Streamflow Permanence Monitoring
For June 2019 Meeting, USPP Tech Comm

Data sources:

- Game cameras to look for presence or absence of water along the San Pedro River, cameras run by USDA-ARS Tombstone office since mid-2006. Data available upon request.
- Stream gauge data from USGS website, daily average flow from Charleston Gauge (data since April 2019 flow data is provisional)
- Rain gage data for Coronado NM and Y Lightning at http://drought.rcc-acis.org/. Sierra Vista average from ARS gages 423-426, Tombstone data from ARS gage 81.

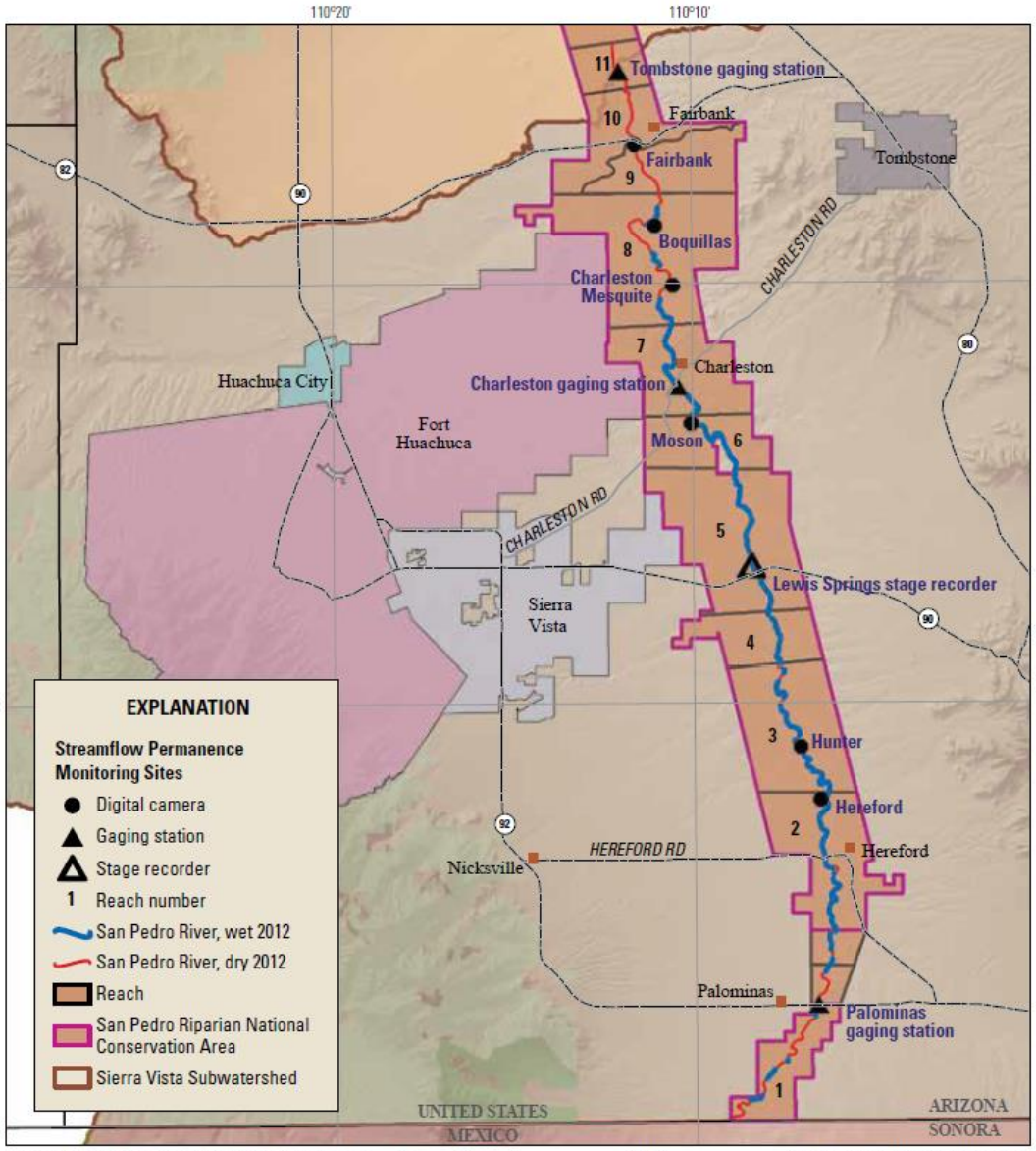
Presenter: Russ Scott, Research Hydrologist, USDA-ARS, Tucson, AZ. russ.scott@ars.usda.gov


