

## Conversation Contents

**Re: For Tuesday -- NY Times query on climate language**

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**"Raff, David" <draff@usbr.gov>**

---

**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Fri Aug 02 2019 16:29:18 GMT-0600 (MDT)  
**To:** "Eisenman, Theresa" <teisenman@usbr.gov>

**CC:** Amanda Erath <aerath@usbr.gov>, "Palumbo, David" <dpalumbo@usbr.gov>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png

Thanks Theresa. Perhaps we could all plan to talk on Tuesday morning before planning a response? I could also call in on Monday as I will be returning from our weekend if that is better. This goes back to 2017 and certainly worth getting you up to speed and David, Amanda, and I refreshing our memories.

On Fri, Aug 2, 2019 at 4:12 PM Eisenman, Theresa <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)> wrote:  
For discussion on Tuesday.... Thanks

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From: **Tabuchi, Hiroko** <[hiroko.tabuchi@nytimes.com](mailto:hiroko.tabuchi@nytimes.com)>  
Date: Fri, Aug 2, 2019 at 4:59 PM  
Subject: [EXTERNAL] Klamath River Basin Report  
To: <[TEisenman@usbr.gov](mailto:TEisenman@usbr.gov)>

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Hiroko cell: [REDACTED]

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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

## "Eisenman, Theresa" <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>

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**From:** "Eisenman, Theresa" <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>  
**Sent:** Fri Aug 02 2019 16:33:26 GMT-0600 (MDT)  
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## "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

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**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Mon Aug 05 2019 09:11:51 GMT-0600 (MDT)  
**To:** Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>, "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Fwd: For Tuesday -- NY Times query on climate language  
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FYI

### ***Amanda Erath***

*Program Analyst*  
Policy and Administration  
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Denver, CO 80225-0007

*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

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(b) (5)



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**Sent:** Mon Aug 05 2019 10:59:31 GMT-0600 (MDT)  
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Thanks Amanda, also, would you have a minute this afternoon to talk about our old PART measures? Bob Wolf is bugging me about this. I think he wants to be able to tell Hilda whether we think there is any value to hanging on to them.

Avra

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

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**Sent:** Mon Aug 05 2019 11:02:35 GMT-0600 (MDT)  
**To:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
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I'm taking off this afternoon to work on unpacking and trying to get some semblance of order going in our house since we moved on Saturday. I can talk anytime before 1:00 today though. The content of Bob's email didn't come through on your email though. So I'm not sure what his question is exactly.

### ***Amanda Erath***

*Program Analyst*  
Policy and Administration  
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P.O. Box 25007  
Denver, CO 80225-0007

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[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

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FYI

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P.O. Box 25007  
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Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

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From: **Eisenman, Theresa** <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>

Date: Fri, Aug 2, 2019 at 4:33 PM

Subject: Re: For Tuesday -- NY Times query on climate language

To: Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)>

Cc: Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>, Palumbo, David <[dpalumbo@usbr.gov](mailto:dpalumbo@usbr.gov)>

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Date: Fri, Aug 2, 2019 at 4:59 PM

Subject: [EXTERNAL] Klamath River Basin Report

To: <[TEisenman@usbr.gov](mailto:TEisenman@usbr.gov)>

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## "Morgan, Avra" <aomorgan@usbr.gov>

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**From:** "Morgan, Avra" <aomorgan@usbr.gov>  
**Sent:** Mon Aug 05 2019 12:40:32 GMT-0600 (MDT)  
**To:** "Erath, Amanda" <aerath@usbr.gov>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png

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**Sent:** Mon Aug 05 2019 12:42:27 GMT-0600 (MDT)  
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Ah, ok.

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**Sent:** Mon Aug 05 2019 13:21:51 GMT-0600 (MDT)  
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(b) (5)



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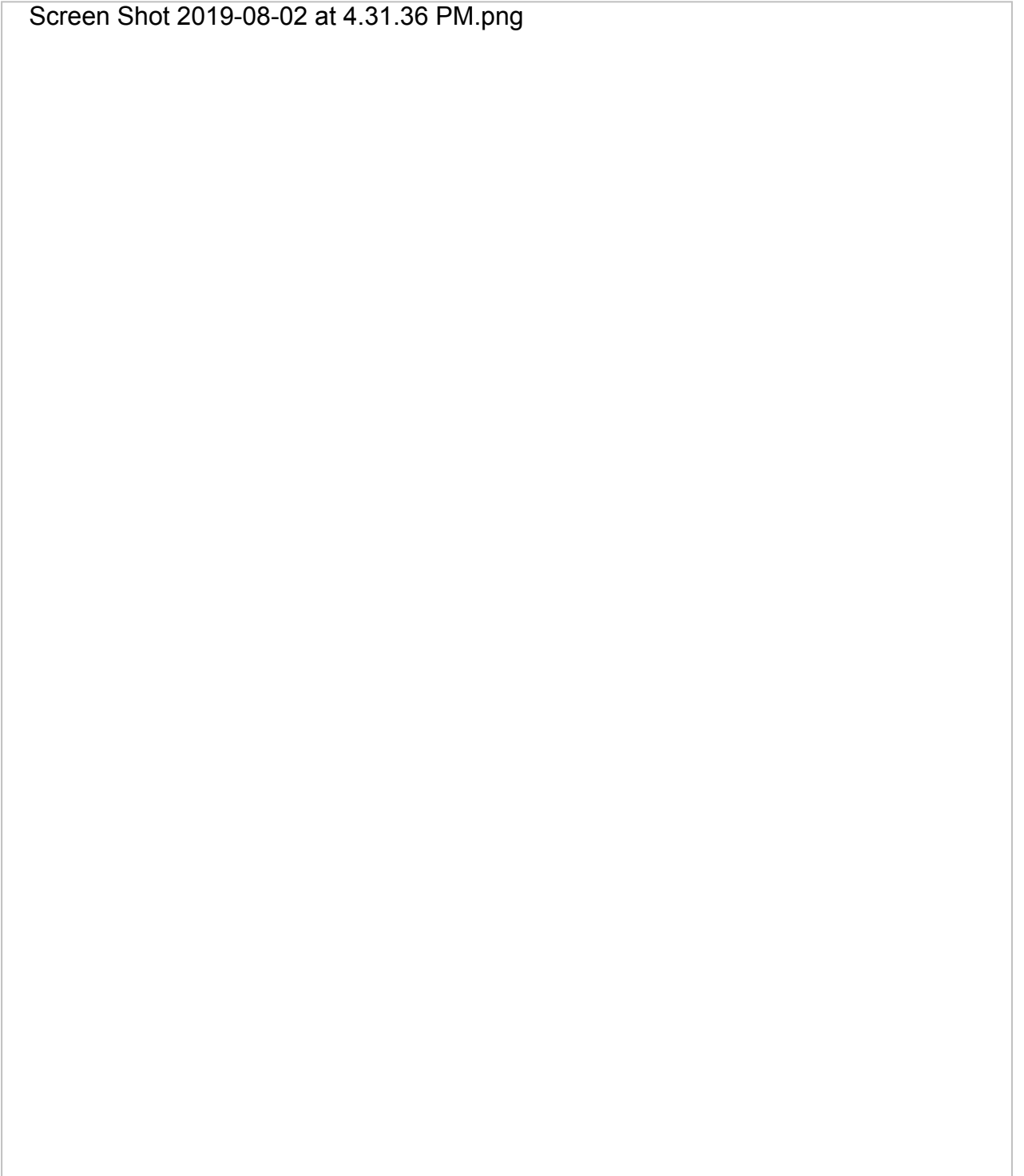
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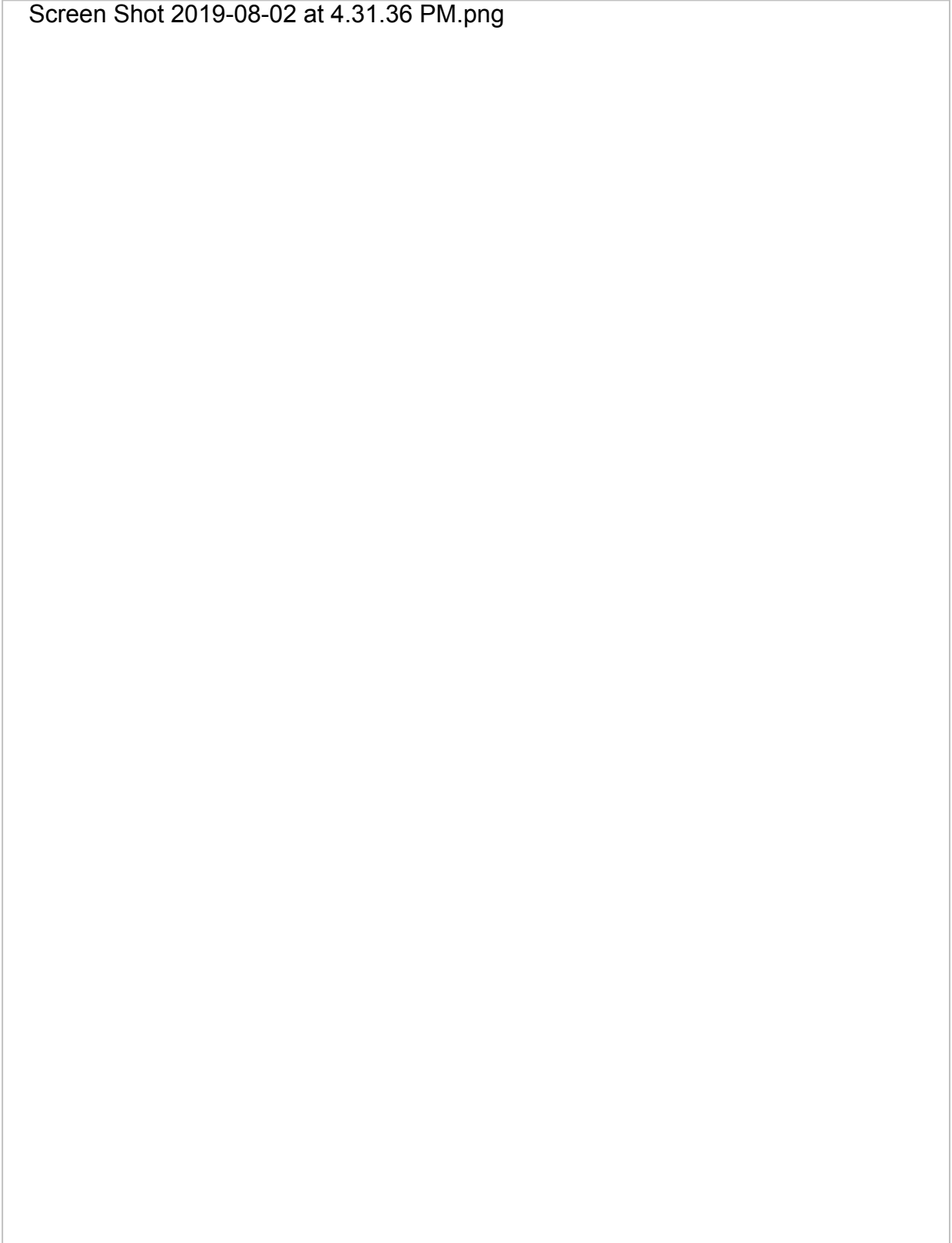
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**Sent:** Tue Aug 06 2019 07:55:57 GMT-0600 (MDT)  
**To:** "Raff, David" <draff@usbr.gov>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png

(b) (5)



**Amanda Erath**

*Program Analyst*  
Policy and Administration  
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Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

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**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Tue Aug 06 2019 08:00:19 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
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**CC:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>, "Palumbo, David" <[dpalumbo@usbr.gov](mailto:dpalumbo@usbr.gov)>  
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**To:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>  
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Thank you!

**Avra Morgan** | Program Analyst | Policy and Administration | Denver  
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Denver Federal Center  
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P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

----- Forwarded message -----

From: **Erath, Amanda** <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
Date: Tue, Aug 6, 2019 at 10:00 AM  
Subject: Re: For Tuesday -- NY Times query on climate language  
To: Eisenman, Theresa <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>  
Cc: Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)>, Palumbo, David <[dpalumbo@usbr.gov](mailto:dpalumbo@usbr.gov)>

Theresa,

(b) (5)

[Redacted]

[Redacted]

- [Redacted]

[Redacted]

- [Redacted]
- [Redacted]

Please let me know if you have any questions or need anything else.

Thanks,  
Amanda

**Amanda Erath**  
*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

On Fri, Aug 2, 2019 at 4:33 PM Eisenman, Theresa <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)> wrote:  
I'll set up a call for Tuesday morning. Thanks for your flexibility. The reporter is not on urgent deadline ... so no need to change your Monday plans for this one. I can respond to her on Tuesday after we chat. Have a great weekend.

On Fri, Aug 2, 2019 at 6:29 PM Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:  
Thanks Theresa. Perhaps we could all plan to talk on Tuesday morning before planning a response? I could also call in on Monday as I will be returning from our weekend if that is better. This goes back to 2017 and certainly worth getting you up to speed and



David, Amanda, and I refreshing our memories.

On Fri, Aug 2, 2019 at 4:12 PM Eisenman, Theresa <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)> wrote:  
For discussion on Tuesday.... Thanks

----- Forwarded message -----

From: **Tabuchi, Hiroko** <[hiroko.tabuchi@nytimes.com](mailto:hiroko.tabuchi@nytimes.com)>

Date: Fri, Aug 2, 2019 at 4:59 PM

Subject: [EXTERNAL] Klamath River Basin Report

To: <[TEisenman@usbr.gov](mailto:TEisenman@usbr.gov)>

Hi Theresa, thanks for your time just now. Off the record, here are the emails that we're looking at.

On P. 1, you can see David Raff sending "proposed uncertainty language to be used in future Reclamation planning studies" to Inudr Goklany. Goklany's response with his edits to the proposed language is on P. 2

The actual proposed language is in attachments, which we also obtained. See Attachment A (Raff's proposed language) and Attachment B (Goklany's edits.)

You'll see that Goklany suggests adding phrases such as: "Recent comparisons of GCM model projections versus observations suggest that the projections may be overestimating the rate of global warming, for whatever reason."

