

# CalSim-simulated impacts of proposed NMFS amendment to CVP operations

-- DRAFT --

2017.06.14

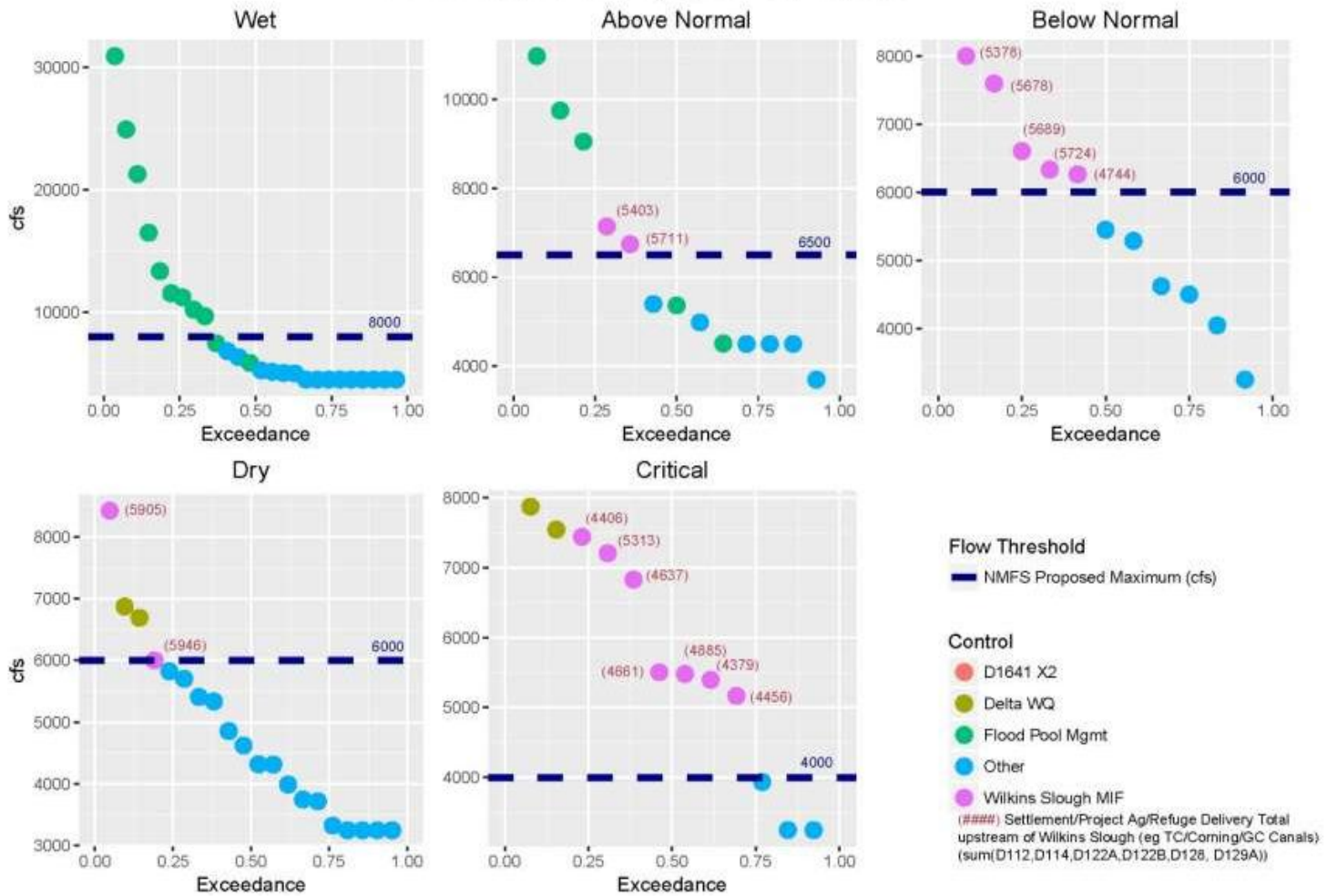
# Analysis:

- **Two scenarios** represented in CalSim simulations
- No specific logic that guarantees Shasta storage levels
  - Attempt to meet targets by reducing allocations
- Two scenarios:
  - “Current Ops”
  - “NMFS Amendment”

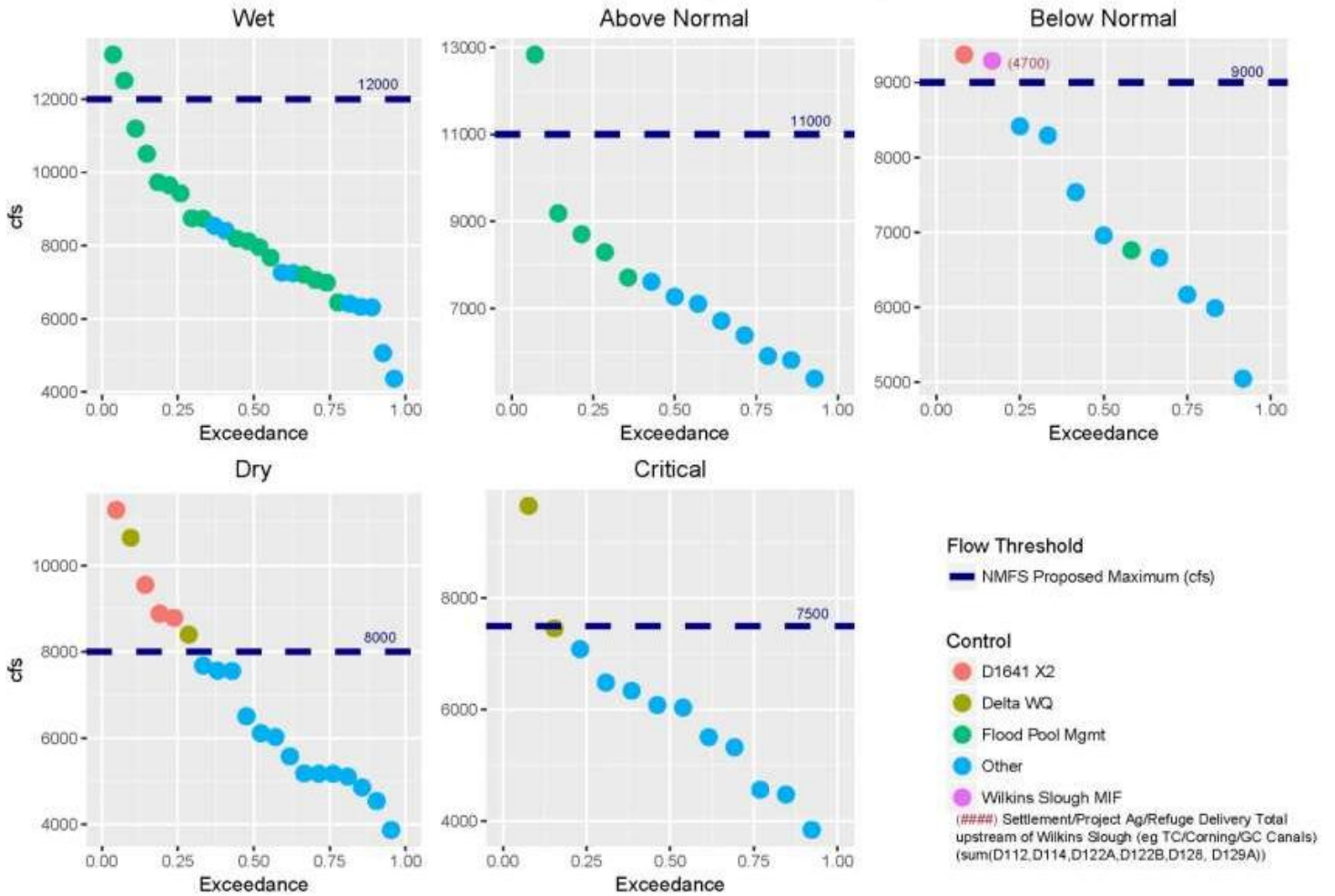
# Analysis: Two Scenarios

- “Current Ops”
  - Attempts to replicate shortage allocation approaches taken during recent drought sequence
- “NMFS Amendment”
  - Allows for any shortage allocation necessary, even to extent that Exchange and Settlement Contractors are reduced to 0
    - Not a policy or realistic strategy, but used to test ability to reach targets under any supply condition
  - Shasta-Folsom balance adjusted to promote delivery from Folsom rather than Shasta

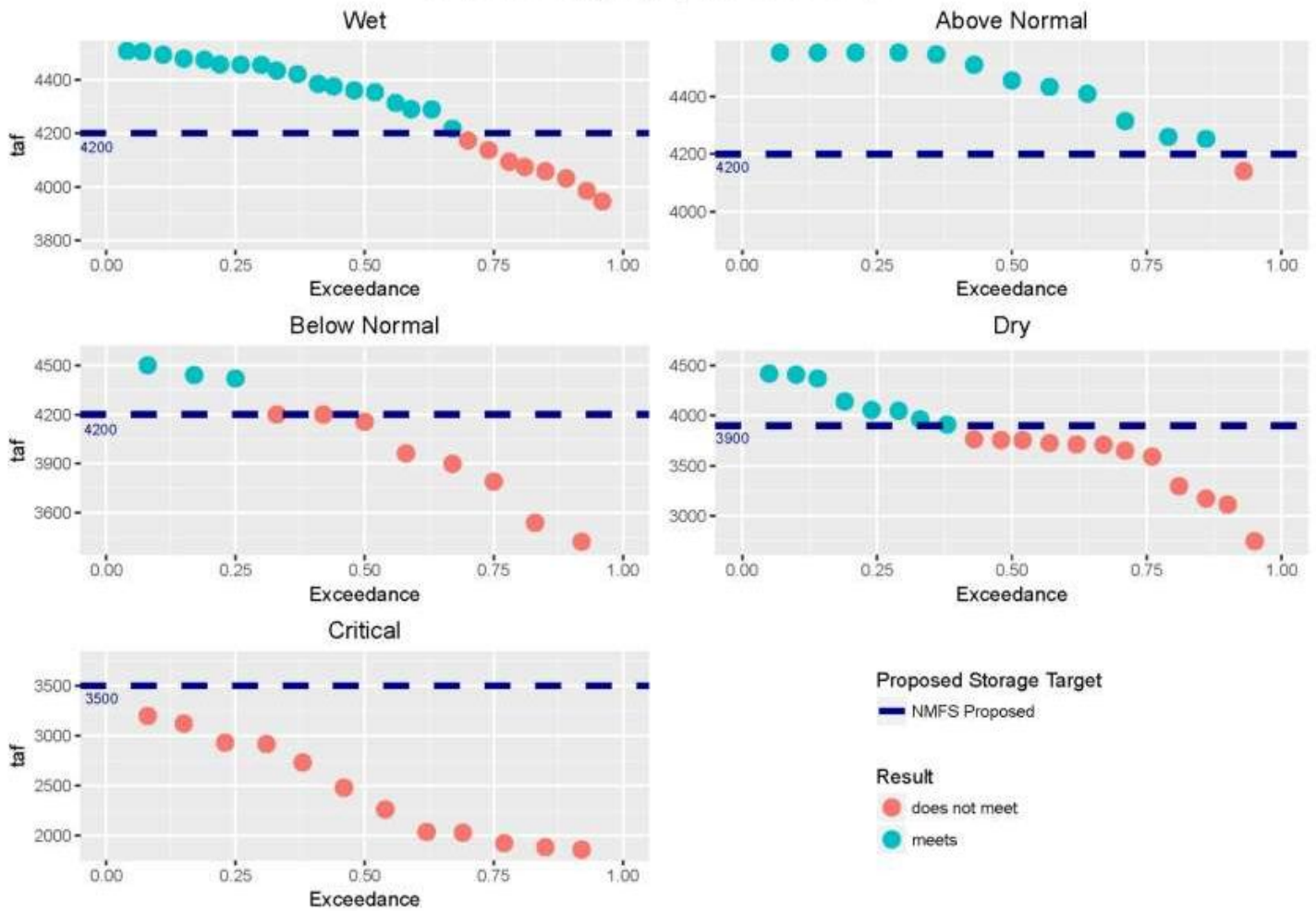
## Keswick release limits, April – Current Ops