6/08/07 5:00 PM USDA-ARSUSPP*c5
Cuddeback


10/02/07 4:00 PM USDA-ARSUSPP*c5
Cuddeback


6/09/07 7:00 AM USDA-ARSUSPP*c5
Cuddeback


8/29/07 10:00 AM USDA-ARSUSPP*c5
Cuddeback



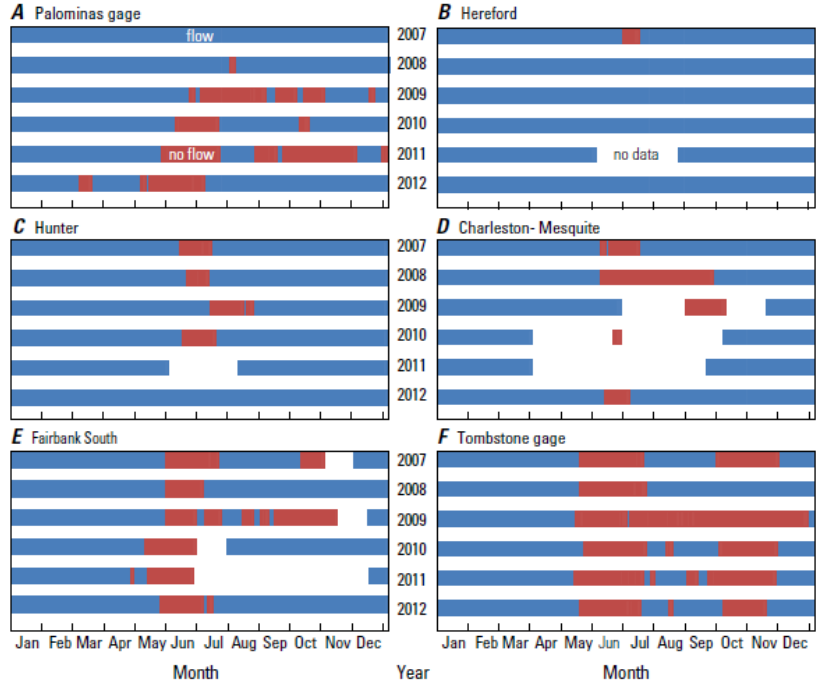


Figure 27. Graphs showing streamflow permanence as a function of month and year at sites along the San Pedro River in the Sierra Vista Subwatershed, southeastern Arizona. *A*, Palominas gage; *B*, Hereford; *C*, Hunter; *D*, Charleston-Mesquite; *E*, Fairbank South; *F*, Tombstone gage. Lewis Springs, Charleston, Moson, and Boquillas sites were perennial for period of record and are not shown. Blue indicates flow, red indicates no flow, and white indicates no data available.

