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**From:** Huang, Guobiao@DWR <Guobiao.Huang@water.ca.gov>  
**Sent:** Wednesday, March 13, 2019 9:42 AM  
**To:** brian.ellrott@noaa.gov  
**Cc:** Kadir, Tariq@DWR  
**Subject:** RE: Historical Figure of Delta exports relative to natural inflows  
**Attachments:** Unimpaired Delta inflow and total exports\_updated.xlsx

Brian,

Attached are the updated unimpaired and natural Delta inflow estimates (Table B-28 and C-23), there are only small changes in unimpaired flow values after 1998. The adjustment is for consistency in method/assumption with earlier Valley floor runoff data.

This is based on our natural and unimpaired flow draft report:

<https://water.ca.gov/-/media/DWR-Website/Web-Pages/Library/Modeling-And-Analysis/Files/Modeling-and-Analysis-PDFs/Estimates-of-Natural-and-Unimpaired-Flows-for-the-Central-Valley-of-California-1922-2014.pdf>

Thanks,

Guobiao

Guobiao Huang, Ph.D., P.E.  
Bay-Delta Office  
California Department of Water Resources  
1416 Ninth Street, Rm 252A  
Sacramento, CA 95814  
916-653-8698

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**From:** Kadir, Tariq@DWR  
**Sent:** Tuesday, March 12, 2019 3:02 PM  
**To:** Huang, Guobiao@DWR <Guobiao.Huang@water.ca.gov>  
**Subject:** FW: Historical Figure of Delta exports relative to natural inflows

**From:** Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)>  
**Sent:** Sunday, March 10, 2019 2:39 PM  
**To:** Kadir, Tariq@DWR <[Tariq.Kadir@water.ca.gov](mailto:Tariq.Kadir@water.ca.gov)>  
**Subject:** Re: Historical Figure of Delta exports relative to natural inflows

Tariq,  
Thanks for the quick response. Here's the spreadsheet I forgot to attach.

Would Wednesday at 9am work for you?

Brian

On Fri, Mar 8, 2019 at 4:45 PM Kadir, Tariq@DWR <[Tariq.Kadir@water.ca.gov](mailto:Tariq.Kadir@water.ca.gov)> wrote:

Brian-

I can provide you with the Delta inflows under natural conditions as simulated in our models. I did not find an attached spreadsheet. Regarding data related to Figure 1-1 in your e-mail I can provide you with partial data from our modeling efforts. However, another good source are the staff who work on the California Water Plan. For clarifications can we schedule a conference call next week? I'm available most days except next Friday.

Thanks,

Tariq

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**From:** Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)>

**Sent:** Friday, March 8, 2019 11:40 AM

**To:** Kadir, Tariq@DWR

**Subject:** Historical Figure of Delta exports relative to natural inflows

Tariq,

As you can see below, Derek Hilts suggested I contact you for some data that I'm trying to find. I'm looking for a figure or data so I can show total annual Delta exports divided by total annual natural Delta inflow over time. I think that would be a reasonable way to show the percentage of water exported from the Delta, relative to what came in, but I welcome advice on this.

The attached spreadsheet shows what I'm trying to do. I'm looking for the data to fill in column R.

Additionally, do you know of data like shown below for CA's water distribution, that is specific to the Central Valley? I'm interested in seeing a pie chart that breaks out Central Valley water by urban, ag, and environmental uses.

