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**From:** Evan Sawyer - NOAA Federal <evan.sawyer@noaa.gov>  
**Sent:** Wednesday, April 17, 2019 11:34 AM  
**To:** Kate Spear - NOAA Federal; Stephen Maurano - NOAA Federal  
**Cc:** Cathy Marcinkevage - NOAA Federal  
**Subject:** Fwd: [EXTERNAL] Inimpaired Flow Hydrograph  
**Attachments:** DWRpublication\_UF\_May2007aVersion.pdf; SacramentoRiver\_UnimpairedFlow\_4NOAA.xlsx

Hey Stephen, Kate,

Attached is an excel file of unimpaired, average monthly flow at Red Bluff. Also included is a DWR report in which those flows were calculated.

I'm not totally sure how best to summarize this information (there are limitations given the format but I'm open to suggestions or ideas!) but what I'd like to describe is, generally what un-managed flows are like in the Sac River. This way I can describe how the life history adaptations are (may be) incongruent with water operations. Not sure if including [WYT](#) would be helpful or not. Also if units could be converted to cfs that would be helpful.

Take a look and let's talk,  
Evan

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

**From:** **Hilts, Derek** <[derek\\_hilts@fws.gov](mailto:derek_hilts@fws.gov)>  
**Date:** Wed, Apr 17, 2019 at 8:53 AM  
**Subject:** Re: [EXTERNAL] Inimpaired Flow Hydrograph  
**To:** Cathy Marcinkevage - NOAA Federal <[cathy.marcinkevage@noaa.gov](mailto:cathy.marcinkevage@noaa.gov)>, <[Evan.Sawyer@noaa.gov](mailto:Evan.Sawyer@noaa.gov)>

Hi Cathy,

Here (attached) is a report DWR put out around 10 years ago with unimpaired flow estimates for WY1922-WY2003.

I pulled out the table for the Sac River near Red Bluff and added more recent years' data per documentation in the attached workbook.

I'll leave it to Evan to decide how he wants to chart the data.

Derek

Derek Hilts M.S., P.E.  
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On Tue, Apr 16, 2019 at 2:33 PM Cathy Marcinkevage - NOAA Federal <[cathy.marcinkevage@noaa.gov](mailto:cathy.marcinkevage@noaa.gov)> wrote:

Hey Derek --

Have you seen, or do yo have an idea of the difficulty in generating, a hydrograph of average unimpaired flow ("full natural flow"?) for the upper Sac, say below Keswick? Evan could find that to be useful so I'm poking to find one.

Thanks -  
Cathy

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