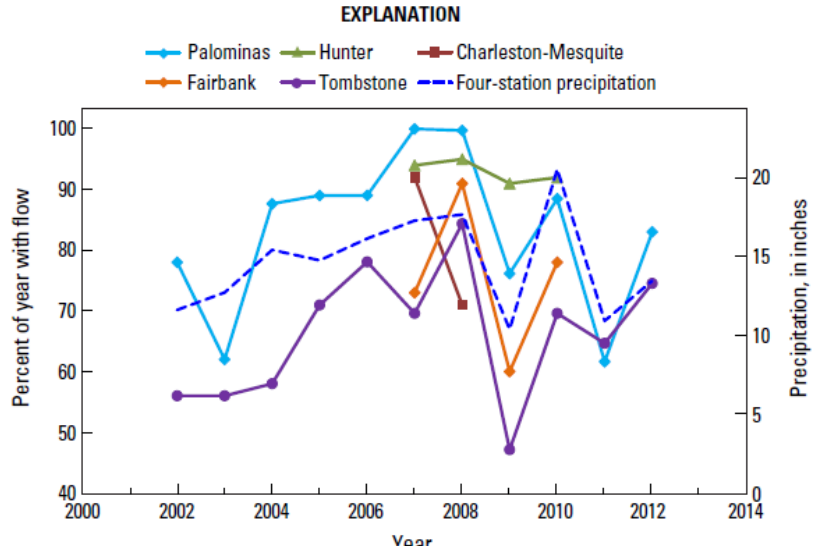
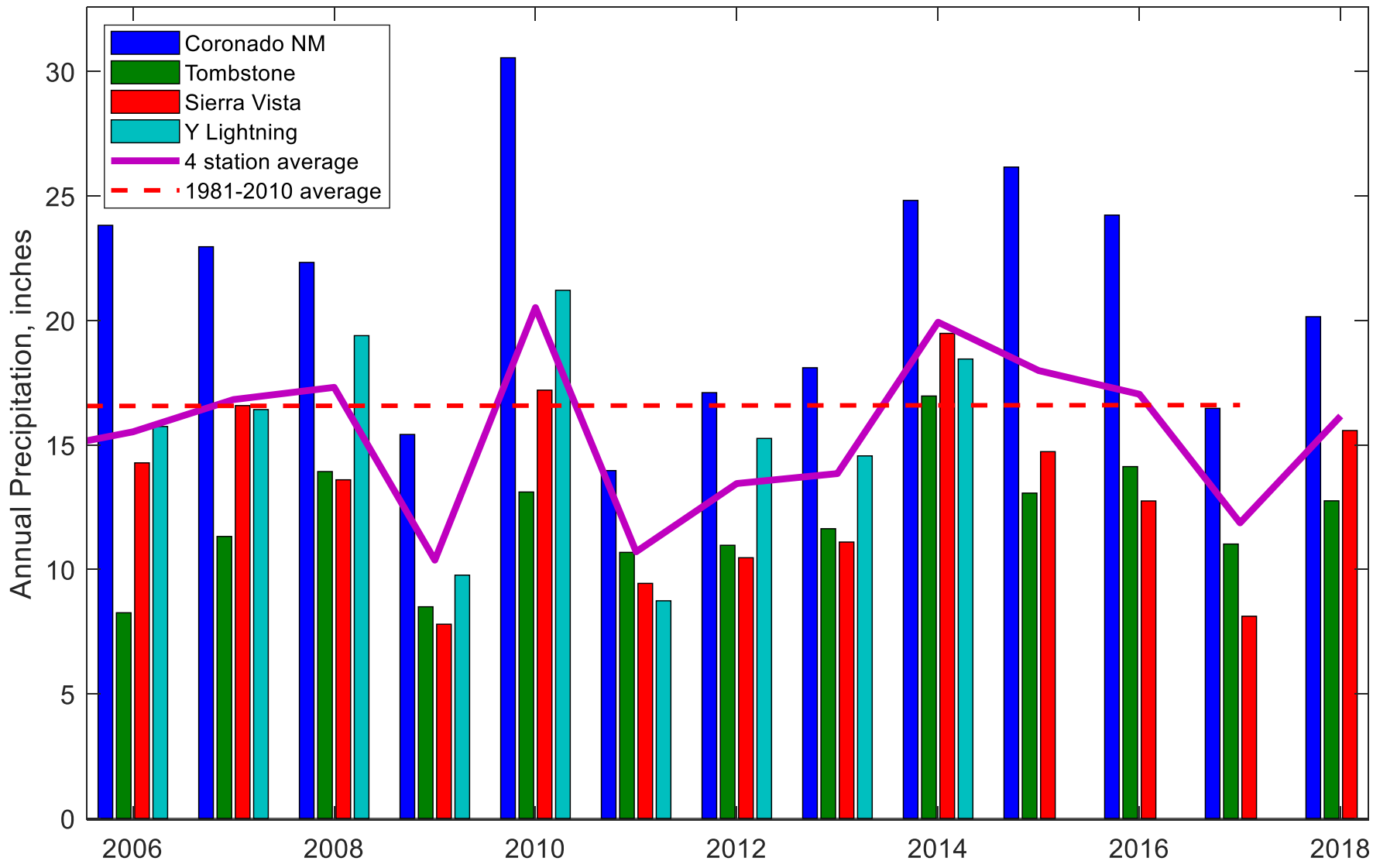
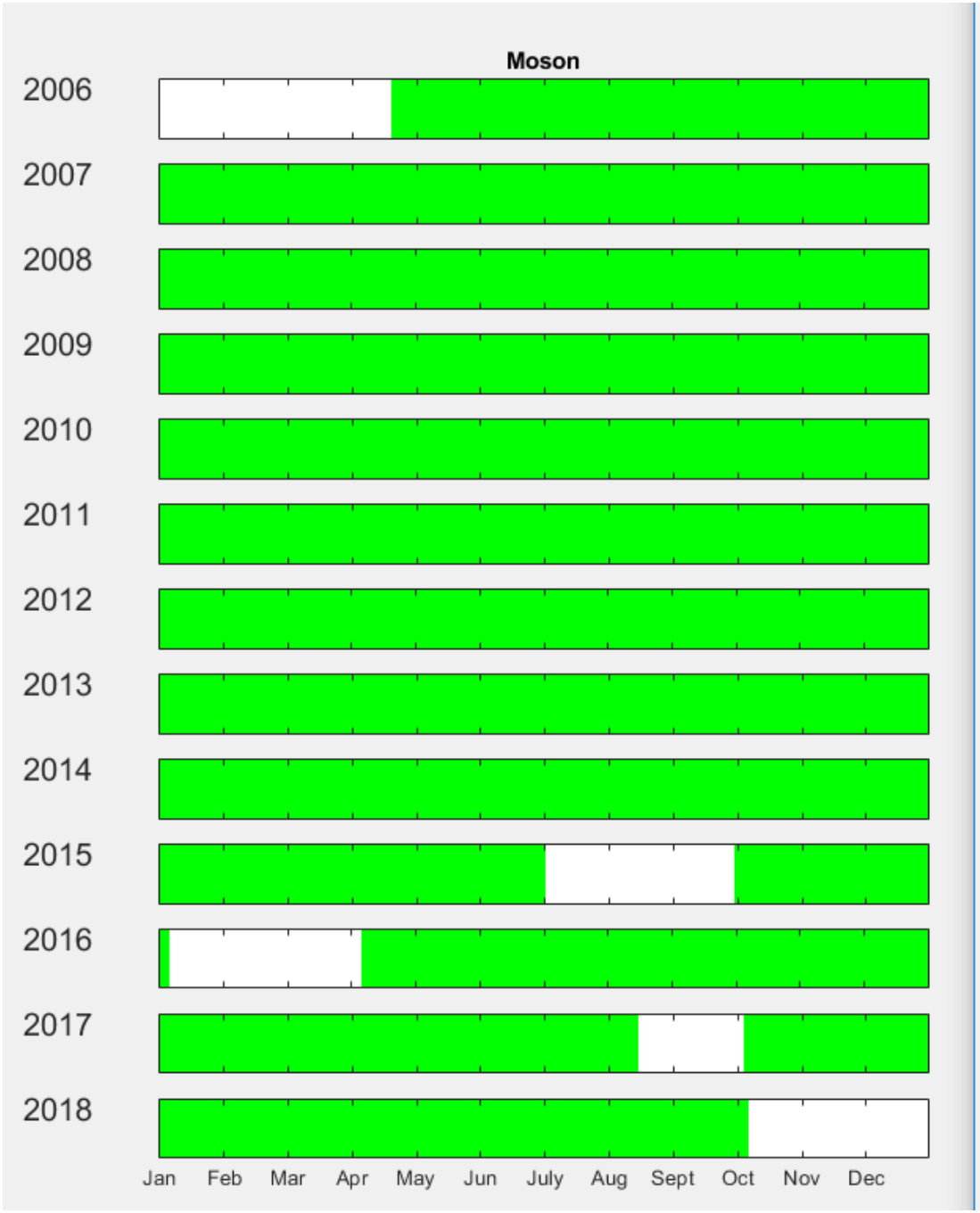
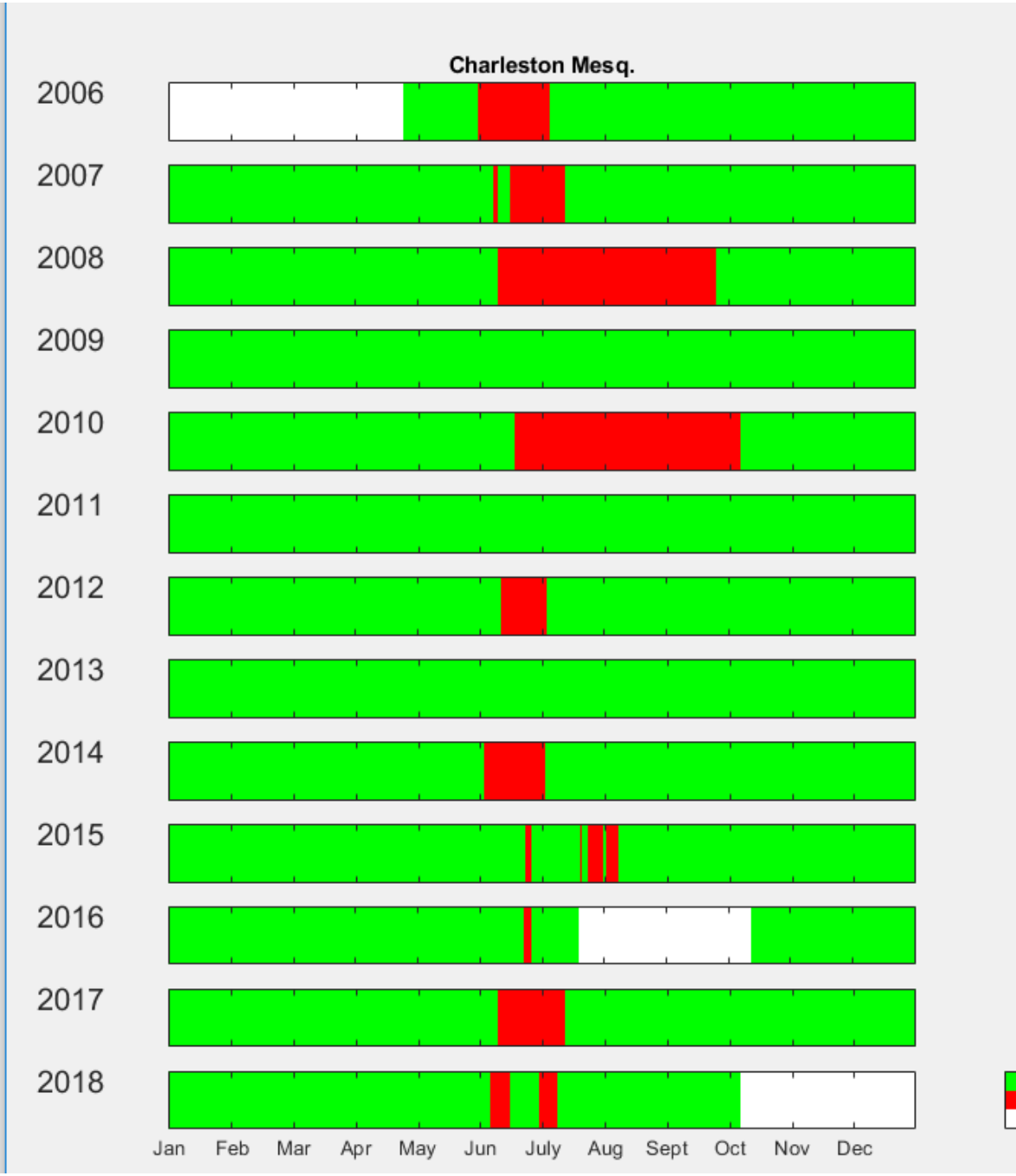


