the construction here. We all often have transportation issues when we build
1884 dams. Here you see the first public railroad operated by the federal government. We had
1885 to actually put in a railroad from the end of a spur at Barber all the way 17 miles up to the
1886 dam site. The project was authorized by the president in 1911 and my attorneys tell me
1887 that I can't do anything without authorization. Well it turns out we just kind of took over
1888 and started this railroad in 1910, about a year before this authorization happened. You
1889 know, there's some good things about not having good communication. And so we had
1890 the railroad, and it was authorized. So here's how you build a dam. First you build the
1891 transportation, you build a railroad to get people and materials to the site. There's that
1892 U.S. Reclamation Service train. I would love to see it today. I have no idea where it is.
1893 And then of course once you're ready to start building, you bring in the dignitaries, and
1894 they have their photo opportunity. You see second to the left is Frederick G. Newell, who
1895 by now was the Director of the Bureau of Reclamation. Then you get to work. First you
1896 build a town basically around your construction site. So this is the town that was built just
1897 downstream of where Arrowrock Dam now stands today. It was- had a capacity of about-
1898 it was built for about 900 people, and at the peak it had 14 hundred people living here.
1899 They had a post office, they had a school, they had a YMCA, they had a dance hall, they
1900 had hotels, it was a wonderful place to live if you wanted to live somewhere for two or
1901 three years. And then of course you have to deliver the newspapers with your train and
1902 your kids. Then the next thing you do is you build a diversion tunnel to divert the river
1903 around the dam site, and that way you can construct where the dam's going to be. This is
1904 them constructing that tunnel and here's the upstream end of the tunnel before they
1905 started constructing the dam. Now moving through, then you gotta excavate to get out to
1906 the bedrock, 'cause you gotta have a really strong foundation for your dam. So this is
1907 them doing those excavations. Here's a couple of shots of the bedrock. You can see there
1908 has been water flowing over that bedrock. They had to excavate down quite a ways to
1909 get to it. And you can see the undulating character of that rock. If you look in the center
1910 of the photo there, you can see a man standing in there. So this is serious divots in this
1911 rock. But it proved to be a very good foundation for the dam because it can hold on to all
1912 these columns of rock here in the bedrock. Then you start excavating for your materials.
1913 This is a steam powered crane loading up the railroad cars. And then you start building
1914 your forms. See, there's the forms for the sluice gates at the very bottom, you put in the
1915 rebar for those, then you install your sluice gates, then you put in some more farms and
1916 you start pouring concrete. Then of course you add some more gates. Now Arrowrock
1917 Dam proofed out some concepts that we used in building Hoover Dam. Some of those
1918 was active temperature monitoring—they actually embedded thermometers within the
1919 dam structure and they put in contraction- yeah, contraction joints that would help the
1920 concrete cool. Here's- that's a 21-ton valve that they installed into the dam. So you just
1921 keep on pouring concrete, placing forms, building it up, and sometimes you do it at night

1922 because you're on a fast schedule, and then you put a road on top of it. Then you gotta
1923 work on the spillway, so these are the drillers working on the spillway. You can see their
1924 lack of hardhats. I went to Hoover Dam and they told me that that's where they invented
1925 hardhats, and I guess I have to believe them because they didn't have them here. You
1926 install that spillway shoot on the side of the dam, get a finish at the bottom, and then your
1927 dam's built. That's all you have to do. Piece of cake. So- and then of course you have
1928 another party and you invite the community and you celebrate the completion of the dam.
1929 So- well, let me go back a little bit. So Arrowrock Dam was the tallest dam in the world
1930 for about nine years after it was completed, and it was overtaken by this dam. So I'll give
1931 20 bucks to anybody who can tell me what this dam is. Seriously. Hm? No, not Owyhee.
1932 Nope, you got the wrong continent, so I'll help you out. This is Schräh Dam in
1933 Switzerland. That took over the title from Arrowrock Dam. There's a lot of dams in
1934 Switzerland as well. And here it is last year as we released these high amounts of flow.
1935 So now we have a good water supply in the Boise River and we've still got problems in
1936 the Payette. We haven't been able to complete everything we need to, the only thing
1937 we've done is built a little one siphon under the Boise River to provide some of the
1938 drainage water over to the Payette. This is an iconic photo. This is near Parma, and I
1939 believe this- let's see if I can- I believe that structure is still standing. So you might go
1940 and try to find that. I haven't verified that, but I've been told by a reliable photographer.
1941 So we start working in the Payette. The first dam we built around the 1920s was Black
1942 Canyon Dam. You can see this is looking upstream where Black Canyon came to be. You
1943 can see the line where the crest of the dam was, so we built that dam to provide- there's
1944 two things we did with Black Canyon Dam. First one was help the Emmet Irrigation
1945 District, who was in- their canal would be on the left side of this picture. Their canal
1946 started about 16 miles up the canyon, and it frequently washed out and they had all kinds
1947 of problems with it. So a dam would make it much easier to manage their canal. And the
1948 second one was to provide water to new lands, and that would be from a new canal
1949 installed on the right side of this photo. And that canal is now run by the Black Canyon
1950 Irrigation District. So there's the dam nearing completion. Again, we have railroad and
1951 transportation problems. There was the Oregon Short Line Railroad had a track on this
1952 side up here, and that made it so we couldn't raise the dam high enough to actually get
1953 water into that existing canal. We were 25 feet short. And so what did we do? Well, we
1954 called our engineers, and they said, "Well, we can put in some hydro pumps right here
1955 and we can pump water uphill," so there's a turbine aside from the power plant turbines,
1956 it's a turbine that spins and it drives a screw that lifts water up to the top of the dam and it
1957 goes in a pipe over to that Emmet Irrigation District Canal. And it's fed by gravity to that
1958 new canal on the right side. So again, transportation and water supply often are linked
1959 together. And then of course, here's a current map. You see the canals on either side of
1960 the dam irrigating those lands, and we also added new canals as this project progressed.
1961 The next one was Deadwood- again, same issue as we had in the Boise. We had a dam to

1962 divert water but we didn't have water to divert, so then we built Deadwood Reservoir in
1963 probably the most remote section of my Boise River Operation. Here is that dam going
1964 up another beautiful concrete arch dam, and this is the mail service coming in during
1965 winter. The first workers had to come by dogsled to get there. Transportation is a big
1966 issue, and any of you who have been there, you know about the transportation challenges
1967 getting to that reservoir. There it is operational. And then finally, our largest reservoir,
1968 which is Lake Cascade, which we built and to really firm up the water supply for that
1969 Payette Division. There's the dam at Lake Cascade. Again, we had to reroute a railroad as
1970 we were doing it. And you can see the economic impact there, the recreation economy
1971 there. But even still, we have droughts. This water supply isn't perfect, so we have to
1972 manage through droughts and other issues. Here's some benefits you see of that Payette
1973 Division: Orchards, agriculture, here's some cherries. In 1950, some people- they won
1974 the lottery to get the first piece of land off some of these new lands. Great change to their
1975 life. But again, we still have floods. It's not perfect. And then finally, Anderson Ranch
1976 Dam, also built to firm up the supply on the Boise side. So that completed the
1977 Reclamation Boise Project. You can see I counted through the- let's see, we've got about
1978 seven or more dams that we built there in this long project that took more than 50 years,
1979 and then you see the last dam that was built, that's actually a core of engineers dam,
1980 Lucky Peak Reservoir. But we operate that as a system for flood control with Anderson
1981 Ranch and Arrowrock Reservoirs. And here's some of the benefits on the Boise side.
1982 This is lettuce farming, this is a coal-powered tractor, sea potatoes. I don't know if you
1983 can read the little label that's in the center of that photo, that's stacks of sugar,
1984 amalgamated sugar, and that says, "To Ms. Housewife." So, there we go. Lots of
1985 benefits, we see how times change. And here's the- here's hops being grown there
1986 supplementing the barley that we grow on the east side of the state. Recreation's a big
1987 impact there. This is some early recreation on Anderson Ranch, this is people floating the
1988 Boise in the 1960s. So this is a resource that all kinds of people use, and again, what do
1989 you know, we still have flood challenges. This was prior to Lucky Peak, but it's
1990 something as you know seeing last year we are still very careful of and we coordinate
1991 very closely with the core of engineers on. Let's see. So that's how you build a project.
1992 I'm not sure how I'm doing on time. I'm getting close here. I'll figure out where I am on
1993 my notes. So current day, you see- I'm going to turn this off. You see some of the fruits
1994 of some of the work that Reclamation has done. We've got 476 dams, 348 reservoirs,
1995 including Grand Coulee on the left and Hoover Dam on the right, and many would say
1996 our mission's been accomplished. But there's still a lot of work that we have to do, even
1997 having accomplished these things, providing water and hydropower and agricultural
1998 benefits, which we see here, and also lighting a big chunk of the West. And luckily it's
1999 still a little bit darker here than it is on the east side of the U.S. We still operate according
2000 to state water laws because the water is a resource of the state, and we see the state's
2001 primacy in their water laws, so we work with the state very closely. I might say that our

2002 mission statement could be reworded as, “Reclamation ensure the economic viability of
2003 the arid West by providing reliable, sustainable, and affordable water supplies.” You can
2004 see how these cities grow up around Reclamation projects and the importance of them.
2005 So what do we have to do today? What makes us relevant? Well, first of all we have to
2006 keep these assets running. This is Minidoka Dam. In 2015 we finished constructing that
2007 new spillway you see with those big gates and we put in new gates for that Southside
2008 Canal you see on the right side of the photo. That feeds to the Burley irrigation district.
2009 And we have- there’s a lot of infrastructure here. We hear about aging infrastructure, and
2010 I think we do a pretty good job of keeping that infrastructure functioning. We have to
2011 deal with a changing climate. This is an example of climate projections in the Yakima
2012 Basin. You can see, on I believe it’s the black line, how currently most of the runoff
2013 comes in the spring as the snow melts and it comes out nice and slow so we can actually
2014 use it while it’s melting. But you look at a few of the scenarios, and that water might
2015 come during the winter more as rainfall when it comes off all of a sudden. So, same
2016 amount of water, but we might need to have a little more storage to be able to make use
2017 of it when we need it. We’ve got environmental challenges, invasive species challenges,
2018 so- although that looks like a nice stucco’d wall or something, it’s actually quagga
2019 mussels. And so luckily we don’t have them here yet, but we’ve experienced them in
2020 Reclamation, we’ve done a lot of research on figuring out how to deal with them. That’s
2021 another challenge that we have, and we have to work with our partners at the state in
2022 dealing with that. We deal with other values that probably weren’t prevalent back when
2023 these facilities were constructed. Here you see some stream flow restoration projects
2024 we’ve done, putting log barbs in. This helps preserve these rivers that are still out there
2025 and are still valuable to us. And we have to think about fish passage now for salmon and
2026 other species. This is a Cle Elum Dam in Washington, and you can see on the right side it
2027 looks like this nice big tubular water slide with multiple entries into it. We tested that at a
2028 lab in Denver, and actually that’s something no matter what the elevation of the water
2029 behind the reservoir, those fish can swim into these channels and take the water slide
2030 down and end up down in the river on the downstream side. It costs a lot of money to do
2031 these things, but as a nation we’ve recognized the importance of doing that. Let’s see.
2032 Also, we’ve- we also are very serious about water conservation. We have a number of
2033 grants that we give every year to irrigation districts and others who don’t have any
2034 affiliation with Reclamation. You can see here’s a canal-lining project—we have a
2035 number of these we give grants for every year—water measurement projects so we can
2036 measure- so the state can do better accounting, the irrigation districts know the water
2037 they’re using. Also piping so this valuable water doesn’t seep back into the ground. But
2038 as we’ve- as many of us have talked about before, groundwater is an issue, and some of
2039 this seepage has supplied the groundwater, so even though we pipe to conserve water,
2040 there’s other ripple issues that we have to deal with. We do headgate automation, that
2041 really helps the irrigation districts managing their supply. So these are things that we’re

2042 doing now. Here in Idaho, we are participating in many of these challenges that so many
2043 of us spend our time on. We're looking at potential new storage. We've just kicked off a
2044 feasibility study with Idaho Water Resource Board looking at additional storage at those
2045 three reservoirs on the Boise River. The state's looking at storage behind Island Park
2046 Reservoir in Eastern Idaho—again, one of our facilities, and we need to participate in
2047 that. We've dealt with groundwater issues and how to help with recharge in the Upper
2048 Snake in the winter when we're releasing water because of high conditions. And
2049 sometimes old policies and old contracts and old laws get in the way of doing that, so we
2050 have to be really creative as a community in dealing with these issues. We all have a goal
2051 of managing water well and we have to figure out what our constraints are and how to
2052 work through those constraints. We have lots of constituents now. You can see our old
2053 building that's still over there across from where DWR is, but we have lots of
2054 constituents who have a lot of interest, and we work to meet those interests, and
2055 sometimes we don't meet them equally and people aren't happy with us. But we really try
2056 to meet the needs of economics and nation-building and other values that have been
2057 created since then in relation to environment and fisheries and those kind of things. So we
2058 need solid policy analysis, we need people that know the issues, but we also need people
2059 that understand why and how we got where we are. And through coming to meetings like
2060 these and sharing these thoughts, we can start to understand each other's perspectives.
2061 We can understand why the federal government sometimes seems really hard to work
2062 with. We're dealing with a very long history. And- but we're also trying to help the
2063 community move forward. So I'm thankful for this opportunity to share this message
2064 with you and share with you a little bit about Reclamation and how we work and how we
2065 do business. Many of our partners are here in the room and I know this is- we have
2066 problems that never get easier, they only get harder, they only get more complex. It takes
2067 solid policy analysis, which I thank the Andrus Center here and Boise State for training
2068 people to participate in these hard challenges, and I thank all of you for being part of this
2069 community and paying attention and caring about this significant economic asset that we
2070 have here in Idaho. And with that, I think I'm done. Yeah, I can take some questions.
2071 Should I take this?

2072

2073 [applause]

2074

2075 JF: Or I can take this and you can stand there.

2076

2077 RS: Okay. I'll talk loud, I'm a professor, unless somebody shows me how to turn this on. So-

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2079 JF: You can just push that.

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2081 RS: I'm trying to push it.

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JF: Okay. All right, so first question coming in a minute, but has everybody noticed the great irony here? We bash the federal government, maybe justifiably so sometimes, but without the federal government and what it did in terms of building these water projects and other things later, we wouldn't probably be here to bash the federal government. The old Bernard DeVoto line about parts of the West saying, "Shut up, get out, and keep the money coming in" is still something in our history—and Patty Limerick knows it better than I—that we at least need to be attentive to as we move into the future. So Roland, the first question: Can you discuss the agency's perspective on the, you know, on your challenges of an ever-changing diminishing snowpack for the Treasure Valley?