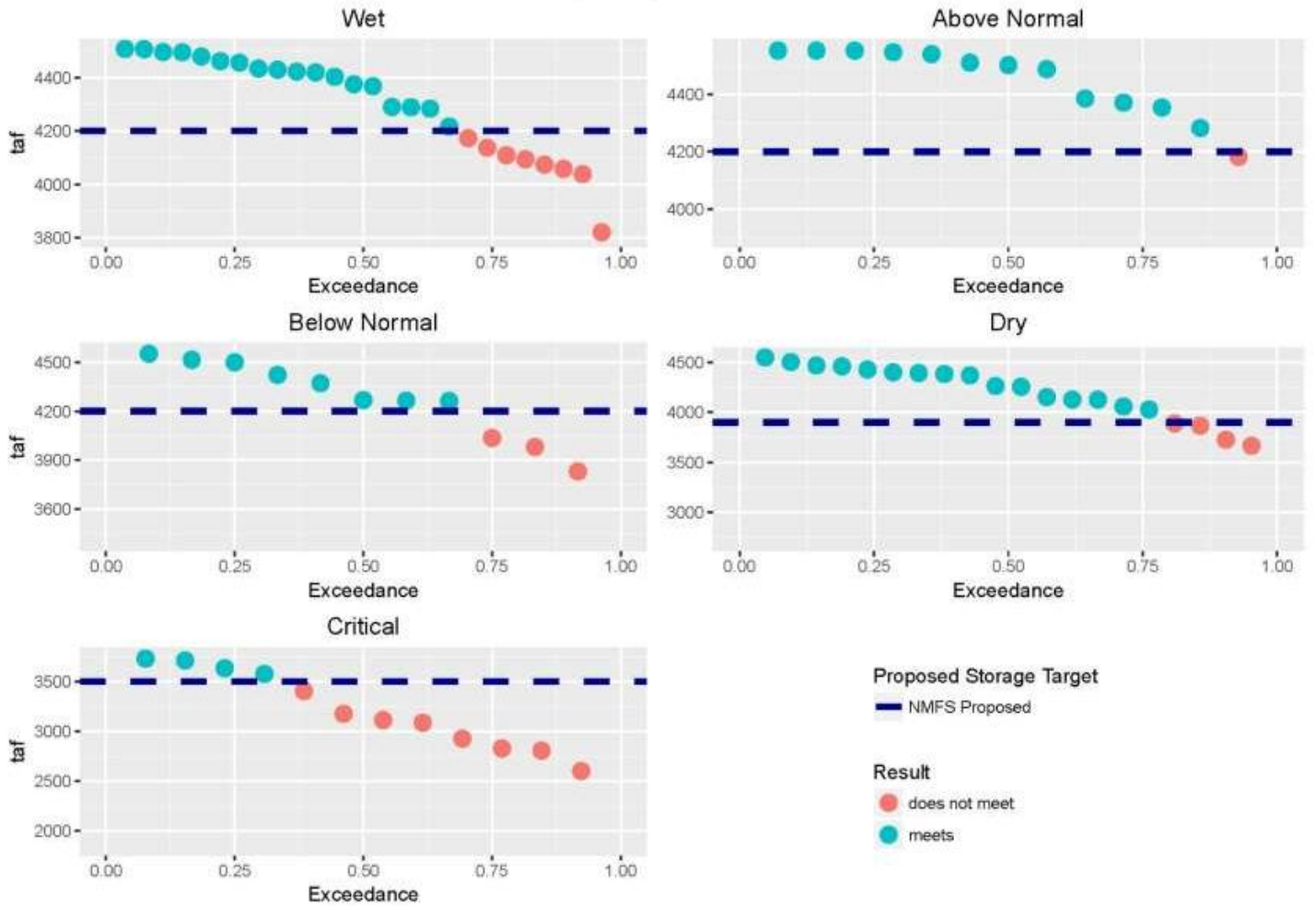
### Keswick release limits, May – Current Ops



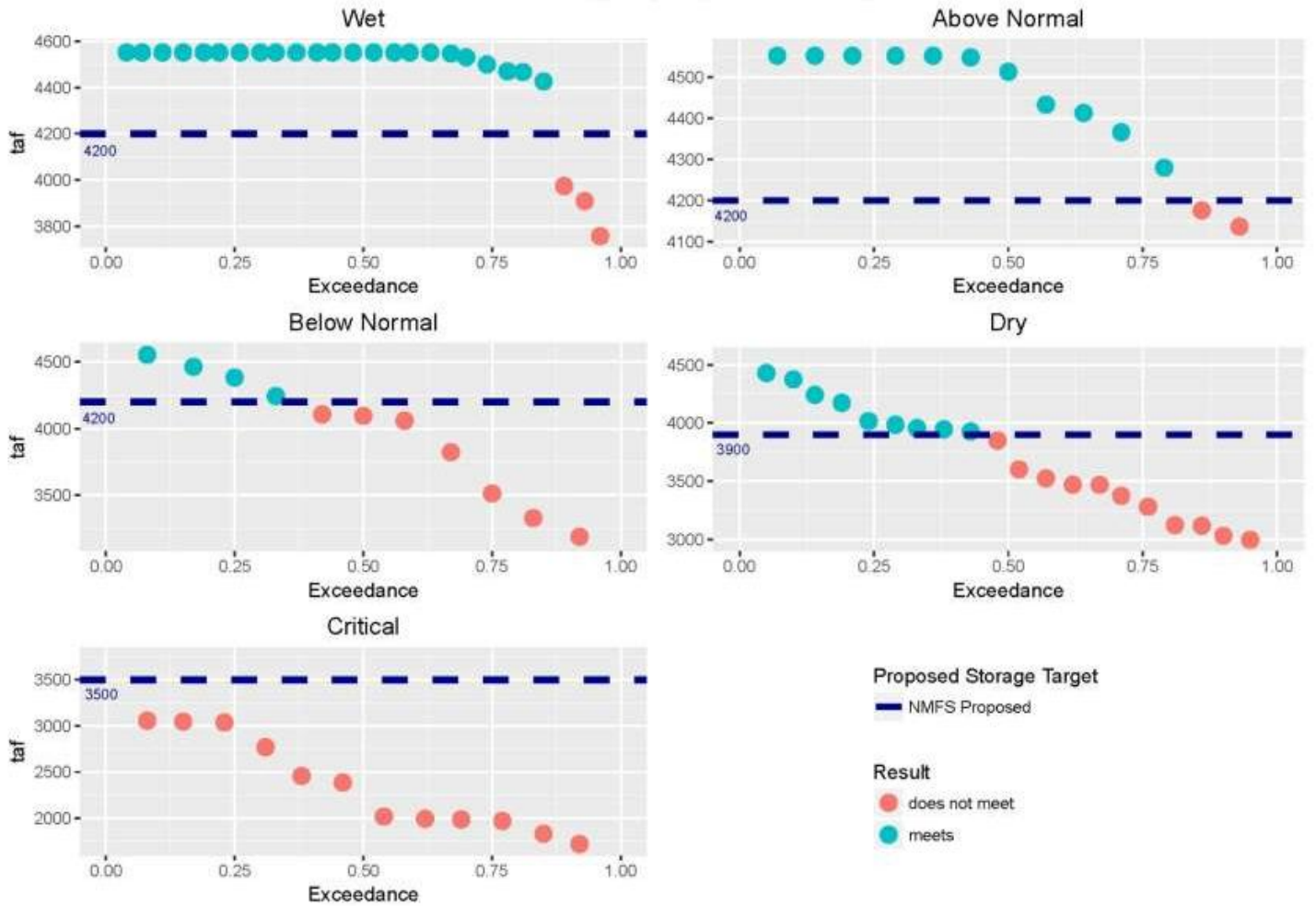
### Shasta Fill Targets, April – Current Ops