The proposed language also contains statements like: "Warming and increased carbon dioxide may increase plant water use efficiency, lengthen the agricultural growing season, but may also have adverse effects on snowpack and water availability."

\*\*I am actually unsure what report(s) Raff is referring to -- the Klamath River report, or future reports, or both

Separately, you'll see on P.11 an email from Amanda Erath to Goklani containing "uncertainty language that we have drafted to be added to the Klamath Basin Study Summary Report." She adds: "We have made some additions to the uncertainty discussion in section 3.9.1 to specifically address bias correction."

And the actual uncertainty language proposed is:

Screen Shot 2019-08-02 at 4.31.36 PM.png

I was looking earlier at the now-released [Klamath River Basin Report](#), and wasn't seeing this specific language. However, similar language does seem to have made it into the [Summary Report](#).

Just trying to figure out what happened here -- were Golkany et al's proposed language ignored in the main report? Also -- will uncertainty language appear in future Reclamation reports, as Raff seems to suggest?

Many thanks

Hiroko cell: [REDACTED]

Hiroko Tabuchi | Reporter | The New York Times | Phone 212-556-2642  
| [hiroko.tabuchi@nytimes.com](mailto:hiroko.tabuchi@nytimes.com) | <http://www.nytimes.com/by/hiroko-tabuchi>



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Theresa Eisenman, PMP  
Chief, Public Affairs  
Commissioner's Office  
Bureau of Reclamation  
[1849 C Street, NW](#) MS-7069  
Washington, DC 20240  
Direct: (202) 513-0574  
Cell: (202) 595-4454  
[teisenman@usbr.gov](mailto:teisenman@usbr.gov)

--

--

David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

--

Theresa Eisenman, PMP  
Chief, Public Affairs  
Commissioner's Office  
Bureau of Reclamation  
1849 C Street, NW MS-7069  
Washington, DC 20240  
Direct: (202) 513-0574  
Cell: (202) 595-4454  
[teisenman@usbr.gov](mailto:teisenman@usbr.gov)

# Conversation Contents

uncertainty language / climate change

**"Raff, David" <draff@usbr.gov>**

---

**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Tue Aug 06 2019 09:12:20 GMT-0600 (MDT)  
**To:** Theresa Eisenman <teisenman@usbr.gov>  
Amanda Erath <aerath@usbr.gov>, Avra Morgan  
**CC:** <aomorgan@usbr.gov>, "Palumbo, David"  
<dpalumbo@usbr.gov>, Dean Marrone <dmarrone@usbr.gov>  
**Subject:** uncertainty language / climate change

Good Morning Theresa,

Regarding the full uncertainty language that we arrived at in 2017 - it has been used. One example is in the Final Environmental Impact Statement (FEIS) for the Kachess Drought Relief Pumping Plant and Keechelus Reservoir-to-Kachess Reservoir Conveyance page 3-135 Section 3.12

<https://www.usbr.gov/pn/programs/eis/kdrpp/feis2019/feis2019v1.pdf>

<https://www.usbr.gov/pn/programs/eis/kkc/index.html>

There may very well be other examples but hopefully this suffices to answer the immediate question.

Thanks,  
Dave

--

David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

# Conversation Contents

## Basin Study Disclaimer and Uncertainty Language

### Attachments:

/3. Basin Study Disclaimer and Uncertainty Language/1.1 Basin Study Disclaimer Language June 2014(1) + OMB edits clean.docx

/3. Basin Study Disclaimer and Uncertainty Language/1.2 Uncertainty\_092517 (1) (1).docx

## "Erath, Amanda" <aerath@usbr.gov>

---

**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Fri Mar 08 2019 14:15:36 GMT-0700 (MST)  
**To:** "Millstein, Max" <mmillstein@usbr.gov>, "Diroll, Caroline (Carrie)" <cdiroll@usbr.gov>  
**Subject:** Basin Study Disclaimer and Uncertainty Language  
**Attachments:** Basin Study Disclaimer Language June 2014(1) + OMB edits clean.docx Uncertainty\_092517 (1) (1).docx

### ***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
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Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

## "Diroll, Caroline (Carrie)" <cdiroll@usbr.gov>

---

**From:** "Diroll, Caroline (Carrie)" <cdiroll@usbr.gov>  
**Sent:** Fri Mar 08 2019 15:08:17 GMT-0700 (MST)  
**To:** "Erath, Amanda" <aerath@usbr.gov>  
**CC:** "Millstein, Max" <mmillstein@usbr.gov>  
**Subject:** Re: Basin Study Disclaimer and Uncertainty Language

Thank you!

On Fri, Mar 8, 2019 at 2:15 PM Erath, Amanda <[aerath@usbr.gov](mailto:aerath@usbr.gov)> wrote:

***Amanda Erath***

*Program Analyst*  
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--

Carrie Diroll  
Reclamation Law & Administration  
Bureau of Reclamation  
(303) 445-2835

# Conversation Contents

## Basin Studies Uncertainty Language

### Attachments:

/4. Basin Studies Uncertainty Language/1.1 Uncertainty\_092517 (1) (1).docx  
/4. Basin Studies Uncertainty Language/1.2 Klamath Basin Study Summary Report.docx  
/4. Basin Studies Uncertainty Language/3.1 Uncertainty\_092517 (1) (1).docx

## "Erath, Amanda" <aerath@usbr.gov>

---

**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Mon Oct 01 2018 15:29:15 GMT-0600 (MDT)  
**To:** Carri Hessman <chessman@usbr.gov>, Michael Relf <mrelf@usbr.gov>  
**Subject:** Basin Studies Uncertainty Language  
**Attachments:** Uncertainty\_092517 (1) (1).docx Klamath Basin Study Summary Report.docx

Here's the uncertainty language that we agreed on for the Klamath and Niobrara Basin Studies, and the Klamath Summary Report that went forward to OMB.

### ***Amanda Erath***

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Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

## "Hessman, Carri" <chessman@usbr.gov>

---

**From:** "Hessman, Carri" <chessman@usbr.gov>  
**Sent:** Tue Oct 02 2018 15:59:25 GMT-0600 (MDT)  
**To:** "Erath, Amanda" <aerath@usbr.gov>  
**Subject:** Re: Basin Studies Uncertainty Language

Thanks Amanda!

On Mon, Oct 1, 2018 at 3:29 PM, Erath, Amanda <[aerath@usbr.gov](mailto:aerath@usbr.gov)> wrote:

Here's the uncertainty language that we agreed on for the Klamath and Niobrara Basin Studies, and the Klamath Summary Report that went forward to OMB.

***Amanda Erath***

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*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

--

Carri Hessman, PMP  
Program Manager, Project Management and Coordination  
USBR PN Regional Office  
1150 N. Curtis Rd. Ste 100  
Boise, ID 83706

(208) 378-5106

**"Relf, Michael" <mrelf@usbr.gov>**

---

**From:** "Relf, Michael" <mrelf@usbr.gov>  
**Sent:** Thu Feb 21 2019 14:31:41 GMT-0700 (MST)  
**To:** "Erath, Amanda" <aerath@usbr.gov>  
**Subject:** Re: Basin Studies Uncertainty Language  
**Attachments:** Uncertainty\_092517 (1) (1).docx

Amanda - Sorry to pester you with specifics, but it seems wise to try to get this right: when folding the uncertainty language (attached) into the Deschutes report, I noticed that reference #4 doesn't seem to have a corresponding footnote in the text. At the moment, I've translated references #1, 2, and 3 into the report's format and am leaving #4 out. Please let me know if that's not correct, thank you - Mike

On Mon, Oct 1, 2018 at 3:29 PM Erath, Amanda <[aerath@usbr.gov](mailto:aerath@usbr.gov)> wrote:

Here's the uncertainty language that we agreed on for the Klamath and Niobrara Basin Studies, and the Klamath Summary Report that went forward to OMB.

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
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*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

# Conversation Contents

## Basin Study Transmittal and Disclaimer

### Attachments:

/5. Basin Study Transmittal and Disclaimer/1.1 Klamath Transmittal Memo.docx  
/5. Basin Study Transmittal and Disclaimer/1.2 Basin Study Disclaimer Language June 2014(1) + OMB edits clean.docx

**"Erath, Amanda" <aerath@usbr.gov>**

---

**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Mon Feb 04 2019 13:24:02 GMT-0700 (MST)  
**To:** Darion Mayhorn <dmayhorn@usbr.gov>  
**Subject:** Basin Study Transmittal and Disclaimer  
**Attachments:** Klamath Transmittal Memo.docx Basin Study Disclaimer Language June 2014(1) + OMB edits clean.docx

Here you go. We've recently negotiated some more robust uncertainty language with the Department that will also be included in all Basin Study Final Reports going forward, but that's really more focused on the climate change/future projections issue. Let me know if you want that too though.

### ***Amanda Erath***

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## Conversation Contents

final uncertainty language for basin studies

**Attachments:**

/6. final uncertainty language for basin studies/2.1 Uncertainty\_092517 (1) (1).docx

---

### "McGuire, Marketa" <mmcguire@usbr.gov>

**From:** "McGuire, Marketa" <mmcguire@usbr.gov>  
**Sent:** Wed Jan 02 2019 16:28:07 GMT-0700 (MST)  
**To:** Amanda Erath <aerath@usbr.gov>  
**Subject:** final uncertainty language for basin studies

Hi Amanda,  
Can you resend me the final uncertainty language for basin studies? I want to be sure I have the latest version.

Thank you!  
Marketa

--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

---

### "Erath, Amanda" <aerath@usbr.gov>

**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Thu Jan 03 2019 07:43:05 GMT-0700 (MST)  
**To:** "McGuire, Marketa" <mmcguire@usbr.gov>  
**Subject:** Re: final uncertainty language for basin studies  
**Attachments:** Uncertainty\_092517 (1) (1).docx

Here's the final version we agreed on with the Department.

***Amanda Erath***

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Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

On Wed, Jan 2, 2019 at 4:28 PM McGuire, Marketa <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)> wrote:

Hi Amanda,

Can you resend me the final uncertainty language for basin studies? I want to be sure I have the latest version.

Thank you!

Marketa

--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

---

## "McGuire, Marketa" <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>

**From:** "McGuire, Marketa" <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>  
**Sent:** Thu Jan 03 2019 09:44:44 GMT-0700 (MST)  
**To:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Subject:** Re: final uncertainty language for basin studies

Thank you!

Marketa

On Thu, Jan 3, 2019 at 7:43 AM Erath, Amanda <[aerath@usbr.gov](mailto:aerath@usbr.gov)> wrote:

Here's the final version we agreed on with the Department.

***Amanda Erath***

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*Office:* (303) 445-2766

*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

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Hi Amanda,

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Thank you!

Marketa

--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455 | [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcquire@usbr.gov](mailto:mmcquire@usbr.gov)

# Conversation Contents

Re: Climate Change Memo?

**"McGuire, Marketa" <mmcguire@usbr.gov>**

---

**From:** "McGuire, Marketa" <mmcguire@usbr.gov>  
**Sent:** Wed Oct 03 2018 11:05:44 GMT-0600 (MDT)  
**To:** Patrick Erger <perger@usbr.gov>, "Gangopadhyay, Subhrendu" <sgangopadhyay@usbr.gov>, Amanda Erath <aerath@usbr.gov>, Gerald Benock <gbenock@usbr.gov>  
**Subject:** Re: Climate Change Memo?

Hi all,

In light of the memo that recently came out regarding review of work involving future climate projections, I imagine we need to build in time for Dave to review the Missouri Headwaters Basin Study? If so, at what stage do we anticipate his review happening?

Thanks!  
Marketa

On Wed, Oct 3, 2018 at 10:31 AM Erger, Patrick <[perger@usbr.gov](mailto:perger@usbr.gov)> wrote:

FYI

----- Forwarded message -----

**From:** **Morrissey, Roxanne** <[rmorrissey@usbr.gov](mailto:rmorrissey@usbr.gov)>  
**Date:** Tue, Oct 2, 2018 at 10:55 AM  
**Subject:** Re: Climate Change Memo?  
**To:** Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)>  
**Cc:** Buddy Fazio <[bfazio@usbr.gov](mailto:bfazio@usbr.gov)>, Roxanne Peterson <[repeterson@usbr.gov](mailto:repeterson@usbr.gov)>, Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, David Trimpe <[dtrimpe@usbr.gov](mailto:dtrimpe@usbr.gov)>, Joey Esilva <[jesilva@usbr.gov](mailto:jesilva@usbr.gov)>

Just received a copy - attached for your information.

Roxanne

On Tue, Oct 2, 2018 at 10:44 AM, Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)> wrote:

Hi -

I understand a memo came out of DC to the Regions related to climate change and analysis needing to be reviewed by Dave Raff. Have any of you received a copy of this memo? If so, can you please share so we can determine how it plays (or not) into our environmental compliance analysis?

I have received questions recently seeking analysis guidance and not sure if this memo

plays into it.

Thank you,  
Jen

**Jennifer W. Beardsley**

*Environmental Compliance Coordinator*  
Great Plains Region  
Bureau of Reclamation  
406-247-7722  
Email: [jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)

--

"Safety First, Every Job, Every Time"

Patrick J. Erger  
Supervisory Hydrologist  
Water Operations and Hydrology Group  
Great Plains Region  
phone 406-247-7755  
cell 406-670-9064  
fax 406-247-7680  
e-mail [perger@usbr.gov](mailto:perger@usbr.gov)

--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcquire@usbr.gov](mailto:mmcquire@usbr.gov)

**"Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>**

---

**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Wed Oct 03 2018 11:18:09 GMT-0600 (MDT)  
**To:** Marketa Elsner <[mmcquire@usbr.gov](mailto:mmcquire@usbr.gov)>  
Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, "Gangopadhyay, Subhrendu"  
<[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, "Benock, Gerald"  
<[gbenock@usbr.gov](mailto:gbenock@usbr.gov)>  
**CC:**  
**Subject:** Re: Climate Change Memo?

Yes, we do. I've already set up a meeting with Dave tomorrow to discuss where we left the "uncertainty" discussion with Indur Goklany. I wanted to be able to suggest language to add as part of the policy review. I'm planning to mention the Missouri to him as well as another Basin Study that is wrapping up now. There is also an issue currently about how many emissions scenarios are being used in climate analysis. So we'll need to discuss that issue with Dave too.

