NATURAL RESOURCES DEFENSE COUNCIL

April 25, 2011

Erin Foresman
U.S. Environmental Protection Agency
75 Hawthorne Street, WTR-3
San Francisco, California 94105

RE: Comments in response to EPA's Advanced Notice of Public Rulemaking, Water Quality Challenges in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Docket # EPA-R09-OW-2010-0976)

Dear Ms. Foresman:

On behalf of the Natural Resources Defense Council ("NRDC"), which has 1.2 million members and activists, 250,000 of which live in California, I am writing to provide comments in response to the February 22, 2011 Advanced Notice of Public Rulemaking ("ANPR"). The ANPR provides a useful summary of scientific information pertaining to water quality impairment in the Bay-Delta estuary, and the publication of this ANPR should help advance the use of sound scientific information in the Bay-Delta. The ANPR properly concludes that water quality impairment is one of many factors adversely affecting fish and wildlife in the Bay-Delta estuary, and that more must be done to prevent and restore water quality in the estuary.

In particular, NRDC recommends that EPA focus its water quality work in the Bay-Delta estuary on developing scientific information and regulatory standards pertaining to: (1) estuarine health; (2) migratory corridors; and (3) contaminants (particularly standards for selenium and pesticides, and analysis of the effects of changes in residence time, transport, and pollutant loading on the Bay-Delta ecosystem).

In order to most effectively and efficiently address these issues, NRDC strongly encourages EPA to participate, on a limited basis, in existing regulatory and policy processes, particularly the Bay Delta Conservation Plan ("BDCP") and Delta Stewardship Council ("DSC"). EPA's involvement in BDCP and the DSC should be focused on ensuring that these processes utilize the best available scientific information and adequately restore and protect water quality (particularly standards pertaining to estuarine health, migratory corridors, and contaminants). In addition, EPA's environmental review of BDCP should ensure that the BDCP process and associated analyses adequately address water quality concerns. While EPA's involvement in BDCP may be limited in light of resource constraints, EPA's participation will ensure a more effective and efficient BDCP review process and ultimately lead to a better outcome consistent with California's co-equal goals for the Bay-Delta.

On the pages that follow, each of these issues is discussed further.

(1) Estuarine Health

NRDC strongly recommends that a top priority for EPA's Bay-Delta water quality work should be the continued development and refinement of scientific understanding and regulatory standards for estuarine health and migratory corridors in the estuary. As the ANPR accurately notes, Delta outflow and the location of the low salinity zone (X2) play a critically important role in the life cycles of the Bay-Delta food chain,[1] many pelagic species, invasive species like the overbite clam (*Corbula amurensis*), and other fish species. *See* Unabridged ANPR at 52-53, 55. Likewise, the ANPR appropriately recognizes that peer reviewed scientific evidence shows that changes in the location of X2 in the fall have a population level effect on threatened Delta smelt, and that the U.S. Fish and Wildlife Service, California Department of Fish and Game, and State Water Resources Control Board have all recommended Fall X2 measures to protect Delta smelt. *Id*. at 53-56.

The overwhelming scientific evidence shows that Delta outflow, both in the spring and fall months, is one of the dominant factors in determining estuarine health. *See* Baxter *et al* 2010 at 90-93 (identifying outflow and salinity as the two drivers hypothesized to have the largest effect on the resilience of the Delta ecosystem). The ANPR notes that several existing processes are underway to address outflow and estuarine health. *See* ANPR at 56. However, lending EPA's scientific expertise to BDCP and these other processes is necessary to ensure that these processes utilize the best available scientific information, consistent with the information in this ANPR. At this time, it does not appear that the existing processes are adequately analyzing outflow and estuarine health in the Bay-Delta, and proposals in BDCP appear to worsen delta outflow and estuarine habitat in both spring and fall months.