### Shasta Fill Targets, April – NMFS Amendment

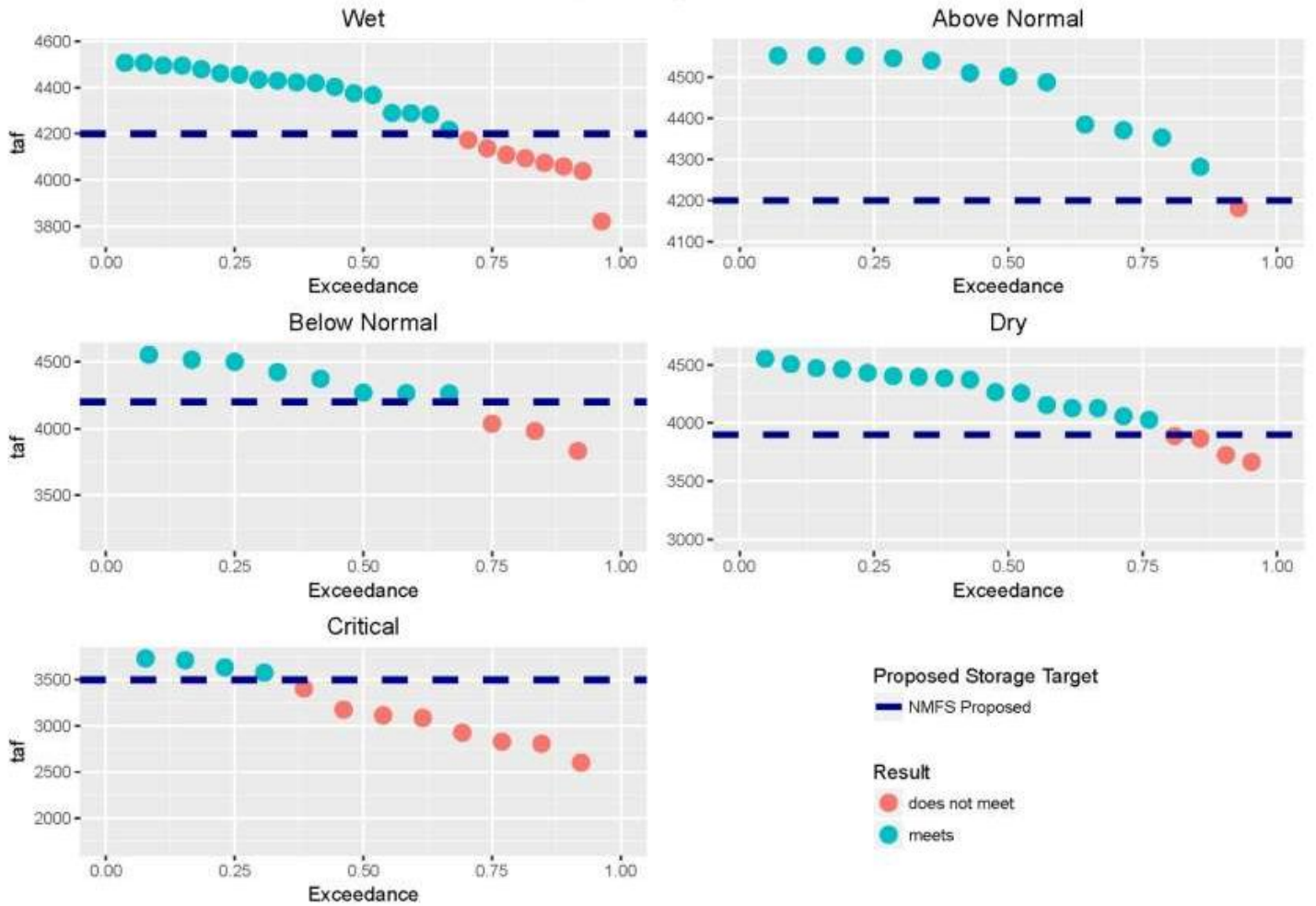


### Shasta Fill Targets, May – Current Ops





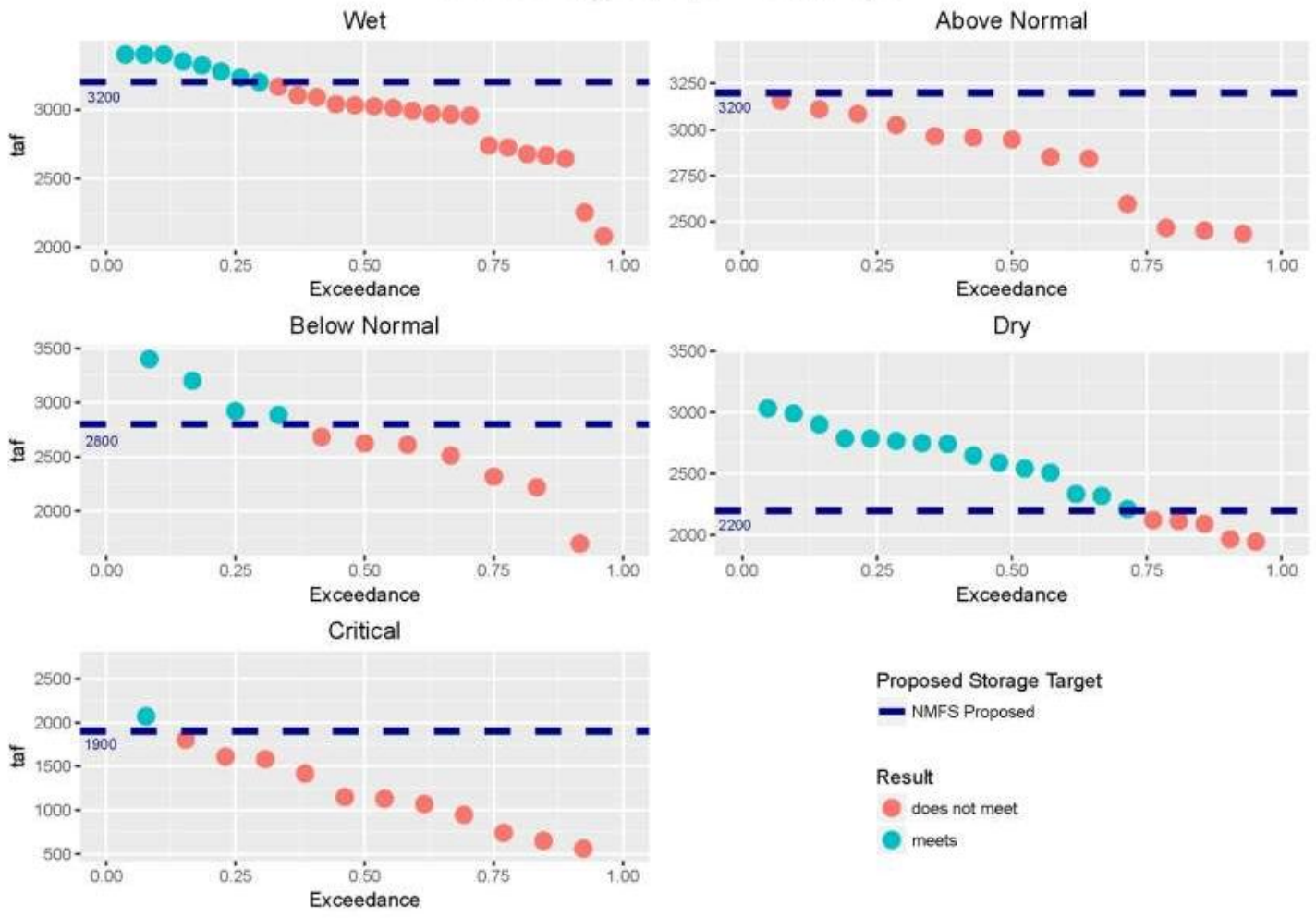
### Shasta Fill Targets, May – NMFS Amendment



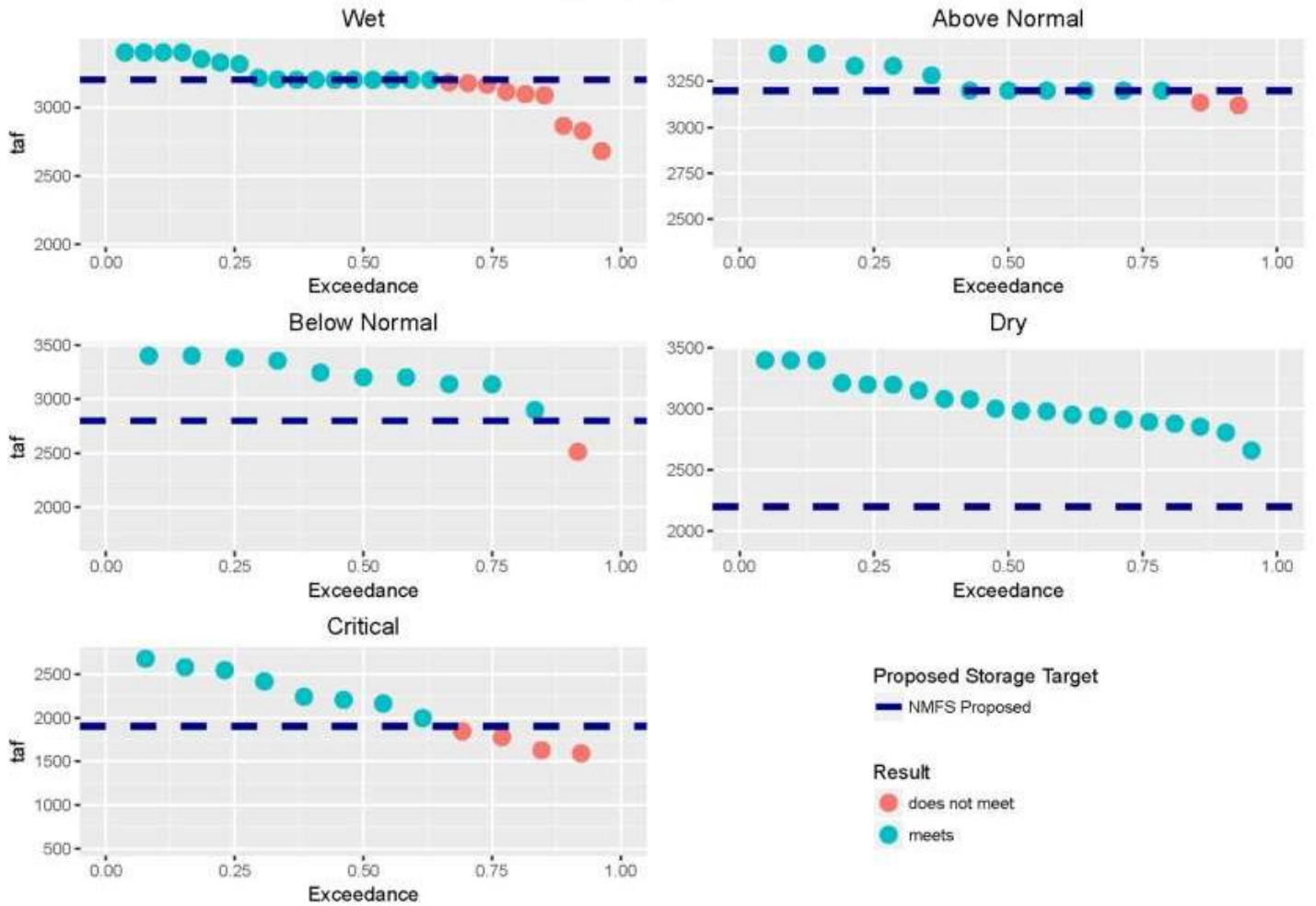
# Oct-May Sacramento Controls for years not meeting May target version: Adjusted WSI-DI

Year	WY Type	Previous WY Type	Met Prev Sept Target?	May Fill Target	May Target Diff	Delivery												San Luis			Oct-May Shasta Inflow									
						Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Max Fill	Max Fill Month	NOD	SOD	Oct	High	May										
1924	5	3	Yes	3500	-624	NDO	WS	RV	NDO	WS	NDO	K	WQ	K		K	X2	K	X2	WS	NDO	WS	3429	3	846	471	615	972	968	1885
1931	5	4	Yes	3500	-775	NDO	WS	RV	NDO	K	WQ	K	WQ	K		K	K	X2	WS	NDO	WS	3171	3	611	402	576	972	972	1829	
1932	5	5	No	3500	-551	NDO	WS	RV	NDO	K	WQ	K		K		K			WS		WS	2949	5	780	274	972	927	964	2978	
1933	5	5	Yes	3500	-550	NDO	WS	RV	NDO	WS	WQ/NDO	K		K		K		X2	K	X2	WS	2950	5	531	298	972	972	971	2626	
1934	5	5	Yes	3500	-584	NDO	WS	RV	NDO	K		K		K		X2	K	X2	WS	X2	WS	3123	3	704	350	972	972	923	2590	
1977	5	4	Yes	3500	-913	NDO			NDO		NDO	K	WQ/NDO	K	X2	K	X2			NDO	WS	2838	10	467	298	972	972	972	1751	
1991	5	5	Yes	3500	-388	NDO	WS	RV	NDO	RV	WQ/NDO	K	NDO	K	WQ/X2						WS	3114	4	611	298	922	972	971	2220	
1992	5	5	Yes	3500	-31	NDO	WS	RV	NDO	RV	WQ/NDO	K	WQ	K	WQ	K			K	X2	WS	3712	4	754	334	972	972	914	2855	
1994	5	2	Yes	3752.1	-41	X2			X2		EI/NDO	K	WQ	K		K				WS	3752	3	818	953	539	967	710	2325		
1944	4	1	Yes	3900	-169	X2			X2		EI/NDO	K		K		K			WS	WQ	WS	3731	5	828	629	555	972	844	2740	
1947	4	2	Yes	3900	-55	X2	WS		X2			K		K		K			WS	WQ/X2		4154	4	1003	943	212	906	698	2895	
1964	4	1	No	3900	-134	X2		K	X2		EI	K		K	EI	K		WQ/X2	WS	WQ/X2	WS	3990	3	949	849	250	890	775	3022	
1976	4	1	Yes	3900	-235	X2			X2		EI	K		K	K			WQ	WS	WQ/NDO		3889	4	991	560	705	972	964	2649	
1987	4	1	No	3900	-45	X2		K	X2		NDO	K		K		K		X2	WS	WQ/X2		4149	3	889	514	860	972	869	3048	
2001	4	2	Yes	3900	-60	X2			X2		NDO	K		K		K			WS	WQ/X2		4059	4	810	739	183	882	808	3196	
1923	3	1	Yes	4200	-141	X2						K		K		K					WS	4265	4	831	844	316	972	498	2958	
1936	3	4	Yes	4200	-182	NDO					NDO	K	WQ	K		FC					WS	4036	4	782	687	611	972	963	3755	
1939	3	1	No	4200	-587	X2	WS		X2		EI/NDO	K		K		K		X2		WQ/NDO		3900	3	876	883	794	972	851	2710	
1959	3	1	No	4200	-5	X2			X2		EI/NDO	K		FC		FC	EI	K	X2	WS	WQ/X2		4262	4	1003	943	713	972	767	4078
1985	3	1	No	4200	-433	X2		K			FC		FC	K		FC			WS	X2		3981	4	852	687	562	972	810	3072	
1970	1	1	Yes	4200	-98	X2			X2				FC		FC		FC		WS	WQ/X2		4109	4	914	890	430	972	918	7546	
1986	1	3	Yes	4200	-324	NDO			NDO	K	WQ	K		FC		FC			K		WS	3876	5	781	590	439	972	972	6771	
1997	1	1	Yes	4200	-274	X2		WS	X2		FC		FC		FC		FC		WS	WQ	WS	4038	4	936	715	610	972	895	6666	