**Figure 1-1 California Water: How It Was Used and Where It Came From, 2011–2015**

Water Year	2011	2012	2013	2014	2015
% Average Rainfall	134%	75%	77%	56%	77%
Precipitation in millions of acre feet (MAF)	248.1	138.9	142.0	102.6	143.3
<b>Applied Water - how water was used ...</b>					
	millions of acre feet				
Urban	<b>7.7</b>	<b>8.3</b>	<b>8.3</b>	<b>8.1</b>	<b>7.0</b>
Large Landscape	0.6	0.8	0.7	0.8	0.7
Commercial	1.1	1.1	1.2	1.1	1.0
Industrial	0.4	0.4	0.4	0.3	0.3
Energy Production	0.1	0.1	0.1	0.1	0.1
Residential - Interior	2.4	2.7	2.7	2.9	2.4
Residential - Exterior	2.3	2.4	2.5	2.4	1.9
Conveyance Applied Water	0.4	0.4	0.4	0.4	0.3
Groundwater Recharge Applied Water	0.5	0.5	0.2	0.1	0.2
<b>Irrigated Agriculture</b>	<b>31.7</b>	<b>35.0</b>	<b>35.7</b>	<b>35.0</b>	<b>32.4</b>
Applied Water - Crop Production	26.9	31.6	32.6	32.5	30.5
Conveyance Applied Water	3.4	3.0	2.9	2.3	1.8
Groundwater Recharge Applied Water	1.4	0.3	0.2	0.2	0.1
<b>Environmental Water</b>	<b>53.2</b>	<b>33.9</b>	<b>29.8</b>	<b>21.7</b>	<b>24.7</b>

Thanks,  
Brian

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

From: **Brian Ellrott - NOAA Federal** <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)>  
 Date: Thu, Mar 7, 2019 at 7:07 PM  
 Subject: Re: [EXTERNAL] Historic Exports  
 To: Hilts, Derek <[derek\\_hilts@fws.gov](mailto:derek_hilts@fws.gov)>  
 Cc: Cathy Marcinkevage - NOAA Federal <[cathy.marcinkevage@noaa.gov](mailto:cathy.marcinkevage@noaa.gov)>

No problem at all. Thanks for the DWR contact.

On Thu, Mar 7, 2019 at 5:18 PM Hilts, Derek <[derek\\_hilts@fws.gov](mailto:derek_hilts@fws.gov)> wrote:

Hi Brian,  
 I don't have the natural flow estimates, but I would think DWR would. I suggest you contact Tariq Kadir at DWR ([kadir@water.ca.gov](mailto:kadir@water.ca.gov)) for any numbers referenced in the report. Sorry I can't be of more help.  
 Derek

Derek Hilts M.S., P.E.  
 US Fish and Wildlife Service  
 650 Capitol Mall Room 8-300  
 Sacramento, California 95814  
 Work desk phone 916.930.5633

On Thu, Mar 7, 2019 at 1:10 PM Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)> wrote:

After reading the DWR report you sent, it seems that total Delta exports divided by total natural Delta inflow would better represent the percentage taken out. I didn't see a companion table for natural inflow like Appendix B's Table B-28, although there are some data on natural Delta inflows. Any advice on a next step?

On Wed, Mar 6, 2019 at 3:57 PM Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)> wrote:

Yes, super helpful. Thanks Derek.

On Wed, Mar 6, 2019 at 4:37 PM Hilts, Derek <[derek\\_hilts@fws.gov](mailto:derek_hilts@fws.gov)> wrote:

In case it helps, I put the table in Excel (double check me) along with the combined Tracy and Banks exports. (attached).

Derek

Derek Hilts M.S., P.E.  
US Fish and Wildlife Service  
650 Capitol Mall Room 8-300  
Sacramento, California 95814  
Work desk phone 916.930.5633

On Wed, Mar 6, 2019 at 2:33 PM Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)> wrote:

Thanks Derek. Those data seem like what I'm after, but I'll look to understand the caveats you mentioned.

On Wed, Mar 6, 2019 at 2:22 PM Hilts, Derek <[derek\\_hilts@fws.gov](mailto:derek_hilts@fws.gov)> wrote:

Hey Brian,

I don't know if you intentionally said "unimpaired Delta inflow", but I will assume you did. See Appendix B's Table B-28 of the attached report.

Unimpaired flow estimates have a gigantic number of caveats that come with them. The attached report has a ton of information that might be of interest to you.

Derek

Derek Hilts M.S., P.E.  
US Fish and Wildlife Service  
650 Capitol Mall Room 8-300  
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On Wed, Mar 6, 2019 at 1:51 PM Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)> wrote:

Hi Derek,

Some day this project will push you out the door, but I'm really glad it hasn't happened yet. Thanks for the export data!