First, operational proposals being analyzed in BDCP decrease winter/spring outflow, and publicly available information from BDCP acknowledges that this could reduce populations of longfin smelt by up to 20%. *See* Bay Delta Conservation Plan, 10.07.10 SC Presentation Effects Analysis Status update, available online at: http://bdcponline.com/Libraries/SC_Agendas_and_Handouts/10_07_10_SC_Presentation_Effects_Analysis_Status_update.sflb.ashx. In light of the relationship between spring outflow and mysid shrimp, reduction of spring outflow could also negatively impact the Bay-Delta foodweb. EPA should review the BDCP effects analysis and ensure that these effects are being adequately analyzed.

Second, current operational proposals in BDCP do not include any measures to protect estuarine habitat in the fall (do not include a Fall X2 action). Federal biologists last year identified this as a significant concern that is "likely to increase the risk that delta smelt become extinct." *See* Attachment 1. EPA should review the BDCP effects analysis and ensure that these effects are being adequately analyzed.

[1] As the ANPR notes, although the correlation for some species has shifted somewhat since 1994, there is still a statistically strong relationship between X2 and the abundance of several fish species. ANPR at 55. In addition, it should be noted that the relationship between X2 and the abundance of bay shrimp (mysids) has not changed. *See* Kimmerer 2009; Baxter 2010. The effects of delta outflow / X2 on estuarine food webs is an important component of the X2 standard which merits attention, given the changes in food web processes in the estuary observed over the past several decades.

Third, BDCP has not provided any information as to how it is analyzing whether and how hydrologic and other changes proposed in BDCP will affect phytoplankton production and ecosystem health, for instance through changes in residence time and export. *See, e.g.*, Jassby and Cloern 2000; Jassby and Cloern 2002; Jassby 2008. The U.S. Geological Survey has been developing computer models and other analyses of how hydrologic and other changes affect phytoplankton production and ecosystem health, as part of its CASCaDE project. *See* Lisa Lucas *et al*, U.S.G.S., Assessing the San Francisco Bay-Delta phytoplankton and clams for CASCaDE scenarios of change, available online at http://cascade.wr.usgs.gov/presentations/20081024calfed/Task3_LisaLucas.pdf. As part of its limited involvement in BDCP, EPA should work with other state and federal agencies to ensure that BDCP is adequately analyzing how changes in CVP and SWP operations, habitat restoration, and other major activities will affect pollutant loading, residence time, and transport. *See* Unabridged ANPR at 31.

Finally, EPA has an opportunity to work with the Delta Stewardship Council to ensure that water quality concerns, particularly as they relate to estuarine health, are adequately addressed in the Delta Plan and in BDCP. SB 7x 1 of 2009 requires the DSC to review the adequacy of scientific information in BDCP, and requires the DSC to ensure that BDCP meets certain statutory requirements. The Delta Plan likewise is intended to guide the long term management of the Delta, and EPA can provide useful guidance to the DSC regarding estuarine health.

(2) Migratory Corridors:

As the ANPR notes, salmon (and steelhead[2]) populations in the San Joaquin River basin have substantially declined in recent decades. Unabridged ANPR at 57-61. Inadequate flows in the San Joaquin River tributaries and at Vernalis have been identified as one of the key causes of this long term decline, which predated the recent collapse of the salmon fishery. *Id*. at 60 and notes 330-331, 352, 358. In contrast, it should be noted that increased flows at Vernalis in 2010 resulted in reduced predation on salmon and substantially increased survival in the lower reaches of the river. *See* Mark Bowen and Ray Bark, *2010 Effectiveness of a Non-Physical Fish Barrier at the Divergence of the Old and San Joaquin Rivers (CA)*, U.S. Bureau of Reclamation, Technical Memorandum 86-68290-10-07 (September 2010).

While much of the focus in the Delta has been on entrainment of juvenile fish and wildlife, as the ANPR documents, exports during the fall months can create a migratory barrier for the upstream migration of adult salmon to the San Joaquin River basin. *Id*. at 58 and note 337. This information does not appear to be well known to regulatory agencies and scientific reviewers, and it helps explain the decline of San Joaquin River basin salmon in recent years and the high straying rates that have been observed.