Do you know how many emissions scenarios were used in the Missouri Basin Study? I'll get the ball rolling when we talk tomorrow, and then likely set up some follow-up conversations to deal specifically with the Missouri Basin Study.

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto: aerath@usbr.gov)

On Wed, Oct 3, 2018 at 11:05 AM McGuire, Marketa <[mmcquire@usbr.gov](mailto: mmcquire@usbr.gov)> wrote:

Hi all,

In light of the memo that recently came out regarding review of work involving future climate projections, I imagine we need to build in time for Dave to review the Missouri Headwaters Basin Study? If so, at what stage do we anticipate his review happening?

Thanks!  
Marketa

On Wed, Oct 3, 2018 at 10:31 AM Erger, Patrick <[perger@usbr.gov](mailto: perger@usbr.gov)> wrote:

FYI

----- Forwarded message -----

From: **Morrissey, Roxanne** <[rmorrissey@usbr.gov](mailto: rmorrissey@usbr.gov)>

Date: Tue, Oct 2, 2018 at 10:55 AM

Subject: Re: Climate Change Memo?

To: Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto: jbeardsley@usbr.gov)>

Cc: Buddy Fazio <[bfazio@usbr.gov](mailto: bfazio@usbr.gov)>, Roxanne Peterson <[repeterson@usbr.gov](mailto: repeterson@usbr.gov)>, Patrick Erger <[perger@usbr.gov](mailto: perger@usbr.gov)>, David Trimpe <[dtrimpe@usbr.gov](mailto: dtrimpe@usbr.gov)>, Joey Esilva <[jesilva@usbr.gov](mailto: jesilva@usbr.gov)>

Just received a copy - attached for your information.

Roxanne

On Tue, Oct 2, 2018 at 10:44 AM, Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto: jbeardsley@usbr.gov)> wrote:

Hi -

I understand a memo came out of DC to the Regions related to climate change and analysis needing to be reviewed by Dave Raff. Have any of you received a copy of this memo? If so, can you please share so we can determine how it plays (or not) into our environmental compliance analysis?

I have received questions recently seeking analysis guidance and not sure if this memo plays into it.

Thank you,



Jen

**Jennifer W. Beardsley**

*Environmental Compliance Coordinator*  
Great Plains Region  
Bureau of Reclamation  
406-247-7722  
Email: [jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)

--

"Safety First, Every Job, Every Time"

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Water Operations and Hydrology Group  
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--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

---

**"Benock, Gerald" <[gbenock@usbr.gov](mailto:gbenock@usbr.gov)>**

**From:** "Benock, Gerald" <[gbenock@usbr.gov](mailto:gbenock@usbr.gov)>  
**Sent:** Wed Oct 03 2018 11:18:50 GMT-0600 (MDT)  
**To:** Marketa Elsner <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>  
**CC:** Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, Subhrendu Gangopadhyay <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Subject:** Re: Climate Change Memo?

Marketa,  
Good question regarding when Dave Raff needs to complete his review.  
When we know more on the review schedules, I suggest we schedule a call with DNRC and our team to discuss the re-write of the Exec Summary and the timeline for completing the Study Report.

Patrick, Can you forward me a copy of the DC memo that the Regions received?

Amanda, Do you have any insight on this?

Jerry

On Wed, Oct 3, 2018 at 11:05 AM McGuire, Marketa <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)> wrote:

Hi all,

In light of the memo that recently came out regarding review of work involving future climate projections, I imagine we need to build in time for Dave to review the Missouri Headwaters Basin Study? If so, at what stage do we anticipate his review happening?

Thanks!  
Marketa

On Wed, Oct 3, 2018 at 10:31 AM Erger, Patrick <[perger@usbr.gov](mailto:perger@usbr.gov)> wrote:

FYI

----- Forwarded message -----

From: **Morrissey, Roxanne** <[rmorrissey@usbr.gov](mailto:rmorrissey@usbr.gov)>

Date: Tue, Oct 2, 2018 at 10:55 AM

Subject: Re: Climate Change Memo?

To: Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)>

Cc: Buddy Fazio <[bfazio@usbr.gov](mailto:bfazio@usbr.gov)>, Roxanne Peterson <[repeterson@usbr.gov](mailto:repeterson@usbr.gov)>, Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, David Trimpe <[dtrimpe@usbr.gov](mailto:dtrimpe@usbr.gov)>, Joey Esilva <[jesilva@usbr.gov](mailto:jesilva@usbr.gov)>

Just received a copy - attached for your information.

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Thank you,  
Jen

**Jennifer W. Beardsley**

*Environmental Compliance Coordinator*

Great Plains Region

Bureau of Reclamation

406-247-7722

Email: [jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)

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Great Plains Region  
phone 406-247-7755  
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Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

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Gerald 'Jerry' Benock  
Manager of Planning and Project Development Division  
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Montana Area Office  
PO Box 30137  
Billings, MT 59107

[gbenock@usbr.gov](mailto:gbenock@usbr.gov)  
Office: (406) 247-7331  
Cell: (406) 670-6978  
Fax: (406) 247-7359

**"Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>**

---

**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Wed Oct 03 2018 11:23:22 GMT-0600 (MDT)  
**To:** "Benock, Gerald" <[gbenock@usbr.gov](mailto:gbenock@usbr.gov)>  
Marketa Elsner <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>, Patrick Erger  
<[perger@usbr.gov](mailto:perger@usbr.gov)>, "Gangopadhyay, Subhrendu"  
<[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>  
**CC:**  
**Subject:** Re: Climate Change Memo?

I just know the basics. Dave needs to review climate related analysis, and there is sensitivity right now about studies that only use one emissions scenario and the direction is that we need to use more than one. We've always given Dave time to review Basin Studies before they go to the Commissioner, so this would really just be a timing change to have him review it sooner. Hopefully my conversation with Dave tomorrow will shed a little more light on the details.

***Amanda Erath***  
*Program Analyst*

Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

On Wed, Oct 3, 2018 at 11:19 AM Benock, Gerald <[gbenock@usbr.gov](mailto:gbenock@usbr.gov)> wrote:

Marketa,

Good question regarding when Dave Raff needs to complete his review.

When we know more on the review schedules, I suggest we schedule a call with DNRC and our team to discuss the re-write of the Exec Summary and the timeline for completing the Study Report.

Patrick, Can you forward me a copy of the DC memo that the Regions received?

Amanda, Do you have any insight on this?

Jerry

On Wed, Oct 3, 2018 at 11:05 AM McGuire, Marketa <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)> wrote:

Hi all,

In light of the memo that recently came out regarding review of work involving future climate projections, I imagine we need to build in time for Dave to review the Missouri Headwaters Basin Study? If so, at what stage do we anticipate his review happening?

Thanks!  
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Cell: (406) 670-6978  
Fax: (406) 247-7359

**"McGuire, Marketa" <mmcguire@usbr.gov>**

---

**From:** "McGuire, Marketa" <mmcguire@usbr.gov>  
**Sent:** Wed Oct 03 2018 11:37:00 GMT-0600 (MDT)  
**To:** Amanda Erath <aerath@usbr.gov>  
**CC:** Patrick Erger <perger@usbr.gov>, "Gangopadhyay, Subhrendu" <sgangopadhyay@usbr.gov>, Gerald Benock <gbenock@usbr.gov>  
**Subject:** Re: Climate Change Memo?

Hi Amanda,

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Thanks, Marketa

On Wed, Oct 3, 2018 at 11:18 AM Erath, Amanda <[aerath@usbr.gov](mailto:aerath@usbr.gov)> wrote:

Yes, we do. I've already set up a meeting with Dave tomorrow to discuss where we left the "uncertainty" discussion with Indur Goklany. I wanted to be able to suggest language to add as part of the policy review. I'm planning to mention the Missouri to him as well as another Basin Study that is wrapping up now. There is also an issue currently about how many emissions scenarios are being used in climate analysis. So we'll need to discuss that issue with Dave too. Do you know how many emissions scenarios were used in the Missouri Basin Study? I'll get the ball rolling when we talk tomorrow, and then likely set up some follow-up conversations to deal specifically with the Missouri Basin Study.

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)



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## "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

---

**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Wed Oct 03 2018 12:29:03 GMT-0600 (MDT)  
**To:** Marketa Elsner <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>  
**CC:** Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, "Gangopadhyay, Subhrendu" <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, "Benock, Gerald" <[gbenock@usbr.gov](mailto:gbenock@usbr.gov)>  
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Based on this, I think we are good, but I will mention it to Dave to see if he agrees.

### ***Amanda Erath***

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## "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

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**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Thu Oct 04 2018 15:52:29 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**CC:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>, Katherine Schultz <[kschultz@usbr.gov](mailto:kschultz@usbr.gov)>  
**Subject:** Fwd: Climate Change Memo?

Here's the info on the emissions scenarios used in the Missouri Headwaters Basin Study. Let me know if you need anything else.

### ***Amanda Erath***

*Program Analyst*  
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Cc: Buddy Fazio <[bfazio@usbr.gov](mailto:bfazio@usbr.gov)>, Roxanne Peterson <[repeterson@usbr.gov](mailto:repeterson@usbr.gov)>, Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, David Trimpe <[dtrimpe@usbr.gov](mailto:dtrimpe@usbr.gov)>, Joey Esilva <[jesilva@usbr.gov](mailto:jesilva@usbr.gov)>

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Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455 | [mmcquire@usbr.gov](mailto:mmcquire@usbr.gov)

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# Conversation Contents

**Fwd: Uncertainty Language**

**Attachments:**

/8. Fwd: Uncertainty Language/1.1 Uncertainty\_092517.ig\_dar.docx  
/8. Fwd: Uncertainty Language/3.1 Uncertainty\_092517.ig\_dar.docx

**"Larsen, Denise (Deena)" <delarsen@usbr.gov>**

---

**From:** "Larsen, Denise (Deena)" <delarsen@usbr.gov>  
**Sent:** Fri Jun 15 2018 15:11:19 GMT-0600 (MDT)  
**To:** "McGuire, Marketa" <mmcguire@usbr.gov>, Amanda Erath <aerath@usbr.gov>  
**Subject:** Fwd: Uncertainty Language  
**Attachments:** Uncertainty\_092517.ig\_dar.docx

Hi,

Please get with Avra on this--do we need to have anything like this on the Upper Missouri River Basin?

Dagmar and I are working on the Pecos Basin one, and I thought you might want to know about this.

Deena Larsen  
Technical Writer  
Bureau of Reclamation  
Technical Service Center  
85-827000 Bldg 67  
Denver Federal Center  
Denver Colorado 80225-0007  
(303) 445-2584  
[delarsen@usbr.gov](mailto:delarsen@usbr.gov)

----- Forwarded message -----  
From: **Llewellyn, Dagmar** <[dllewellyn@usbr.gov](mailto:dllewellyn@usbr.gov)>  
Date: Fri, Jun 15, 2018 at 3:08 PM  
Subject: Fwd: Uncertainty Language  
To: "Larsen, Denise (Deena)" <[delarsen@usbr.gov](mailto:delarsen@usbr.gov)>

Dagmar Llewellyn

Hydrologist  
Bureau of Reclamation, Albuquerque Area Office  
555 Broadway Blvd. NE, Suite 100  
Albuquerque, NM 87102  
505-462-3594  
[dllewellyn@usbr.gov](mailto:dllewellyn@usbr.gov)

----- Forwarded message -----

From: **Morgan, Avra** <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>

Date: Fri, Jan 26, 2018 at 3:33 PM

Subject: Uncertainty Language

To: Noe Santos <[nsantos@usbr.gov](mailto:nsantos@usbr.gov)>, Subhrendu Gangopadhyay <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, David Groves <[groves@rand.org](mailto:groves@rand.org)>, "Johnson, Genevieve" <[gjohnson@usbr.gov](mailto:gjohnson@usbr.gov)>, John Spears <[jspears@usbr.gov](mailto:jspears@usbr.gov)>, David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>, MICHAEL NEUMAN <[mneuman@usbr.gov](mailto:mneuman@usbr.gov)>, Katherine Schultz <[kschultz@usbr.gov](mailto:kschultz@usbr.gov)>, Zackary Leady <[zleady@usbr.gov](mailto:zleady@usbr.gov)>, Lindsay Bearup <[lbearup@usbr.gov](mailto:lbearup@usbr.gov)>, Jennifer Cuhaciyani <[jcuhaciyani@usbr.gov](mailto:jcuhaciyani@usbr.gov)>, James Prairie <[jprairie@usbr.gov](mailto:jprairie@usbr.gov)>, KIRK NELSON <[kenelson@usbr.gov](mailto:kenelson@usbr.gov)>, MICHAEL TANSEY <[mtansey@usbr.gov](mailto:mtansey@usbr.gov)>, Jobaid Kabir <[jkabir@usbr.gov](mailto:jkabir@usbr.gov)>, Rob Cifelli - NOAA Federal <[rob.cifelli@noaa.gov](mailto:rob.cifelli@noaa.gov)>, Dagmar Llewellyn <[dllewellyn@usbr.gov](mailto:dllewellyn@usbr.gov)>, "Dahm, Katharine" <[kdahm@usbr.gov](mailto:kdahm@usbr.gov)>, Kenneth Nowak <[knowak@usbr.gov](mailto:knowak@usbr.gov)>, "Sholtes, Joel" <[jsholtes@usbr.gov](mailto:jsholtes@usbr.gov)>, Vanessa King <[vking@usbr.gov](mailto:vking@usbr.gov)>, Heather Patno <[hpatno@usbr.gov](mailto:hpatno@usbr.gov)>, "Erger, Patrick J" <[perger@usbr.gov](mailto:perger@usbr.gov)>, Ian Ferguson <[iferguson@usbr.gov](mailto:iferguson@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>

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Avra

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

**Marketa McGuire** <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>

---

**From:** Marketa McGuire <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>  
**Sent:** Fri Jun 15 2018 15:14:49 GMT-0600 (MDT)  
**To:** "Denise (Deena) Larsen" <[delarsen@usbr.gov](mailto:delarsen@usbr.gov)>  
**CC:** Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Subject:** Re: Uncertainty Language