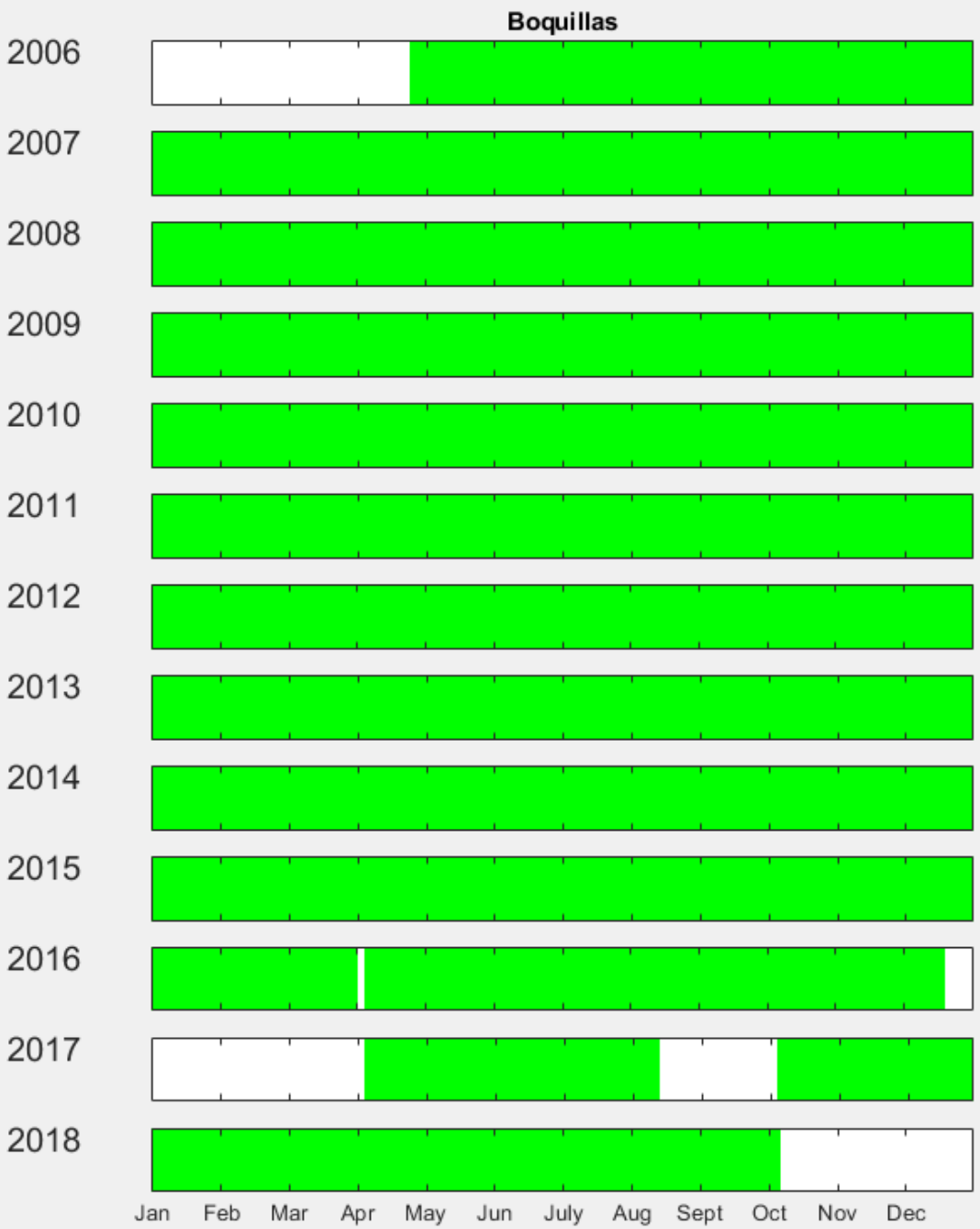
Figure 28. Graph showing San Pedro River annual streamflow permanence and annual precipitation (mean of four National Climate Data Center precipitation gaging stations) for 2002–12, in the Sierra Vista Subwatershed, southeastern Arizona. Stations with 100-percent flow permanence are not shown (Hereford, Hunter, Lewis Springs, Moson, Charleston, Boquillas).