[2] Because of a lack of long term monitoring data on steelhead populations in the San Joaquin River basin, and a lack of studies on the migratory survival of steelhead, studies using Chinook salmon often constitute the best available scientific information for steelhead. Appropriate use of Chinook salmon as a surrogate must acknowledge and account for life history and other biological differences. We agree with EPA that studies utilizing steelhead should be utilized, and studies utilizing steelhead are currently being implemented. However, absent better scientific information that utilizes steelhead, studies using Chinook salmon often represent the best available scientific information on steelhead survival. *See* ANPR at 60.

Although not discussed in the ANPR, BDCP has identified the reduction in Sacramento River inflows to the Delta as having potential impacts on migratory success of adult salmon to the Sacramento River, as a result of reduced olfactory cues. *See* Bay Delta Conservation Plan, 10.07.10 SC Presentation Effects Analysis Status update, available online at: http://bdcponline.com/Libraries/SC_Agendas_and_Handouts/10_07_10_SC_Presentation_Effects_Analysis_Status_update.sflb.ashx.

EPA appropriately listed the lower San Joaquin River as temperature impaired under section 303(d) of the Clean Water Act, *see* ANPR at 60, and EPA should continue to work with the State Water Resources Control Board, the Bay Delta Conservation Plan, and other processes to ensure that migratory corridors for adult salmon and steelhead are adequately restored and protected.

(3) Contaminants

Development of scientific information and regulatory standards pertaining to water quality contaminants is one of EPA's traditional roles, and we encourage EPA to continue to play a leading role on these issues, focusing on the actions described below. However, EPA's work on water quality contaminants in the Bay-Delta does not and should not supplant the need for EPA to be involved on issues pertaining to estuarine health and migratory corridors.

First, NRDC strongly supports EPA finalizing new national guidance criteria for selenium and new criteria to adequately protect fish and wildlife in the Bay-Delta and San Joaquin River and tributaries. *See* Unabridged ANPR at 32-33. Existing scientific data suggest that existing water quality standards for selenium are not adequately protective of migrating salmon and other fish and wildlife, including listed species, and fail to incorporate food web interactions and specific environmental conditions in the Bay-Delta and San Joaquin River systems. *Id*. at 30-33; *see esp. Id.* note 169 (Beckon and Mauer 2008). We strongly encourage EPA to work closely with U.S. Fish and Wildlife Service staff, including Dr. Beckon and Mr. Mauer, in developing these criteria for the Bay-Delta and San Joaquin River systems.

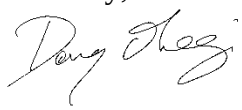
Second, we encourage EPA to work closely with the state and regional boards to ensure that adequate regulatory programs for pesticides, including Total Maximum Daily Loads (TMDLs), are established and enforced. Pesticides and other water quality contaminants from both urban and agricultural uses appear to be contributing to declining conditions in the Bay-Delta, although contaminant loads have not been implicated as a substantial cause of the pelagic organism decline. *See* Baxter 2010 at 95-96.

Finally, EPA should work with other state and federal agencies to ensure that BDCP, the Delta Plan being prepared by the Delta Stewardship Council, and other regulatory processes are adequately analyzing how changes in CVP and SWP operations, habitat restoration, and other major activities will affect pollutant loading, residence time, and transport. *See* Unabridged ANPR at 31.

Conclusion

The Bay-Delta MOU identifies EPA as an important agency and partner in addressing water quality impairment in the Bay-Delta estuary. NRDC strongly recommends that EPA participate to a limited extent in the Bay Delta Conservation Plan process to ensure that the process utilizes the best available science and adequately addresses threats to estuarine habitat, migratory corridors, and contaminants. The participation of EPA's scientific expertise in BDCP will ensure a more effective and efficient process and ultimately lead to a better outcome that is consistent with California's co-equal goals for the Bay-Delta.