RS: Okay, so yeah. A little bit about that. We recognize that there is change happening in our hydrology and in our snowpack. I'm- there's a lot of data and projections that show some of the things that I talked about in my presentation that while the total water may not decrease in this area, here in the Pacific Northwest the projections aren't as dire as we see in other places, but the timing and the way that snow and that precipitation comes down could change, which would make it harder to access. And so that's one of the reasons I think we need to think about different storage potential or different ways of managing our water better, because it doesn't come off as slowly-melting snow in the spring and into the summer. I think that's one of our big challenges that we have to deal with in figuring out how to change that distribution and timing and amount.

JF: You can all say to part of this, "You weren't here then," but here's the question: When we think about the history of Reclamation in Idaho, what should we keep in mind about the Teton Dam collapse in 1976?

RS: Teton Dam in 1976. So, just- you'll be able to figure out my age pretty quickly, but that collapsed on the day I turned 10, and so that's a monumental event in my life. Teton Dam taught us a lot within Reclamation. It actually was the beginning of Reclamation's Dam Safety Program. When that dam was built, there were a number of risks that weren't adequately addressed, I might say. First, there was foundational issues. We were never able to have a solid foundation as we pumped more and more concrete and grout into that volcanic rock there. Didn't have a solid- a great foundation to allow water to seep around it. And also when we saw problems, what we saw an opportunity I should say when we had a really high runoff year the year after we constructed that dam. And we filled it faster than the specifications allowed us to, and some say that could've caused the seeping through the structure and eventually also contributing to the demise of it. What did we learn, what do we do about Teton Dam today? Who here has been to the Teton Dam site? Okay, most of you. Another great place to go. That dam is still sitting up there, of course there's a gaping hole through it now and another gaping hole that was created

2122 for research. It's still authorized, it could still be built. It would take a lot of money, it
2123 would take a lot of political clout, and I won't take any sides on whether it should be
2124 built, but it is an authorized project, and it sits up there and it waits. Now we do have
2125 irrigation on either side of that river now, a lot of through electric pumps that pull out the
2126 water there. Interesting to note that if any of you have kids that go to BYU Idaho, tell
2127 them they shouldn't go play around in it. So it turns out there are tunnels and there are
2128 shafts in that dam which have been sealed off to the public and to me, to all of us. People
2129 keep on going around and they use cutting torches and they cut through metal bars and
2130 they blast through concrete and they go party down there. And so- and that's really
2131 worrisome to us. We need to get control over that because it's really a safety issue. Those
2132 are confined spaces and people could get hurt or killed down there. So that's- you know,
2133 that's something that we deal with with this infrastructure that's now a relic. But the
2134 water could be captured. I know that Teton River has significant environmental benefits,
2135 you might say, as a free-flowing stream. It's a beautiful river, there are tons of cutthroat
2136 trout in there, it's a beautiful place to be. So we'll see what happens with that dam.

2137

2138 JF: Please don't misquote him that he said people at BYU Idaho party a lot, all right? I did
2139 not hear that. [laughter]

2140

2141 RS: There's something about the honor code, right? I don't know if that counts.

2142

2143 JF: Any more questions? Well, Roland, thank you a lot for visiting with us today, very
2144 informative.

2145

2146 RS: You're welcome. Thanks for having me.

2147

2148 [applause]

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2150 JF: Our next panel's at 1:30, so you can take a quick break as we assemble that panel.

2151

2152 **Panel: What are the water quality implications of the urbanization of agricultural land?**

2153 *JF=John Freemuth, TH=Toni Hardesty, DM=Dick Manning, RM=Ralph Myers, SB=Stephen*
2154 *Burgos, HS=Hawk Stone*

2155

2156 JF: Okay folks. We want to get the next panel started. It's a bit bigger. Okay, so a quick
2157 announcement on the nametags before you leave—and there's a reception afterwards of
2158 course—so after you've gone to the reception, you leave, we'll have a box out for the
2159 nametags. There are members of the Andrus Board here I wanted to thank for coming and
2160 acknowledge: Elaine and John French from up in Sun Valley Ketchum are here with us
2161 today, Jenna Whitlock, who you might want to corral, she was BLM director when the

2162 Bears Ears was designated a national monument. She has stories. And then Wendy
2163 Jakewood, which I assume most of you know, former legislator, member of the Andrus
2164 Board, and has helped our students here a lot with internships and so forth. There's one
2165 more member who, number one on behalf again on the Andrus Center and Tracy Andrus
2166 and everybody we want to thank for her service, who's also your moderator, and that's
2167 Toni Hardesty, who, first of all, I want to thank Toni again for being on the Board and for
2168 moderating this today. She of course was DEQ Director for years and now is a state
2169 director of the Nature Conservancy here, so very experienced and committed to all things
2170 environmental. Toni will introduce your panelists.
2171

2172 TH: Great. Thank you, John. All right, good afternoon. So this is an opportunity to switch
2173 gears a little bit. This morning we talked about water quantity, which sometimes I refer to
2174 as the water with the big Q. But this afternoon we're going to talk about water quality.
2175 Sometimes I call it the little q because oftentimes it's a little bit of an afterthought when
2176 you've been talking about water quantity. But I think as you're going to see and hear and
2177 hopefully most of you share, water quality is as equally important an issue as water
2178 quantity. I am pleased today to have four panelists here. Their full bios are in the
2179 program, but I'm gonna tell you a little bit about each one of them and then we're going
2180 to kick it off with some questions and discussion. So first we have Dick Manning. Dick,
2181 if you can raise your hand. He's an environmental author and journalist. His work has
2182 appeared in a host of well-known and prestigious publications, including the New York
2183 Times, American Scholar, Autobahn, and Outside. For over 15 years, Dick has been
2184 reporting on important environmental issues that are relevant to us in the West. Prior to
2185 his career in journalism, he worked as a consultant on agriculture, poverty, and
2186 environment to the McKnight Foundation, the Rockefeller Foundation, and the Food and
2187 Agriculture Organization of the United Nations. Next to him to the right is Ralph Meyers.
2188 Ralph manages water quality planning and compliance related to the licensing and
2189 operation of Idaho Power's hydroelectric projects. Over his 29-year career with Idaho
2190 Power, he has developed and implemented strategies and actions related to Idaho Power's
2191 hydro operations and water quality in the Snake River. He has also participated in
2192 development and implementation of TMDLs for several reaches of the Snake River and
2193 its tributaries. Right here next to me we have Steve Burgos. Steve is the Public Works
2194 Director for the City of Boise. Steve has over 20 years of experience in the environmental
2195 industry as a private consultant and in the public sector. Steve oversees a wide range of
2196 water-related issues for the city of Boise, including waste water treatment, sustainability
2197 planning, water resource planning, and storm water and flood plain review. And at the far
2198 end of the panel we have Hawk Stone. Hawk is a Surface Water Specialist for the
2199 Department Environmental Quality, my favorite state agency I might add. Hawk has
2200 worked on water quality issues throughout the state of Idaho. Hawk has led the planning
2201 effort for the Watershed Plan for the streams in the Lower Boise Rivershed, bringing

2202 interest from agriculture, urban, and environmental interests to address pollution in a
2203 rapidly urbanizing watershed. He has also developed a comprehensive valley-wide map
2204 of all surface water and irrigation and drainage canals. And that are your panelists. So, to
2205 kick this off the first question I have is along the lines that poll after poll that has been
2206 conducted in the Treasure Valley, it shows residents put water quality at the top of their
2207 priority lists when asked which environmental issues are most important to them. So in
2208 general terms, from your vantage point and role—and we have many vantage points and
2209 roles and perspectives up here—how would you characterize the status of the water
2210 quality situation in the Treasure Valley area? And I'm going to ask Hawk to lead off with
2211 this one.

2212
2213 HS: Hello? There you go, it's working. Hello, everyone. I started with water quality in this
2214 basin about 17 years ago, and I just thought I'd share one of my first experiences, which
2215 was on a field crew collecting a bug sample from Mason Creek and sinking up to my
2216 thighs in mud in the creek. And to go from that perspective to working on the basin-wide
2217 TMDL—perspectives are important. So in terms of water quality, all of the major streams
2218 in this basin are impaired by something. It's the most widespread pollutants are sediment
2219 and E.coli, and perhaps the most visible pollutant is phosphorous and nutrients. There's
2220 also temperature, and upcoming are pesticide pollutants. In general, water quality
2221 decreases as you move down the Valley, from starting fairly clean up top until it reaches
2222 the Snake River where the river itself is impaired by a list of pollutants. Of course, with
2223 those extra pollutants come extra opportunities, and there are projects happening in the
2224 valley now that take advantage of the higher pollution levels further down, such as the
2225 Alkali Drain pilot project and the Dixie Drain Phosphorous Treatment project. Overlaid
2226 on the water quality problems that we have here in the Valley are the problems of
2227 physical hydrography, and that makes this valley a little different from some of the other
2228 water quality programs we work on in the state in that the Valley- a lot of the streams in
2229 the Valley- one person's stream is another person's irrigation facility. A lot of the streams
2230 here don't look like normal streams to us; they're straightened, they're deepened, they've
2231 been used as drainage facilities. And that leads you back to this question of perspective.
2232 Where I live I have a canal that runs through my property, and to me and to the other
2233 people who take water from that canal, it's a facility. It's a lateral. Yet, I talk to my
2234 neighbors who maybe don't take water from the canal, and they don't call it those words.
2235 They call it, "stream, creek," 'cause in places it does look like that. And one of the things
2236 I see changing in the Valley is that people's expectations of water quality here, it kind of
2237 varies depending on what you're used to and your history and what you use it for.

2238
2239 TH: Anything to add from any of the other panelists?
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2241 DM: Get this thing live here, there we go. So my issue is water quality, that's why I write a lot
2242 about water quality all over the place. And the reason that I am tapped for this panel, I
2243 think, is I did a piece for High Country News, oh, four or five years ago about water
2244 quality in the Snake River. It's not my first exposure to the Snake River at all. As I was
2245 walking in here, I got struck with a flood of memories seeing the display about Frank
2246 Church out front, 'cause one of my first jobs as reporter for the Idaho Falls Post Register
2247 in 1979 was to interview Frank Church. And so I got to know him and know a little bit
2248 about Idaho then. But since I've done a lot of other jobs around the world, and my career
2249 is kind of a mile wide and an inch deep, like a Western river in that way. And I write
2250 about water quality a lot just because rivers, to me, are an accounting. They account for
2251 the quality of the people who live there in terms of water quality. But lately my job has
2252 been pretty easy and included the piece I did here on the Snake River, which was to write
2253 about agriculture, because I can go to any place- if I want to write about bad water
2254 quality, all I have to do is say, "Where do we do agriculture?" And that's where it's
2255 deteriorating in this country right now. And I've done a lot of work in the Midwest where
2256 I've talked to- I've interviewed hunters, for instance, who wouldn't take their hunting
2257 dogs out in the field without a bottle of water any longer because if they drank out of the
2258 streams, the dog would die. And that's largely because of nutrient pollution in those
2259 areas. And it's happened because of two things: One is the Clean Water Act essentially—
2260 and court decisions since—exempted agriculture from point source rules. So we don't
2261 regulate point source stuff very well. The more important thing that's happened is the
2262 intensification of agriculture to depend on nitrogen fertilizers. And nitrogen has become
2263 such a big deal in agriculture now that that's become the primary nutrient across the
2264 country, and it's no different in the Snake River at all, largely because of two things:
2265 One, the dairy farms around Twin Falls, but also the fact they're growing corn, and corn
2266 is the big user of nitrogen fertilizers. So there's a U.S.G.S. report, for instance, that talks
2267 about the nitrate load in Snake River which says that- and we all look at the feed lots
2268 around Twin Falls and say, "That's gotta be pretty hard on the river." And they are.
2269 Believe me, they are. We say, "Well, that's gotta be a source of nitrogen in the river."
2270 And it turns out more nitrogen is coming from the cornfields themselves because of the
2271 fertilizer used there. So one of the earlier iterations of the question that was put to the
2272 panelists today was that this confrontation we talk about between urbanization and
2273 agriculture and are we really- how does that affect water quality to convert agricultural
2274 land to cities. And my take on that, no matter where I go in the United States, but even
2275 here as well, is that that's a gain for water quality. That's positive, and that any time that
2276 we stop industrial agriculture from having its way with our rivers, we come out ahead.
2277 Now, I can qualify that, and I was brought here to say something heretical and I did.
2278 [laughter] But we'll talk about that as we keep going.
2279

2280 RM: Makes my comment seem kind of bland after that. This- you know, the question you get a
2281 lot when you go out there and you meet with folks in the public as you're out collecting
2282 water quality data or doing stuff that'll- you know, the first question's, "Well, how's the
2283 water quality," when they find out you're out there looking at it. And you know, my
2284 thought always is, "Well, what do you want to use it for?" 'Cause I think you know, you
2285 look at issues like whether it's excessive nutrients in the river, well, that's not necessarily
2286 a problem if you're irrigating with it. Now, if you're- if it's causing algae blooms and
2287 you're hunting dog wants to drink the water, then that's a problem. So I guess that's, you
2288 know, that's just one perspective that comes to mind when you know you hear results
2289 about that water quality is an important component to people. What's the expectation
2290 there? What's their perspective? Kind of like what Hawk mentioned. Specific to
2291 conditions, what we're seeing in the Snake River, we've been doing water quality
2292 monitoring since the early 1990s, in some places on a regular basis, so we can start
2293 looking at trends. You know, a lot of times we hear, and the things that get reported out,
2294 are the more negative things in a lot of ways, but we're seeing statistically significant
2295 improvements in total phosphorous concentrations coming into Brownlee Reservoir. So
2296 down in the Snake River near Weiser. Over that time period, phosphorous levels have
2297 declined in that stretch, and there's no reason to expect that they're not gonna continue
2298 to. Along those lines, still we're seeing, again, statistically significant improvement in
2299 dissolved oxygen levels within the reservoirs and downstream of Hell's Canyon
2300 Reservoir, and I think related to those upstream improvements of water coming into the
2301 reservoir. Now the other part of that is, you know, we do seem to be seeing more
2302 nuisance algae blooms, nitrate levels are going up. So you know I guess the thing there is
2303 I think it's important to recognize there are successes out there but, you know, there are
2304 also places where we need to keep working and we need to keep looking at where things
2305 can be improved. And then the other aspect that I want to mention that's related to water
2306 quality but not a direct measure of that I think is the willingness and interest in other
2307 groups and stakeholders to be involved in cooperative water quality improvement
2308 projects. I mean, a lot of our mitigation programs related that we're proposing related to
2309 Hell's Canyon Complex, our strategy is to try and work with other stakeholders, work
2310 with doing- looking at improvements upstream of the reservoirs, and trying to improve
2311 the water quality that's coming into the reservoirs as a way of improving conditions in
2312 the reservoirs. But when you do that, you got the outside of the scope of control of the
2313 company and you start having to work with other groups, and that was you know one of
2314 the main questions that we had and that we got as we were proposing these water quality
2315 improvements is, "Well that's all good and fine, but are you going to get people who
2316 want to work with you?" And you know since that was a major question, we spent the
2317 past few years working through that, setting up pilot projects and trying to work with
2318 folks, and I gotta tell you, I was pretty skeptical going into it but I'm totally convinced
2319 now that if there's a reason to be doing the work—funding helps, if you can come in and

2320 offer some financial assistance and working with folks—there's a real interest out there
2321 in making things better. And I think that's important.