### Shasta CO Targets, Sept – Current Ops



### Shasta CO Targets, Sept – NMFS Amendment



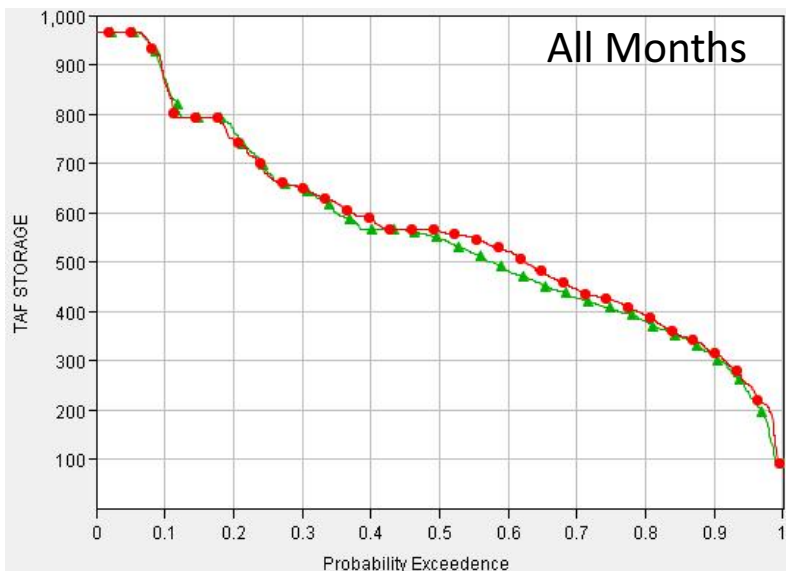
# June-Sept Sacramento Controls for years not meeting September target

version: Adjusted WSI-DI

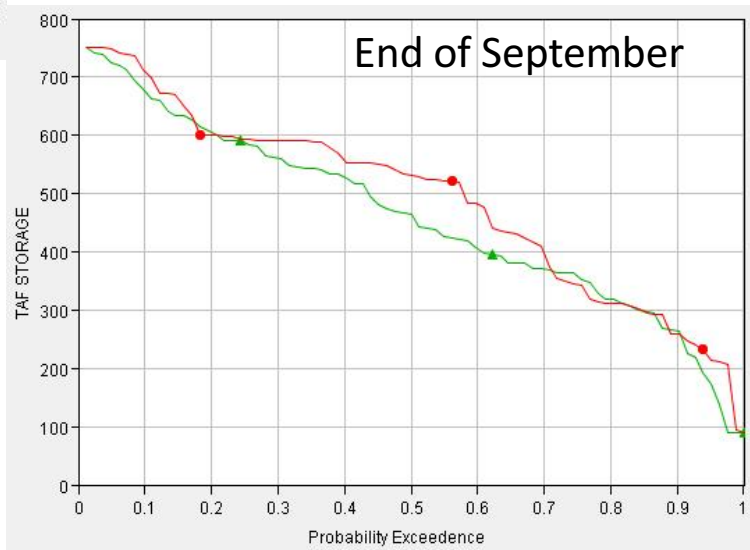
Legend:	
WS	Wilkins Slough
RV	Rio Vista
FC	Flood Control
X2	Fall X2

Year	WY Type	May Target	Met May Target?	Sept Target Diff	Month Fell Below Sept Target						Max Fill	Max Fill Month	SOD Allocation			
						June	July	August	Sept	Ag			EX	MI	RF	
1924	5	3500	-654	-272	8	WS				RV	3429	3	0.00	0.02	0.50	0.75
1931	5	3500	-775	-124	8				WS	RV	3171	3	0.00	0.00	0.50	0.75
1934	5	3500	-584	-309	8					RV	3123	3	0.00	0.37	0.50	0.75
1977	5	3500	-913	-57	8				K	RV	2838	10	0.00	0.00	0.50	0.75
1939	3	4200	-587	-288	7						3900	3	0.06	0.77	0.56	0.75
1928	2	4200	Yes	-80	9			WS		X2	4510	4	0.00	0.66	0.50	1.00
1940	2	4200	Yes	-65	8	WS		WS		X2	4251	5	0.19	1.00	0.69	1.00
1938	1	4200	Yes	-103	9	WS	WS	WS		X2	4552	5	0.68	1.00	0.93	1.00
1953	1	4200	Yes	-24	9	FC				X2	4552	5	0.20	1.00	0.70	1.00
1956	1	4200	Yes	-34	9	WS	WS	FC		X2	4552	5	0.32	1.00	0.75	1.00
1958	1	4200	Yes	-18	9	FC	FC	FC		X2	4552	2	0.53	1.00	0.78	1.00
1963	1	4200	Yes	-335	9	WS		WS		X2	4552	5	0.44	1.00	0.75	1.00
1970	1	4200	-98	-520	8			WS		X2	4109	4	0.00	0.35	0.50	1.00
1984	1	4200	Yes	-87	9			FC		X2	4552	5	0.00	0.99	0.50	1.00
1986	1	4200	-324	-112	8	WS		WS		X2	3876	5	0.00	0.50	0.50	1.00
1997	1	4200	-274	-373	9	WS		WS		X2	4038	4	0.00	0.80	0.50	1.00

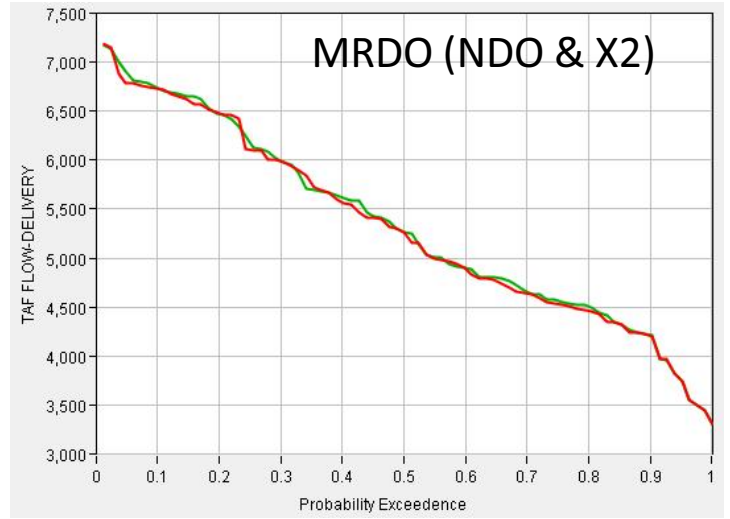
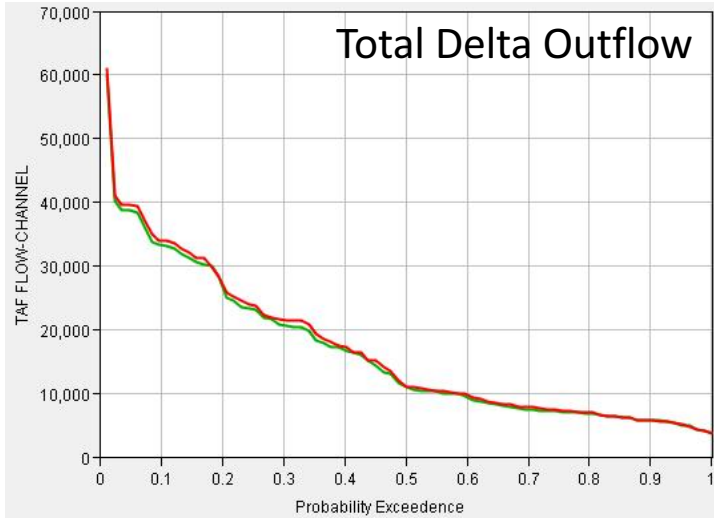
# Folsom Storage Results



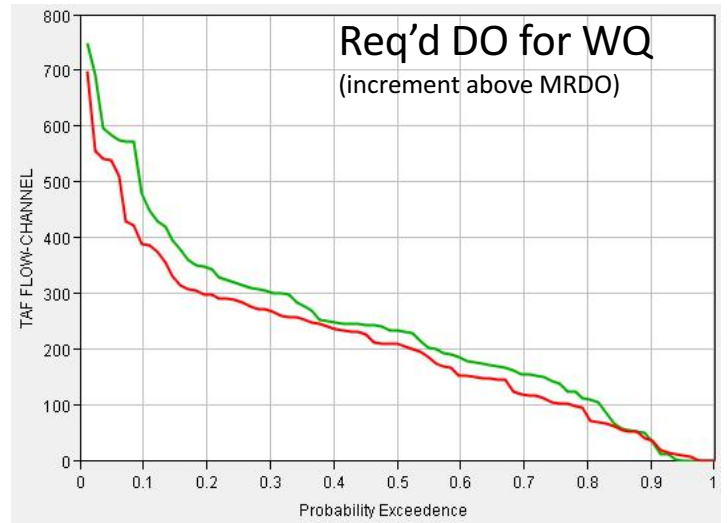
**“Current Ops”**  
**NMFS Amendment**



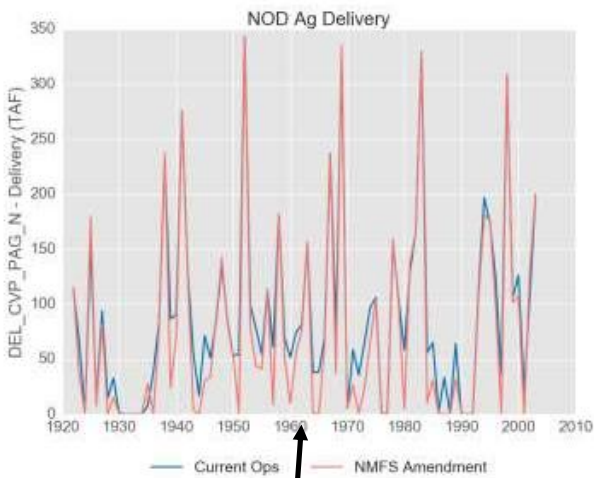
# Annual Delta Outflow Exceedences



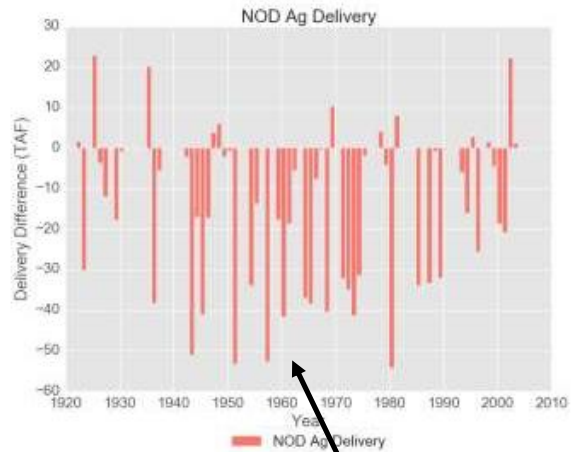
**“Current Ops”**  
**NMFS Amendment**



# Delivery Differences - Example



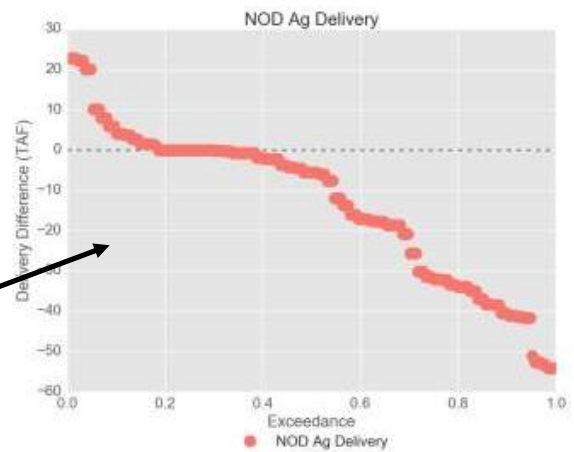
Actual deliveries, all years, both scenarios