Sincerely,



Doug Obegi
Staff Attorney

ATTACHMENT 1

BDCP Effects Issue Brief

Topic: Effects of changes in delta outflow on delta smelt

Authors: Department of Interior biologists

Date: 27 September, 2010

Summary of position.

Substantial reductions in delta outflow in the BDCP proposed project have not been adequately evaluated in the Effects Analysis and are likely to increase the risk that delta smelt will become extinct. Analysis of these changes should be completed in order to fully characterize the problem, but it appears to be important enough to warrant reconsideration of the delta outflow features of the proposed project.

Introduction.

The BDCP modeling output indicates that there will be a substantial decrease in delta outflow in certain scenarios, accompanied by substantial reductions in outflow variability. Discussion of these changes in "theme team" meetings have produced expressions of concern by some participants that the changes could adversely affect several covered species, including Winter-Run Chinook salmon, delta smelt, and longfin smelt. This brief addresses only the delta smelt aspect of the issue.

Outflow effects on delta smelt, in particular, were the subject of an all-day "theme team" discussion on 9/23. While there appeared to be agreement that additional analytical work is needed in this area, there was considerable controversy over the interpretation of the relevant model data and the application of the available scientific literature to this issue.

At the end of that meeting, it was agreed that an "unresolved scientific controversy" exists that pertains to the effects of delta outflow reduction on delta smelt. It was further agreed that the opposing sides in the controversy would prepare BRIEF summaries of their positions for review by the Oversight Committee and others. The summaries are intended to (a) clearly define a position on the conclusions that can reasonably be drawn from the available data; (b) provide the train of logic by which the conclusions were arrived at, and references to the supporting evidence; and (c) a statement of the importance of the issue to the success of the BDCP.

This summary by the Interior biologists is meant to frame the position that the outflow reductions revealed in the proposed project CALSIMII modeling indicate that the project as described would substantially adversely affect delta smelt in the future. While the authors view the current Effects Analysis as incomplete (and, in particular, not incisive enough in the way it addresses this issue), they believe the modeling results clearly indicate that adverse affects would likely occur. Hence, this is not a case of simple uncertainty about the science.

The Position, Step by Step

1. The low-salinity zone (LSZ) is an important physical characteristic of the San Francisco Estuary, and it has important biological concomitants.

The LSZ is the interface between the freshwater and marine environments and ranges in salinity from about 0.5-6 psu (Kimmerer 2004). The LSZ changes in position, size and shape primarily in response to tides and delta outflow. The metric X2 was developed to index the relative location and extent of the LSZ (Jassby et al. 1995). Monthly delta outflow and X2 data are the factors available within the BDCP modeling framework to evaluate project effects to the LSZ.

It is well established that variation in Delta outflow or X2 is correlated with many ecosystem processes and the abundance or survival of estuarine biota (Stevens and Miller 1983; Jassby et al. 1995; Kimmerer 2002; Kimmerer 2004; Kimmerer 2009; Thomson et al. 2010; Mac Nally et al. 2010; Feyrer et al. 2010). Because the LSZ is dynamic in both space and time, habitat conservation and restoration efforts involving species that use the LSZ must address the dynamism. In the BDCP, restored habitats will be inhabited by LSZ species (e.g., delta smelt) only when delta outflow causes the LSZ to overlay the nominal habitats or occur in areas accessible from the habitats.

2. The LSZ is crucial habitat for delta smelt.

Of all the species covered under the BDCP, delta smelt spend the largest fraction of their life cycle in the low-salinity portion of the estuary. Except during spawning, pre-adult and adult delta smelt live their entire lives in the LSZ (Moyle et al. 1992; Bennett 2005; Feyrer et al. 2007; Nobriga et al. 2008) with a center of distribution closely associated with X2 (Bennett 2005; Sommer et al. 2010); juvenile delta smelt are consistently distributed slightly upstream of X2 (Dege and Brown 2004). As a result, X2 strongly predicts delta smelt distribution, as well as the location and amount of suitable abiotic habitat (Feyrer et al. 2010).