2322

2323 SB: Just two things to add. One would be that I think water quality is a relative kind of
2324 concept. We think back to the 70s and the Boise River, we had in some instances the
2325 river running red because the slaughterhouses. So compared to then to what we have
2326 today, I'd say water quality's pretty good. So in many ways, the Clean Water Act, the
2327 way it was developed back in the early 70s, it was kind of like a sledgehammer to deal
2328 with a huge problem nationally. What I think I'm finding now as we move forward is—
2329 and Hawk alluded to it—we have all these different types of constituent issues that are
2330 really vexing, and they don't just exist in a vacuum. Sediment interacts with
2331 phosphorous, which impacts temperature. And so moving forward, we gotta start thinking
2332 about more kind of the scalpels that are going to be required to address these more finite
2333 problems that the river, you know, we can't just concentrate on the phosphorous dial and
2334 just turn that down to zero, because then we still have sediment issues to deal with and
2335 we still have temperature issues to deal with, so from my perspective I think we're at a
2336 point now where the sledgehammer worked to a certain extent, that we've got some of
2337 those major issues figured out, we still have issues to deal with moving forward, and
2338 from our perspective, a project like the Dixie Drain is more of a scalpel to deal with
2339 maybe how the Clean Water Act can't get to things, alluding to the non point source issue
2340 that's out there. So- and I think the other thing is that we have- we have examples now of
2341 where we have partnered. Ralph was alluding to it's going to take partners sitting down at
2342 the table. I would argue that the lower Boise River TMDL for phosphorous is a- if you
2343 ask folks nationally, they'll look to that as a gold standard of how a TMDL comes
2344 together. We had ag at the table, they played a role, they bought in. The cities were there,
2345 Stormwater was there. And so I think we have some models on how to move forward on
2346 water quality issues and the balancing of urbanization and agricultural operations, and we
2347 have some example projects of how we worked together to do that. So.

2348

2349 TH: Great. Thanks, go ahead.

2350

2351 HS: I have a comment about the sledgehammer, the tool we have, from a regulatory
2352 perspective. As Steve mentioned, it was the Clean Water Act, and the framework we used
2353 was developed to address point sources of pollution mostly, factories spewing out
2354 pollutants straight into rivers, and it perhaps isn't the most elegant tool for the problems
2355 we face here. I mentioned how the streams here are—maybe they're streams, maybe
2356 they're irrigation facilities—well, the water quality standards that we use to evaluate
2357 them are the same standards that we apply to streams up in the wilderness and up in Bear
2358 Valley and up in places that don't have the human footprint. And sometimes it feels like a
2359 square peg in a round hole. The TMDL framework is—and I'm sorry with the acronyms,

2360 Total Maximum Daily Load—it's a budget, a pollution budget for the river. But when a
2361 sizeable portion of that budget comes from non point sources of pollution that are exempt
2362 from the Clean Water Act regulation, it makes a very difficult tool to use to clean up
2363 water. When you have a sizeable point source pollution, which we do have for
2364 phosphorous from the wastewater treatment plants, then negotiations and compromises
2365 can happen. But that's harder when you're dealing with something like sediment or E.coli
2366 that's almost entirely non point source.

2367
2368 TH: On that note, you- Dick has shared with us his perspective with regards to this conversion
2369 from agriculture to a more urbanization environment as being a positive for water quality.
2370 I'm guessing though for many of you as you're dealing with this, that while you may or
2371 may not agree with that, but it certainly is different in the challenges that are being faced,
2372 like from a city of Boise as you're seeing this conversion and some of the issues you're
2373 dealing with. So maybe Steve, you could comment on that?

2374
2375 SB: Sure. I think, you know, certainly there's no- it's not breaking news that we're growing,
2376 and I think there was an article recently that suggested we're the fastest-growing
2377 metropolitan area in the U.S. So we've gotta get our hands around the additional flow
2378 that we're going to be dealing with from urbanization. And I think we're trying to get
2379 there, but it requires us to think differently about what it is that is coming to us from our
2380 citizens, this used water. Historically, we have allowed it to be defined as wastewater,
2381 and we've talked about it that way, sewers. And we created this concept that these, like,
2382 the wastewater treatment plants that are in and around the Valley, they're almost like the
2383 water equivalent of a landfill, right? We just want to put this over here and we don't want
2384 to deal with what we're sending there. And I think a big shift when we start seeing
2385 urbanization happen is thinking differently about these waste products that are coming to
2386 us. And I say products very deliberately. They are products. We are pulling things back
2387 out of the water that come to use because we know it has value. So I would use the
2388 example of, there's this product called Struvite. It's basically phosphorous, a form of
2389 phosphorous, that we recover now at our West Boise Water Renewal Facility—and
2390 notice I didn't say wastewater treatment plant. It's a water renewal facility, we are
2391 renewing resources there. So I think a big part of this urbanization and the growth of
2392 cities is changing our view of waste, and it's almost like a circular economy. I brought
2393 with me a prop. And so this is actually treated effluent from Orange County, and it's been
2394 treated to a drinking water standard, and so it's bottled and you can drink it, and some
2395 people might be cringing a little bit, the ick factor. But this is important because I think
2396 what- when I start thinking about urbanization, it's almost like we need to break down
2397 barriers between these different silos that we have created for ourselves. It's- yes, it's ag
2398 water, I understand we talk about drinking water and I understand we talk about waste
2399 water, but it is all one water. And when we start to manage it together, I think we'll find

2400 better solutions. And so this is an example of taking one silo, wastewater that now is
2401 drinking water, and it has a funny little tagline on here that says, “Tastes like water
2402 because it is water.” [laughter] And so the point being that a drop of water is a drop of
2403 water. We have allowed ourselves to get it segmented and this silo will not talk to that
2404 silo because they’re different types of water. Well I don’t think that’s true, and so when
2405 we think about moving forward, we have to have conversations across those silos to deal
2406 with this ag to urban interface because- we have to have farms. We have to have them.
2407 And we have to figure out how to work together to make sure that we’re addressing water
2408 quantity and quality issues. I think there are some solutions out there, and when we break
2409 down some of those silos.

2410

2411 TH: I have a couple questions here that have come in that are related to this whole idea of ag
2412 versus urbanization. So one of the questions is, how do you address the fact that some
2413 studies have shown that lawns pollute more than two to three times that of ag land? So,
2414 perspectives from the panel on that?

2415

2416 DM: That’s really interesting, and it brings up a point, because we need to refine when we talk
2417 about urbanization. And so this morning for instance, people were talking about it in
2418 terms of subdivisions, and we know that’s what growth looks like in the West in a lot of
2419 ways: sprawl, essentially. So in Montana for instance about- I looked up the statistic- but
2420 more than half of our houses in a very rapid growth period have been built on lots larger
2421 than 10 acres. And that’s crazy. I mean, we’re using up the landscape, but a bunch of
2422 resources, we’re paying for fire protection on those places because they’re out in areas
2423 where they shouldn’t be and all that stuff. And it’s true that those places tend to use more
2424 fertilizer, pesticides, and water than a farm, and so the average of nitrate load on a
2425 bluegrass lawn would embarrass a corn farmer in Iowa. And so it’s how we do cities that
2426 counts, and in fact we should be doing cities- and so one of the things that’s happening
2427 right now, and this is a really positive development, is that first of all, the West is the
2428 most urbanized region of the country. That’s something we need to chew on for a while,
2429 because we think of ourselves as rural. We are not. We live in cities; Westerners are
2430 urban people. But it’s also the most vibrant area in the country in terms of the growth of
2431 cities right now, and Boise is no exception to that, it’s the leader in that. But there are
2432 other cities like that—Bozeman in my state for example, Missoula where I live, but
2433 certainly Denver—those cities have incredibly vibrant economies and they’re changing.
2434 They’re called creative class economies, educated economies. The people there are doing
2435 things like revitalizing urban cores, so they’re going back into density again. We’re going
2436 back down there and stopping sprawl and living together in cities. They’re doing things
2437 like preserving open space. So I think of time- the signature act of my town Missoula
2438 occurred 30 years ago when we passed a bond issue to have open space outside the town.
2439 And I said, “Well that’s unique, my town’s very cool.” Well if I go to any of those

2440 creative class economies in the West right now, they're all doing the same damn thing.
2441 It's because people insist on it, they want that. They insist on sustainable agriculture, so if
2442 I look at sustainable agriculture where it's happening, it's happening just outside those
2443 cities. So the positive thing—and it's almost market-driven—is that we are at the same
2444 time we're doing this growth, we are changing the nature of cities, and that changing
2445 nature gives us tools we can harness to do things better all across the board, and that's
2446 really positive development.

2447
2448 SB: Yeah, that's an interesting point you make about cities, and I think that's one of the- a big
2449 initiative for us is density. Really pushing that infill in that urban core, even outside that
2450 urban core, to increase density to then tie back to the concepts of like a green storm water
2451 infrastructure that's actually treating the water before it goes into the groundwater. And
2452 so another part of the Clean Water Act is our storm water management permit, which
2453 requires in the future green storm water infrastructure retaining on site, kind of returning
2454 cities to the pre-development hydrology. That's really important from a water quality
2455 standpoint, and so for us density is really important, it's something we're focused on
2456 moving forward. Yes, we do have some of those developments that are more, would be
2457 considered quote unquote sprawl. But we're trying our best to encourage folks to increase
2458 densities, 'cause I think that's a better outcome from so many different perspectives, not
2459 just from a water quality standpoint, but from transportation issues, etcetera. It really
2460 helps with this urbanization question.

2461
2462 TH: Okay, so next question. As we look out 10 years, looking at both the Treasure Valley and
2463 other kinds of communities like it in the West, are there things that you see—in addition
2464 to growth, urbanization, climate change, etcetera—that we should be putting in place now
2465 that are going to help us deal proactively with those kinds of issues? What is it we can do
2466 at this point in time that might be proactive versus reactive?

2467
2468 HS: So I could imagine thinking of this in terms of the way the Boise River Greenbelt came
2469 about. By forward thinking ahead of time, a resource that the whole community benefits
2470 from was able to be established in a fairly contiguous manner. I see the biggest change
2471 happening in terms of expectations of where people live and the water quality, and
2472 similar to a manner of the Greenbelt, by thinking ahead of time and realizing that what
2473 are now irrigation returns, or creeks in poor condition, could be a resource for the
2474 community and things that people like to live by, and treating them as a benefit that is an
2475 attraction to people would stand us in good stead for the next decade.

2476
2477 RM: I think the one thing that we see there is just the uncertainty with that. And how- I guess
2478 in my mind, the best way to deal with that is to put together water quality improvement
2479 programs that have the necessary certainty and rigor that you need to get through the

2480 regulatory process and make sure that there are meaningful measures, but at the same
2481 time, don't lock into things that 10 or 20 years down the road when the world we live in
2482 and the situations change in a way that we're never gonna get perfect foresight at this
2483 time, you need to look ahead as much as you can, but also be able to deal with the
2484 uncertainty. And that's been a pretty tough balance for us with- we're dealing with hydro
2485 licenses that are lasting for 30 to 50 years, and we're expected to put together mitigation
2486 packages, mitigation plans, that are going to work for the terms of the license. And just
2487 given the uncertainty, the- you know our approach has been like I said to look at how
2488 much certainty we can put in those measures and deal with it the issues the way you see
2489 them now, but also be able to deal with adaptations and being able to deal with changes
2490 over time. And it's a struggle, but I think anything we can do to build that adaptability in
2491 while still giving the assurances that folks need on the short term is going to be important
2492 in being able to manage things into the future.

2493
2494 SB: Certainly when we look 10, 20 years out, there's a lot of opportunity. And we just
2495 finished a climate adaptation assessment—again, we're not going to get into the why,
2496 we're just trying to get our head around if it's going to happen, what are we as a city
2497 trying to do to proactively get ahead of those issues? And so I would- all of you, I don't
2498 know if you drove across the river today, but it was flowing at about 46 hundred cfs. This
2499 time last year, maybe it was more in May, we were upwards around 9,000, 10,000 cfs
2500 screaming through the system. We know that that's probably going to be more the normal
2501 than not in the future because it's been alluded to I don't know how many times today
2502 about this idea that the runoff's going to come sooner. So how do we adapt to that? How
2503 do we create a resiliency in our system where all of us sitting down start talking about,
2504 hey of that 46 hundred cfs that's flowing right now in the river, maybe we should divert a
2505 thousand of that off into some kind of recharge project south of Boise. I know the Water
2506 Resources Board is interested in recharge. We're potentially interested in recharge. So I
2507 think there are opportunities out there if we're willing to sit down and start talking and
2508 having substantive conversations past the "I take a position that I represent only the
2509 municipality and I'm not going to listen to what anybody else has to say," or ag, or pick
2510 the silo that I was talking about earlier. I think the time is now, the opportunities are
2511 there, I just think we need to start having more substantive dialogue. This is a start, and
2512 it's just a start. A more substantive dialogue amongst the key players, I think there's
2513 some win-wins out there. We just have to start talking about it.

2514
2515 TH: Ralph, we had a question come in specifically for you. It says Idaho Power is working
2516 with a non-profit on water quality in the Snake. Please tell us a little bit about that work.