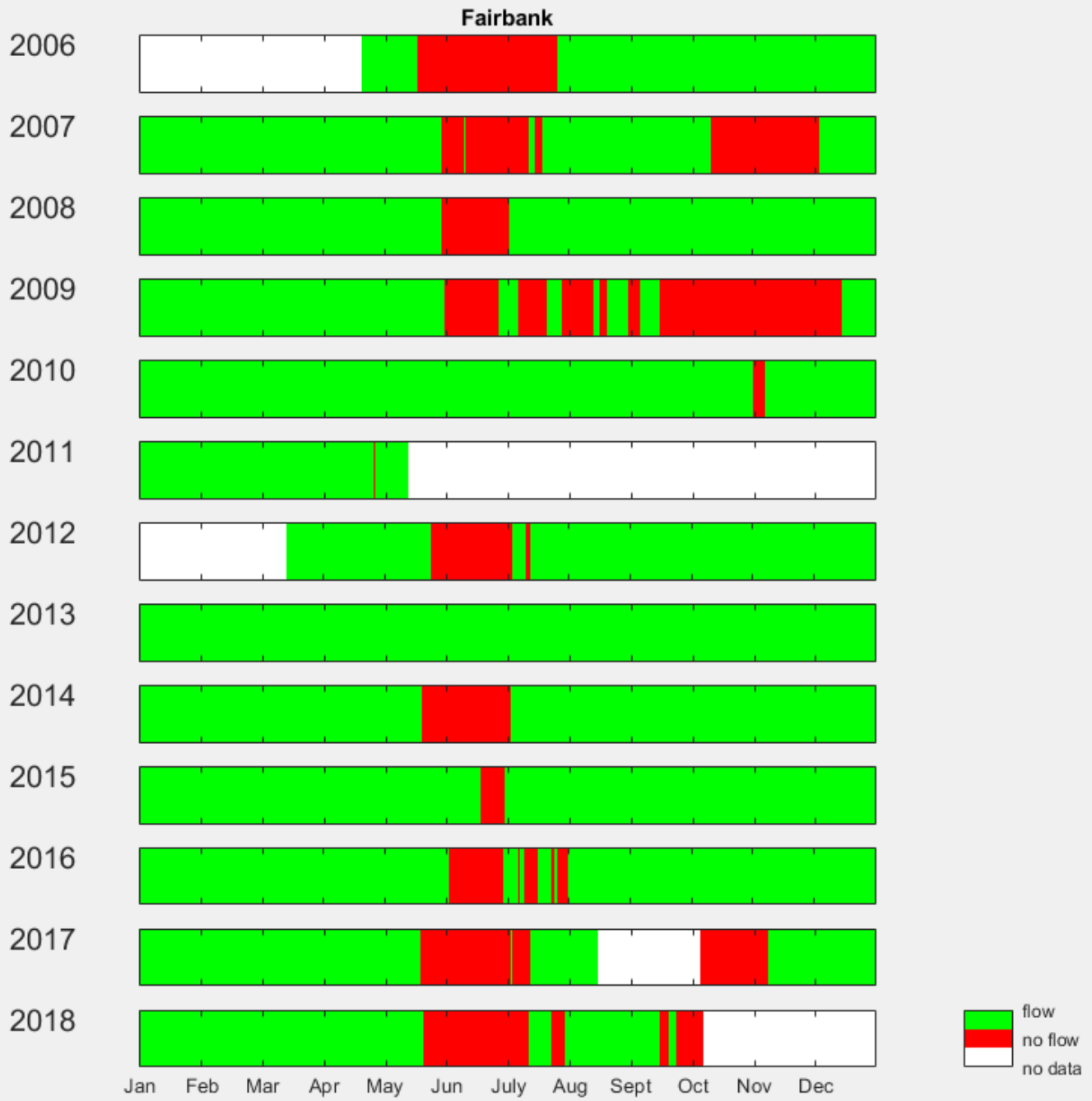

Coronado NM
Tombstone
Sierra Vista
Y Lightning
4 station average
1981-2010 average
Annual Precipitation, inches
0
5
10
15
20
25
30
2006
2008
2010
2012
2014
2016
2018

Some interpolation done to fill smaller gaps. Flow indicated continuous or ponded water.