3. BDCP will substantially affect the LSZ from early summer through early winter.

As indexed by X2, the BDCP modeling output suggests that the proposed project will affect the LSZ in several ways. The project will cause X2 to shift substantially upstream from June through December in wet and dry years, from May through December in above normal and below normal years, and from September through December in critical years. Intra-annual variability will be lost in the fall months in all water year types; X2 will become static. Interannual variability will be lost in the fall months among water year types; wet years will become dry years. The magnitude of these effects is illustrated in the box plots that follow the text.

4. The effects of water temperature are not adequately addressed in the effects analysis.

Central California is projected to get warmer in the coming decades (Dettinger 2005). This aspect of climate change and its consequences are not adequately addressed in the effects analysis. Although this is not a project effect, it does have serious implications for the proposed project because at its upstream edges, the LSZ is already seasonally too warm to support coldwater fishes. Warmer water in the future will exacerbate this fundamental physiological limitation - particularly for the salmonids and smelts. Delta smelt is the species of highest concern because it is not anadromous and therefore cannot avoid excessively warm LSZ waters by migrating elsewhere.

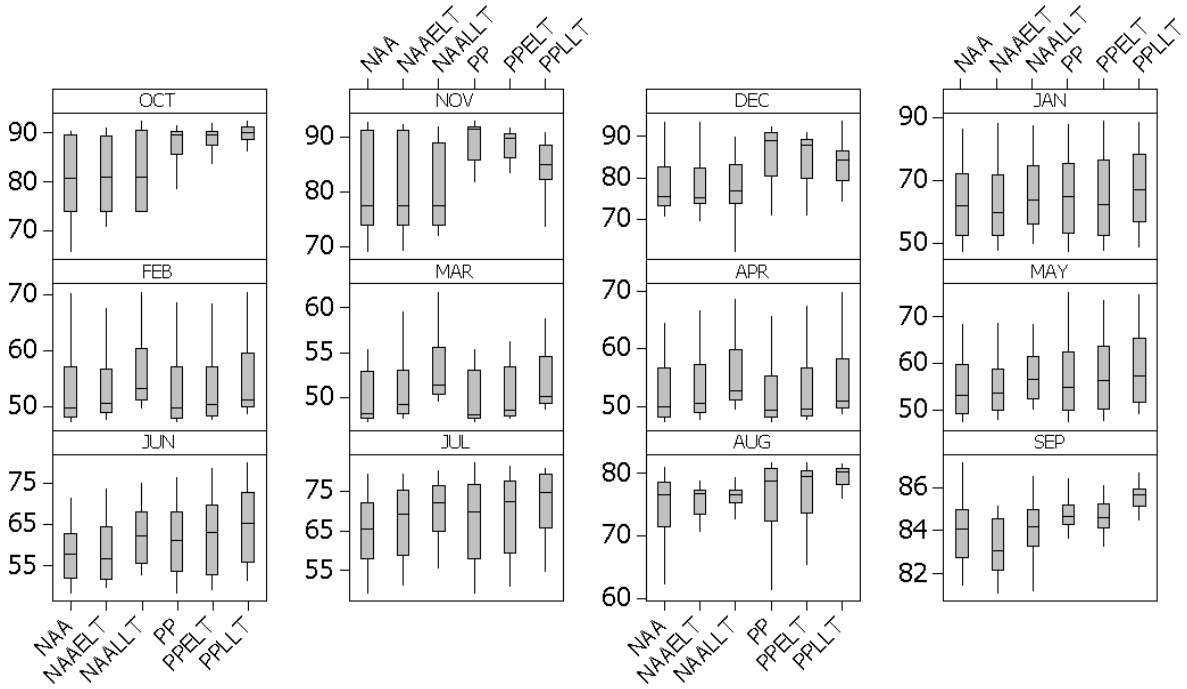
5. The effects of BDCP on the LSZ and interactions with future climate change is likely to have serious consequences for delta smelt.