Differences (NMFS Amendment minus Current Ops) in years where Shasta Sept target is met

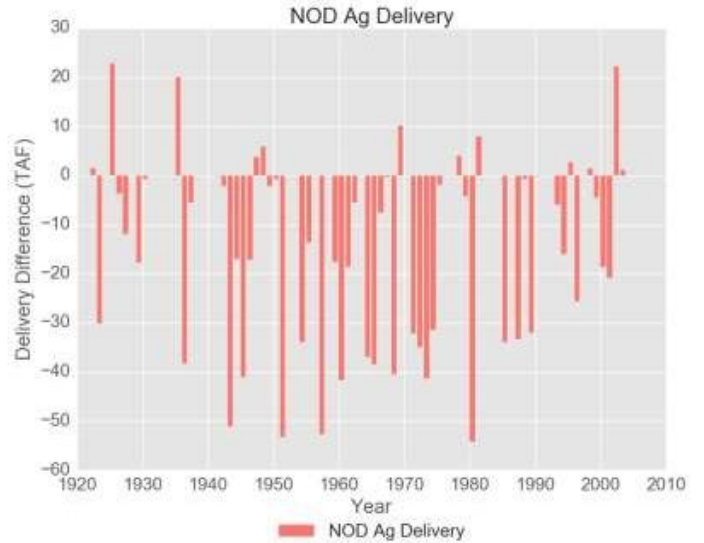
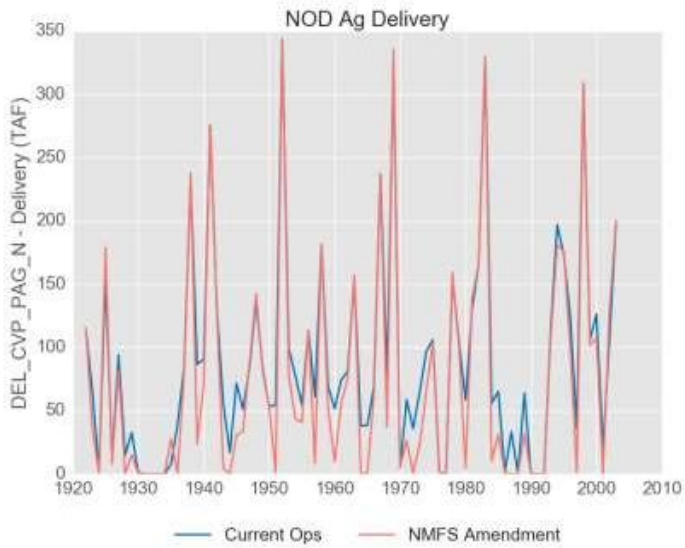
Maximum loss: -54 TAF  
Avg Change: -11 TAF

Exceedance plot of differences for years when Sept target is met

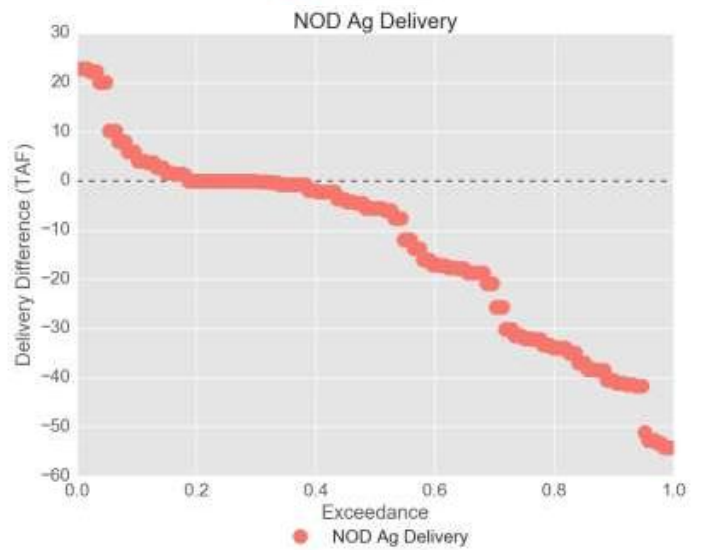




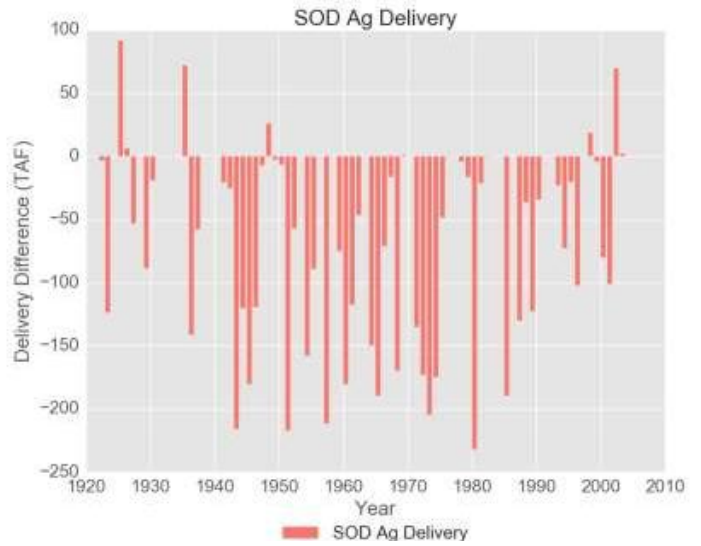
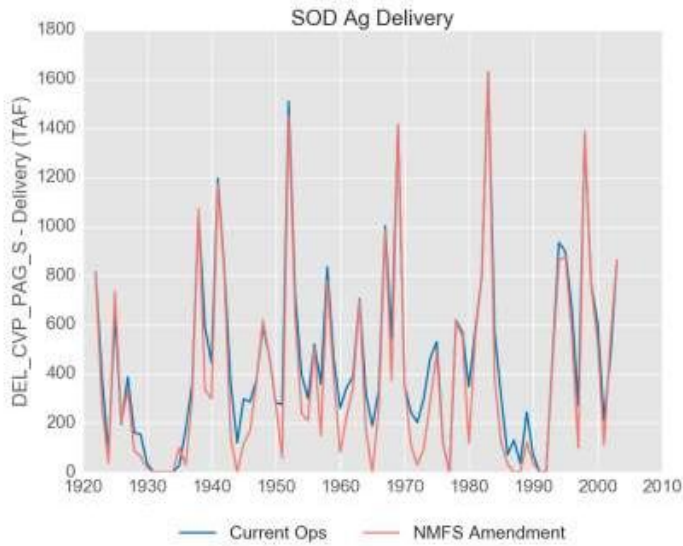
## Delivery Differences: NOD Ag



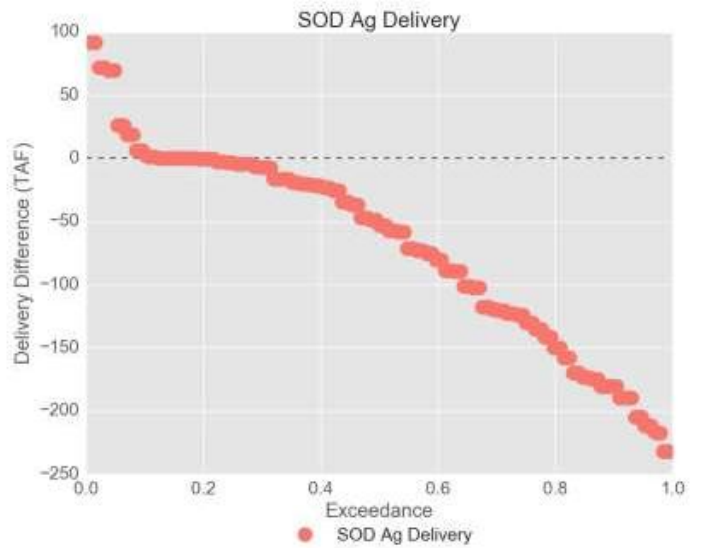
Maximum loss: -54 TAF  
 Avg Change: -11 TAF



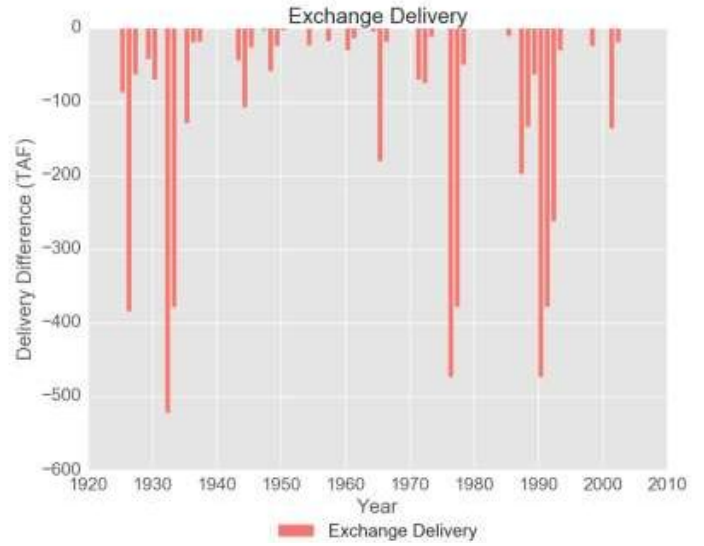
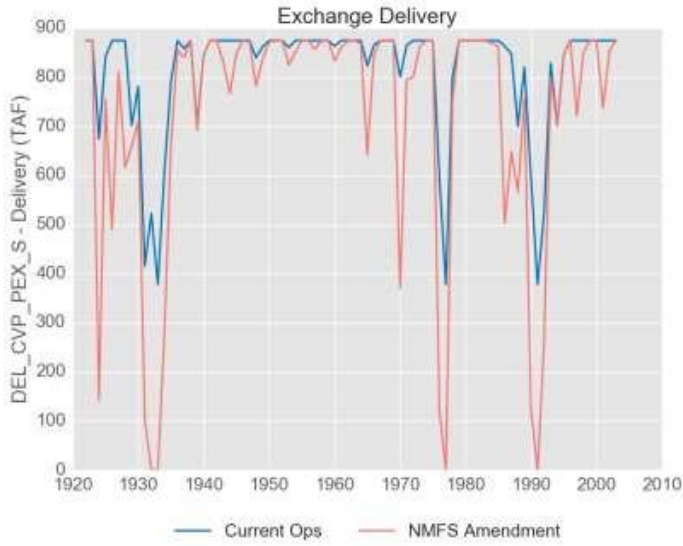
# Delivery Differences: SOD Ag