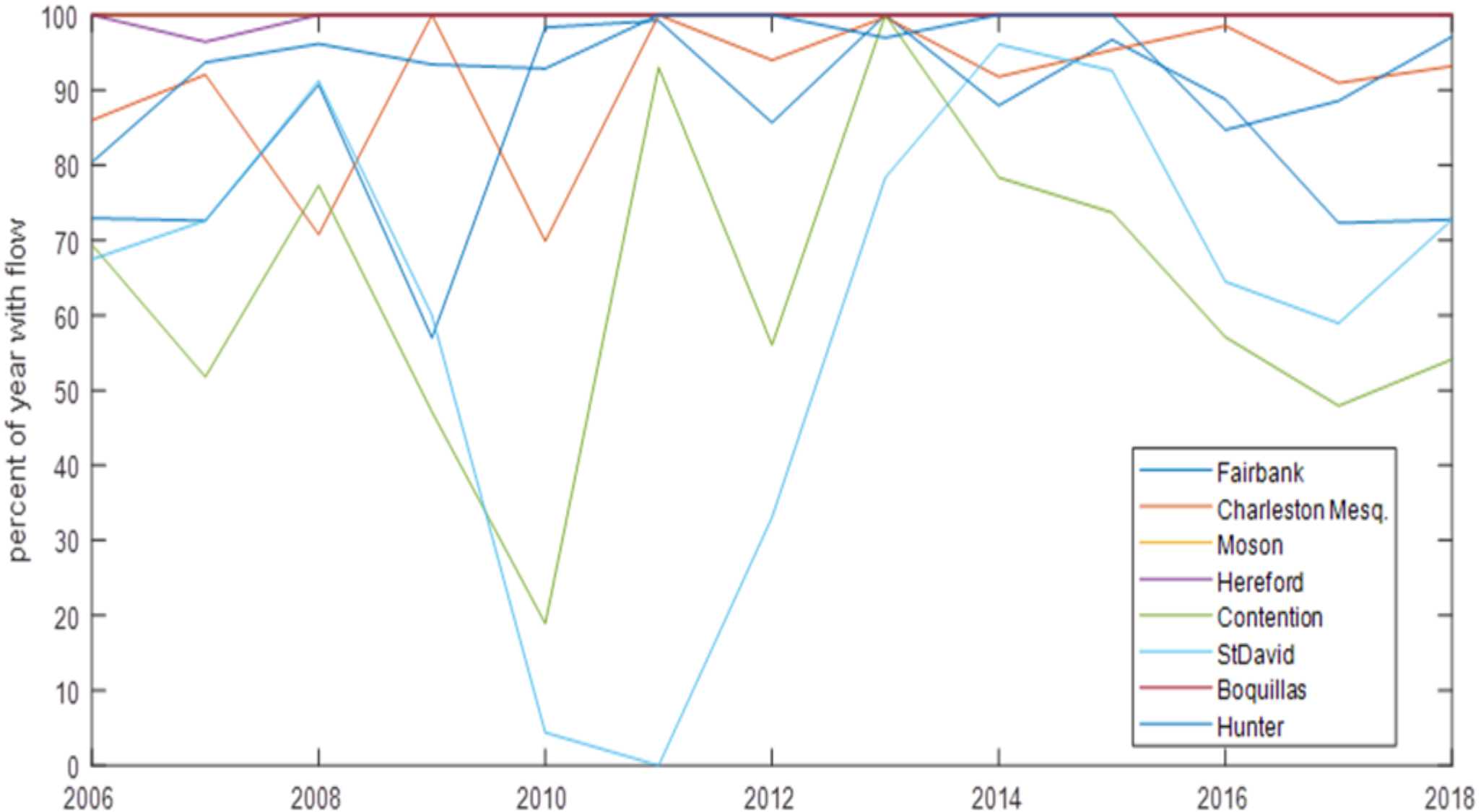

Moson
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sept
Oct
Nov
Dec


Charleston Mesq.
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sept
Oct
Nov
Dec