Because X2 is an index of delta smelt distribution and the position and amount of delta smelt abiotic habitat, changes in habitat distribution are directly associated with changes in X2. This has several implications for delta smelt. First, under the proposed project delta smelt habitat will very seldom coincide with Suisun Bay and Marsh. Thus, it is unlikely that restored tidal marsh in the Suisun region, or even existing Suisun tidal marsh, will meaningfully contribute to delta smelt recovery, and it may not contribute to production. Second, lower summer outflows will increase the length of time that seasonal delta smelt habitat constriction occurs and overlaps with physiologically stressful water temperatures. This means that more food production will be required to maintain current delta smelt growth and survival rates, even in areas where temperatures remain suitable. In areas where temperatures exceed physiological suitability limits (~24 C) during the summer, no amount of food production will increase growth

rates or survival rates. Third, the restricted distribution of delta smelt during most summers and essentially all falls will increase the chance that a localized catastrophic event, such as a chemical spill, would pose a serious threat to the continued existence of delta smelt. Fourth, the effects of lower outflow and increased residence time in combination with warmer water temperatures are likely to push the lower Sacramento River and the west Delta towards a submerged aquatic vegetation, *Microcystis* and centrarchid-dominated community similar to that which currently exists in the lower San Joaquin River and south Delta.

6. The draft effects analysis does not have a complete and balanced assessment of the target species habitat requirements. Delta outflow, chemical conditions and the food web are interrelated and influence fish abundance in the estuary (Kimmerer 2002; Rosenfield and Baxter 2007; Sommer et al. 2007; Kimmerer et al. 2009; Thompson et al. 2010; Mac Nally et al. 2010). Several recent studies have shown that even the relatively abundant animals that use the LSZ are food-limited and exposed to contaminants. This includes splittail (Greenfield et al. 2008), Mississippi silversides (Lehman et al. 2010) and even overbite clam (Thompson et al. 2006) and largemouth bass (Nobriga 2009). Because silversides, the overbite clam, and largemouth bass are thriving, it is clear that the effects of 'other stressors' cannot by themselves explain ecological success or failure. The effects analysis does not have any scientifically defensible demonstrations that the outflow regime in the proposed project will reduce the effects of “other stressors” such as contaminants, eutrophication, non-native predators, and submerged aquatic vegetation. In fact, because delta outflow will be reduced, the importance of these “other stressors” to native fish species may be increased (because of increased temperatures and residence time, decreased current velocities, etc.). Therefore, overall habitat conditions under the proposed project are likely to be worse than present day conditions or future conditions under the “no action alternative”.