2517
2518 RM: Yeah, that's our Snake River Stewardship Program. And the basic purpose there is to
2519 address the water quality issue- temperature issue below Hell's Canyon Dam. So what

2520 we're finding is that because of the presence of the three reservoirs, Brownlee, Oxbow
2521 and Hell's Canyon, temperature conditions in the fall are delayed in how they cool down.
2522 Fall Chinook come up as spawn in the river below Hell's Canyon Dam, and so for a short
2523 period of time in the fall during the spawning season, the water temperatures don't meet
2524 the [salmon] spawning standard below Hell's Canyon Dam, and so our task was to come
2525 up with a measure that would address that. And essentially, it kinda came down or comes
2526 down to two alternatives. One would be to put a temperature controlled structure in
2527 Brownlee that would be able to selectively pull cooler water off of Brownlee, the deep
2528 parts of Brownlee, and run it downstream when we need it to cool temperatures in the
2529 fall. The other was looking at it from the perspective of when we look at the temperatures
2530 and the conditions below Hell's Canyon Dam, there have been one or two years over the
2531 past 20 years when temperatures during the spawning period were above what laboratory
2532 studies in the scientific literature shows is likely having a negative effect on Fall
2533 Chinook. The rest of the conditions are- it's over the standard, but from the work we've
2534 done and looked at it, it's hard to demonstrate that there's a negative effect there on the
2535 spawning fish. So the- what that did is it allowed an approach where we could look
2536 upstream in the river above Brownlee Reservoir where we know the summertime
2537 temperatures are actually causing fish mortality. I mean we had documented Whitefish
2538 kills in the river upstream of Brownlee Reservoir in the summertime. And so the places
2539 ties in with the nonprofit that was asked about is back in about 2011 or 2012, we teamed
2540 up with the Freshwater Trust, and they're a conservation group and they were originally
2541 based out of Portland. They now have an office in Boise as well as I think an office in
2542 California as well, so they've expanded some. But they have implemented programs and
2543 developed programs over mostly up in the Rogue system in Oregon where they- the
2544 utilities have been able to deal with a temperature issue by essentially- in that case it's
2545 trading- developing riparian conditions that promote river cooling as opposed to putting
2546 in a chilling tower or something like that. And so similar to the issue we had in- or we
2547 saw some similarities there where we were with Brownlee and the selective withdraw
2548 tower and what we felt was a better solution was to go out and get a much broader
2549 landscape scale benefit. And so we're working with them on being able to do upstream
2550 improvements, which include changing the physical features of the Snake River Channel
2551 itself where we're- in the areas we're working, where we're making it deeper, higher
2552 velocities, so that it can get back to some of those ecological functions that it's no longer
2553 able to support given the reduced flows that now come through the system because of
2554 upstream developments. And then another major component of that is working in the
2555 tributaries to develop riparian areas, develop better or in a lot of cases just develop any
2556 kind of riparian on the tributaries as a way to reduce thermal loading and approve habitat
2557 and temperature conditions in the tributary to offset the elevated temperatures for that
2558 brief period in the fall below Hell's Canyon Dam.
2559

2560 TH: So we mentioned earlier, a couple panelists mentioned the fact, that non-point sources are
2561 not regulated. So we had a question come in saying, should non-point sources be
2562 regulated and have there been long-term trends which support this premise?
2563

2564 SB: I'll take a stab at it. Considering how functional D.C. is right now, I'm sure we could
2565 amend the Clean Water Act to get [laughter] non-point sources included. So, you know,
2566 the lower Boise River TMDL, how it was developed is that the cities- if they need to, as
2567 we're growing, the additional waste level- waste allocation- to Hawk's description- the
2568 original budget that you might need for additional phosphorous to put in the river, that
2569 can only be gotten through trading. That's how the TMDL was written. The trading will
2570 occur when folks get on non-point sources of pollution, i.e. drains that are coming back to
2571 the river, and there are treatment systems there to get to those pounds of phosphorous that
2572 then the cities will use to augment their growth. So we have a mechanism within the
2573 TMDL—and I would argue that's the scalpel—that we have a mechanism for us to get to
2574 some of that non-point source that the city's going to need for growth. And that was a
2575 very deliberate move in the TMDL as maybe a way we can start getting to that non-point
2576 source. So that's one example.
2577

2578 DM: Which brings up an interesting question of justice for urban residents, because what's
2579 really happening there is city residents are paying to treat that waste the farmers don't
2580 treat. And because they're not regulated—it's not because they're bad people, good
2581 people, anything like that, it's because that's the way the law reads—and so you end up
2582 subsidizing that pollution because that total TMDL standard is a load on everybody, and
2583 if somebody doesn't pay then somebody else does. And that becomes- so if you gather
2584 what I'm saying here, is yes, they should be regulated in some way. That's what brought
2585 the cities into compliance with the issues. You know, and back up a second, 'cause the
2586 Clean Water Act is really important in this. And if- the Clean Water Act passed Congress
2587 because the Cuyahoga River caught on fire from industrial pollutants. And the Cuyahoga
2588 River's in Ohio. Well, you know, two years ago, three years ago, the Toledo River, the
2589 river that flows through Toledo I should say, was- there was a state of emergency
2590 declared because of toxic algal blooms in the Toledo River and John Kasich had to send
2591 in bottled water to everybody in Toledo, one drainage over. That's where we are. But we
2592 need to think about the political realities of that, not just the Clean Water Act, but all of
2593 our key environmental legislation passed in the early 70s. That's what we're running on
2594 today, all of our environmental gains have been made in the early 70s. From where I sit
2595 and from where- the political question is this: We could not pass that legislation today.
2596 We couldn't have passed the Endangered Species Act, we couldn't pass the Clean Water
2597 Act today. As it was- forget about the improvements, where we're really headed. So the
2598 problem really becomes a political one in a lot of ways, and that's kind of the fix we're
2599 in. And you've heard people talk about local solutions and doing this thing and other

2600 things in groups. That's where we are, and that's not all bad. That's really not all bad. But
2601 that's kind of where the political realities are is, or where- from a Clean Water
2602 perspective, yes non-point should be regulated. But political reality is it never will be, so
2603 we're going to have to adjust in some other way.

2604 HS: So working from the situation that we find our self in and are likely continue to find our
2605 self in, it becomes a question of how do you incentivize the non-point sources to improve
2606 the conditions in those waters. Steve mentioned there's trading mechanisms, we can use
2607 that rather blunt TMDL tool to incentivize it, but we need to make it easy and to put a
2608 value on the pollution so that those trades can occur.

2609
2610 TH: Another question came in that says when perhaps twice as much ditch water is delivered
2611 to a lawn that can be consumed by it, what is the water quality implications of this? So
2612 you basically have more water being delivered to lawn than it's needed and probably
2613 runoff occurring from that.

2614
2615 HS: It depends on the situation, and maybe this could be paralleled on the large scale with
2616 farm fields too. If you're delivering twice as much water and it flows on and flows off,
2617 yes, you have a pretty serious potential water quality problem because it carries sediment
2618 and extra fertilizer with it. But if you're applying it in a more precision manner, perhaps
2619 by sprinklers, then not so much. More is retained on site. You don't see runoff from
2620 sprinkler fields. And the same would be true of lawns. If that water is just unused and
2621 flows down the ditch, then presumably it enters the river later, but if it's a flood irrigation
2622 situation where too much is being applied, then perhaps that's more of an education
2623 situation that can be resolved. That again is one of those examples that maybe could be
2624 incentivized. If we can value what the clean water and what the pollution is worth, then
2625 we can make money available to convert from flood irrigation to sprinkler irrigation,
2626 thereby reducing runoff, thereby keeping water in the canals or maybe not using it at all
2627 and reducing the runoff down the drains so that those drains are now filled with cleaner
2628 infiltrating groundwater and not farm field runoff. That helps the river and it helps save
2629 water too.

2630
2631 RM: Yeah, I think maybe one of the keys to look at there is why is twice as much water being
2632 delivered to the lawn? You know, we've done a couple of projects, one with the
2633 Riverside Irrigation District down there at the mouth of the Boise and the Snake to help
2634 them be able to improve their water delivery system and reliability while at the same time
2635 giving us the benefit of keeping phosphorous out of the river. Along the same lines, up in
2636 the Grandview area, helping to fund the farmers up there to convert from flood gravity
2637 irrigation to sprinkler, which if you implement the sprinklers properly, you can
2638 essentially eliminate runoff into the river. And in both of those cases, you know, neither
2639 of those groups—the groups we're working with—really had a need or an interest in any

2640 of the inefficiencies or the way they were doing business other than that was the way they
2641 were set up and you know they needed some motivating to change things. So I guess, you
2642 know, I'm not familiar with the lawn issue, but I think a lot of times we don't necessarily
2643 look at or try and get at what's the real need of who you're dealing with? And I think a
2644 lot of times there are solutions there where you can come up with something that works
2645 pretty well and really is not a hardship and in some ways may even be better for the
2646 different stakeholders and people you're working with.

2647

2648 TH: On that note, one of the other questions is with regards to education. What role does
2649 education play, whether it is helping people understand the fact that in some cases there is
2650 a lot of finger-pointing, where people from subdivisions think it's all agriculture that's
2651 the problem, and maybe people from subdivisions don't understand the portion that they
2652 are contributing with regards to fertilizing their lawn. What role does education play as
2653 we move forward?

2654

2655 SB: I think it's hugely important. We have the Boise Watershed and that's focused for the
2656 City of Boise through the Boise Environmental Education Process. The watershed is
2657 focused mostly on children, but I think we also recognize that our ratepayer education is
2658 becoming just as much a priority. The watershed is focused on broader water issues, not
2659 just water quality issues. So educating ratepayers on these bigger questions, I think Ralph
2660 brings up a really good point on the idea of that example you used on the lawn, why are
2661 they using twice as much and do they know there may be better approaches that could be
2662 used? We're dealing with—some of you may have heard—a recycling issue here in
2663 Boise. Made my gray hair even grayer over the last two months. Fundamentally though,
2664 that's a question about how- we can keep recycling it, but maybe there's that reduce reuse
2665 piece that we've kind of forgotten about within the recycling world. I think it could also
2666 apply to the water world, where we've gotten to the point where we react to these
2667 problems that are coming to us based on our current water use. I think there's room for
2668 education on how to reduce and reuse rather than just deal with the problem at the back
2669 end. And that could save us a lot of money and a lot of heartache, so I think there's other
2670 solutions to be thinking about, and education is certainly a huge part of that.

2671

2672 HW: As well as outward focused education. I would share that when I was writing the TMDL
2673 for the streams in the lower Boise, I found that I had an awful lot to learn as well. By
2674 going out in the field and touring some of what I had previously imagined to be creeks, I
2675 found they looked very very different from what I imagined they would look like and I
2676 saw how they were being used. That also led to ideas and potentials for improvement,
2677 and I felt like maybe that went the other way too. When I talked to the irrigation district,
2678 maybe there were ways of looking at it that weren't part of the way that had always been
2679 done. And we start seeing those collaborations come together when people take the time

2680 to learn from each other. So I think it's important that education be- that as regulators and
2681 advocates and users of water, we educate ourselves as much as the public.

2682

2683 TH: Steve, you mentioned the fact that with regards to money. And one of the questions that
2684 has come in- I'll be curious on all of your perspectives. They say: As a nation, we enjoy
2685 the cheapest, safest food in the world. From your perspective, is society willing to pay to
2686 help keep water pristinely clean?

2687

2688 SB: I would say yes based on not just anecdotal information that we hear, but I could point to
2689 a number of surveys or recent votes that we've had in Boise. So last year we- or two
2690 years ago we passed the open space levy, and 74 percent of Boiseans said basically,
2691 "Charge me. Charge me for something that I value and want to contribute money to."
2692 Subsequent to that we did a survey on our water renewal program. We started asking
2693 folks, "Are you interested in us pursuing alternative approaches, whether it's to resource
2694 renewal or different ways to think about water?" And resoundingly we heard back from
2695 citizens, statistically relevant survey, telling us, "Yes, we're very interested in that." And
2696 then of course the next question is, "Are you willing to pay for that?" And that's where
2697 the- usually in most cities, the rub is there we see a drop off on the percentages. And I'm
2698 here to tell you that didn't happen in Boise. It was probably about a 77 percent wanted us
2699 to pursue these innovative approaches, and probably about 72 percent said, "I'm willing
2700 to pay for it." The next big question is how much. We haven't asked that yet. But I think
2701 those are two very specific examples where our city values these outcomes. And if you
2702 can frame it in exactly that, a value proposition, folks are willing to pay additional money
2703 when they see the value that comes out of it. And so it's incumbent upon us as city
2704 leaders to frame it properly, and frame it fairly too. It's not just painting this panacea of
2705 just give us the additional money and all your problems will go away. It's not that. It's
2706 gotta be an honest conversation. But I'm emboldened by and I'm encouraged by the fact
2707 that our citizens are consistently giving us the feedback that if you frame it properly,
2708 we're willing to pay more. We're willing to pay that additional to see the value that we
2709 get out of the whatever the infrastructure is.

2710

2711 RM: And I'll put in a plug for the technical part of that relative to the framing it properly and
2712 the value. I think if you implement projects and people need to spend some money to do a
2713 project that's successful and gets what they want, you can have support for that. But you
2714 know, just trying to get support for projects that aren't based on good scientific principles
2715 and in- done in a way that's going to get the results, I think that's where you lose that
2716 support and I think once you lose support, it's a way bigger climb to ever get it back than
2717 to maintain it along the way.

2718

2719 DM: That area of willing to pay is where the market-driven solutions come into play a little
2720 bit, and one of the areas I followed over the last 20 years is grass-fed beef. That's- it's
2721 really critically important, and the growth in that particular area, but in sustainable ag in
2722 general, has been far faster than we thought it could be. And it is because people are
2723 willing to pay. When you ask them, "Will you pay 50 percent more for this steak that you
2724 just bought at the good foods store in Missoula right now" they'd say, "Yeah, I do." They
2725 sell them out. They do real well. And why that's important I think is because it doesn't
2726 take much, okay? So I once asked a guy in Iowa, "If you converted 10 percent of the land
2727 in Iowa to permanent pastures, which is what grass-fed beef, what would happen to your
2728 environmental problems?" And he said, "Well, they'd go away. We'd lose flooding
2729 because we'd have these barriers that we- so we can control runoff, we control flooding.
2730 We'd have some nutrient sinks to support close to the rivers. And all those things are
2731 worth." It doesn't take much to convert 10 percent. So those market solutions, while they
2732 sound a little quixotic, or say, well what's 10 percent going to do? Ten percent does a lot.
2733 It does a lot if we have the ability to plan and do things. And with the market driving and
2734 then people getting good quality beef out of the deal, I'm not seeing a downside to any of
2735 this.

2736
2737 SB: Let me just add one thing, Tony. The idea that we're trying to change that dialogue
2738 around wastewater, that kind of goes back to the value that all cities bring through
2739 wastewater treatment. So we're not just doing that to give ourselves a new name, we're
2740 doing it because we need to change the discussion we're having with the public on what
2741 we at the City of Boise, City of Meridian, City of Nampa, what they do with that treated
2742 effluent. It's not just- like I said, it's not just a landfill for water. There's a lot of
2743 resources that come out of that and it's really great work that the professionals do. And I
2744 think when you frame it a certain way, the public starts to think differently about what
2745 service is provided.

2746
2747 HS: And thinking just a little more about how the public perceives itself, I see this as almost a
2748 question of self identity. I mean, we care about water quality, that's important to
2749 Boiseans. We frame our community around water-related things. Think of the
2750 Whitewater Park, the Greenbelt. In- I wear a different hat for part of the year—I run the
2751 Idaho Forest Practice audits where DEQ is inspecting forestry operations, and at our most
2752 recent audit there, we found 96 percent compliance with the forestry rules. And people
2753 would ask me ahead of time, well, what do you expect to find, and surely people aren't
2754 going to be obeying these because they're mostly out in the woods. And there's 96
2755 percent, and why is that? And I think in large part it's because the foresters see
2756 themselves as stewards of water quality as they go about their work. That's how they
2757 differentiate themselves from Brazilian foresters or other parts of the world. And so that

2758 sense of identity and just a core factor of our being here is that we care about water
2759 quality. There's a lot of good will here that can be used.

2760

2761 TH: Steve, there's a question specifically here for you about the City of Boise and are you
2762 open to a graywater program?

2763 SB: Umm, hmm. I think a graywater program is an interesting concept. It would be
2764 challenging from an infrastructure standpoint to try to figure out is it on a case-by-case
2765 basis per home, is it another piping system that we would use the graywater to get it to
2766 some other treatment? There's a lot of questions there that would come up. At first blush
2767 I think it's probably- there would be a fair amount of dollars tied to that. And we think
2768 there might be better outcomes using the current infrastructure that we have, but that's an
2769 interesting question.