Boquillas
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sept
Oct
Nov
Dec

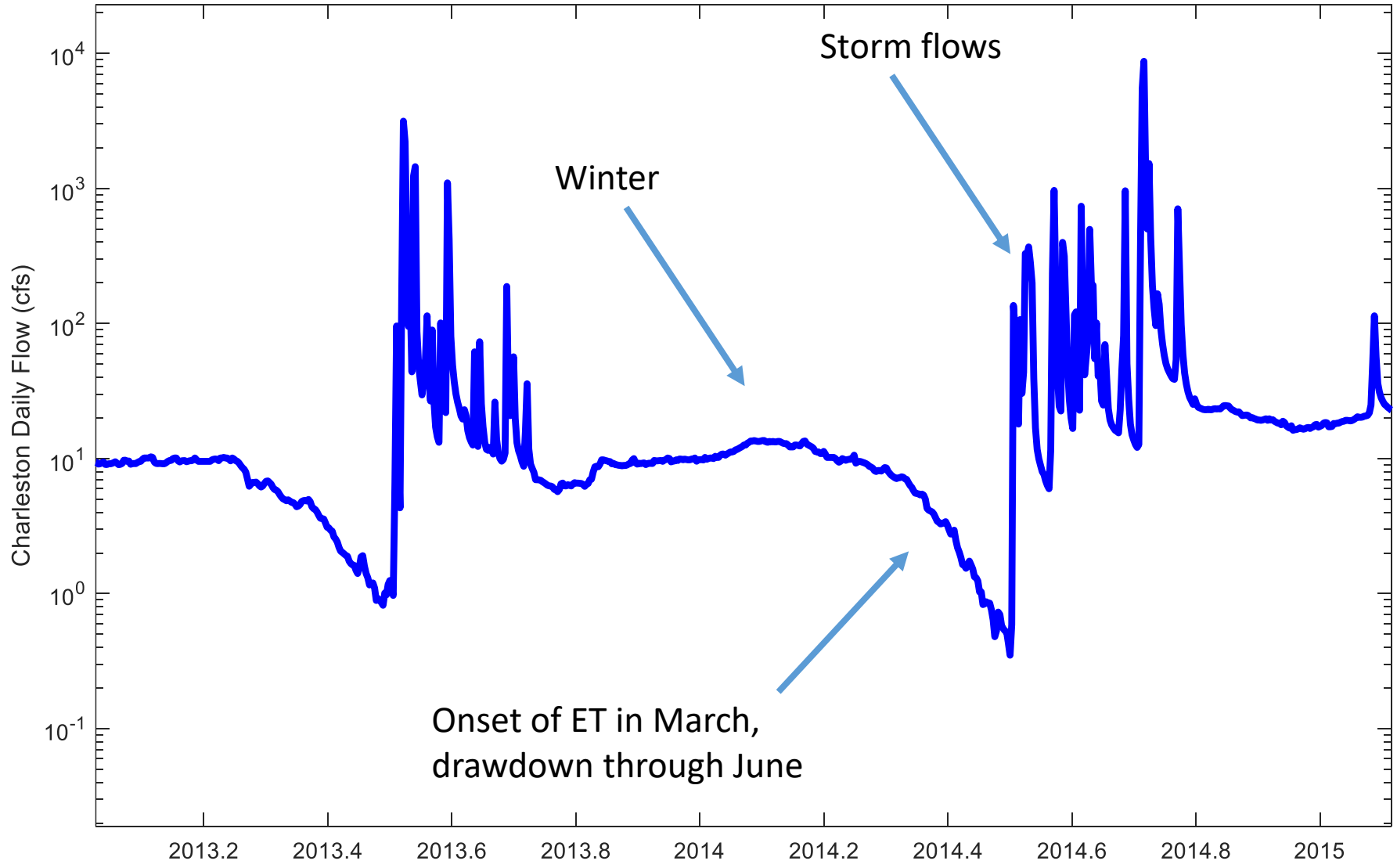

Fairbank
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sept
Oct
Nov
Dec
flow
no flow
no data

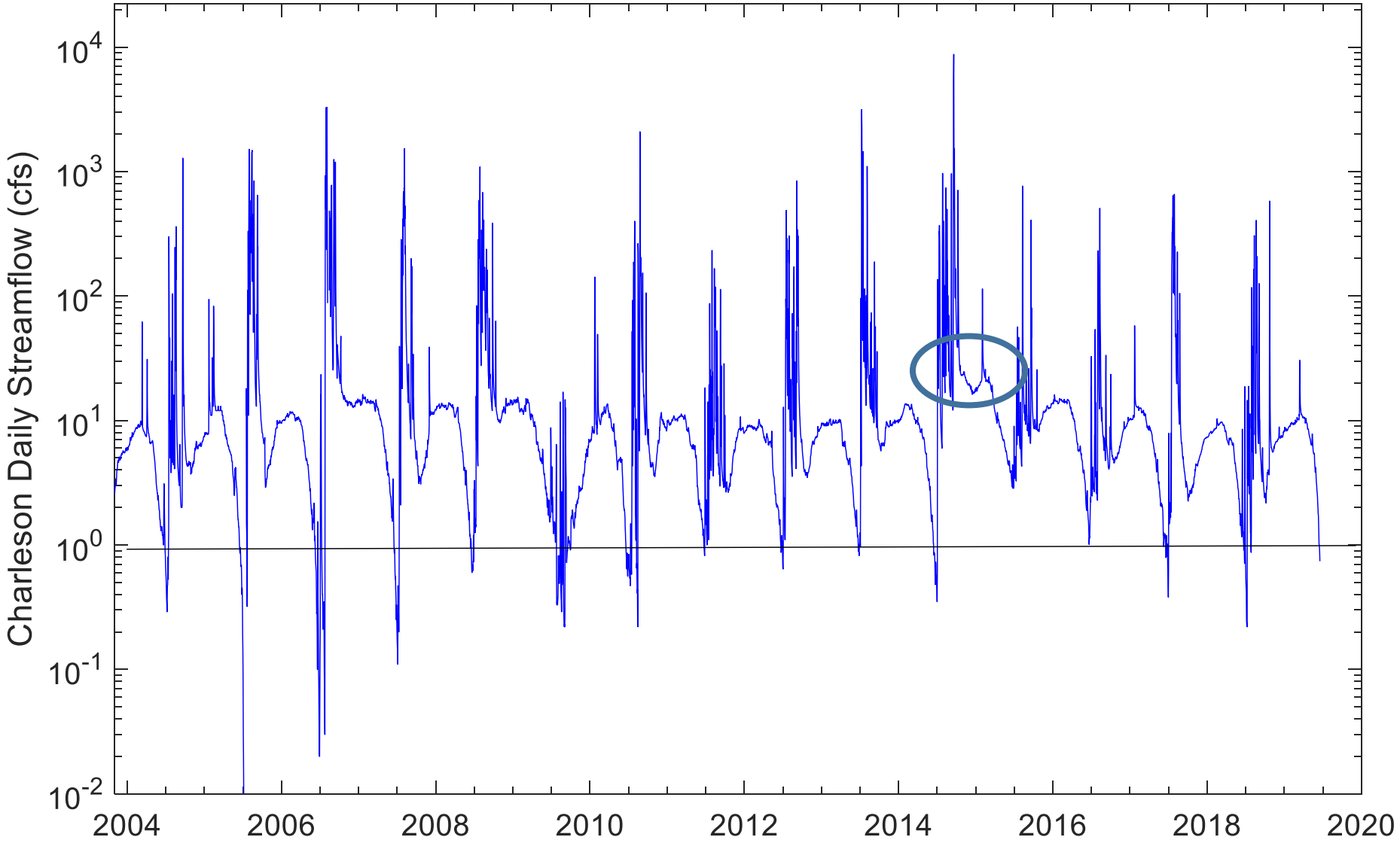

Contention
StDavid
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sept
Oct
Nov
Dec
flow
no flow
no data