X2 - Wet Years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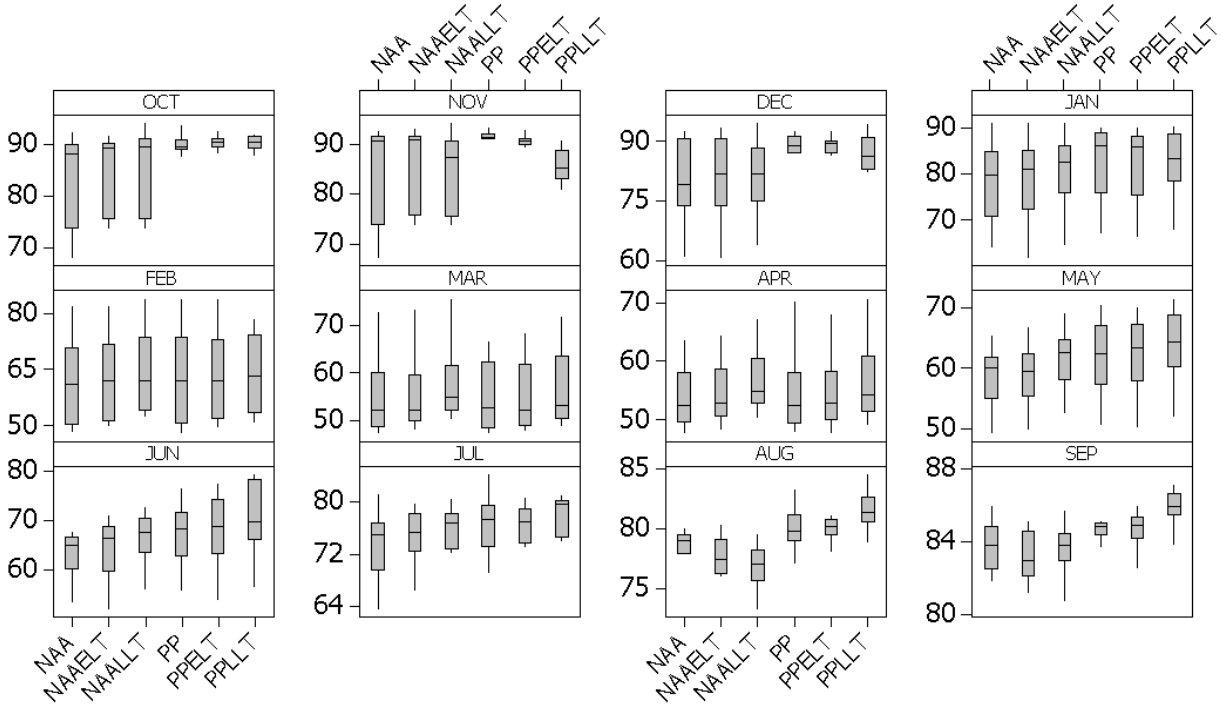
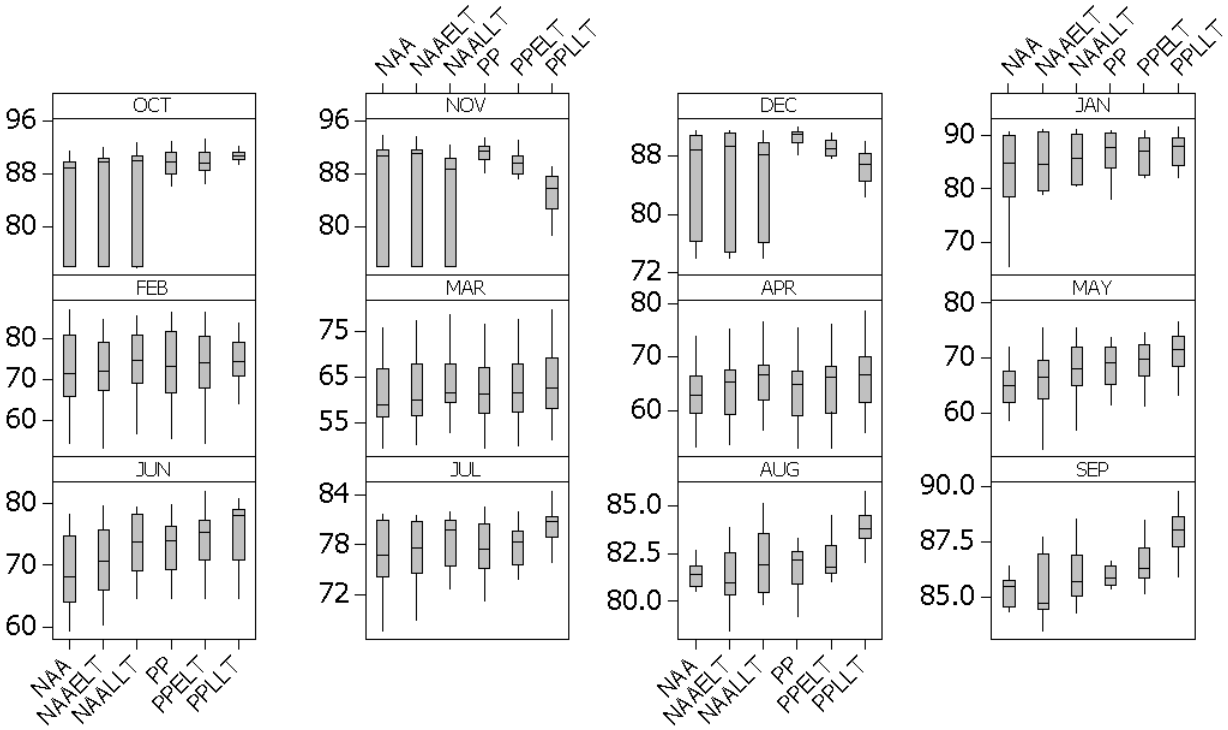