2770

2771 TH: So are there things that you have seen as you look at neighboring communities, states,
2772 where they've got maybe some similar challenges or have had some similar challenges
2773 that we've got here and things that we should draw from or things that you would like to
2774 point out that you think are really worth considering for some of the challenges we face
2775 here in Idaho with regards to water quality?

2776

2777 RM: I guess the- I mean one thing that comes to mind is trading. And I know that can be a
2778 good thing or a bad thing depending on how folks look at it. But you know we're in
2779 dealing with- I guess the question about the non-profit conservation group that we've
2780 been dealing with on our Snake River Programs, and you know in working through water
2781 quality issues in the boundary water between Idaho and Oregon, you know, my
2782 perception is that trading has been used more say in Oregon than in Idaho and again, you
2783 know maybe something that we're not getting as much use or value out of here. Steve
2784 kind mentioned relative to the market there's a lot of issues but that's one thing that
2785 comes to mind that we don't appear to be using that tool as much as my perception of
2786 what's being done in other- in Oregon or other states.

2787

2788 DM: I've just been looking closely at a community with that very question in mind and the
2789 reason I'm looking at this community is I look at rivers across the country, I see
2790 deterioration, mostly through nutrient loading. And I know of only one river that's better
2791 than it was 20 years ago. Much better. And it's the Big Blackfoot in Montana. So you
2792 know, if you've seen the movie A River Runs Through It, that's the river. And why it got
2793 better had nothing to do with the film—well, kind of. It raised money off that. But it had
2794 a lot to do with a rancher named David Mannix. And he's a grass-fed beef guy. But he
2795 also had a rule. And I interviewed a bunch of people who didn't know I knew David or
2796 knew about this at all and I said, you know, what's going on? They all quoted the same
2797 thing to me, the rule. And they say is, "It's the 80/20 rule." And what it says is that we

2798 live in this great place and our commitment to it has made our values similar, so we agree
2799 on 80 percent of the stuff no matter who we are, if we're a mill owner, we're a rancher,
2800 we're all those things. So let's talk about that, let's do this community cohesion, get this
2801 community functioning as a community and then these other problems will start to be
2802 dealt with in some other way. And it's actually worked there over the course of about 30
2803 years. So I think that that's a good thing for other communities to think about.
2804

2805 HS: There's examples in the Northeast of people trying to use new measures. Again, that
2806 square peg round hole problem with the TMDL. So as urbanization comes, we get more
2807 impervious surface and people trying to write TMDLs based on impervious surface to
2808 reduce runoff. A lot of these things end up running into core challenges though because
2809 of the precise wording of the Clean Water Act. I think what has worked well so far for us
2810 though, and maybe we can learn from neighboring states, is the groups that we assembled
2811 to try and solve the problem such as the Lower Boise Watershed Council. I'm then in a
2812 position to take these ideas that maybe don't quite fit into the regulatory framework and
2813 use them in an implementation framework to try and change things and improve things
2814 on the ground.
2815

2816 SB: I think when I look to other states—I don't know that we have just a great example of it,
2817 but I think the idea of integrated water management comes to mind to help solve a lot of
2818 the broader issues. Going back to getting rid of some of the silos, the temperature issue
2819 that Ralph alluded to—we're looking at a potential solution where we- in lieu of these
2820 chillers at the end of our renewal facilities, we would take our treated effluent, we'd
2821 would put some of it in an irrigation canal, the Farmers Union Canal, we have a contract
2822 with them to do that. We're working through the regulatory hurdles on that right now—
2823 and then the in-stream solutions would be in-stream restoration projects up and down the
2824 river, and we'd work with some of the other cities to hopefully team up on some of those
2825 projects. If we were to take that water out and put it in the Farmer's Union, we'd have to
2826 work hopefully with the irrigators, maybe to get some water in the river to keep our flows
2827 up. So you can start to see how all these things start to interconnect and the idea that we
2828 would throw our hands up and just say, "You know that's just too hard, just put a chiller
2829 at the end of the treatment plant and call it good." That just doesn't sit well with me. And
2830 you know, I might be naive I suppose, but I've been called worse—but I think if we just
2831 keep talking about some of these solutions that are out there that, again, there are wins
2832 that are available to us if we just start to think on a more integrated basis across those
2833 different silos that we've allowed ourselves to be put in.
2834

2835 TH: All right. So we have maybe just another minute or two. If you guys have any parting
2836 words of wisdom or final comments you'd like to share.
2837

2838 HS: I'll just say that I couldn't agree more with what Steve just said. Bringing people together
2839 whose interests maybe haven't always aligned and also pulling that 80 percent, the things
2840 that you do have in common, whether it's a care of water quality. For myself, I found it
2841 was maps. When I sat down with somebody with a map and we looked at how the water
2842 flowed on the land, we found connections and interests that didn't exist before, and that
2843 collaboration and bringing together different groups to solve problems in unusual ways
2844 is- I think that's our future.

2845

2846 RM: Yeah, you know in general the regulations are necessary to drive the process and the way
2847 things happen, but I think the real success stories and the places- the way you're really
2848 going to make a difference is through what's been- I think the common theme up here is
2849 that we gotta break the silos down, we've gotta work together, and we gotta come up with
2850 solutions that work. And you know it's- regulations definitely have a place, but it can be
2851 a struggle sometimes within the existing framework to implement what's what I think are
2852 good effective projects. We need to just keep working at that and make sure we do that
2853 and don't give up and take the easy solution.

2854

2855 SB: Yeah, I guess change is coming. We know it's coming. We see it in our basin, we see it
2856 across the West, so I think it's an opportunity now to be proactive and not wait for a
2857 crisis to hit us. Let's get ahead of it so we can actually say, "Hey, we got a plan moving
2858 forward to actually deal with with growth, to deal with this urban ag interface." I think
2859 the opportunity is now. We're at a time in- from our perspective at the city, we're in a
2860 really interesting time in our city's history, and there's a lot of challenges ahead of us, but
2861 there are tons of opportunities to solve those unique challenges and set ourselves up to do
2862 it differently. We get told a lot, "Well, Boise was Denver 30 years ago." Well, I don't
2863 want to be Denver 30 years from now. So how do we do it differently? It's right before
2864 us, so we just need to keep talking and I think things will come up that- we'll surprise
2865 ourselves.

2866

2867 TH: Well, thank you all. Join me in thanking the panel.

2868

2869 [applause]

2870

2871 TH: [whispered] Thank you. Nicely done.

2872

2873 JF: We finished a little quick, so if you want to do a quick stand up break before our last
2874 speaker, who will be worth hearing, do it, do it do it and we'll get you back here pretty
2875 quick.

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Closing Speaker

JF=John Freemuth, PL=Patricia Limerick

JF: Okay everybody. We're gonna have our last speaker, who you really are going to want to hear. Okay. Get that group over there. All right, so our next speaker- this is not the first time she's spoken at an Andrus conference. She came and was our luncheon speaker I think at Troubled Waters a few years ago. I've known her for a long time in that there was a time when the Hewlett Foundation funded a get-together of all these centers for the- in the West that studied, well, various parts of the West, various issues and so forth. And we've struck up a friendship over the last 10 or 20 years, so this is a great pleasure. And I know Governor Andrus really enjoyed her company as well. So Patty Limerick is the Faculty Director and Chair of the Board of the Center of the American West at the University of Colorado Boulder, and probably the best-known center that covers Western things I think. She's also a professor of environmental studies and history. She's also the Colorado State Historian and is on the National Endowment for the Humanities Advisory Board called the Council on the Humanities, nominated by President Barack Obama in 2015 and confirmed by the Senate. So that's not just any other appointment, right? She's the author of *Desert Passages*, *The Legacy of the Conquest*, *Something in the Soil*, and *A Ditch in Time*. She's a frequent speaker and columnist for the Denver Post, and something that she and I agree on and have in common is she's- except that I'm a policy guy, not a historian, though without history we can't do anything—bridging the gap between academics and the general public to demonstrate the benefits of applying historical perspective to contemporary dilemmas and conflicts and for making the case for humor, as you're going to see, as an essential asset of the humanities. A recipient of a MacArthur Fellowship and the Hazel Barnes Prize, the University of Colorado's highest award for teaching and research, she has served as President of the American Studies Association, the Western History Association, the Society of American Historians, and the Organization of American Historians, and the Vice President for Teaching of the American Historical Association. She received her BA from UC Santa Cruz and her PhD from Yale. Welcome, Patty.

PL: Thank you.

[applause]

Well, this is really a great pleasure and I'm very indebted to John Freemuth, who I will just note is the 2018 Boise State University Distinguished Professor.

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[applause]

And of all my writing activities in the last year, getting to write a letter for that was one of the greater pleasures. Those Denver Post columns [in the path] I must say to do that. It was also great to be here in anything involving the name Cecil Andrus. He was- complicated story, I did a series of interviews with the former Secretaries of the Interior, and I got to interview him for that. Came to Boise to do that. And then agreed to come to a- speak at a conference he was having a few months later in between those two events. My first husband died of a stroke, and so the first trip I took to speak at an event after some very tough times was to come here, and Governor Andrus was very very kind to me on that occasion. So it is a huge honor to be here and to make a tiny step of expression of my gratitude to him. So I am spending- I spend a lot of time quoting Thomas Jefferson and John Adams and that key phrase in their correspondence says something about our circumstances in 2018 has put me in a complete frenzy for quoting that. Jefferson and Adams quarreled very intensely during the founding of the nation, and they did not speak to each other or communicate to each other. And then their friend Benjamin Rush went back and forth and negotiated a discussion between them in correspondence. They never met in person. And they wrote back and forth a giant collection of letters, and in the midst of that correspondence they wrote to each other. One said at first, “We must explain ourselves to each other before we die.” And the other responded and said, “Yes, we must explain ourselves to each other before we die.” And I think that’s something we should just all go around quoting in 2018, ‘cause it’s not happening everywhere in the nation right now. So that is the phrase that I would like to start with before I turn to a somewhat sillier vein here of limericks, which are not anywhere near as solemn as anything in the correspondence between Lincoln and Jefferson. So years ago, I went- I just wanted to say, one of the great things about being at this conference—and I think Doug and I might be distinctive in having such pleasure in this—we are out of the Colorado Basin and nobody has talked obsessively about California. [laughter] Hasn’t that been, like bomb? Soothing bomb not to have to keep hearing about California? I was at a Arizona water conference probably 20 years ago and good, Heaven’s sake, we couldn’t go more than a, I don’t know what, four and a half minutes without remarks about California. And so that caused me to write a limerick, which is not- it’s so important to say- is not my point of view, but I am summing up some of the atmosphere at that Arizona Water Conference.

When California falls into the sea,
its neighbors will shout out with glee.
The state was our bane, causing trouble and pain,
and now that’s it’s gone, we are free.

2958
2959 [laughter] So, that is not my angle, but good Heavens it was in the atmosphere at that
2960 Arizona conference. So, how pleasant to be here where we don't have to talk obsessively
2961 about California. I think I might have come with some expectation that this might work
2962 as a logical construction: California is to Colorado, and to our opinions in Colorado,
2963 maybe what Oregon and Washington are to Idaho in terms of the downstream user that
2964 doesn't understand us and our rights and privileges, but I'm not sure what the discussion
2965 of the compacts, I'm not- I think that logical arrangement is not really as convincing as I
2966 thought, but I'll look forward at the reception to getting more edified on that. When I
2967 wrote a book on the history of water in the Denver zone, it's called *A Ditch in Time: The*
2968 *City, The West, and Water*—that title *A Ditch in Time* came from the fact that it had an
2969 incredible boring title and a friend asked me what was the- so I'm trying to come up with
2970 a better title and this friend said, "What was the pattern with the Denver water
2971 department?" And I said, "Well, they didn't wait for shortage to hit, they were always
2972 looking ahead, kind of like a stitch in time." And then we froze and went, "Ha. A Ditch in
2973 Time." That's where that came from. That Denver water habit of looking ahead has not
2974 made it beloved in other parts of the state. It was for many years a very aggressive
2975 imperial power claiming early water rights on the Western slope through prior
2976 appropriation. It's seen in many ways as still to this day in some parts as the City of
2977 Colorado as an evil empire I guess. And I will get back to that question when I get to the
2978 issues of cities and rural areas and their relationships. And yet, Denver Water has gone
2979 through very sizeable changes over the last- since 1990 in the Two Forks Defeat, so,
2980 might want to reflect on that a little bit as well. Well, two other- so this is the only book
2981 on natural resources or really on anything under the sun, that has a limerick between each
2982 chapter. [laughter] It's a very nice feature, and they sum up a lot. So I thought, in an
2983 uncanny way, some of the discussions- I dunno, we've heard, what, 10 or 12 repetitions
2984 of the very important point, variations, but that in fact an urban population can grow quite
2985 a bit and water use does not necessarily escalate proportionately. So over and over we've
2986 heard that and I thought, this is an interesting thing because apparently I had a deeper
2987 understanding than I realized at the time. This is a limerick from the book, it's called *The*
2988 *Tangled Ties of Growth an Water*. It's published- written in 2011 and published in 2012,
2989 so here we are:

2990
2991 The West left settlers aghast,
2992 it was dry, it was rugged, it was vast,
2993 they thought water was the trigger for making towns bigger,
2994 an idea whose time is now passed.

2995
2996 So, that sums up an observation that many better-informed people made today, so I'm
2997 proud of that. [laughter] Historians are very pathetic when it comes to prophecy and

2998 prediction. We are- have licenses to operate in the past tense and it doesn't go well for us
2999 when we move over into the other lane, present tense. But if you stay really alert it's
3000 okay, but boy if you start moving over into the future tense you're going to be pulled
3001 over, they're going to look at that degree from Yale, gonna say, "You have no license to
3002 operate in the future tense." But the temptation still comes up. In the case in that- when I
3003 seem to get that right. Then this one I don't know if it's prophecy or prediction, but it
3004 certainly seems to have come up in our conversation in terms of the smaller communities,
3005 small but still sizeable communities—Doug was making that point—, that are really the
3006 ones that do not have established water rights or infrastructure and are pushing to get
3007 resources from agriculture. So here it is:

3008
3009 Throughout the American West,
3010 the suburbs have made us all stressed,
3011 they have eaten up farms, set of fiscal alarms,
3012 and given the cities no rest.