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Deena Larsen  
Technical Writer  
Bureau of Reclamation  
Technical Service Center  
85-827000 Bldg 67  
Denver Federal Center  
Denver Colorado 80225-0007  
(303) 445-2584  
[delarsen@usbr.gov](mailto:delarsen@usbr.gov)

----- Forwarded message -----

From: **Llewellyn, Dagmar** <[dllewellyn@usbr.gov](mailto:dllewellyn@usbr.gov)>  
Date: Fri, Jun 15, 2018 at 3:08 PM  
Subject: Fwd: Uncertainty Language  
To: "Larsen, Denise (Deena)" <[delarsen@usbr.gov](mailto:delarsen@usbr.gov)>

Dagmar Llewellyn  
Hydrologist  
Bureau of Reclamation, Albuquerque Area Office  
555 Broadway Blvd. NE, Suite 100  
Albuquerque, NM 87102  
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[dllewellyn@usbr.gov](mailto:dllewellyn@usbr.gov)

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Date: Fri, Jan 26, 2018 at 3:33 PM  
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To: Noe Santos <[nsantos@usbr.gov](mailto:nsantos@usbr.gov)>, Subhrendu Gangopadhyay <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, David Groves <[groves@rand.org](mailto:groves@rand.org)>, "Johnson, Genevieve" <[gjohnson@usbr.gov](mailto:gjohnson@usbr.gov)>, John Spears <[jspears@usbr.gov](mailto:jspears@usbr.gov)>, David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>, MICHAEL NEUMAN <[mneuman@usbr.gov](mailto:mneuman@usbr.gov)>, Katherine Schultz <[kschultz@usbr.gov](mailto:kschultz@usbr.gov)>, Zackary Leady <[zleady@usbr.gov](mailto:zleady@usbr.gov)>, Lindsay Bearup <[lbearup@usbr.gov](mailto:lbearup@usbr.gov)>, Jennifer Cuhaciyon <[jcuhaciyon@usbr.gov](mailto:jcuhaciyon@usbr.gov)>, James Prairie <[jprairie@usbr.gov](mailto:jprairie@usbr.gov)>, KIRK NELSON <[kenelson@usbr.gov](mailto:kenelson@usbr.gov)>, MICHAEL TANSEY <[mtansey@usbr.gov](mailto:mtansey@usbr.gov)>, Jobaid Kabir <[jkabir@usbr.gov](mailto:jkabir@usbr.gov)>, Rob Cifelli - NOAA Federal <[rob.cifelli@noaa.gov](mailto:rob.cifelli@noaa.gov)>, Dagmar Llewellyn <[dllewellyn@usbr.gov](mailto:dllewellyn@usbr.gov)>, "Dahm, Katharine" <[kdahm@usbr.gov](mailto:kdahm@usbr.gov)>, Kenneth Nowak

<[knowak@usbr.gov](mailto:knowak@usbr.gov)>, "Sholtes, Joel" <[jsholtes@usbr.gov](mailto:jsholtes@usbr.gov)>, Vanessa King <[vking@usbr.gov](mailto:vking@usbr.gov)>, Heather Patno <[hpatno@usbr.gov](mailto:hpatno@usbr.gov)>, "Erger, Patrick J" <[perger@usbr.gov](mailto:perger@usbr.gov)>, Ian Ferguson <[iferguson@usbr.gov](mailto:iferguson@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>

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Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

**Amanda Erath** <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

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**Sent:** Fri Jun 15 2018 15:17:38 GMT-0600 (MDT)  
**To:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Fwd: Uncertainty Language  
**Attachments:** Uncertainty\_092517.ig\_dar.docx

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

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Date: Fri, Jun 15, 2018 at 3:12 PM

Subject: Fwd: Uncertainty Language

To: McGuire, Marketa <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>, Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

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Dagmar Llewellyn  
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---

**From:** Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Fri Jun 15 2018 15:17:57 GMT-0600 (MDT)  
**To:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Fwd: Uncertainty Language

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

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From: Marketa McGuire <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>  
Date: Fri, Jun 15, 2018 at 3:15 PM  
Subject: Re: Uncertainty Language  
To: Denise (Deena) Larsen <[delarsen@usbr.gov](mailto:delarsen@usbr.gov)>  
Cc: Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

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<[knowak@usbr.gov](mailto:knowak@usbr.gov)>, "Sholtes, Joel" <[jsholtes@usbr.gov](mailto:jsholtes@usbr.gov)>, Vanessa King <[vking@usbr.gov](mailto:vking@usbr.gov)>, Heather Patno <[hpatno@usbr.gov](mailto:hpatno@usbr.gov)>, "Erger, Patrick J" <[perger@usbr.gov](mailto:perger@usbr.gov)>, Ian Ferguson <[iferguson@usbr.gov](mailto:iferguson@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>

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--

Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455  
| [mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)

# Conversation Contents

## Upper Deschutes River Basin Study

### Attachments:

/1. Upper Deschutes River Basin Study/1.1 Draft Final Report U Deschutes Basin Study 20190701.docx

**"Erath, Amanda" <aerath@usbr.gov>**

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**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Thu Sep 26 2019 15:32:23 GMT-0600 (MDT)  
**To:** "Raff, David" <draff@usbr.gov>  
**CC:** "Morgan, Avra" <aomorgan@usbr.gov>  
**Subject:** Upper Deschutes River Basin Study  
**Attachments:** Draft Final Report U Deschutes Basin Study 20190701.docx

Hi Dave,

Just wanted to give you a heads-up that we have a Basin Study that just wrapped up. We have a briefing scheduled on October 10 and we're working on transmitting the final report to the WO. Here's the report in case you want to take a look at it. Right now we have the uncertainty language that we agreed on with Goks in the report, but my thought is that we should point that out to the Commissioner during the briefing to make sure that she wants that in there. Sound right to you?

Thanks,  
Amanda

### ***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

# Conversation Contents

## Review of Climate Change Section for an EIS

### Attachments:

/5. Review of Climate Change Section for an EIS/1.1 3 6 Climate Change tracked\_rg.docx

/5. Review of Climate Change Section for an EIS/2.1 scan.pdf

---

## "Grimes, Russell" <rwgrimes@usbr.gov>

**From:** "Grimes, Russell" <rwgrimes@usbr.gov>  
**Sent:** Fri Aug 23 2019 16:30:17 GMT-0600 (MDT)  
**To:** David Raff <draff@usbr.gov>  
**CC:** Anastasia Leigh <aleigh@usbr.gov>  
**Subject:** Review of Climate Change Section for an EIS  
**Attachments:** 3 6 Climate Change tracked\_rg.docx

Hi David.

Per the undated memo (at least the version I have) from David Palumbo to the RLT I'm providing you the Climate Change Chapter for the Long Term Water Transfers EIS. You may recall an earlier version of this sent to you for review late last year for the Draft EIS; this is for the Final EIS. This climate change analysis is in direct response to deficiencies found by the court in our 2014 climate change analysis. We'd like to get the Deputy Secretary briefed on this EIS by October 4, so please let me know if you have any questions or concerns at your earliest convenience so we can make adjustments to the document if needed.

Thanks for your review.  
Russ

Russell W. Taylor-Grimes  
Bureau of Reclamation, Mid-Pacific Region  
Environmental Compliance and Habitat Conservation Branch  
(916) 978-5051 office  
(916) 243-9404 cell

---

## "Raff, David" <draff@usbr.gov>

**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Fri Aug 23 2019 16:35:38 GMT-0600 (MDT)  
**To:** "Grimes, Russell" <rwgrimes@usbr.gov>  
**CC:** Anastasia Leigh <aleigh@usbr.gov>  
**Subject:** Re: Review of Climate Change Section for an EIS  
**Attachments:** scan.pdf

Thanks Russ - I'll plan to review next week. Here is the version I have dated August 20, 2018.

--

David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | Building 67 Denver Federal Center | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

On Fri, Aug 23, 2019 at 4:30 PM Grimes, Russell <[rwgrimes@usbr.gov](mailto:rwgrimes@usbr.gov)> wrote:

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**From:** "Grimes, Russell" <[rwgrimes@usbr.gov](mailto:rwgrimes@usbr.gov)>  
**Sent:** Fri Aug 23 2019 16:36:28 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: Review of Climate Change Section for an EIS

Thanks David. I'll replace my copy with this one.

Russell W. Taylor-Grimes  
Bureau of Reclamation, Mid-Pacific Region  
Environmental Compliance and Habitat Conservation Branch  
(916) 978-5051 office  
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## Conversation Contents

Fwd: [EXTERNAL] Niobrara Basin Study - Cleared w/ Edits

### Attachments:

/6. Fwd: [EXTERNAL] Niobrara Basin Study - Cleared w/ Edits/1.1 noname  
/6. Fwd: [EXTERNAL] Niobrara Basin Study - Cleared w/ Edits/1.2 Niobrara Basin Study Summary Report + OMB Edits.docx

**"Erath, Amanda" <aerath@usbr.gov>**

---

**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Fri Aug 23 2019 15:54:02 GMT-0600 (MDT)  
**To:** Dean Marrone <dmarrone@usbr.gov>, "Morgan, Avra" <aomorgan@usbr.gov>, "Raff, David" <draff@usbr.gov>  
**Subject:** Fwd: [EXTERNAL] Niobrara Basin Study - Cleared w/ Edits  
**Attachments:** noname Niobrara Basin Study Summary Report + OMB Edits.docx

Not sure why she didn't send this to y'all too, but here are OMB's comments. I replied and told her we need to talk through some of these here and with the region. Some of them are just minor editorial things, but some of them are worthy of discussion.

### ***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

----- Forwarded message -----

From: **Hughes-Brown, Marie** <[mhughesbrown@usbr.gov](mailto:mhughesbrown@usbr.gov)>  
Date: Fri, Aug 23, 2019 at 3:09 PM  
Subject: Fwd: [EXTERNAL] Niobrara Basin Study - Cleared w/ Edits  
To: Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

Amanda,

Here you go. Let me know if somebody else should get this, and also if there's anything funky in Alex's edits that you're not comfortable with.  
Beth

----- Forwarded message -----

From: **Hettinger, Alex G. EOP/OMB** <[Alexander\\_G\\_Hettinger@omb.eop.gov](mailto:Alexander_G_Hettinger@omb.eop.gov)>  
Date: Fri, Aug 23, 2019 at 5:02 PM  
Subject: [EXTERNAL] Niobrara Basin Study - Cleared w/ Edits  
To: Hughes-Brown, Beth (Marie) <[MHughesBrown@usbr.gov](mailto:MHughesBrown@usbr.gov)>, Robert Wolf <[rwolf@usbr.gov](mailto:rwolf@usbr.gov)>, [pjoos@ios.doi.gov](mailto:pjoos@ios.doi.gov) <[pjoos@ios.doi.gov](mailto:pjoos@ios.doi.gov)>, Jenkins, Tracey <[tjenkins@usbr.gov](mailto:tjenkins@usbr.gov)>

The attached Niobrara Basin Study is cleared pending the acceptance of the edits found therein.

I don't anticipate the edits will cause much heartburn, but if they do I would be happy to discuss to find mutually agreeable language.

--

*Beth Hughes-Brown  
Assistant Director  
Program & Budget  
Bureau of Reclamation  
202-513-0518*

## Conversation Contents

For Tuesday -- NY Times query on climate language

### Attachments:

/8. For Tuesday -- NY Times query on climate language/1.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/1.2 USBR uncertainty language.pdf  
/8. For Tuesday -- NY Times query on climate language/1.3 Attachment A.pdf  
/8. For Tuesday -- NY Times query on climate language/1.4 Attachment B.pdf  
/8. For Tuesday -- NY Times query on climate language/2.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/3.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/4.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/5.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/6.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/7.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/8.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/9.1 Screen Shot 2019-08-02 at 4.31.36 PM.png  
/8. For Tuesday -- NY Times query on climate language/9.2 Klamath Basin Study Summary Report.pdf  
/8. For Tuesday -- NY Times query on climate language/9.3 Klamath Basin Study Full Report.pdf

**"Eisenman, Theresa"** <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>

---

**From:** "Eisenman, Theresa" <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>  
**Sent:** Fri Aug 02 2019 16:12:23 GMT-0600 (MDT)  
**To:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png USBR uncertainty language.pdf Attachment A.pdf Attachment B.pdf

For discussion on Tuesday.... Thanks

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From: **Tabuchi, Hiroko** <[hiroko.tabuchi@nytimes.com](mailto:hiroko.tabuchi@nytimes.com)>  
Date: Fri, Aug 2, 2019 at 4:59 PM  
Subject: [EXTERNAL] Klamath River Basin Report  
To: <[TEisenman@usbr.gov](mailto:TEisenman@usbr.gov)>

Hi Theresa, thanks for your time just now. Off the record, here are the emails that we're looking at.

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You'll see that Golkany suggests adding phrases such as: "Recent comparisons of GCM model projections versus observations suggest that the projections may be overestimating the rate of global warming, for whatever reason."