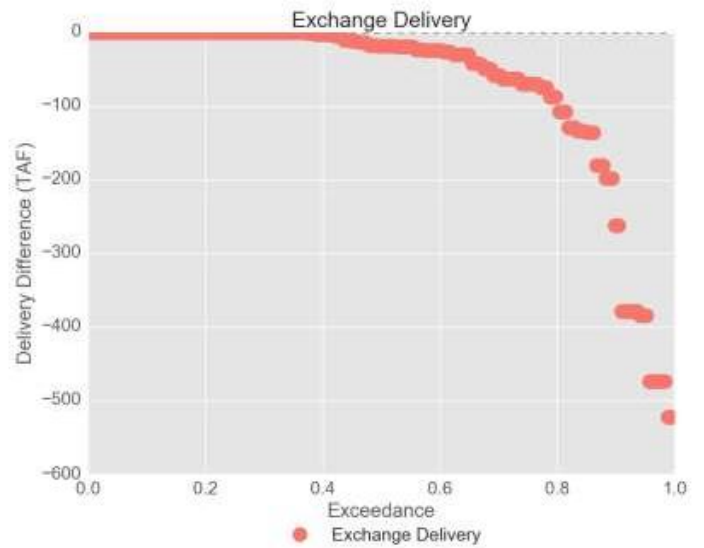
Maximum loss: -232 TAF  
Avg Change: -56 TAF



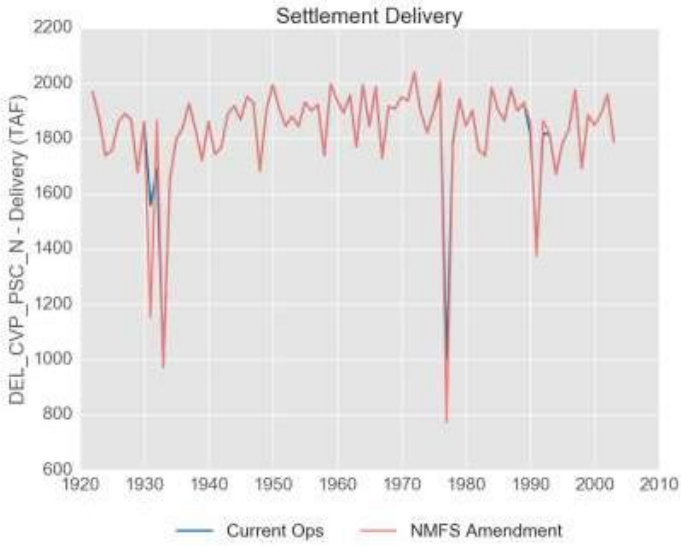
# Delivery Differences: Exchange



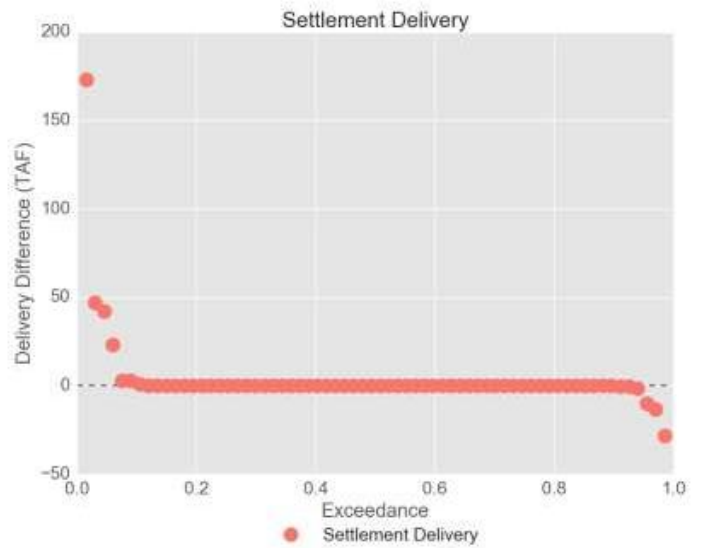
Maximum loss: -523 TAF  
 Avg Change: -57 TAF



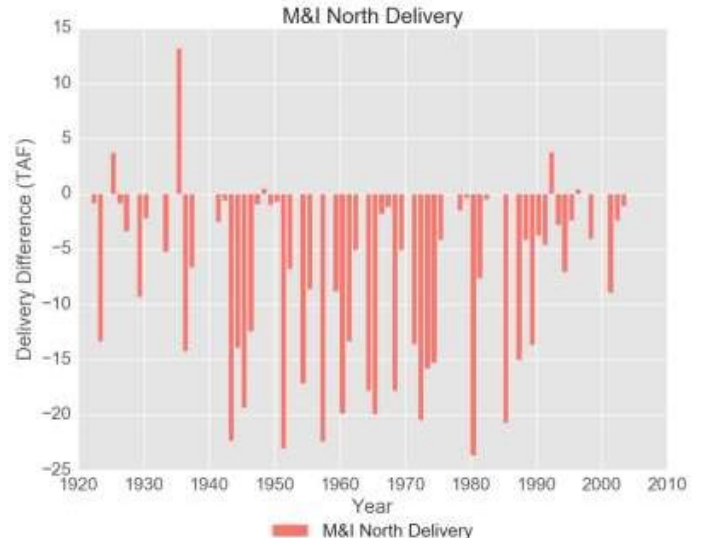
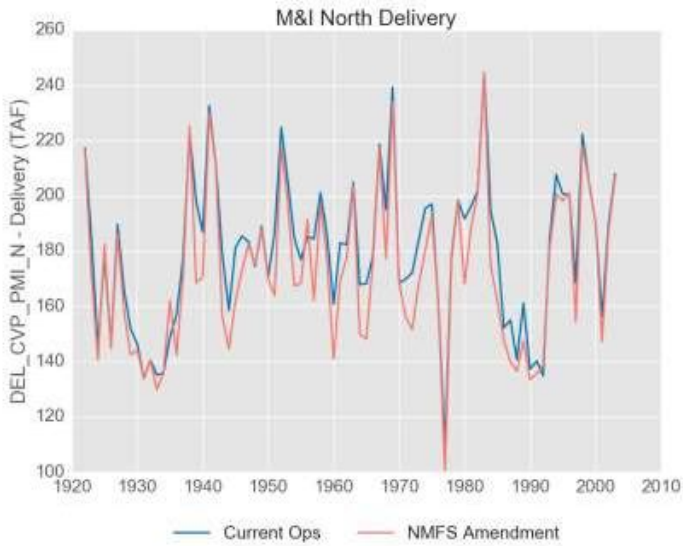
# Delivery Differences: Settlement



Maximum loss: -28 TAF  
 Avg Change: 3 TAF



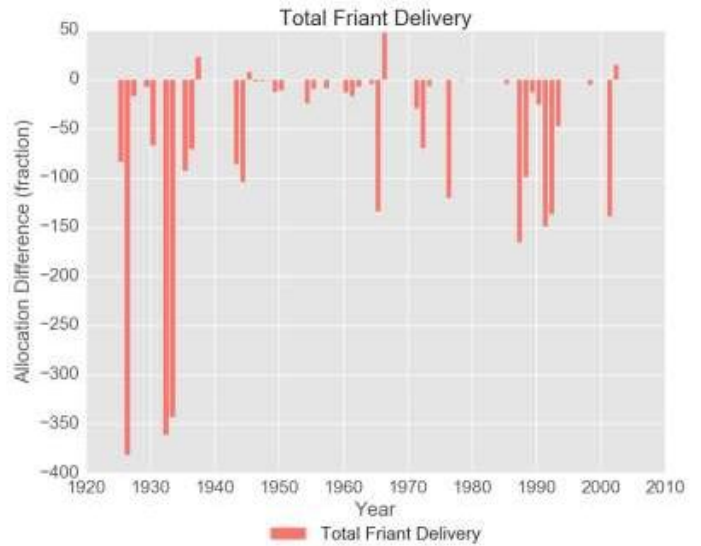
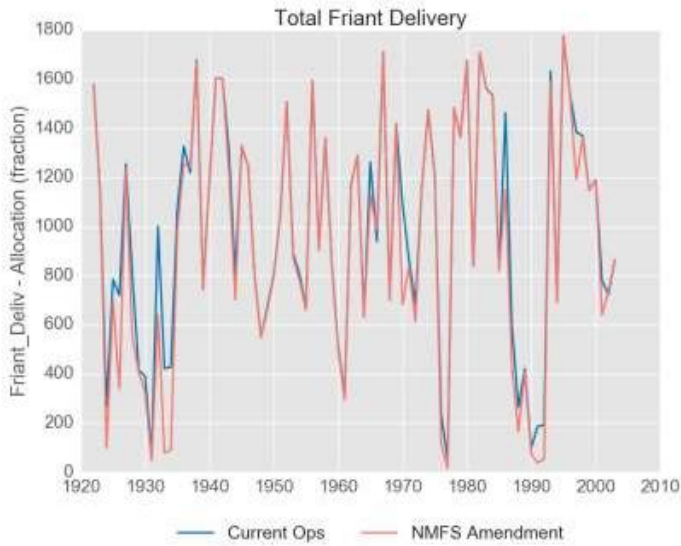
## Delivery Differences: NOD M&I



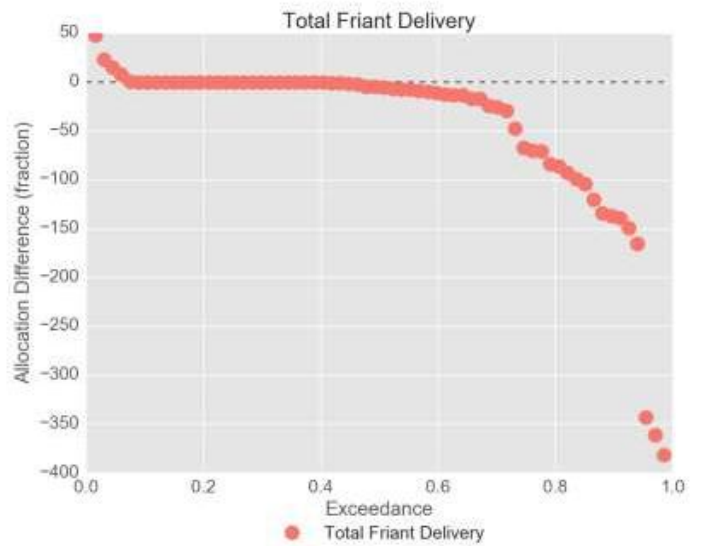
Maximum loss: -24 TAF  
 Avg Change: -6 TAF