3013
3014 [laughter] Doug, would you sign off on that one? Well, you can't sign off as an author,
3015 that would be plagiarism if you did that, but you can certainly certify the material there.
3016 So I will say that the underpinning of my talk is how by writing *A Ditch in Time*, I
3017 escalated the amount of time I spent with water managers. I'd always done some of that
3018 as an applied historian, but boy when *A Ditch in Time* came out I really got out there, and
3019 I've been at American Water Works, Groundwater Association, all kinds of operations
3020 and hung out and fraternized in a big way, and here's the fact: I carry a torch for water
3021 managers. And I will say that the person who really pushed me over the edge on that was
3022 a really nice man at a conference in Northern Colorado—water manager, career fellow—
3023 and he came up to me and he said, "I am so glad you wrote this book." I said, "Thank
3024 you." And he said, "My wife read it and that has made a huge difference in our
3025 relationship." [laughter] And I thought, well this is very remarkable. And he said, "She
3026 read that book, she put it down, and she said, 'I am so glad I read that. Now I know what
3027 you do.'" [laughter] So marriage counseling is not really in my domain, but we'll end
3028 actually on that note of what historians might do in that line of work. So there were many
3029 occasions where I got, oh I don't know, dismayed or certainly fatigued with the
3030 Chinatown syndrome that the nation suffers from. I don't know if you've noticed that, but
3031 that really reprehensible human being Roman Polanski—who we would not want as a
3032 model for our young people at any time—he does a very effective film, *Chinatown*. It is
3033 not historically accurate. In order to have the noir atmosphere of the 1930s, he takes the
3034 LA water development in the Owens Valley and moves it two decades. Now that's really
3035 gonna work for historical accuracy if you take something from the first decade move it to
3036 the 1930s. And it is a powerful movie, and thousands of Americans I've encountered
3037 seem to think that makes them knowledgeable on Western water history. [laughter] I

3038 don't know that I've ever seen anything quite like it. If I say something about being
3039 interested in Western water history, they'll go, "Oh, I saw Chinatown." Well, if you saw
3040 a movie about Martians and life on Mars, if you saw a science fiction movie, would you
3041 say, "Oh, I know about Mars?" I don't think so. You would say, "I read a book, I saw a
3042 strange movie." But for whatever reason, Chinatown is very pernicious and it still gives a
3043 very distorted, oh I don't know, just improbably widely accepted notion that if it involves
3044 the West and it involves water there's something kind of dark up there. It just seems like
3045 a piece of nonsense that we must challenge at every moment. So what I want to do now is
3046 go through three quick segments here, pretty quick segments, so we can have some time
3047 for a discussion. First I want to make some observations on the history of Western water,
3048 not the Roman Polanski version, and I will want to be accenting the complexity, the
3049 contingency, the improbability, the implausibility of that story, and the whole package of
3050 this little section is to be an anti-fatalism treatment program, to counter any sense of
3051 inevitability and entraptness and historical processes that are beyond our- the reach of our
3052 own wills and our own decisions. Then I will shift to several items of conventional
3053 wisdom about Western water that I think deserve a rough workout and significant
3054 filtering and sometimes pruning. Then I will have some ideas about communication and
3055 education on Western water issues, and to the best of my ability I have been trying to take
3056 in things set up here and base the talk on that. So I shall- getting more strenuous. Other
3057 people my age do crossword puzzles to keep their minds agile, and I accept John
3058 Freemuth's invitation to summarize a complicated conference. So who needs a crossword
3059 puzzle when you have John Freemuth to challenge your mind? So, okay. So, I will start
3060 off with a few big observations about the history of natural resource use, but particularly
3061 water use. And the first one is a really really big framework, a gigantic framework, and I
3062 think it helps us navigate through many of the issues that have come up today. It's rarely
3063 discussed in any public framework, and not even that much among historians. So, here is
3064 the big framework. The practices that we know as conservation, the considered careful
3065 use of resources, the thought of longer horizons in time, the process of trying to think
3066 what would benefit the majority, what kinds of tradeoffs and sacrifices must people make
3067 to be part of this enterprise, those practices of conservation originated in very centralized
3068 regimes of power. So I am speaking about the kings' estates where you would have- the
3069 king would have a large block of land and he would rule over that and keep it for his own
3070 preferences, usually in hunting, and he would have gamekeepers who ruled over that and
3071 who had very powerful forms of enforcement with poachers, with locals who were not
3072 doing what he wanted them- what the king wanted done on his estate. One of the great
3073 points that I'm making here is that you are now encouraged to read the book we all snuck
3074 around and read when I was a child, now you have a good educational reason to read
3075 D.H. Lawrence's *Lady Chatterley's Lover*, which we always had to hide a copy from our
3076 parents and read secretly, but now because Oliver in *Lady Chatterley's Lover* is a
3077 gamekeeper, now when you are reading that and people say, "You're reading that rather

3078 off-color book,” you can say, “Yes, I am learning about the origins of conservation in this
3079 book.” [laughter] Conservation in some sense, not in others I guess. So anyway, so kings,
3080 aristocrats, colonial governors, colonial governors traveling to distant places with
3081 naturalists and scientists, those are the people who really began intense engagement with
3082 the practices that we now consider under the framework of conservation. So that makes
3083 the American experiment with conservation enormously important, globally important,
3084 because the experiment we have been engaged in over the last hundred and forty years,
3085 hundred and fifty years, since the start of federal land management in public lands
3086 ownership with Reclamation and so on, last hundred and twenty five, hundred and thirty
3087 years, that is one giant consequential experiment in testing the compatibility between
3088 democracy and conservation. So shifting out of that framework of centralized authority,
3089 which certainly makes it easier, the last panelist talking about regulation- yes, you’re in
3090 my framework here. So it is hugely consequential, and every day, you might even say
3091 every hour, in a water manager’s life is an important data point in that big experiment.
3092 How does that work, to be surrounded by constituents and individuals and citizens all
3093 wanting something from you as you navigate through this conundrum of how you take
3094 practices that are much easier to implement if you are doing it from a top-down, distance
3095 centralized authority. How do you make that work in the democratic republic? In those
3096 terms, I think there are reasons to feel that we are watching something like progress, even
3097 when there are interesting switches and turns and contention. So for instance, when I- I
3098 think it was Jeff Robinson was talking- Robins was talking about the litigation, or
3099 litigiousness, and Doug as well, I thought, you know from a Western historian’s
3100 perspective, I’ll take it. Litigious- showing up in courtrooms as opposed to showing up on
3101 battlefields? I’m okay with that. That’s a form of progress that so many of our primal
3102 struggles for dominance, resource allocation of goods we want, that we go to court for
3103 that rather than going down to Main Street or going into a battlefield. Maybe it’s
3104 especially conspicuous in Indian rights to see the actual brutal physical battles move into
3105 courtrooms. That’s kind of a cool transition from a Western historian’s point of view,
3106 how nice to fight with oral argument rather than other forms of combat. And if we are
3107 now seeing some kind of evolution to a follow-up stage of collaboration and cooperation
3108 and negotiation, well if that doesn’t count under the term progress, I don’t know what
3109 we’re holding out for. So there are ups and downs, the experiment has no conclusion yet,
3110 it continues. I think there is enthusiasm for this idea, because of course that’s a giant
3111 experiment, and to use a beautiful phrase used by one of my students many years ago,
3112 “When shifting paradigms, it is important to remember to put in the clutch.” Now, this
3113 makes no sense to many people who have joined us on the planet, because I think that
3114 something like two percent of the cars sold in the United States have standard
3115 transmission, so. There’s actually a story in the New York Times, maybe 20 years ago,
3116 “Daddy, What’s a Clutch?” So for those who remember that term, it is important to
3117 remember to put in the clutch. Historians can be good for that but that’s quite a shift to go

3118 from the centralized power. To show the peculiar appeal of this idea, I gave a talk oh
3119 seven or eight years ago at the Moscow at Salt Lake University of Utah, and I had
3120 brought with me a little plastic tiara, a little purple tiara. And I had put that on the
3121 podium. I gave the last few minutes of my speech with a tiara on making decrees,
3122 because what to do with that 1922 compact, how to adjust it—that was the subject of the
3123 conference—I thought it would be easier if I just took an imperial power and offered
3124 decrees on- not the technical water court sense of decrees, but just to say, “Okay, the
3125 1922 compact badly underestimated the flow of the Colorado River. As a regal authority
3126 here, I shall now declare that that must be reckoned with. That must be thoroughly
3127 reckoned with.” So anyway, so I give this talk, the last 10 minutes I’ve got the crown on,
3128 I take it off. The audience only wanted to ask questions of the queen. It was the most
3129 preposterous thing I’ve ever seen. All these lawyers and water men- they’re all going,
3130 “Actually, my question is for the queen.” So I had to keep putting this silly tiara on and
3131 speaking imperially. But I think what that was was a sense of we are wearing down from
3132 time to time with this experiment. This shift to democracy and decision-making over
3133 particularly water, but other natural resources, we wouldn’t mind just a fun interlude
3134 where we pretend that a person wearing a plastic tiara carries authority. And we’ll get
3135 over that and we’ll go back to our jobs. But anyway. So there’s that. The second big
3136 framework—this is certainly not succeeded as a household term—but in this book *A*
3137 *Ditch in Time*, I tried to introduce an important phrase for characterizing at least the last
3138 century of American life, and I’m just very surprised to see how little impact it has made
3139 on the public and on the journalism profession, but here is the phrase for the last 125
3140 years: The era of improbable comfort made possible by a truly astonishing but taken-for-
3141 granted infrastructure. Now, the fourth time you’ve said that, it just rolls off your tongue.
3142 The first three times there’s some labor in that. But that is where we are living, maybe
3143 especially in the American West: The era of improbable comfort made possible by a truly
3144 astonishing but taken-for-granted infrastructure. And it will be my hypothesis—because I
3145 can’t do predictions—but I certainly think that the taken-for-granted part is winding
3146 down. That- not to say that every bucky American who goes to a faucet and turns it on
3147 thinks of the connectedness, but I think the percentages are shifting. My hope for
3148 escalating that shift and enhancing it is a very original idea of mine, which I think is very
3149 brilliant, and that is that no dinner party is complete in the American West until you have
3150 invited an engineer. [laughter] So when that has been checked off, then you can sit in
3151 your improbable comfort around the dinner table and you can have someone there who
3152 when you turn on the- when it gets dark and you turn on the lights, you can have
3153 someone at the table who can help you get some reckoning with what had to happen for
3154 you to have the comfort and the luxury. There I will say this is not- well let’s just say this
3155 is quite popular among engineers, and they’re a merry people in ways that not everyone
3156 who’s planning a dinner party has always had the chance to realize yet, so it’s a really
3157 good idea and it helps very much in winding down that taken-for-granted part. I think a

3158 lot of what we're hearing today connects with that winding down of the taking-for-
3159 granted. The third big framework, and it's one that John Freemuth mentioned as
3160 something I would probably say, and indeed I did have it in my plans, that the federal
3161 government is very central in this story. It is not by any means the only player in this
3162 story, but the fact that Westerners have strong feelings about the federal government is
3163 almost in direct proportion to how central and crucial the federal government has been in
3164 making it possible for us to live here and have strong feelings about the federal
3165 government. I am not a sentimentalist apologist for bureaucracies. I almost brought it up
3166 just hold it up at this point, as a member of the National Council on the Humanities, I do
3167 have a federal ID card, and it vexes me that it misspells my name. [laughter] And I have
3168 said to federal friends, "Boy, I would sure like to have a federal ID that actually has my
3169 name right." And they say, "Good luck with that," because I will be many transactions
3170 away from victory that I took part in planning sessions for the Bureau of Reclamation
3171 Centennial and then spoke at several events in 2002. To get to Lakewood, Colorado from
3172 my home, I walked out my door to the sidewalk and I got in a friend's car and drove with
3173 him to Lakewood. Then after several meetings, we were given forms to fill out for travel
3174 reimbursements. I said, "I walked down my walkway and got into my friend's car." They
3175 said, "Oh, then you will have to fill out the forms to claim that you don't have a travel
3176 reimbursement to ask for." [laughter] I don't want to fill out forms, I just want to walk
3177 down my sidewalk. So I certainly have had moments of thinking, I can kind of see how
3178 you might get an anti-government twinge or two from time to time, and if your livelihood
3179 really rested on that, I could see why that would be an issue and I appreciate very much
3180 the luncheon speaker saying that he knows why the federal government isn't instantly-
3181 you don't necessarily have a sense of joy when you know you have to go into a
3182 transaction with that. Sometimes you do, because sometimes there's a wonderful set of
3183 public servants in all of those agencies, and so there are good reasons to dance to the—
3184 well, maybe you wouldn't dance, I don't know—but there are reasons to value and prize
3185 the public servants who often appear in those places, but it is a complicated relationship
3186 and in some ways our dependence as Westerners on those federal infrastructure creations,
3187 that's a large part of the feeling. A fourth one involves—and he's been in here for a
3188 moment at the start—well, not much about John Adams I think haunts us now, maybe
3189 I'm wrong about that, but boy is Thomas Jefferson one omnipresent figure in the shaping
3190 of our attitudes. This is my test proposition. Thomas Jefferson was such an effective and
3191 influential and central thinker, and in many ways was effective because he was
3192 responding so directly to the world around him so we still in ways that are not negative
3193 but consequential, we are still letting him do our thinking for us. And that comes in
3194 sometimes instinctual anti-urbanism, that cities are places that are- where humans do not
3195 prosper, where virtue is difficult to find. So for instance, I'm going to use my Denver
3196 Water example: We wouldn't have to go very far at all walking around the Western Slope
3197 of Colorado to find people that feel that Denver Water is an evil force where urban

3198 people drain resources from the virtuous Jeffersonian agrarians who are sometimes
3199 working on oil shale projects, because Jeffersonian agrarians have to make a living too,
3200 so anyway. So it's not clear to me that the Jeffersonian agrarian is the bulk of the
3201 population on the Western Slope of Colorado, but the self-image of that. When Thomas
3202 Jefferson said so memorably that farmers are the chosen people of God if ever he had a
3203 chosen people. Well, they were certainly the necessary personnel for democracy. They
3204 were people who could support themselves, workers. You could exploit workers and
3205 bully them and by withholding their livelihood you could make them ineffective citizens,
3206 but a farmer could feed himself and his family. So that's not madcap speculation, that
3207 made sense in a nation that was a vast vast majority of farmers. It's not that now. I want
3208 to get- I'll get back to the notion that the urban growth- urban and suburban growth in the
3209 interior West is motivated in very large part by the urbanites' and suburbanites' access to
3210 open spaces in the West, and those spaces are kept open in a significant way by farms and
3211 ranches. And if you de-watered those, those would be unappealing—well, that would be a
3212 process of uglification. That's not a technical term, but it's used in *Alice in Wonderland*,
3213 so we can use that. So if you withdrew the water that supports ranches and farms, this
3214 region would really take a great downturn in aesthetic attractiveness, so it's very
3215 intertwined, the growth in urban and suburban population. The farmers and ranchers are a
3216 very diminished percentage of the population, but they are an important cultural element
3217 and an important economic element. So to have Thomas Jefferson install in our minds
3218 such a hard and fast configuration of who are the virtuous people—the chosen people of
3219 God—and then this phrase he used—oh, why did such an influential man say such a
3220 thing? He said that cities were cancers on the- they were sores on the body politic. Well
3221 don't say that, President Jefferson. That's not going to help us over time when here we
3222 had people at the previous panel talking about the value of density. Well, why should
3223 they have to have a fight with Thomas Jefferson? He died in 1826, that was a long time
3224 ago. They should not have to have that attitude that density is somehow or other an
3225 affliction. When people live in urban density, their virtue is plummeting- that's, that's-
3226 Mr. Jefferson, take a rest is really what you end up feeling about this. And the way in
3227 which it has been the Jeffersonian dream of the individual living in nature, well has there
3228 ever been a better force for suburban sprawl and exurban sprawl if you have this notion
3229 that you will be a better and more virtuous person if you are living separate from your
3230 neighbors with an open view? My own solution on urban planning for the West and
3231 suburban and exurban planning would have been to prohibit picture windows, and all you
3232 could have if you had a suburban or exurban house, you could just have those little things
3233 they have in hotel doors, so- so many problems, so much disruption of wildlife habitats
3234 gone if you had had my land use planning advice. Anyway, Jefferson's thinking is
3235 incredibly persistent, and he seems to be present in our midst when people say as if they
3236 knew it for a fact—I've been in their company in Colorado when they do it—"Denver
3237 Water drains the rest of the state of water and uses it selflessly for its urban population."