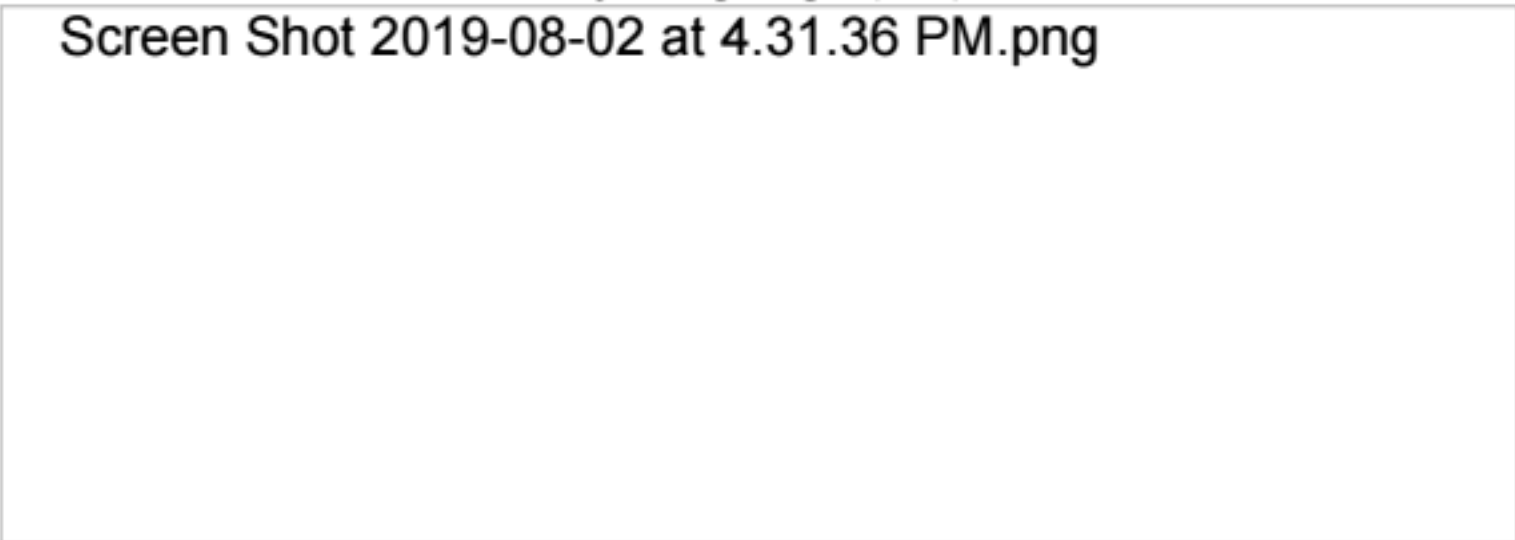
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Many thanks

Hiroko cell: [REDACTED]

Hiroko Tabuchi | Reporter | The New York Times | Phone 212-556-2642  
| [hiroko.tabuchi@nytimes.com](mailto:hiroko.tabuchi@nytimes.com) | <http://www.nytimes.com/by/hiroko-tabuchi>

--

Theresa Eisenman, PMP  
Chief, Public Affairs  
Commissioner's Office

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1849 C Street, NW MS-7069  
Washington, DC 20240  
Direct: (202) 513-0574  
Cell: (202) 595-4454  
[teisenman@usbr.gov](mailto:teisenman@usbr.gov)

**"Raff, David" <draff@usbr.gov>**

---

**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Fri Aug 02 2019 16:29:18 GMT-0600 (MDT)  
**To:** "Eisenman, Theresa" <teisenman@usbr.gov>  
**CC:** Amanda Erath <aerath@usbr.gov>, "Palumbo, David" <dpalumbo@usbr.gov>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png

Thanks Theresa. Perhaps we could all plan to talk on Tuesday morning before planning a response? I could also call in on Monday as I will be returning from our weekend if that is better. This goes back to 2017 and certainly worth getting you up to speed and David, Amanda, and I refreshing our memories.

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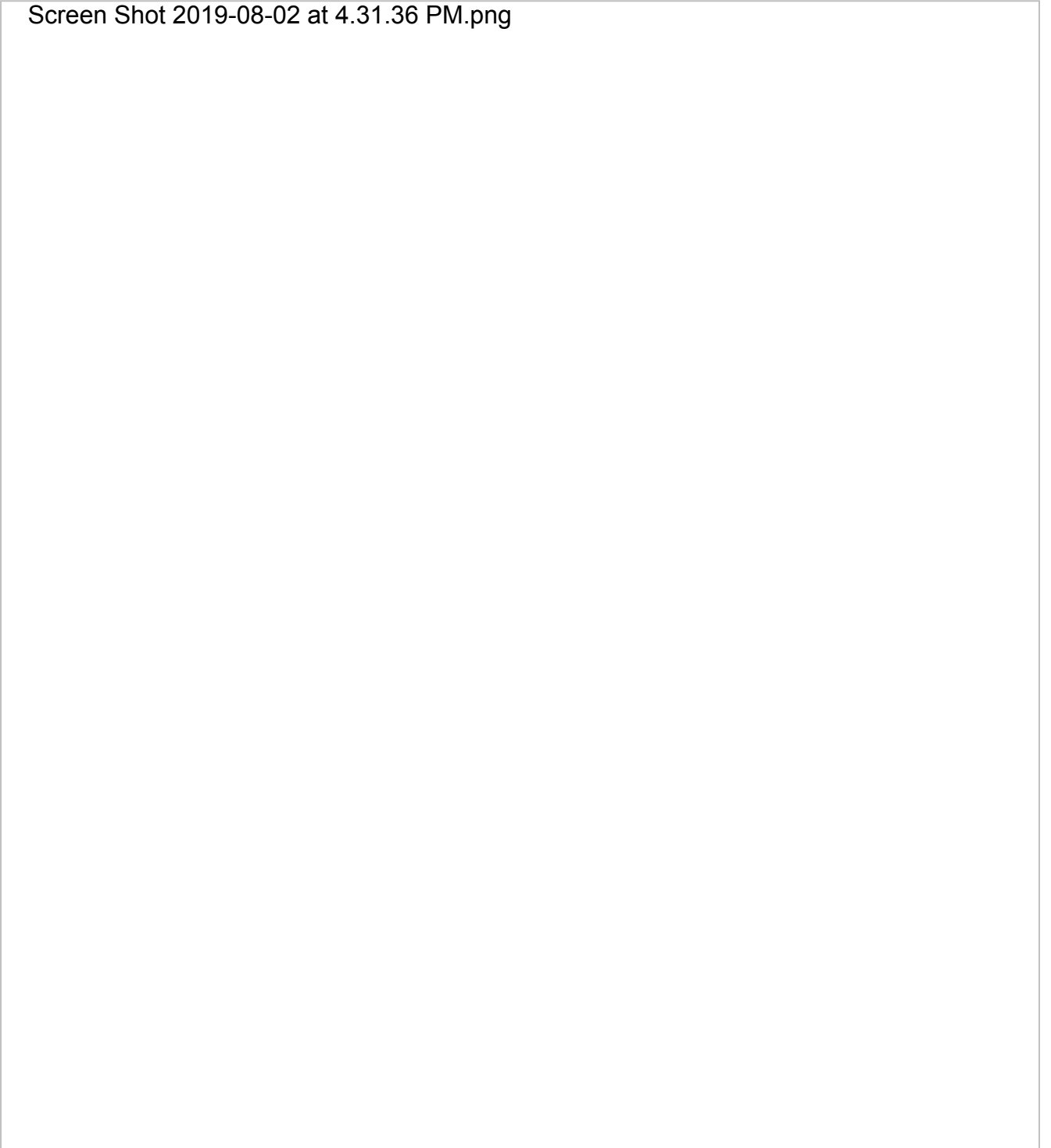
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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

## "Eisenman, Theresa" <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>

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**From:** "Eisenman, Theresa" <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>  
**Sent:** Fri Aug 02 2019 16:33:26 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**CC:** Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>, "Palumbo, David" <[dpalumbo@usbr.gov](mailto:dpalumbo@usbr.gov)>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
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I'll set up a call for Tuesday morning. Thanks for your flexibility. The reporter is not on urgent deadline ... so no need to change your Monday plans for this one. I can respond to her on Tuesday after we chat. Have a great weekend.

On Fri, Aug 2, 2019 at 6:29 PM Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

Thanks Theresa. Perhaps we could all plan to talk on Tuesday morning before planning a response? I could also call in on Monday as I will be returning from our weekend if that is better. This goes back to 2017 and certainly worth getting you up to speed and David, Amanda, and I refreshing our memories.

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Date: Fri, Aug 2, 2019 at 4:59 PM



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Theresa Eisenman, PMP  
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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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## "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>

---

**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Mon Aug 05 2019 09:16:30 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png

(b) (5)


### ***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

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**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Mon Aug 05 2019 13:21:51 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
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### ***Amanda Erath***

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Policy and Administration  
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Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

On Mon, Aug 5, 2019 at 9:16 AM Erath, Amanda <[aerath@usbr.gov](mailto:aerath@usbr.gov)> wrote:

(b) (5)


### ***Amanda Erath***

*Program Analyst*  
Policy and Administration

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(b) (5)



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Email: [aerath@usbr.gov](mailto:aerath@usbr.gov)

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For discussion on Tuesday.... Thanks

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Date: Fri, Aug 2, 2019 at 4:59 PM

Subject: [EXTERNAL] Klamath River Basin Report

To: <[TEisenman@usbr.gov](mailto:TEisenman@usbr.gov)>

Hi Theresa, thanks for your time just now. Off the record, here are the emails that we're looking at.

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Bureau of Reclamation  
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**"Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>**

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**Sent:** Tue Aug 06 2019 07:55:57 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
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(b) (5)

*Amanda Erath*



*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
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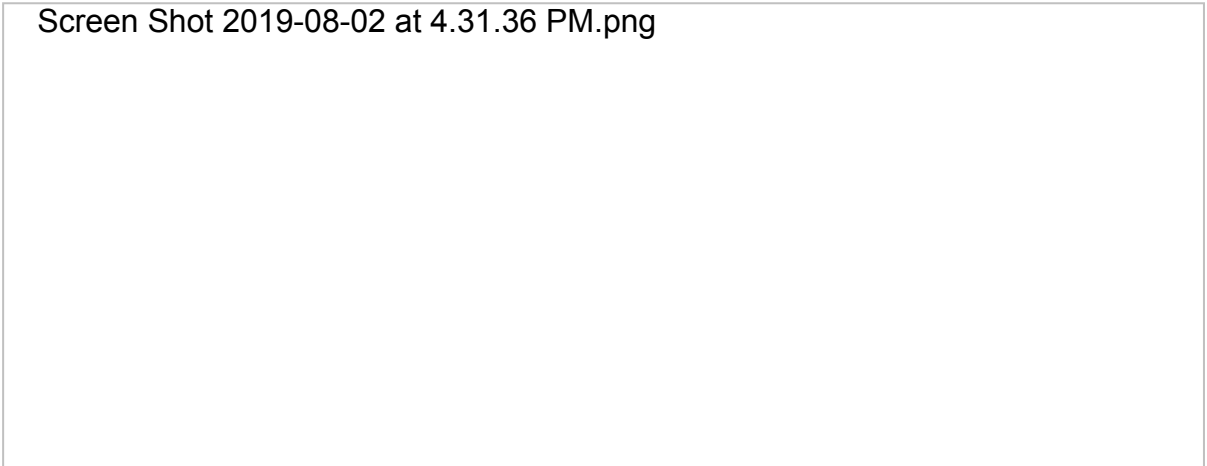
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**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Tue Aug 06 2019 08:00:19 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
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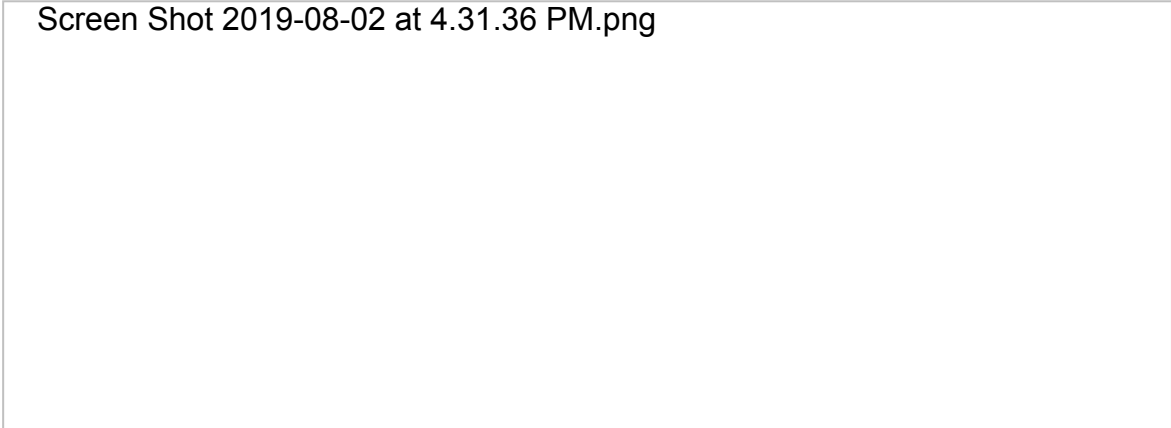
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**From:** "Erath, Amanda" <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Sent:** Tue Aug 06 2019 10:00:12 GMT-0600 (MDT)  
**To:** "Eisenman, Theresa" <[teisenman@usbr.gov](mailto:teisenman@usbr.gov)>  
**CC:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>, "Palumbo, David" <[dpalumbo@usbr.gov](mailto:dpalumbo@usbr.gov)>  
**Subject:** Re: For Tuesday -- NY Times query on climate language  
**Attachments:** Screen Shot 2019-08-02 at 4.31.36 PM.png Klamath Basin Study  
Summary Report.pdf Klamath Basin Study Full Report.pdf

Theresa,

(b) (5)

[REDACTED]

[REDACTED]

- [REDACTED]

[REDACTED]

- [REDACTED]



• (b) (5)

Please let me know if you have any questions or need anything else.

Thanks,  
Amanda

***Amanda Erath***

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I'll set up a call for Tuesday morning. Thanks for your flexibility. The reporter is not on urgent deadline ... so no need to change your Monday plans for this one. I can respond to her on Tuesday after we chat. Have a great weekend.