Any chance you would have data or a figure on the percentage of CVP/SWP Delta exports relative to total unimpaired Delta inflow over that same or a similar historic time period? As in what's the percent taken out each year.

Thanks,  
Brian

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

From: **Cathy Marcinkevage - NOAA Federal** <[cathy.marcinkevage@noaa.gov](mailto:cathy.marcinkevage@noaa.gov)>  
Date: Fri, Mar 1, 2019 at 4:14 PM  
Subject: Fwd: [EXTERNAL] Historic Exports  
To: Brian Ellrott <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)>

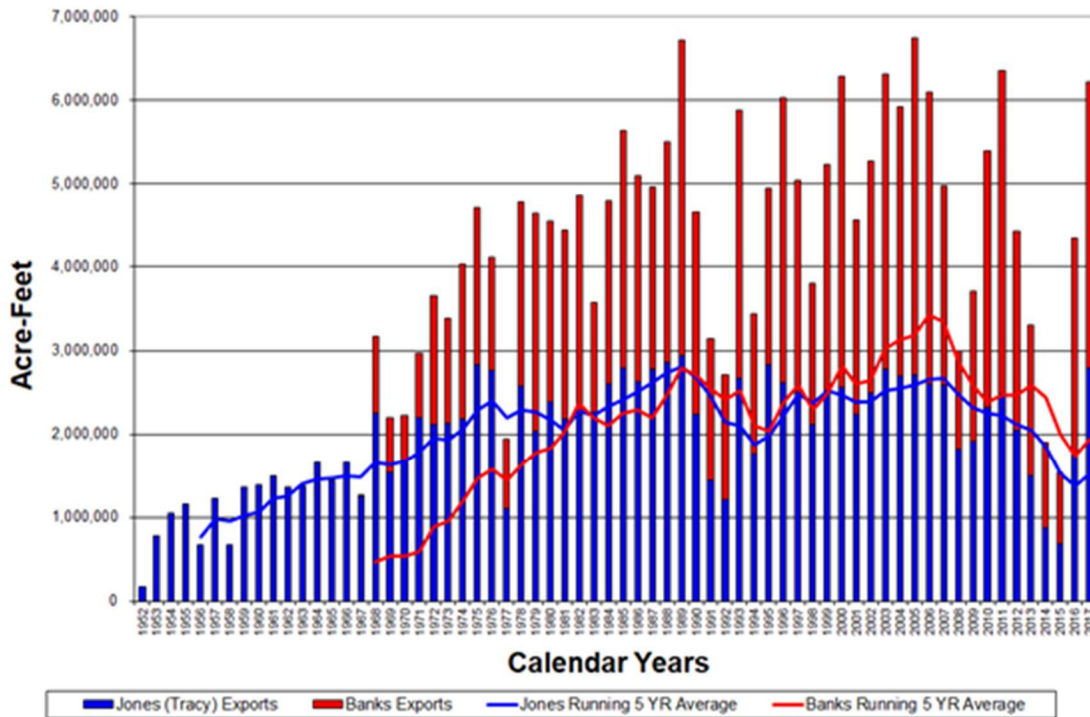
Try this? Want it to go longer?

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

From: **Hilts, Derek** <[derek\\_hilts@fws.gov](mailto:derek_hilts@fws.gov)>  
Date: Fri, Mar 1, 2019 at 4:04 PM  
Subject: Re: [EXTERNAL] Historic Exports  
To: Cathy Marcinkevage - NOAA Federal <[cathy.marcinkevage@noaa.gov](mailto:cathy.marcinkevage@noaa.gov)>

Cathy,  
I have this chart, but it only goes through Dec 2017. I can update it for 2018 numbers on Monday if you want.  
Derek

**Annual Historical Delta Export Pumping Volumes**



Derek Hilts M.S., P.E.  
US Fish and Wildlife Service  
650 Capitol Mall Room 8-300  
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