3238 Denver Water uses two percent of the state's water to support 25 percent of the
3239 population. Well, okay. Now everyone has- in this room you will be attuned and you'll
3240 notice I left out food in that statement. So every time someone in Denver buys a
3241 strawberry, that is an agricultural water transfer. Every time they buy an ear of corn. And
3242 so that calculation is not sufficient just to say that, and it is a kind of strikingly efficient
3243 use of water to support a population if you- even if you move that two percent up to
3244 include the agricultural products, that's still something other than a drain on- it's not a
3245 cancer on the body politic necessarily. So anyway, so the Jeffersonian heritage, that was
3246 our fourth item. And this is the point where people begin to despair and think, will there
3247 be 19 items? Will she ever end here? No. There will be one more item and that is two
3248 elements of improbability that I- well, I guess there are two more items but they're very
3249 short. I wanted- as I said, I wanted to accent the unforeseeable, the unpredictable, the
3250 implausible, and there are two features of that in my fifth point here that I'd like to accent
3251 that nobody in the nineteenth century could've possibly seen coming, nobody in the early
3252 twentieth century could really have had any database with which to project and anticipate
3253 this. And I think I'm thinking of two particular features of American attitudes that are
3254 very powerful and American practices that are very consequential that no one could've
3255 seen coming. The two things are the emergence and growth of outdoor recreation as an
3256 economic force in the West—and for some communities, the economic force—and an
3257 attitudinal change that without which this other thing would never have worked, the
3258 unforeseeable revolution in public attitudes towards arid and semi-arid places. The
3259 nineteenth century Americans overland travelers found deserts to be a mistake of the
3260 creator. They literally would say that, that God left this unfinished. Something must've
3261 distracted him. Started on the sagebrush lands and then went back and worked on
3262 Pennsylvania some more, it's unclear what happened there. But that notion that there was
3263 something very deficient and wrong about arid and semi-arid places, well good Heavens,
3264 what a transition. It was about 20 years ago I began to realize how, I think it's tenable to
3265 say there is not one unloved square inch of land in the American West. Now, the aesthetic
3266 attitudes have changed, many people have had what they consider to be intense spiritual
3267 experiences in sagebrush places- sagebrush? There's a whole culture around sagebrush?
3268 If you read any overland traveler from the mid-nineteenth century, they have very
3269 negative attitudes toward sagebrush. It's the stupidest plant they ever saw, they can't
3270 imagine why it's there. Mark Twain wrote very mockingly and wonderfully about it. And
3271 now people treasure sage and sagebrush lands. So that is a dramatic change, as indeed
3272 many attitudes towards nature in the United States are. There have been reference to the
3273 Bureau of Land Management, and I'll just say that one of the great things about the
3274 Bureau of Land Management standing in our lives is that every single time the American
3275 people develop an idea of a use for or a reason to appreciate or value nature, they add it to
3276 the BLM's mandate. [laughter] And it's really just quite a seis- like a seismic record of
3277 every change and attitude there. They never eliminate any of the previous ones, they just

3278 keep layering them on. So. Well, that's a whole other topic of BLM, won't go there. So
3279 astonish the immigrant is a game I've proposed playing from time to time, where we
3280 imagine bringing nineteenth century pioneers into our present moment and we try to
3281 think what would be the most astonishing change in our times. I would certainly say the
3282 love of sagebrush would really just amaze anyone from that time period. I also have
3283 sometimes said that since every pioneer settler family wanted to have livestock and
3284 wanted to protect that livestock against predators, that the other way to astonish the
3285 immigrant would be to take the immigrant into a courtroom where a case on predator
3286 control was being tried. Bring the immigrant in and say, "Now in your times, you all did
3287 everything you could to kill bears and mountain lions and wolves and coyotes, and here
3288 in our time we have, here you'll see over on that side of the courtroom, there are
3289 attorneys who went to law school in order to represent predators in court. In our time,
3290 predators have attorneys." [laughter] And the immigrant would say, "That can't be.
3291 That's- there's no imaginable reason for that." A friend of mine is a colonial American
3292 historian. I told that story once and she said- or made that proposition once- and she said,
3293 "Oh Patty, you've got that wrong historically. Predators have always had attorneys.
3294 What's new in our time is that animal predators have attorneys." [laughter] So I say that
3295 just because I didn't go to law school and I could've and I'm always tagging behind the
3296 lawyers and trying to figure out their better understanding of water law, so that's why I
3297 told that mean story about predators. Okay, so now we are moving on to conventional
3298 thinking propositions that need to be rethought, rejected, pruned, filtered, and maybe
3299 reconfirmed sometimes. So here's just a few- there's a- I'll go through three or four of
3300 them and then probably move on to the conclusion. The first one has had such a long run
3301 to American people, the notion that nature in its water supply can function, or does
3302 function as a legislator. So the early American explorers crossing the American West in
3303 the first years of the 1800s often reported that it didn't look workable to them for
3304 American settlement. It was too dry. It was too dry. And they were often crossing at mid-
3305 summer, a little bit of a weird behavior occurred there, cognitive behavior, where front
3306 range of what's now Colorado, Zebulon Pike and Stephen Long, they saw dry riverbeds,
3307 or almost dry riverbeds. And they were coming- they couldn't leave the Midwest until the
3308 winter was over and the mud was hardened, so they get there in mid-summer and they're
3309 looking and they see dry riverbeds. And a person might ask, "Why is there a riverbed
3310 there?" So there was an open door to think, "Maybe there's more water in the spring
3311 runoff," but they didn't see that, so that's where all those notions of the Great American
3312 Desert came from, that the American West was simply too dry, too dry to support
3313 conventional American settlement. And oddly enough, some of those early explorers
3314 thought—this might surprise you—they thought that's a relief. That's really good news.
3315 Why? The republic was young, they did not know how big a democratic republic could
3316 be, if it overspread itself geographically that could be risky, so as I think it was Zebulon
3317 Pike said, "Are people so prone to rambling will find their limits here." And that seemed

3318 good, 'cause the Union could be overstressed. They also felt that this would be a solution
3319 to conflicts with Indians, that if the whites didn't want it this could be the permanent zone
3320 of Indians. Anyway, the Great American Desert was- that idea was one of the ways of
3321 saying nature will set the limits, nature will govern our settlement and our actions,
3322 humans will be relieved of those tough decisions. In our time- in more recent times, mid-
3323 twentieth century, it was often expressed as the carrying capacity, people with
3324 environmental inclinations would say that the West came with limited water and so there
3325 was a carrying capacity and we could only support so many human beings with that
3326 amount of water. So there's the same dream, that nature will set the limits just as the-
3327 Pike and Long and others saw the Great American Desert then, some environmentalists in
3328 the last half of the twentieth century, Edward Abbey, those folks, said, "Nature rules."
3329 Well, not exactly. The term "carrying capacity," that works when you have mule deer,
3330 you have prairie dogs. The remarkable thing about mule deer and prairie dogs—and this
3331 is very good news—they don't go to engineering school, 'cause it is quite dreadful to
3332 think what they would do if they had that power. But they don't do that, and human
3333 beings and the power and ingenuity of engineers, that's something that nobody, none of
3334 the Great American Desert supporters in the- or people putting that forward- saw coming.
3335 So that is a really important reminder to us that it comes back to us and our decision-
3336 making. Even when we are making our most earnest efforts to say, "Nature will legislate
3337 for us, nature will set the limits on our actions," that's a pretty empty thought. A second
3338 conventional wisdom item to note: If I had a dollar for every time—well, I'd probably
3339 need a hundred dollars I guess to really get where I want to go with this—every time I've
3340 been at a water conference and someone said, "Well, it's the way Mark Twain put it,
3341 "Water is for"- excuse me, "whiskey is for drinking and water is for fighting." If I had a
3342 hundred dollars for every time I heard that, I would've endowed the American West for
3343 eternity. Would just be one- my organization would thrive. The problem is, we tried to
3344 find out- we asked the people of the Mark Twain papers if Mark Twain ever said that.
3345 There's no evidence that he did—not surprising, it's not a particularly witty remark,
3346 Mark Twain would usually have something funnier than that—so if he were to revise it-
3347 well, he never said it, but if he were to be summoned back and he were to look around,
3348 get a little bit oriented to our times, what's going on in our times, then I think this is what
3349 the rewrite that Mark Twain would've- if he decided it was worth his time to try to save
3350 this silly remark, "Water is for brewing for coffee"- excuse me, "whiskey is for
3351 drinking." That stands. Nobody has to rewrite that. "Whiskey is for drinking, water is for
3352 brewing coffee for serving at watershed stakeholder meetings." [laughter] That's true.
3353 That is what Denver Water did for eight or nine years and came up with the Colorado
3354 River Agreement with the Western Slope- many units within the Western Slope and
3355 Denver, and a very remarkable- we have—I just want to mention this in case anyone is
3356 interested in learning more about it—on June 18 to the 20th, our organization Center for
3357 the American West will host a group funded by the National Oceanic and Atmospheric

3358 Administration with historians looking at particular Western communities they have
3359 studied and pooling case studies where Western communities confront a drought over the
3360 last couple of hundred years and said, “This is too serious for us to fight. We have to
3361 collaborate and cooperate. Or situations where Western communities confront a drought
3362 and said, “This is too serious for us to do anything but fight each other for the last drop.”
3363 So we’re going to have a very interesting set of case studies brought together on that, plus
3364 many Western communities that swung back and forth between that. A bad mistake in
3365 planning that event occurred and we only invited historians, and John Freemuth I hope is
3366 going to be free on June 18th through the 20th, and even though he is- well, we can just
3367 make him a- we can give him something that is as flawed I suppose as my federal ID
3368 card, but we can give him an honorary historian card if he can come to us and join that.
3369 And we’ll spell your name right too. So that is a reality, that many many many case
3370 studies have shown that water is too important to fight over. And we had several speakers
3371 making that point during the day, that it is something where people have had to say,
3372 “Well now we’ll have to figure out how to get along.” A third point of a conventional
3373 wisdom, and it is something that has just crept into popular understandings, one of our
3374 speakers was saying that the Department of Water Resources gets requests from citizens
3375 to do things that they are not in fact legally authorized to do, to bring together- convene
3376 groups of collaborating people, people in Colorado, many of them think that Denver
3377 Water’s charter gives them power over land use decisions, over settlement areas, over
3378 where developments can occur. And you can read that charter over and over and it’s not
3379 there. So that pretty widespread pattern of thinking that because water is so important the
3380 people who manage it have greater powers than they in fact have at this moment—not
3381 that that couldn’t change—that seems like a place to challenge conventional wisdom, and
3382 also to celebrate that there’s a mounting set of conversations in the last 20 years between
3383 water managers and land use planners. That’s good, but it is really important to recognize
3384 where the water people actually have some constraints on what they can do. Then a point
3385 on science and climate change. So everyone signs on today to the notion that science
3386 should play a key role and is an essential role for providing the data for intelligent
3387 decision-making, policy regulation, etcetera, but that’s harder than it seems. Scientists
3388 and engineering professionals have been given very little in the way of professional
3389 training on communication, and with affection and respect, I would say that climate
3390 scientists have not performed at the highest level in effective communication. That’s not
3391 to blame victims. There have been many efforts to make this terrain as complicated as it
3392 can be by many different factions, but it has not been a successful story of scientific
3393 communication. So when there were folks saying, very rightly very appropriately today,
3394 “We must give a large role for science,” I was thinking, then let’s give an even larger role
3395 for deliberation on how scientists can and should be involved in our public conversations.
3396 To say, “You just go off, get some data, present it to us,” that is not sufficient. I have a
3397 wonderful friend Randy Olson who is a science communicator guy. He wrote a book

3398 called *Don't Be Such a Scientist*, and then he wrote a book called *Houston, We Have a*
3399 *Narrative*. Both of those books are really good, really elemental about how scientists
3400 might enhance their game and control more of their message. I was mentioning to several
3401 people that scientists are scrupulous, scientists and engineers, in using error bars and
3402 margin of errors, they present their findings often as probabilities and whatever kinds of
3403 findings there's always an error bar, a margin of error. The public just speeds right past
3404 that and instantly begins quoting numbers with no attention to the error bar. I have a very
3405 nice idea of having every Western community have a bar that is called the Error Bar and
3406 to get admitted, to get past the bouncer, you have to admit to some kind of uncertainty.
3407 You can't be allowed in there. And then in the Error Bar, young people flirt the way they
3408 would flirt in any bar, except that they would do so in probabilities and so that the young
3409 man says to the young woman, "What are the chances I've seen you here before?" And
3410 she says, "Well, let's get some data on this." And they get to work on their algorithm and
3411 they, "How many blocks do you live from the bar," and so on and so. Anyway, that
3412 would just be a public education mode on science communication. Meanwhile, if we
3413 wanted to see- if we wanted just for relief for our minds to go to a zone where we often
3414 hear- where our chances are the best they can be for hearing civil productive
3415 conversations about climate change, water managers are the place to go. Partly, we heard
3416 some fine examples today of some people saying, "You know, let the question of why, let
3417 the anthropogenic thing"—come back to that at some other point—"deal with what we
3418 are seeing" and then there's the moment of, "there are thermometers. Thermometers do
3419 not have political affiliations!" You didn't say that, but I think that's, "why here's a
3420 democratic thermometer!" That- I'm getting feverish just thinking about it. That's a
3421 really silly idea, but I love that idea. Anyway, Jim Lockhead, the manager of Denver
3422 Water, if he- I've seen him on panels where others are making long complicated answers
3423 to how much we should be facing up to climate change and Jim Lockhead just says, "I'm
3424 in the business of water management. It would be irresponsible to not be paying attention
3425 to this." Over. So, that's refreshing. Environmental Defense Fund organized a conference
3426 in Denver that I got to be the emcee for four or five years ago. Their collaborators were
3427 the Colorado Cattlemen's Association. The excellent Terry Finkhauser, who is Vice
3428 President of Colorado Cattlemen's Association, he and his- a bunch of his colleagues
3429 from there were just saying in the most forthright way, "Talk to us about drought, talk to
3430 us about fire, talk to us about flood. Let's do that for a few years and then we'll see if we
3431 can change the—" add a few other phrases to it, but start where we are all in agreement
3432 that we have concerns. And it was a very persuasive very effective notion. So you get
3433 into the world of water and there's some hope. I'm going to now read a climate change
3434 limerick just to lighten it up from the book. Okay.