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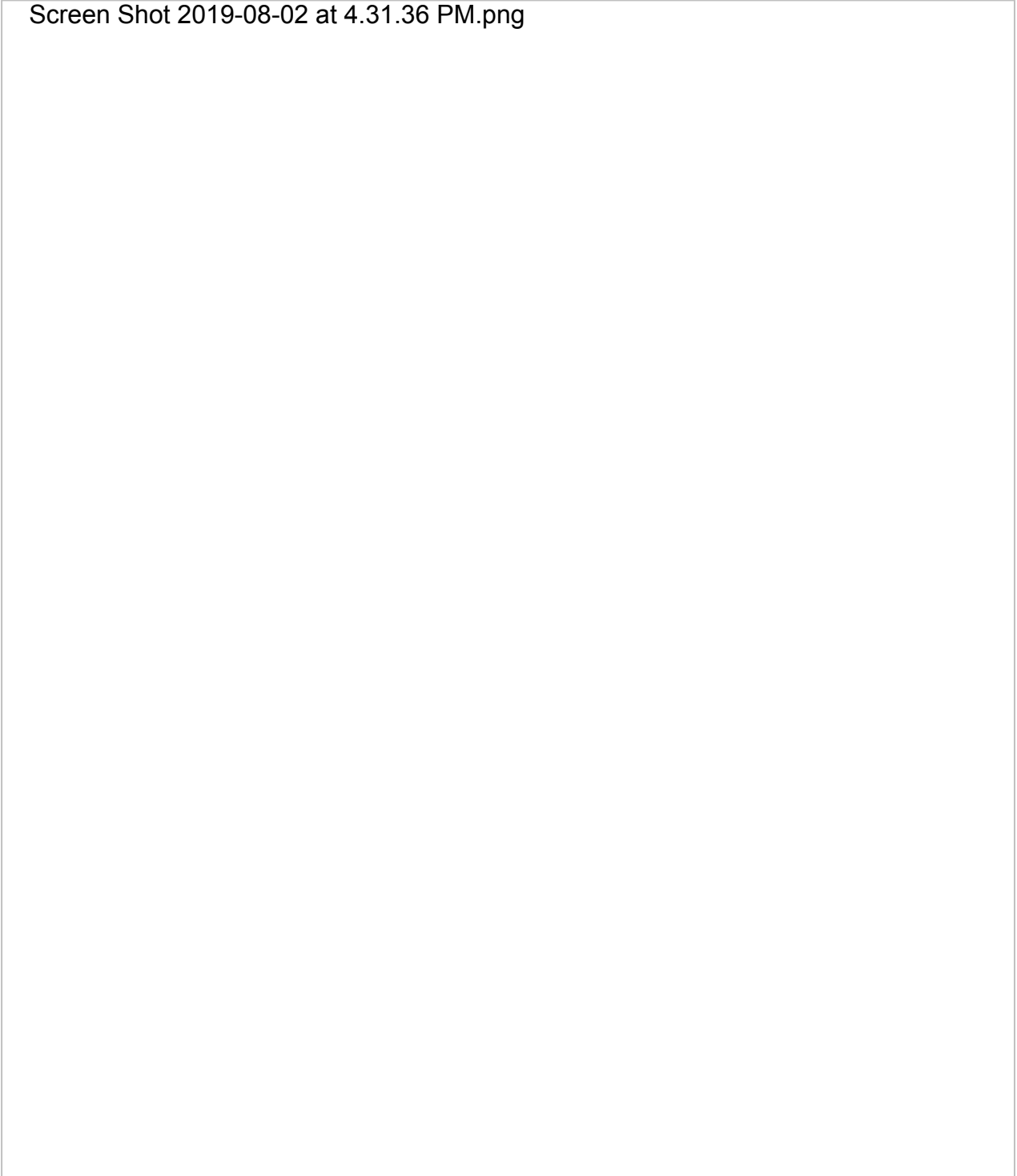
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# Conversation Contents

uncertainty language / climate change

**"Raff, David" <draff@usbr.gov>**

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**Sent:** Tue Aug 06 2019 09:12:20 GMT-0600 (MDT)  
**To:** Theresa Eisenman <teisenman@usbr.gov>  
Amanda Erath <aerath@usbr.gov>, Avra Morgan  
**CC:** <aomorgan@usbr.gov>, "Palumbo, David"  
<dpalumbo@usbr.gov>, Dean Marrone <dmarrone@usbr.gov>  
**Subject:** uncertainty language / climate change

Good Morning Theresa,

Regarding the full uncertainty language that we arrived at in 2017 - it has been used. One example is in the Final Environmental Impact Statement (FEIS) for the Kachess Drought Relief Pumping Plant and Keechelus Reservoir-to-Kachess Reservoir Conveyance page 3-135 Section 3.12

<https://www.usbr.gov/pn/programs/eis/kdrpp/feis2019/feis2019v1.pdf>

<https://www.usbr.gov/pn/programs/eis/kkc/index.html>

There may very well be other examples but hopefully this suffices to answer the immediate question.

Thanks,  
Dave

--

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## Washita Bulletin Climate Change Question

### Attachments:

/21. Washita Bulletin Climate Change Question/1.1 WaterSmart Bulletin\_05092019.pdf

### "Morgan, Avra" <aomorgan@usbr.gov>

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**From:** "Morgan, Avra" <aomorgan@usbr.gov>  
**Sent:** Fri May 17 2019 14:16:20 GMT-0600 (MDT)  
**To:** David Raff <draff@usbr.gov>  
**Subject:** Washita Bulletin Climate Change Question  
**Attachments:** WaterSmart Bulletin\_05092019.pdf

Hi Dave, we are working on a bulletin for each of the res ops pilots. The Washita is the farthest along, see attached. I have hesitated to send this to you because we are replacing the map - **so please ignore the map!** What I am wondering is what we need to do about Goks uncertainty language. Some of these pilots focused more on cchange than this one but I think all of them mention it. Do we have Goks' language on line somewhere? I am wondering if we could just add a reference to it? I welcome your thoughts and sugestions.

Avra

[Avra Morgan](#) | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

### "Raff, David" <draff@usbr.gov>

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**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Mon May 20 2019 09:16:57 GMT-0600 (MDT)  
**To:** "Morgan, Avra" <aomorgan@usbr.gov>  
**Subject:** Re: Washita Bulletin Climate Change Question

The map isn't bad... i don't think. has all the necessary information in it and location, etc... river looks like a river too. what am i missing?

As for uncertainty language - particularly that developed with Goks a couple years ago - I don't think it applies here as it had to do with GCMs and this is about paleohydrology and PDSI reconstructions. I didn't even see GCM in the bulletin. Did I miss it?

Bulletin looks great to me.

--

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On Fri, May 17, 2019 at 2:16 PM Morgan, Avra <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)> wrote:

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**From:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Sent:** Mon May 20 2019 10:39:35 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: Washita Bulletin Climate Change Question

Hi Dave, the map is ok, you just can't see the names of the states and some things aren't in the legend, like the county lines. Kenneth is working on fixing it up a little. I think you are correct that there were no GCMs used in the Washita now that i think about it. But, I think they did use GCMs in the Crooked and the Salt River pilots. I am not sure if we have that language on our website? If not, maybe we could add the uncertainty language to our cc web page and then just reference it?

Avra

[Avra Morgan](#) | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

On Mon, May 20, 2019 at 9:16 AM Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

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Bulletin looks great to me.

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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

On Fri, May 17, 2019 at 2:16 PM Morgan, Avra <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)> wrote:

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## "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>

---

**From:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Sent:** Mon May 20 2019 10:41:10 GMT-0600 (MDT)  
**To:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Re: Washita Bulletin Climate Change Question

yeah - i agree - i am also starting to wonder whether our agreement is still in place as I don't think that he is in the Dep Secs office. I'm trying to think of how best to test that though.

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**"Morgan, Avra" <aomorgan@usbr.gov>**

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**From:** "Morgan, Avra" <aomorgan@usbr.gov>  
**Sent:** Mon May 20 2019 10:43:20 GMT-0600 (MDT)  
**To:** "Raff, David" <draff@usbr.gov>  
**Subject:** Re: Washita Bulletin Climate Change Question

Yes, that seems like a delicate thing to test.

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
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## Conversation Contents

before EIS"s get to DC...

### Attachments:

/41. before EIS"s get to DC.../1.1 Memo to RLT on Coordination of Projections of Furture Climate Conditions from D. Palumbo - September 28, 2018.docx

/41. before EIS"s get to DC.../5.1 Climate Change from \_Long-Term Water Transfers RDEIR\_SDEIS\_MainBody and Appendix D0181220 (2).pdf

### "Maucieri, Mathew" <mmaucieri@usbr.gov>

---

**From:** "Maucieri, Mathew" <mmaucieri@usbr.gov>  
**Sent:** Thu Dec 20 2018 16:11:04 GMT-0700 (MST)  
**To:** ANASTASIA LEIGH <aleigh@usbr.gov>, Alicia Forsythe <aforsythe@usbr.gov>  
**CC:** Jill Dale <jsdale@usbr.gov>, Mary Knecht <mknecht@usbr.gov>, "Raff, David" <draff@usbr.gov>, David Palumbo <dpalumbo@usbr.gov>, Travis Yonts <tyonts@usbr.gov>  
**Subject:** before EIS"s get to DC...  
**Attachments:** Memo to RLT on Coordination of Projections of Furture Climate Conditions from D. Palumbo - September 28, 2018.docx

hi ali and stacey,

i want to make sure you are aware of the process step for review of EIS's before they're sent to dc. a few weeks back, dep. comm'r palumbo requested that regions "work with the Science Advisor (dave raff) at the scoping stage and at the internal review stages of document development prior to any planned dissemination (of draft EIS's)." see below and attached. asst. secy petty had several questions after today's briefing on the long term transfers EIS and we had shared the doc with dr. raff from here earlier this week, so he handled the asst secy's questions in a quick call afterward. but the sharing is supposed to happen from the region, **before** the documents get to DC per the memo.

thx

- mat

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From: **Quarles, Otelia** <[oquarles@usbr.gov](mailto:oquarles@usbr.gov)>

Date: Fri, Sep 28, 2018 at 1:29 PM

Subject: Coordination of Projections of Future Climate Conditions

To: BOR RLT Roster <[borrltroster@usbr.gov](mailto:borrltroster@usbr.gov)>, BOR WRO RLTSec <[ibr9wrodrtsec@usbr.gov](mailto:ibr9wrodrtsec@usbr.gov)>

Cc: Mathew Maucieri <[mmaucieri@usbr.gov](mailto:mmaucieri@usbr.gov)>

Good afternoon,

The attached memo regarding the subject mentioned above is being sent on behalf of David Palumbo, Deputy Commissioner, Operations. If you have any questions, please contact David Raff at 303-445-4196.

Thank you.

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**Otelia Quarles**  
Secretary to Director, Program and Budget Office  
Bureau of Reclamation  
1849 C Street, NW  
Washington, DC 20240  
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Fax: (202) 513-0307

--

**Mathew Maucieri**  
Bureau of Reclamation  
U.S. Department of the Interior  
202.513.0569 desk  
202.277.4934 cell

**"Leigh, Anastasia" <aleigh@usbr.gov>**

---

**From:** "Leigh, Anastasia" <aleigh@usbr.gov>  
**Sent:** Thu Dec 20 2018 16:34:20 GMT-0700 (MST)  
**To:** "Maucieri, Mathew" <mmaucieri@usbr.gov>  
Alicia Forsythe <aforsythe@usbr.gov>, Jill Dale  
<jsdale@usbr.gov>, Mary Knecht <mknecht@usbr.gov>, "Raff,  
**CC:** David" <draff@usbr.gov>, David Palumbo  
<dpalumbo@usbr.gov>, Travis Yonts <tyonts@usbr.gov>  
**Subject:** Re: before EIS"s get to DC...

Hi Mat-

Thanks for the reminder. I'll touch bases with Russ and make sure Dave gets looped into the process. I apologize if it did not happen for this one.

Stacey

On Thu, Dec 20, 2018 at 3:11 PM Maucieri, Mathew <[mmaucieri@usbr.gov](mailto:mmaucieri@usbr.gov)> wrote:

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**From:** "Leigh, Anastasia" <[aleigh@usbr.gov](mailto:aleigh@usbr.gov)>  
**Sent:** Thu Dec 20 2018 16:51:28 GMT-0700 (MST)  
**To:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>, Russ Grimes <[rwgrimes@usbr.gov](mailto:rwgrimes@usbr.gov)>  
**CC:** "Maucieri, Mathew" <[mmaucieri@usbr.gov](mailto:mmaucieri@usbr.gov)>  
**Subject:** Re: before EIS"s get to DC...

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To: BOR RLT Roster <[borrltroster@usbr.gov](mailto:borrltroster@usbr.gov)>, BOR WRO RLTSec <[ibr9wrodriltsec@usbr.gov](mailto:ibr9wrodriltsec@usbr.gov)>

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## "Raff, David" <draff@usbr.gov>

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**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Fri Dec 21 2018 10:07:26 GMT-0700 (MST)  
**To:** "Leigh, Anastasia" <aleigh@usbr.gov>  
**CC:** Russ Grimes <rwgrimes@usbr.gov>, "Maucieri, Mathew" <mmaucieri@usbr.gov>  
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Climate Change from \_Long-Term Water Transfers



**Attachments:**

RDEIR\_SDEIS\_MainBody and Appendix D0181220 (2).pdf

Dave-

Here is the climate change section from the Long Term Water Transfers Supplemental Draft EIS. Based on the conversations yesterday, I think you've already seen the EIS, but we did get permission to release the document at the Review Team briefing today so let us know if you have any questions or concerns.

As I said, the next two EISs that should be going out will be the Final EIS for the El Dorado County Water Agency Contract and the Draft EIS for BF Sisk Safety of Dams. We will pull the appropriate sections from those documents out for you and get them to you in the near future.

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# Conversation Contents

## K Projects Final EIS - Phase I

### Attachments:

/44. K Projects Final EIS - Phase I/3.1 D Raff Climate Change.pdf  
/44. K Projects Final EIS - Phase I/3.2 Clean RTC Log K Projects Phase I FEIS.docx  
/44. K Projects Final EIS - Phase I/5.1 D Raff Ch 3 Affected Environment Climate Change.pdf  
/44. K Projects Final EIS - Phase I/6.1 Uncertainty\_092517.docx

**"jlong@usbr.gov" <Secure@usbr.gov>**

---

**From:** "jlong@usbr.gov" <Secure@usbr.gov>  
**Sent:** Wed Dec 12 2018 10:15:22 GMT-0700 (MST)  
**To:** draff@usbr.gov  
**CC:** ddenton@usbr.gov  
**Subject:** K Projects Final EIS - Phase I

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**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Wed Dec 12 2018 10:40:37 GMT-0700 (MST)  
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it says i am unable to access. could you send me relevant climate change chapter?