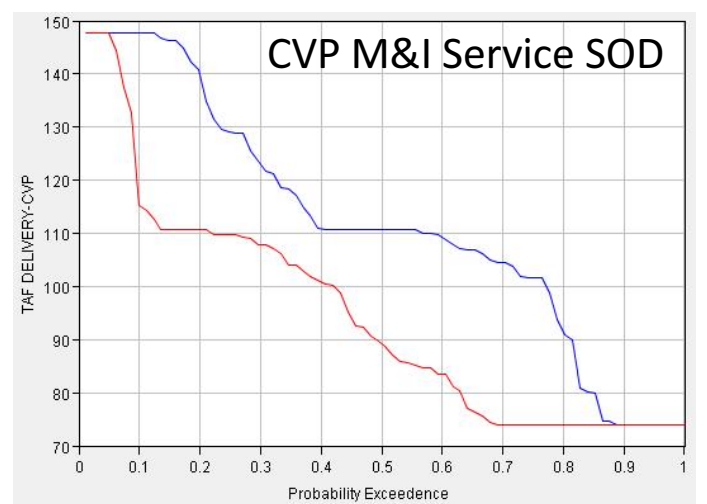
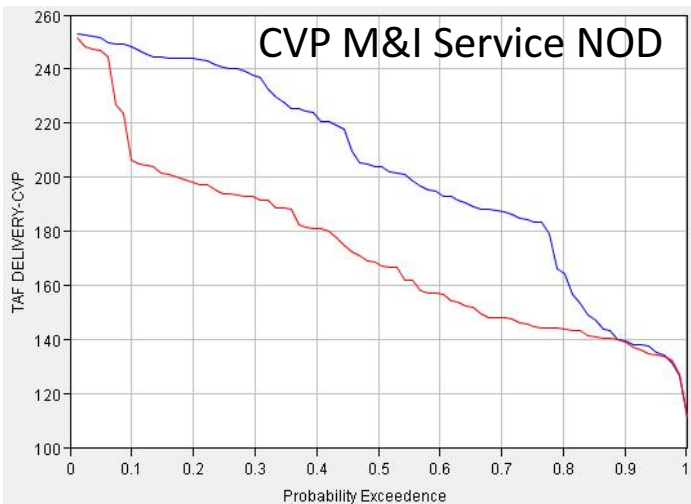
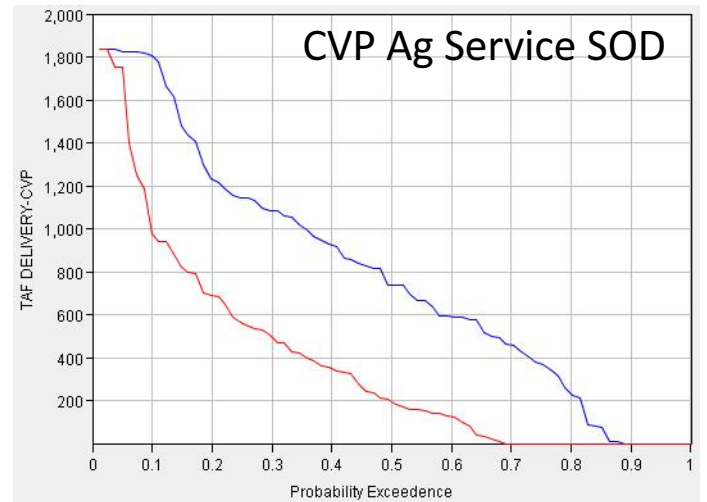
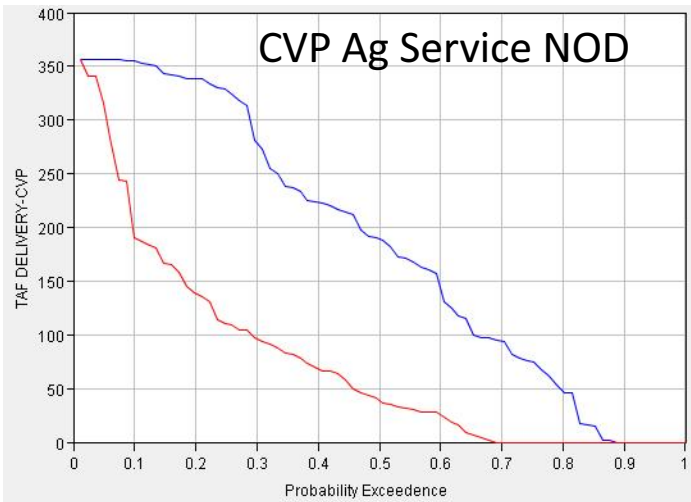
# Delivery Differences: Friant



Maximum loss: -381 TAF  
 Avg Change: -34 TAF



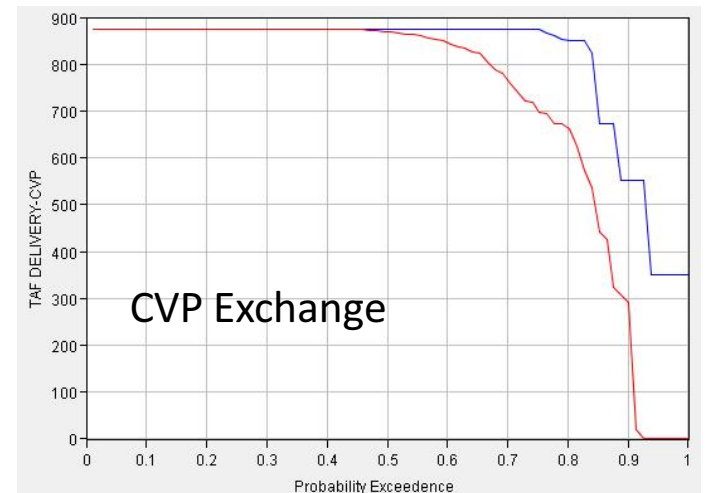
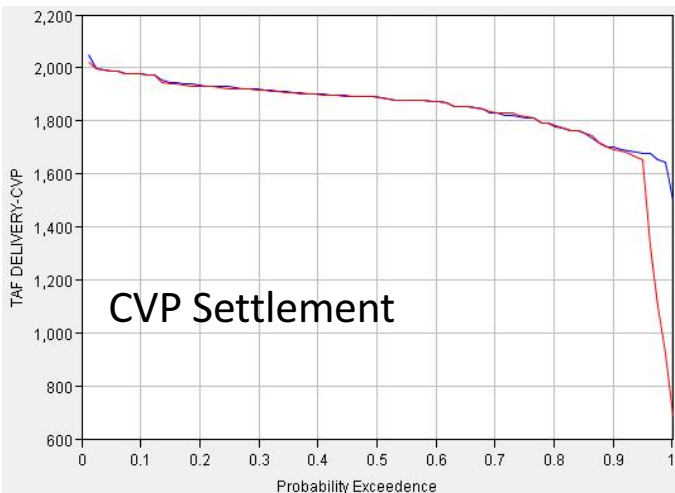
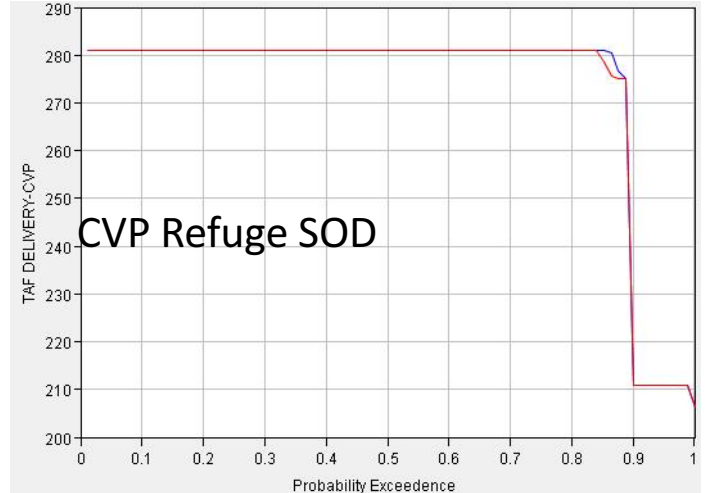
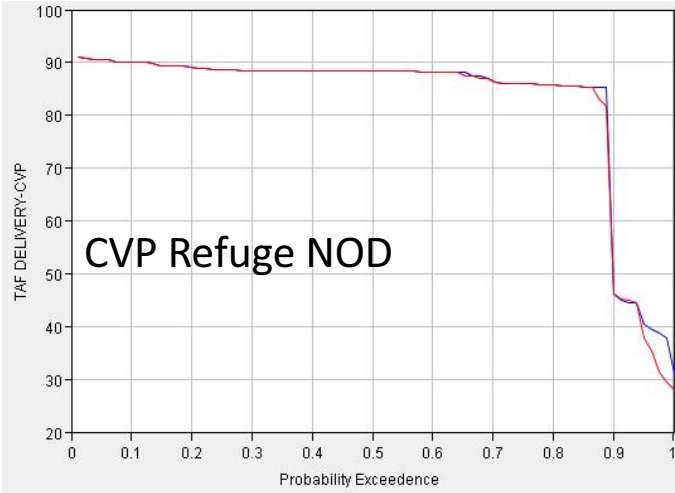
# Delivery Exceedence – Ag and M&I



**“Current Ops”**

**NMFS Amendment**

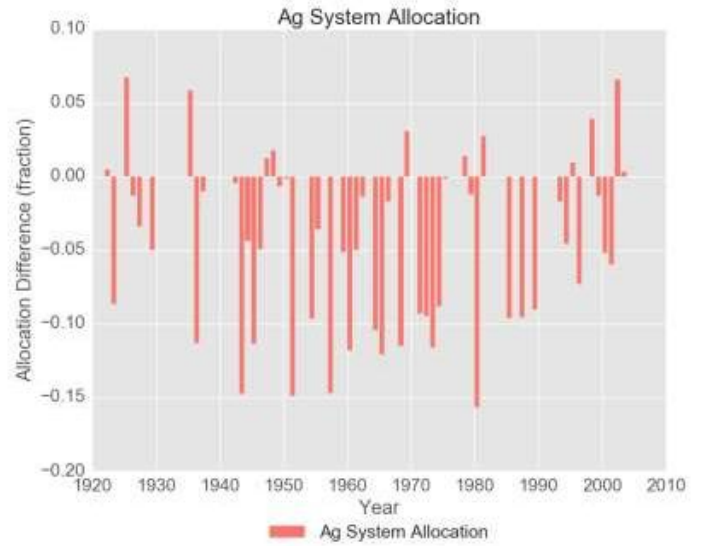
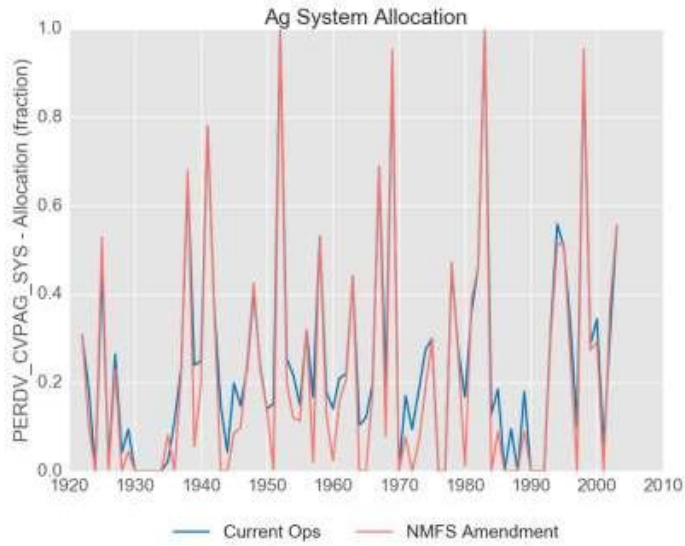
# Delivery Exceedence – Refuge, Settlement, Exchange