3435

3436 *Climate change and the stressful life of water managers*

3437

3438 As the world proceeds to get hotter,
3439 the power to predict will soon totter,
3440 the baseline's been battered, the norm has been shattered,
3441 but everyone still wants their water.
3442

3443 So, there's a lived reality. Okay, so there's- yeah. Now a few last items on
3444 communication and then some discussion. It's really good several people have mentioned
3445 some things of how we can wait for crisis and then we have an intense but agitated
3446 conversation about water resources. It's really good to be engaged in education and
3447 communication that does not wait for crisis, the fact that several- many people have
3448 remarked on the abundance of water and choices about what to do with the water in
3449 Idaho. That's really good. As an educator, when I hear people who are not educators
3450 exult in the possibility of education, I think that's actually harder than it seems. If- well. I
3451 have freshmen and sophomores mostly in a class, and if they choose not to be receptive
3452 of a responsive to your education program, then they don't get educated. That- it's their
3453 choice. If they have to memorize some stuff for a test and then take the test, then they
3454 will dump that information faster than any flushing mechanism any industrial engineer
3455 has ever come up with for a plumbing system. So there's so much that involves getting
3456 attention and persuasion and consent, and also there are these darn millennials who have
3457 all kinds of things going with social media, animation, with all sorts of forms of
3458 communication, hip hop, etcetera. And Denver Water for instance—I think this is not
3459 exactly millennial products— but when they wanted their greater diversion from the
3460 Fraser River, the advocates for the Fraser River came back with a wonderful public
3461 service ad a video that was around different places and it was a trout that- rather tall trout
3462 that came walking out of the Fraser River and hitchhiked to Denver and held a sign
3463 saying, “I need more water,” and so on. It was such a silly thing, and the Denver Water
3464 fellow Jim Lockhead, the Director, just said, “We got beat on that. That hitchhiking
3465 trout.” So there's just all sorts of interesting things to be done with that. Denver Water
3466 does have a toilet that runs across- a person dressed as a toilet- that at sporting games will
3467 run across the field at halftime while the scoreboard says, “Don't let your toilet run,” and
3468 people run after the toilet- well, anyway. [laughter] So there's all kinds of stuff for humor
3469 that's quite remarkable. The serious point is that water is the focal point, the hub, the
3470 substance with the greatest relevance to every issue of land and natural resource
3471 management. There is nothing of concern to Westerners that doesn't in some way or
3472 another connect directly to water. So whether it's the forest fires, whether it's growth,
3473 whether it's the quality- the origins of the Forest Service was to have the forest serve as a
3474 watershed. That was the most important reason to create the Forest Reserve. So it takes
3475 us whatever holds a citizen's attention and concern and interest, that is a subject that will
3476 connect to water. That's good news, that connectedness, and it's also the bad news
3477 because you're taking on- you can't take on water without taking on the whole package.

3478 So every issue that came up today is an issue that at its core is about how we live with our
3479 legacy from the past, what we keep as tradition and respect as tradition as we should ,
3480 what we put forward for innovation and creativity. What should we keep, what should we
3481 change? That is the basic question that history presents to us. I was really taken with the
3482 word “waste” when it came up earlier today. I’m pretty sure that’s a direct delivery from
3483 the progressive era where progressives in the early 1900s were very concerned about
3484 waste. But that notion, that word has such an inherent pejorative meaning and in fact
3485 takes us in directions of agitation that we may or may not profit from visiting those areas.
3486 That was really really interesting. And the word “reallocation” was also- I mean, that’s
3487 the core. What do we keep from history and what do we change? Reallocation is quite a
3488 word and it has amazing complexity in all kinds of ways. So that, now we get to my
3489 actual concluding remarks: So, reallocation- just that word, I thought what a great
3490 exercise to get a bunch of millennials, get our students just hooked up to that. Various
3491 kinds of exercises to use the word without triggering alarm and panic and instead inviting
3492 this deeper historical deliberation. I don’t know what you could do with a video game,
3493 but I bet it would be better than anything I could propose. I’m sure that young people
3494 could come up with very clever ways of dealing with that. Well, all kinds of things, I
3495 guess I won’t go through a number of those. But markets, wouldn’t that be something? I
3496 mean, Lin-Manuel Miranda, Hamilton’s a big hit, he doesn’t need to work on that
3497 anymore. Why not get him to work on water and markets? Why not hip hop? Why not go
3498 with- I mean, who would’ve thought that hip hop could energize so many millions of
3499 people to care about Alexander Hamilton? So what I know about hip hop could be
3500 written a very very small index card and yet I can see the power it is having in this
3501 culture. And to keep- to get- to talk about water use in the future and not be making a
3502 very aggressive recruitment of millennials as the audience but also as the creators of the
3503 message, that is really missing a great chance. So I am now going to reminisce briefly
3504 about an Idaho Department of Water Resources meeting I went to four or five, six years
3505 ago? Seven years ago? And I thought in that group, it was I guess an annual conference,
3506 and I thought here are the people with whom I can share my hatred of lawns. So I thought
3507 they were largely farmers—indeed a lot of farmers were there—and people supplying
3508 water to farms. So I spoke very ardently about how much I hated my lawn. And then I
3509 was to be on a panel a few minutes afterwards with a panel of farmers. So I went up to
3510 the three farmers afterwards and said hello and one farmer said to me, “Well that was
3511 quite a talk.” I said, “I’m sorry, was there a problem?” He said, “Well, you hit me where I
3512 live.” I said, “I did?” He said, “What do you think I grow on that farm?” Well, turf. Well.
3513 So that was one wonderful lesson of the difficulty of categorizing people by a quick
3514 impression thinking that I had some intuition in which I might be confident to know what
3515 someone thought before I asked the person what he or she thought. That was good. And it
3516 was just a useful way of then opening the door to later recognitions that for urban water
3517 managers, a lawn is a kind of alternative reservoir, it’s a cushion, if you were watering

3518 lawns and then you were stricken with drought and scarcity you have someplace where
3519 you can cut back without really seriously inconveniencing or threatening people's
3520 wellbeing, so those lawns for an urban water manager can be the place where there's
3521 water being used and if you had to cut that, in the case of a prolonged drought, it's better.
3522 It's different. It certainly doesn't interfere with any form of life but it doesn't interfere
3523 with things like showers and- it makes those things possible. So my easy, simple idea of
3524 lawns as a really goofy use of water- that has not survived well. That's why I think any
3525 time we feel ourselves having a moment of conventional wisdom, loyalty to conventional
3526 wisdom, it's a time to rethink. At that same water conference—and I'm going to have to
3527 find out- I know John was there—in the afternoon we had a very unusual presenter. We
3528 were- our presentation was- and I saw it on the schedule and I thought, "I can't think that
3529 this could really be happening." Well this was a session that came from a recognition that
3530 water managers face significant stress in life. And they do. So there I am, here in your
3531 community in Boise, and the presenter was a hypnotherapist. So I think, "This can't
3532 really be happening with all these water managers are going to be sitting here with this
3533 woman telling us to close our eyes, to imagine ourselves in a hallway going down an
3534 elevator, that doors open, we're on a white beach, there's blue water." I thought I'm not-
3535 I mean, I'm from Boulder, Colorado and I think this is dumb, so what will happen here?
3536 So I'm sitting next to a guy from the department and we both kind of go, "Oh boy." Then
3537 we close our eyes, and then to our amazement it's like 35 minutes later and we feel very
3538 calm and we feel quite happy, and I assumed he would be very cynical and he was trying
3539 to be, I assumed I would be cynical, I was trying to be, but we were both saying, "That
3540 was pretty nice." So that was the wildest experience I have had in the public intellectual
3541 world of going through hypnotherapy with 300 people working in the field of water
3542 management. After that, you have to say to yourself, "Anything is possible. There is no
3543 limit to what we can do in public places." So that is why I would like to end by asking for
3544 your help with a really cool program that we have tried and we know it works and we
3545 need to get it back out there, but it is an improbable way of communicating with a public
3546 audience in a more energized way than we sometimes first think of when we think about
3547 educating. So we started this 20 years ago. It's called the Urban Rural Divorce. I play
3548 Urbana- excuse me, I was Urbana Asphalt West, a friend played Sandy Greenhills West.
3549 Sandy sued Urbana for divorce, he was tired of her stealing his water—that was very
3550 primary—using his land for landfill, burdening him with unfunded mandates, keeping
3551 him short on healthcare in hospitals and so on. So he goes, he had all the complaints that
3552 are very familiar and lasting and legitimate and understandable. Then we had a child who
3553 had grown up with very little guidance or supervision, Suburbia Greenlawn West, and
3554 she drank all of our water and she was really intolerable. So we went around and we
3555 performed that and it worked really well in a lot of communities. We did it at the Boise
3556 City Club 15 or so years ago. It went really well. And then we let it kind of peter out.
3557 Now after the November 2016 election, we are reviving it and we are recap- it's

3558 rearranged now, it is not a divorce trial, it is a marriage counselor's last ditch effort to
3559 resolve the urban-rural conflict. So the marriage counselor is now going to have a script.
3560 It'll be a kit, communities can take it, perform it however they would like. The marriage
3561 counselor tries to work with Urbana and Sandy and Suburbia. At any point she or he, the
3562 marriage counselor, can appeal to the audience, can say, "This seems like a locked
3563 conflict here. Is there any way- does anybody here have a way to break into that?" So it's
3564 really more of a think tank than just a performance. So we have a revised script, we're
3565 going to do a couple of practice readings with well-informed people, and then we will
3566 start trying to figure out how we can get this script out there for people to use. I think this
3567 is a really good idea because in fact the urban and suburban areas grow, as I already said,
3568 because of the attractiveness and appeal of the open spaces and a good share of those
3569 open spaces retain their attractiveness and appeal because they are maintained as farms
3570 and ranches. So getting this worked out, and particularly with the hinge on water, that is
3571 crucial to the wellbeing of the urban sector, the suburban sector, and the rural sector. And
3572 I end with a limerick from this 2012 book:

3573
3574 Rural and urban places
3575 are tangled together like laces,
3576 they're like sister and brother, they depend on each other,
3577 they have never been opposite cases.

3578
3579 Thank you.

3580
3581 [applause]

3582
3583 JF: We've got a little time, but you know we never want to keep people from the reception
3584 and the bar, right? So I don't have any question cards now, some want to come up for a
3585 couple of minutes they want to ask them. But I want to ask one 'cause I know Patty
3586 you've got a lot of experience with this. I've had some recent experience, and it's taking
3587 a line from Princess Leia which is, "Help me, Obi-Wan Kenobi, you're our only hope."
3588 And putting Western governors in there instead. In other words, my impression of our
3589 Western governors is they're bipartisan and in some of these collaborative deliberative
3590 urban-rural divorce, they're our only hope right now for- they're pushing a lot of
3591 collaboration on rangelands, on forests. Is that your experience just observing all this?

3592
3593 PL: We have a former director of WGA here. I think it is an extraordinary organization. I first
3594 got involved actually with in 1990 I guess, quite a few years ago. And there they are and
3595 they have been doing this- others have been in that world of trying to not go into Rs and
3596 Ds and spar, but to think what are the topics that we can take on in a collaborative way?
3597 And that is a very inspirational thing to see them. I got to do a presentation at their annual

3598 meeting- their annual winter meeting this year. So it's really a great thing to see those
3599 folks being companionable and I gather, not to say anything about California, but I guess
3600 California kind of is in there and not in there from time to time, but that's what we'd
3601 expect from California. So I want to add to your question though that universities and
3602 colleges and professors could be much more helpful than they are now. And that's
3603 because to get information in a form that is temperate, that is moderate, that is not
3604 tailored to advocacy or activism, that is really a rarity to find people that will do that. I
3605 did a series in Boulder that was very strenuous for everyone, Boulder and Greeley, on
3606 called Fracking Sense. Many programs on hydraulic fraction which is very contentious,
3607 and we worked really hard to keep our credibility through that. It's not a training program
3608 for academics for how to be a temperate moderate participant in a contentious society,
3609 but I think a lot of the younger folks are really engaged by that idea. My people of my
3610 age group with a few conspicuous exceptions, we went to college in the late sixties I
3611 think for quite a few of our contemporaries their sense of themselves is as protestors I
3612 guess was so well-settled that they were not going to be able to say, "Well, I've met some
3613 people who are my opposite number and really enjoyed their company." They weren't
3614 doing that as young people and they will retire without having done much of that. So
3615 that's a shame. But there's plenty of people who are in their 20s, 30s, 40s, 50s who would
3616 embrace that aspect of being a professor. So that is like, one of the hugest most gigantic
3617 most extraordinary renewable resource if we can connect it. I say renewable resource
3618 because the problem is almost exactly the same as the generation of electricity with
3619 renewable energy. The solar resource, the wind resource, is where the users who want
3620 that electricity aren't. So you have to have transmission lines. You've got your solar and
3621 wind production, and those- that's usually occurring at a great distance from the dense
3622 urban populations, so the transmission lines are huge. Same thing for universities and
3623 professorial knowledge, is that it is an enormous resource and the transmission lines are
3624 not in place by and large. You are a transmission line, so, that's huge. So it does happen.
3625 And if you turn out to be a role model, then we'll make it.

3626
3627 JF: Yeah, I just- universities, you think we're liberal left bastions or whatever we are. No.
3628 institutionally, universities are some of the most conservative institutions in America
3629 about changing the way we do things. The world is not organized by departments, but we
3630 are.

3631
3632 PL: Right. Right.

3633
3634 JF: And we need you to demand that change though, you're right, it's happening.

3635
3636 PL: Can I just? A quote that the mystery writer Stephen King, whose books I cannot read
3637 because I would be too scared by them, but I did read his book on writing, and he says

3638 that professors are by and large politically liberal—that may not be as true as it was when
3639 he said that—but he says, “When it comes to defending the practices in their profession,
3640 they are crustaceans in their chosen field.” And I don’t totally what it means- totally
3641 know what it means to be a crustacean in your chosen field but I think it’s one of those
3642 crabs that goes into a hole and just puts its claws out and won’t be budged on that. So if
3643 Stephen King has figured this out, it’s time to change.

3644
3645 [laughter]

3646
3647 JF: So I don’t have any more questions. Let me just say quickly and then we’ll thank Patty
3648 and we’ll move on to the reception is we will as usual have a white paper that comes out
3649 of this that’ll be brief, nonacademic, and suggest next steps in what we heard today and
3650 maybe what could happen next, all right? Like we always try to do with the Andrus
3651 Center conferences and the white papers that come. First, join me in thanking Patty for
3652 once again speaking with us.

3653
3654 [applause]

3655
3656 And the reception is down the hall in the Jordan Ballroom. I’m sure there will be people
3657 directing us and so forth and so on. Thank all of you for coming. It looks like almost
3658 everybody stayed the whole time. Hopefully we’re moving down the road to some kind
3659 of working together to deal with these issues ahead of time here in the Boise area because
3660 we’ve got that chance to do that. Thank you.

3661
3662 [applause]

3663
3664 [End of transcript]