--  
David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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**Sent:** Wed Dec 12 2018 11:13:42 GMT-0700 (MST)  
**To:** draff@usbr.gov  
**CC:** David Denton <ddenton@usbr.gov>  
**Subject:** Re: K Projects Final EIS - Phase I  
**Attachments:** D Raff Climate Change.pdf Clean RTC Log K Projects Phase I FEIS.docx

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Julia Long  
Assistant YRBWEP Manager  
Bureau of Reclamation  
Columbia Cascades Area Office  
1917 Marsh Rd.  
Yakima, WA 98901-2058

Ph: 509.573.8051  
Cell: 509.406.5864  
[jlong@usbr.gov](mailto:jlong@usbr.gov)

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---

**From:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Sent:** Wed Dec 12 2018 11:50:19 GMT-0700 (MST)  
**To:** [jlong@usbr.gov](mailto:jlong@usbr.gov)

**CC:** David Denton <ddenton@usbr.gov>  
**Subject:** Re: K Projects Final EIS - Phase I

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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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Ph: 509.573.8051  
Cell: 509.406.5864  
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## "Long, Julia" <jlong@usbr.gov>

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**From:** "Long, Julia" <jlong@usbr.gov>  
**Sent:** Wed Dec 12 2018 12:25:32 GMT-0700 (MST)  
**To:** draff@usbr.gov  
**CC:** David Denton <ddenton@usbr.gov>  
**Subject:** Re: K Projects Final EIS - Phase I  
**Attachments:** D Raff Ch 3 Affected Environment Climate Change.pdf

Thanks David.

Attached is Chapter 3 Affected Environment - Climate Change.

Julia Long  
Assistant YRBWEP Manager  
Bureau of Reclamation  
Columbia Cascades Area Office  
1917 Marsh Rd.  
Yakima, WA 98901-2058

Ph: 509.573.8051  
Cell: 509.406.5864  
[jlong@usbr.gov](mailto:jlong@usbr.gov)

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**From:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Sent:** Thu Dec 13 2018 09:50:43 GMT-0700 (MST)  
**To:** [jlong@usbr.gov](mailto:jlong@usbr.gov)  
**CC:** David Denton <[ddenton@usbr.gov](mailto:ddenton@usbr.gov)>, Mathew Maucieri <[mmaucieri@usbr.gov](mailto:mmaucieri@usbr.gov)>  
**Subject:** Re: K Projects Final EIS - Phase I  
**Attachments:** Uncertainty\_092517.docx

Language is fine - this reminded me that K-projects was given a pass from further climate modeling. Please, however, make sure that the attached uncertainty language is incorporated somewhere within the document. Probably best at the beginning of chapter 3. This was a

requirement established with the department in 2017 and I haven't heard that it is changed.

thanks,  
Dave

--

David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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# Conversation Contents

mendota deis

**"Maucieri, Mathew" <mmaucieri@usbr.gov>**

---

**From:** "Maucieri, Mathew" <mmaucieri@usbr.gov>  
**Sent:** Mon Nov 05 2018 09:30:42 GMT-0700 (MST)  
**To:** "Raff, David" <draff@usbr.gov>  
**Subject:** mendota deis

the climate change stuff is section 3 chapter 3.11

[Mendota EIS-EIR November 2018-Web View \(1\).pdf](#)

--  
**Mathew Maucieri**  
Bureau of Reclamation  
U.S. Department of the Interior  
202.513.0569 desk  
202.277.4934 cell

**"Raff, David" <draff@usbr.gov>**

---

**From:** "Raff, David" <draff@usbr.gov>  
**Sent:** Mon Nov 05 2018 10:04:56 GMT-0700 (MST)  
**To:** "Maucieri, Mathew" <mmaucieri@usbr.gov>  
**Subject:** Re: mendota deis

So here is my read of Mendota EIS:

(b) (5)

A large rectangular area of the document is completely redacted with a solid black fill. The redaction covers approximately the first two paragraphs of the email body.A second large rectangular area of the document is completely redacted with a solid black fill. This redaction covers the remaining text of the email body.

(b) (5)

Thanks,  
Dave

On Mon, Nov 5, 2018 at 8:31 AM Maucieri, Mathew <[mmaucieri@usbr.gov](mailto:mmaucieri@usbr.gov)> wrote:  
the climate change stuff is section 3 chapter 3.11

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--  
**Mathew Maucieri**  
Bureau of Reclamation  
U.S. Department of the Interior  
202.513.0569 desk  
202.277.4934 cell

--  
David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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**Sent:** Mon Nov 05 2018 10:33:07 GMT-0700 (MST)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>, Arthur Coykendall <[ACoykendall@usbr.gov](mailto:ACoykendall@usbr.gov)>  
**Subject:** Re: mendota deis

thank you doctor.

hi art,

can you access [this link](#) to the mendota exchange program deis and take a look at the climate change chapter for anything regarding the way the requirements are characterized?

thx

mat

On Mon, Nov 5, 2018 at 12:05 PM Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

So here is my read of Mendota EIS:

(b) (5)

(b) (5)

Thanks,  
Dave

On Mon, Nov 5, 2018 at 8:31 AM Maucieri, Mathew <[mmaucieri@usbr.gov](mailto:mmaucieri@usbr.gov)> wrote:  
the climate change stuff is section 3 chapter 3.11

 [Mendota EIS-EIR November 2018-Web View \(1\).pdf](#)

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**Mathew Maucieri**  
Bureau of Reclamation  
U.S. Department of the Interior  
202.513.0569 desk  
202.277.4934 cell

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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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202.277.4934 cell

# Conversation Contents

Fwd: Climate Change Memo?

**"Erath, Amanda" <aerath@usbr.gov>**

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**From:** "Erath, Amanda" <aerath@usbr.gov>  
**Sent:** Thu Oct 04 2018 15:52:29 GMT-0600 (MDT)  
**To:** "Raff, David" <draff@usbr.gov>  
**CC:** "Morgan, Avra" <aomorgan@usbr.gov>, Katherine Schultz <kschultz@usbr.gov>  
**Subject:** Fwd: Climate Change Memo?

Here's the info on the emissions scenarios used in the Missouri Headwaters Basin Study. Let me know if you need anything else.

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

*Office:* (303) 445-2766  
*Email:* [aerath@usbr.gov](mailto:aerath@usbr.gov)

----- Forwarded message -----

**From:** **McGuire, Marketa** <[mmcguire@usbr.gov](mailto:mmcguire@usbr.gov)>  
**Date:** Wed, Oct 3, 2018 at 11:37 AM  
**Subject:** Re: Climate Change Memo?  
**To:** Amanda Erath <[aerath@usbr.gov](mailto:aerath@usbr.gov)>  
**Cc:** Patrick Erger <[perger@usbr.gov](mailto:perger@usbr.gov)>, Gangopadhyay, Subhrendu <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, Gerald Benock <[gbenock@usbr.gov](mailto:gbenock@usbr.gov)>

Hi Amanda,

Here is an paragraph from the Impacts Assessment Water Supply Assessment that describes the projections that went into our future scenario development. I hope this answers your question, but I'm happy to discuss further.

The sub-set of full ensemble of CMIP3 and CMIP5 projections was based on projections using select GHG emissions scenarios, namely CMIP3 A1B, CMIP5 RCP 4.5, and CMIP5 RCP 8.5. This sub-ensemble, comprised of 216 individual projections, was selected as the most likely range of future GHG emissions. More conservative GHG emissions groupings, including CMIP5 RCP 2.6, are broadly outside the projected range of future conditions considered by major climate assessments including those produced by the Intergovernmental Panel on Climate Change (Sun et al., 2015). Further, the Fourth National Climate Assessment, which was

underway at the time of this study, considers CMIP5 4.5 and CMIP5 8.5 projections only. For this study, however, CMIP3 A1B projections were also considered because they provide additional plausible scenarios of future climate conditions, while CMIP3 B1 projections were not considered because, again they may be considered outside the plausible range of future conditions.

Thanks, Marketa

On Wed, Oct 3, 2018 at 11:18 AM Erath, Amanda <[aerath@usbr.gov](mailto: aerath@usbr.gov)> wrote:

Yes, we do. I've already set up a meeting with Dave tomorrow to discuss where we left the "uncertainty" discussion with Indur Goklany. I wanted to be able to suggest language to add as part of the policy review. I'm planning to mention the Missouri to him as well as another Basin Study that is wrapping up now. There is also an issue currently about how many emissions scenarios are being used in climate analysis. So we'll need to discuss that issue with Dave too. Do you know how many emissions scenarios were used in the Missouri Basin Study? I'll get the ball rolling when we talk tomorrow, and then likely set up some follow-up conversations to deal specifically with the Missouri Basin Study.

***Amanda Erath***

*Program Analyst*  
Policy and Administration  
Denver Federal Center  
Building 67 (84-51000)  
P.O. Box 25007  
Denver, CO 80225-0007

Office: (303) 445-2766  
Email: [aerath@usbr.gov](mailto: aerath@usbr.gov)

On Wed, Oct 3, 2018 at 11:05 AM McGuire, Marketa <[mmcguire@usbr.gov](mailto: mmcguire@usbr.gov)> wrote:

Hi all,

In light of the memo that recently came out regarding review of work involving future climate projections, I imagine we need to build in time for Dave to review the Missouri Headwaters Basin Study? If so, at what stage do we anticipate his review happening?

Thanks!  
Marketa

On Wed, Oct 3, 2018 at 10:31 AM Erger, Patrick <[perger@usbr.gov](mailto: perger@usbr.gov)> wrote:

FYI

----- Forwarded message -----

From: **Morrissey, Roxanne** <[rmorrissey@usbr.gov](mailto: rmorrissey@usbr.gov)>

Date: Tue, Oct 2, 2018 at 10:55 AM

Subject: Re: Climate Change Memo?

To: Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto: jbeardsley@usbr.gov)>

Cc: Buddy Fazio <[bfazio@usbr.gov](mailto: bfazio@usbr.gov)>, Roxanne Peterson <[repeterson@usbr.gov](mailto: repeterson@usbr.gov)>, Patrick Erger <[perger@usbr.gov](mailto: perger@usbr.gov)>, David Trimpe <[dtrimpe@usbr.gov](mailto: dtrimpe@usbr.gov)>, Joey Esilva <[jesilva@usbr.gov](mailto: jesilva@usbr.gov)>

Just received a copy - attached for your information.



Roxanne

On Tue, Oct 2, 2018 at 10:44 AM, Beardsley, Jennifer <[jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)> wrote:

Hi -

I understand a memo came out of DC to the Regions related to climate change and analysis needing to be reviewed by Dave Raff. Have any of you received a copy of this memo? If so, can you please share so we can determine how it plays (or not) into our environmental compliance analysis?

I have received questions recently seeking analysis guidance and not sure if this memo plays into it.

Thank you,  
Jen

**Jennifer W. Beardsley**

*Environmental Compliance Coordinator*  
Great Plains Region  
Bureau of Reclamation  
406-247-7722  
Email: [jbeardsley@usbr.gov](mailto:jbeardsley@usbr.gov)

--

"Safety First, Every Job, Every Time"

Patrick J. Erger  
Supervisory Hydrologist  
Water Operations and Hydrology Group  
Great Plains Region  
phone 406-247-7755  
cell 406-670-9064  
fax 406-247-7680  
e-mail [perger@usbr.gov](mailto:perger@usbr.gov)

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Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455 | [mmcquire@usbr.gov](mailto:mmcquire@usbr.gov)

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Marketa McGuire, P.E. | Hydrologic Civil Engineer | Bureau of Reclamation Technical Service Center | 303-445-2455 | [mmcquire@usbr.gov](mailto:mmcquire@usbr.gov)



# Conversation Contents

Agricultural Demands website

**David Raff <draff@usbr.gov>**

---

**From:** David Raff <draff@usbr.gov>  
**Sent:** Mon Jul 30 2018 13:42:54 GMT-0600 (MDT)  
**To:** Kurt Wille <kwille@usbr.gov>, "Spears, John (Mark)" <jspears@usbr.gov>, Subhrendu Gangopadhyay <sgangopadhyay@usbr.gov>, Avra Morgan <aomorgan@usbr.gov>  
**CC:** Dean Marrone <dmarrone@usbr.gov>  
**Subject:** Agricultural Demands website

Not sure who to ask here but here goes - for those not on the other chain I need to present the website to the Commissioner on Wednesday. I was able to access it on the previously sent link at: <https://usbr.maps.arcgis.com/apps/MapJournal/index.html?appid=f08c6c521fe64e259b3da9771b948204>

A couple requests that can hopefully be accomplished by COB tomorrow:

- 1) Easy (I hope) -- fix the link in the opening paragraph describing that this goes along with the report. The link to the report is broken.
- 2) Medium (I hope) -- We need to add a footnote of considerable length at the mention of the climate models: I am copying and pasting that language directly below my name. Can you find a way that makes sense to add to the website?

Thanks,  
Dave

## Uncertainty

The information presented in this report was peer reviewed in accordance with the Bureau of Reclamation and Department of the Interior polices. This report is intended to inform and support planning for the future by identifying potential future scenarios. The analyses provided in this report reflect the use of best available datasets and methodologies at the time of the study.

Water resources studies are developed in collaboration with basin stakeholders to evaluate potential future scenarios to assess risks and potential actions that can be taken to minimize impacts, including supply and demand imbalances. These types of studies support a proactive approach to water resources management, using the best available science and information to develop scenarios of future conditions within the watershed. This positions communities to take steps now to mitigate the impacts of future water supply management issues, including water shortages, impacts of droughts and floods, variations in water supply, and changing water demands for water for new or different uses.

Because every water resources planning study requires the study partners to make assumptions about future conditions, addressing the uncertainties in those assumptions is an essential component of the planning process. For example, there are uncertainties associated with the characterization of future water supply and demand, demographics, environmental and other

policies, economic projections, climate conditions, and land use, to name a few. Moreover, projections are often developed using modeling techniques that themselves are only potential representations of a particular process or variable, and therefore, introduce additional uncertainties into characterizations of the future. The cumulative, interacting uncertainties are not well known in the scientific community and, therefore, are not presented within this study. By recognizing this at each process step, uncertainties are adjusted for and reduced when possible, to allow Reclamation and its stakeholders to use the best available science to create a range of possible future risks that can be used to help identify appropriate adaptation strategies, which is fundamental to the planning process. Importantly, scenarios of future conditions should not be interpreted as a prediction of the future, nor is the goal of any water resources planning study to focus on a singular future. Rather the goal is to plan for a range of possible conditions, thereby providing decision support tools for water managers.