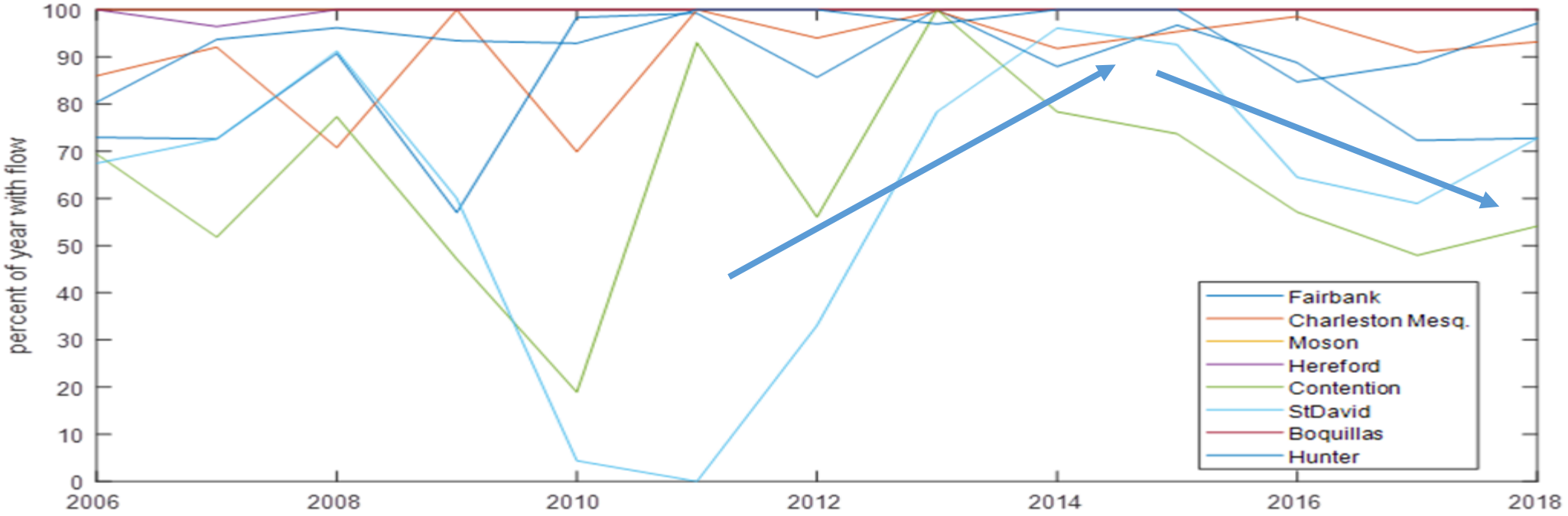


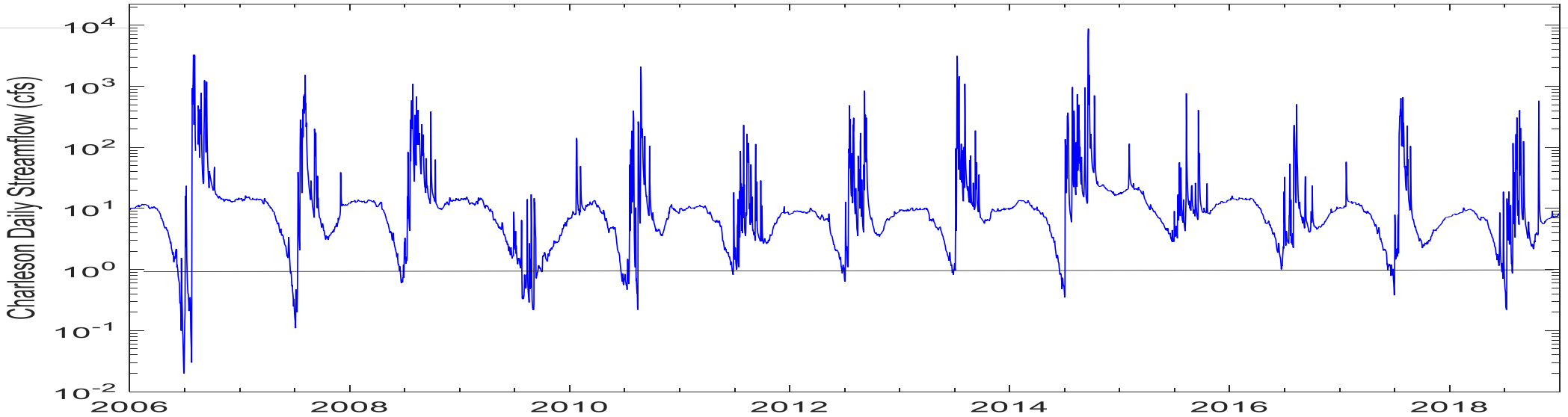
This needs some work and filtering for years with critical gaps

Seasonality of San Pedro Streamflow




Charleson Daily Streamflow (cfs)
10^4
10^3
10^2
10^1
10^0
10^{-1}
10^{-2}
2004
2006
2008
2010
2012
2014
2016
2018
2020


percent of year with flow
100
90
80
70
60
50
40
30
20
10
0
2006
2008
2010
2012
2014
2016
2018
Fairbank
Charleston Mesq.
Moson
Hereford
Contention
StDavid
Boquillas
Hunter


Charleson Daily Streamflow (cfs)
10^4
10^3
10^2
10^1
10^0
10^{-1}
10^{-2}
2006
2008
2010
2012
2014
2016
2018

1. Are these data valuable? How so?
2. If we continue, can we reduce the number of stations?

Quick Low Flow Update