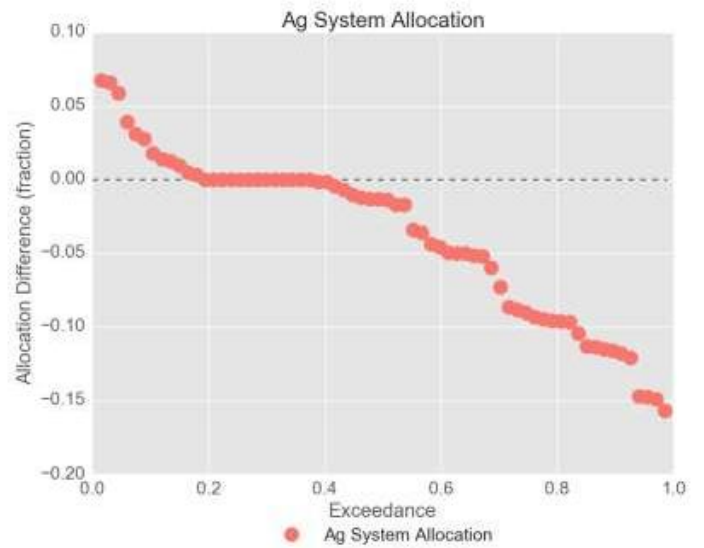
**“Current Ops”**      **NMFS Amendment**



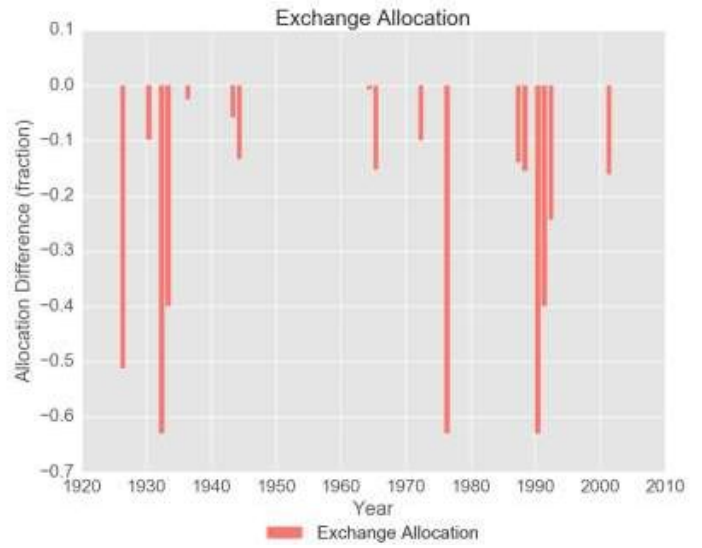
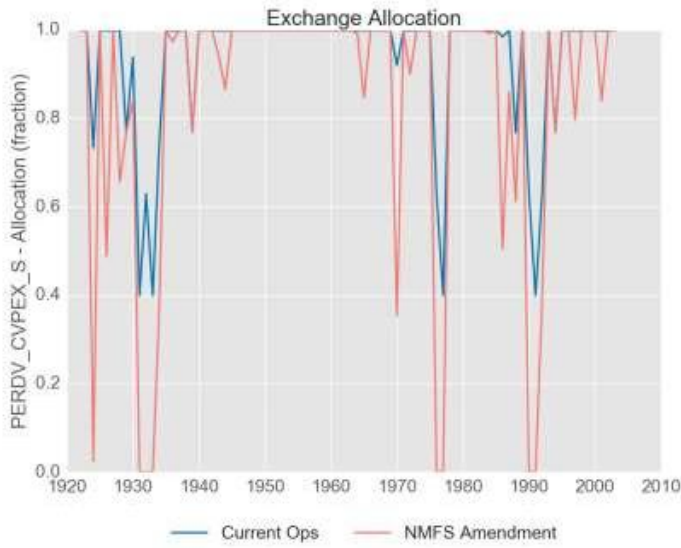
# Allocation Differences: CVP Ag System



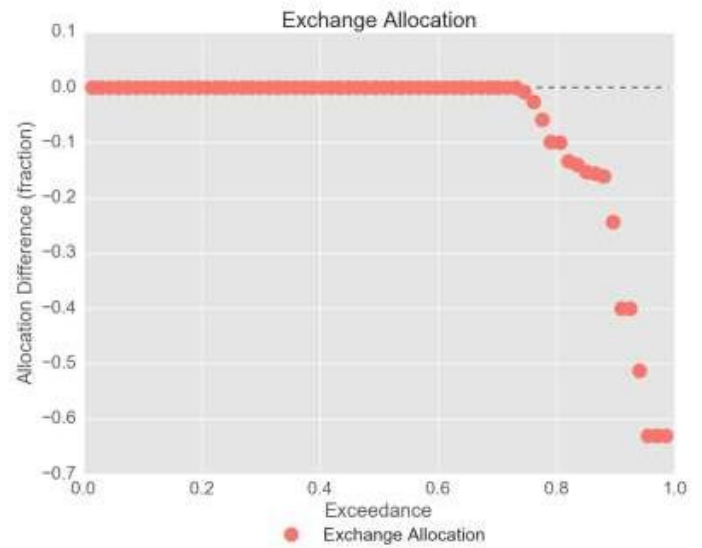
Maximum loss: -0.16  
 Avg Change: -0.03



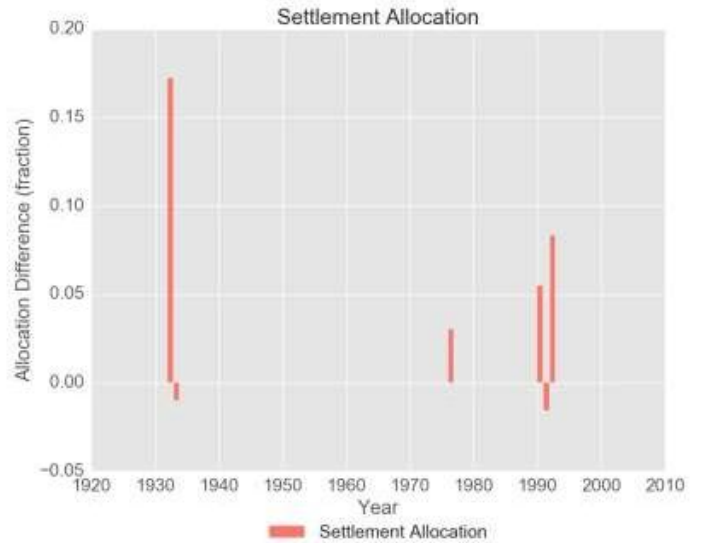
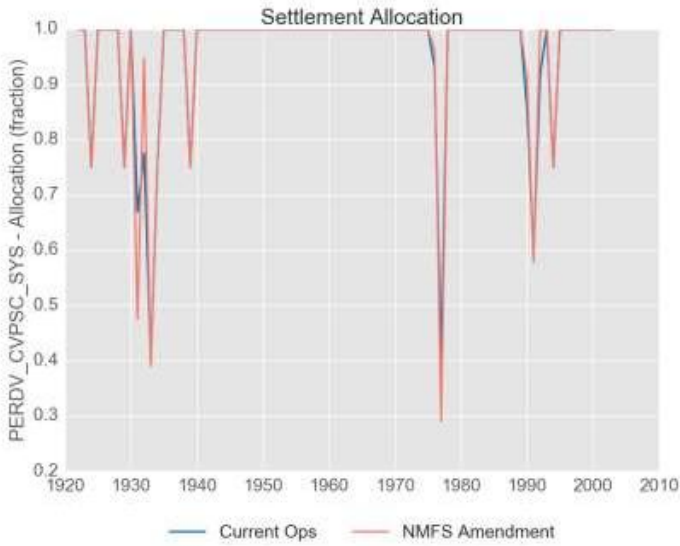
# Allocation Differences: Exchange



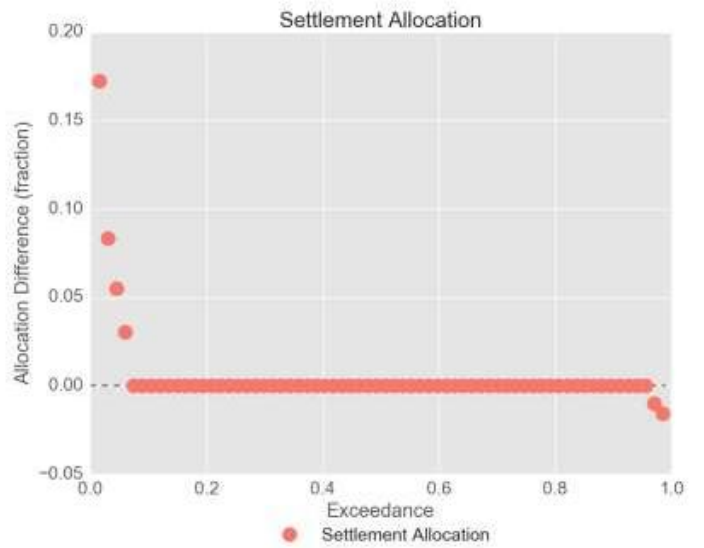
Maximum loss: -0.63  
Avg Change: -0.05



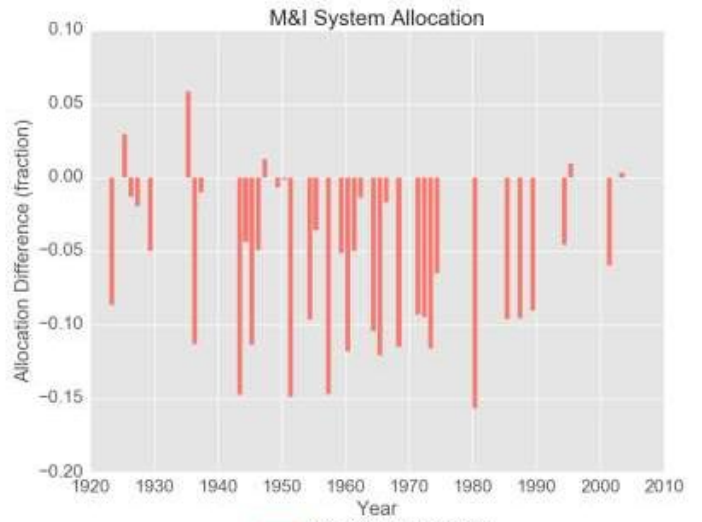
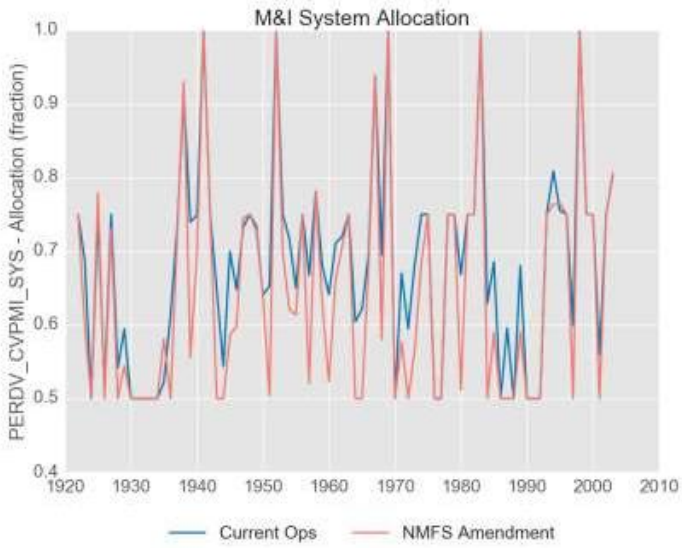
# Allocation Differences: Settlement



Maximum loss: -0.02  
Avg Change: 0.004



# Allocation Differences: M&I System



Maximum loss: -0.16  
 Avg Change: -0.03