Of significant interest are projections of future climate, which ultimately drive many assumptions of water supplies and demands through their influence on the water cycle. Projections of future climate are developed using the scientific communities' best assessment of potential future conditions as characterized by global climate models (GCMs). GCM projections are based upon initial model states, assumptions of future greenhouse gases in the atmosphere, and internal as well as external forcings, such as solar radiation and volcanic activity to name just a few. Changes in land surface, atmosphere, and ocean dynamics, as well as how such changes are best modeled in GCMs continue to be areas of active research. Depending on these and other uncertainties, projected future conditions, such as the magnitude of temperature and precipitation changes, may vary. Observed climatic data and GCM simulations show warming trends over recent decades. However, the degree to which the magnitude of GCM simulated warming agrees with historic observations, where some studies find more GCM warming<sup>1</sup> while others show warming rates more in line with observations,<sup>2, 3</sup> varies based on the data, methods, and time periods used for making such comparisons. The evaluation and refinement of GCM performance is an ongoing area of research and includes methods to characterize model outputs and observations, and how measurement errors, internal variability, and model forcings can be improved to enhance future performance.<sup>2</sup>

Further, it is important to recognize that these models perform better at global rather than regional or watershed level scales. Accordingly, techniques must be employed to localize or "downscale" GCM output for applications such as basin-specific water resources planning studies. These downscaled projections of climate are used as inputs to hydrologic models to produce projected streamflows, which are then used to assess impacts to the water resource system in question.

Uncertainties at each of the steps necessary to translate GCM output to water resources impacts can be characterized and adjusted for, yet uncertainties remain in the downscaling process that can result in variations depending on the modeling technique used.

Ultimately, future conditions at any particular time or place cannot be known exactly, given the current scientific understanding of potential future conditions. Likewise, it is important to recognize that the risks and impacts are the result of collective changes at a given location. Warming and increased carbon dioxide may increase plant water use efficiency, lengthen the agricultural growing season, but may also have adverse effects on snowpack and water availability. These complex interactions underscore the importance of using a planning approach that identifies future risks to water resources systems based on a range of plausible future conditions, and working with stakeholders to evaluate options that minimize potential impacts in ways most suitable for all stakeholders involved.

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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

## Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>

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**From:** Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Sent:** Mon Jul 30 2018 14:05:53 GMT-0600 (MDT)  
**To:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

Hi Dave, thanks for following up on this. Are you going to be in DC on Wednesday or is your discussion with the Commissioner going to be by phone? If by phone, I would like to listen in if that is ok with you. I also understand if you would rather keep it to just you and her to make it less formal etc. It is just that I want her to start connecting the dots between the new activities we are proposing, e.g., baseline assessments, and the old activities these are building from, e.g., demands analysis.

Avra

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

On Mon, Jul 30, 2018 at 1:43 PM David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

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## David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>

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**From:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Sent:** Mon Jul 30 2018 14:23:22 GMT-0600 (MDT)  
**To:** Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

I will be here and you can come join.

--

David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

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Avra

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**"Spears, John (Mark)" <jspears@usbr.gov>**

---

**From:** "Spears, John (Mark)" <jspears@usbr.gov>  
**Sent:** Mon Jul 30 2018 16:10:50 GMT-0600 (MDT)  
**To:** David Raff <draff@usbr.gov>  
**CC:** Kurt Wille <kwille@usbr.gov>, Subhrendu Gangopadhyay <sgangopadhyay@usbr.gov>, Avra Morgan <aomorgan@usbr.gov>, Dean Marrone <dmarrone@usbr.gov>  
**Subject:** Re: Agricultural Demands website

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**J. Mark Spears, PE**

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**From:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Sent:** Tue Sep 04 2018 15:01:47 GMT-0600 (MDT)  
**To:** "Spears, John (Mark)" <[jspears@usbr.gov](mailto:jspears@usbr.gov)>  
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## **"Gangopadhyay, Subhrendu" <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>**

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**From:** "Gangopadhyay, Subhrendu" <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>  
**Sent:** Tue Sep 04 2018 15:07:24 GMT-0600 (MDT)  
**To:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**CC:** "Spears, John (Mark)" <[jspears@usbr.gov](mailto:jspears@usbr.gov)>, Kurt Wille <[kwille@usbr.gov](mailto:kwille@usbr.gov)>, Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

Hi Dave,

This is great news, and thanks for all the follow-ups.

I think this is very timely as we are scoping out the outline for the 2021 report's demands sections.

Thanks again,  
Subhrendu

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Subhrendu Gangopadhyay, PhD, PE | Manager, Water Resources Engineering and Management Group | Reclamation, Technical Service Center, Denver | 303-445-2465

## "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>

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**From:** "Morgan, Avra" <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Sent:** Tue Sep 04 2018 16:31:52 GMT-0600 (MDT)  
**To:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

Hi Dave, did you learn anything about how she views this topic and/or get a sense for whether she still wants to review things like this?

Avra

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

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## "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>

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**From:** "Raff, David" <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Sent:** Wed Sep 05 2018 07:51:06 GMT-0600 (MDT)  
**To:** Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

not entirely. happy to discuss on phone today.

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On Tue, Sep 4, 2018 at 4:32 PM Morgan, Avra <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)> wrote:

Hi Dave, did you learn anything about how she views this topic and/or get a sense for whether she still wants to review things like this?

Avra

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

On Tue, Sep 4, 2018 at 3:02 PM Raff, David <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

Good Afternoon,

The Commissioner has given her approval to publish the ag demands website. Thank you for your patience.

Dave

--

David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

On Mon, Jul 30, 2018 at 4:10 PM Spears, John (Mark) <[jspears@usbr.gov](mailto:jspears@usbr.gov)> wrote:

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# Conversation Contents

Re: Agricultural Demands website

**David Raff <draff@usbr.gov>**

---

**From:** David Raff <draff@usbr.gov>  
**Sent:** Mon Jul 30 2018 16:15:18 GMT-0600 (MDT)  
**To:** "Spears, John (Mark)" <jspears@usbr.gov>  
**CC:** Kurt Wille <kwille@usbr.gov>, Subhrendu Gangopadhyay <sgangopadhyay@usbr.gov>, Avra Morgan <aomorgan@usbr.gov>, Dean Marrone <dmarrone@usbr.gov>  
**Subject:** Re: Agricultural Demands website

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**Avra Morgan <aomorgan@usbr.gov>**

---

**From:** Avra Morgan <aomorgan@usbr.gov>  
**Sent:** Mon Jul 30 2018 16:26:24 GMT-0600 (MDT)  
**To:** David Raff <draff@usbr.gov>  
**CC:** John Spears <jspears@usbr.gov>, Kurt Wille <kwille@usbr.gov>, Subhrendu Gangopadhyay <sgangopadhyay@usbr.gov>, Dean Marrone <dmarrone@usbr.gov>  
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## **Subhrendu Gangopadhyay <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>**

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**From:** Subhrendu Gangopadhyay <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>  
**Sent:** Mon Jul 30 2018 16:50:16 GMT-0600 (MDT)  
**To:** Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**CC:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>, John Spears <[jspears@usbr.gov](mailto:jspears@usbr.gov)>, Kurt Wille <[kwille@usbr.gov](mailto:kwille@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

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Thanks,  
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Sent from my iPhone

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**"Wille, Kurt" <[kwille@usbr.gov](mailto:kwille@usbr.gov)>**

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**Sent:** Tue Jul 31 2018 12:02:55 GMT-0600 (MDT)  
**To:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>  
"Spears, John (Mark)" <[jspears@usbr.gov](mailto:jspears@usbr.gov)>, Subhrendu Gangopadhyay <[sgangopadhyay@usbr.gov](mailto:sgangopadhyay@usbr.gov)>, Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>, Dean Marrone <[dmarrone@usbr.gov](mailto:dmarrone@usbr.gov)>  
**CC:**  
**Subject:** Re: Agricultural Demands website

David:

The changes you requested have been made. Take a look and let me know if these changes work.

-Kurt

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Kurt Wille

Chief, Water, Environmental, & Ecosystems Division  
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(303) 445-2285

**Avra Morgan <aomorgan@usbr.gov>**

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**From:** Avra Morgan <aomorgan@usbr.gov>  
**Sent:** Wed Aug 08 2018 08:37:21 GMT-0600 (MDT)  
**To:** David Raff <draff@usbr.gov>  
**Subject:** Re: Agricultural Demands website

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**Sent:** Wed Aug 08 2018 08:55:11 GMT-0600 (MDT)  
**To:** Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

I did speak with David and the Commissioner for approximately 20 minutes. Bottom line is that the Commissioner did not provide a decision at that time and requested some additional time to review things. I left it with her and David and plan to bring up with David this afternoon when I see him.

--

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2. Lin M, Huybers P, Lin M, Huybers P (2016) Revisiting Whether Recent Surface Temperature Trends Agree with the CMIP5 Ensemble. *Journal of Climate*, 29, 8673–8687.
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**J. Mark Spears, PE**

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## Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>

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**From:** Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)>  
**Sent:** Wed Aug 08 2018 09:04:33 GMT-0600 (MDT)  
**To:** David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)>  
**Subject:** Re: Agricultural Demands website

Ok. I will be curious to hear what Dave P has to say. Also a little surprised that she wants to spend time on this, but I guess it is a good thing that she seems to want to understand everything.

Avra

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov) | 303.445.2906 (office) | 303.330.9967 (cell)

On Wed, Aug 8, 2018 at 8:55 AM David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

I did speak with David and the Commissioner for approximately 20 minutes. Bottom line is that the Commissioner did not provide a decision at that time and requested some additional time to review things. I left it with her and David and plan to bring up with David this afternoon when I see him.

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David Raff, PhD, PE | Science Advisor and Scientific Integrity Officer | Department of the Interior Bureau of Reclamation | 1849 C Street NW, Washington DC 20240 | [draff@usbr.gov](mailto:draff@usbr.gov) | 303-445-4196 (O) | 202-440-1284 (C)

On Wed, Aug 8, 2018 at 8:37 AM Avra Morgan <[aomorgan@usbr.gov](mailto:aomorgan@usbr.gov)> wrote:

Hi Dave, what ever happened with this? Did you talk to the Commissioner last week? I think I lost this thread - I was in an ARC last week.

**Avra Morgan** | Program Analyst | **Policy and Administration** | Denver  
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On Mon, Jul 30, 2018 at 4:15 PM David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

That works for me if it does for everyone else.

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On: 30 July 2018 16:10,

"Spears, John (Mark)" <[jspears@usbr.gov](mailto:jspears@usbr.gov)> wrote:

Dave & Kurt -

I propose we revise the sentence below that's located at the end of the 2nd paragraph of the main page with a link to the "footnote."

Visitors to this website are encouraged to reference the above report for additional information on the methods used and results available from this website, [as well as a discussion on uncertainty pertaining to projections of future climate conditions located at this link.](#)

~Mark

On Mon, Jul 30, 2018 at 1:42 PM, David Raff <[draff@usbr.gov](mailto:draff@usbr.gov)> wrote:

Not sure who to ask here but here goes - for those not on the other chain I need to present the website to the Commissioner on Wednesday. I was able to access it on the previously sent link at: <https://usbr.maps.arcgis.com/apps/MapJournal/index.html?appid=f08c6c521fe64e259b3da9771b948204>

A couple requests that can hopefully be accomplished by COB tomorrow:

1) Easy (I hope) -- fix the link in the opening paragraph describing that this goes along with the report. The link to the report is broken.

2) Medium (I hope) -- We need to add a footnote of considerable length at the mention of the climate models: I am copying and pasting that language directly below my name. Can you find a way that makes sense to add to the website?

Thanks,  
Dave

Uncertainty

The information presented in this report was peer reviewed in accordance with the Bureau of Reclamation and Department of the Interior policies. This report is intended to inform and support planning for the future by identifying potential future scenarios. The analyses provided in this report reflect the use of best available datasets and methodologies at the time of the study.

Water resources studies are developed in collaboration with basin stakeholders to evaluate potential future scenarios to assess risks and potential actions that can be taken to minimize impacts, including supply and demand imbalances. These types of studies support a proactive approach to water resources management, using the best available science and information to develop scenarios of future conditions within the watershed. This positions communities to take steps now to mitigate the impacts of future water supply management issues, including water shortages, impacts of droughts and floods, variations in water supply, and changing water demands for water for new or different uses.

Because every water resources planning study requires the study partners to make

assumptions about future conditions, addressing the uncertainties in those assumptions is an essential component of the planning process. For example, there are uncertainties associated with the characterization of future water supply and demand, demographics, environmental and other policies, economic projections, climate conditions, and land use, to name a few. Moreover, projections are often developed using modeling techniques that themselves are only potential representations of a particular process or variable, and therefore, introduce additional uncertainties into characterizations of the future. The cumulative, interacting uncertainties are not well known in the scientific community and, therefore, are not presented within this study. By recognizing this at each process step, uncertainties are adjusted for and reduced when possible, to allow Reclamation and its stakeholders to use the best available science to create a range of possible future risks that can be used to help identify appropriate adaptation strategies, which is fundamental to the planning process. Importantly, scenarios of future conditions should not be interpreted as a prediction of the future, nor is the goal of any water resources planning study to focus on a singular future. Rather the goal is to plan for a range of possible conditions, thereby providing decision support tools for water managers.

Of significant interest are projections of future climate, which ultimately drive many assumptions of water supplies and demands through their influence on the water cycle. Projections of future climate are developed using the scientific communities' best assessment of potential future conditions as characterized by global climate models (GCMs). GCM projections are based upon initial model states, assumptions of future greenhouse gases in the atmosphere, and internal as well as external forcings, such as solar radiation and volcanic activity to name just a few. Changes in land surface, atmosphere, and ocean dynamics, as well as how such changes are best modeled in GCMs continue to be areas of active research. Depending on these and other uncertainties, projected future conditions, such as the magnitude of temperature and precipitation changes, may vary. Observed climatic data and GCM simulations show warming trends over recent decades. However, the degree to which the magnitude of GCM simulated warming agrees with historic observations, where some studies find more GCM warming<sup>1</sup> while others show warming rates more in line with observations,<sup>2</sup> <sup>3</sup> varies based on the data, methods, and time periods used for making such comparisons. The evaluation and refinement of GCM performance is an ongoing area of research and includes methods to characterize model outputs and observations, and how measurement errors, internal variability, and model forcings can be improved to enhance future performance.<sup>2</sup>

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