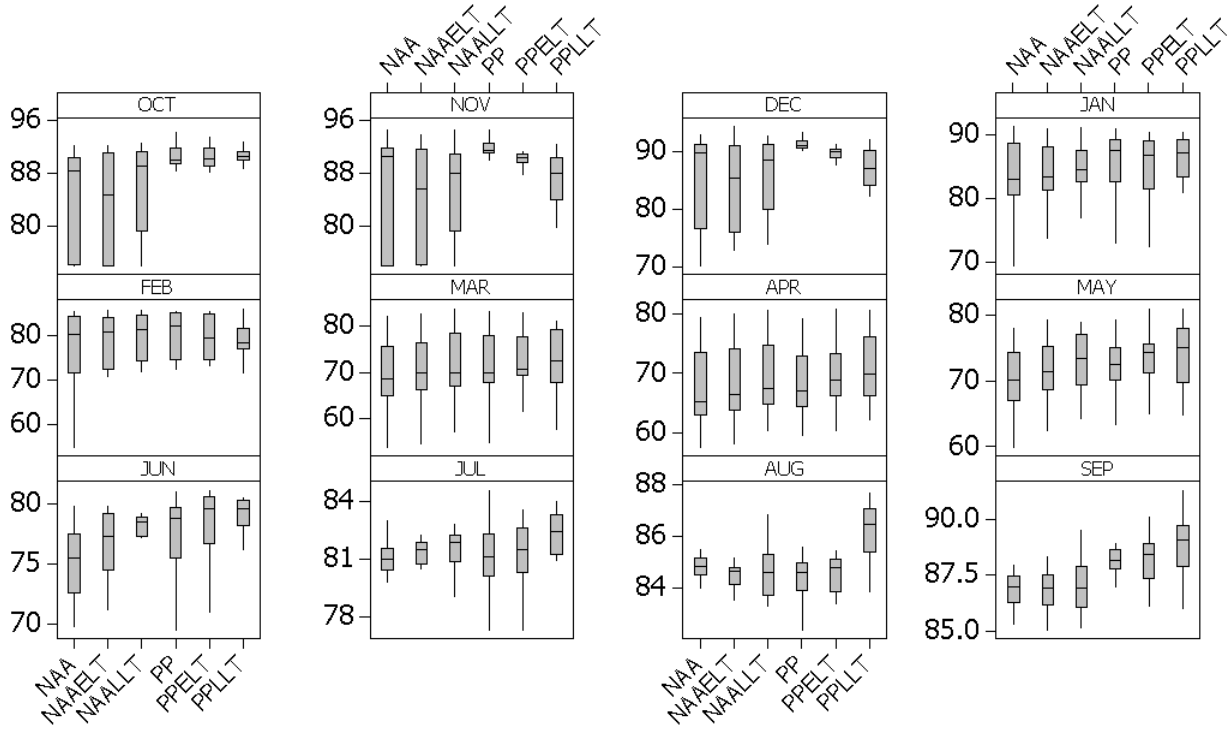
X2 - Above Normal Years



X2 - Below Normal Years



X2 - Dry Years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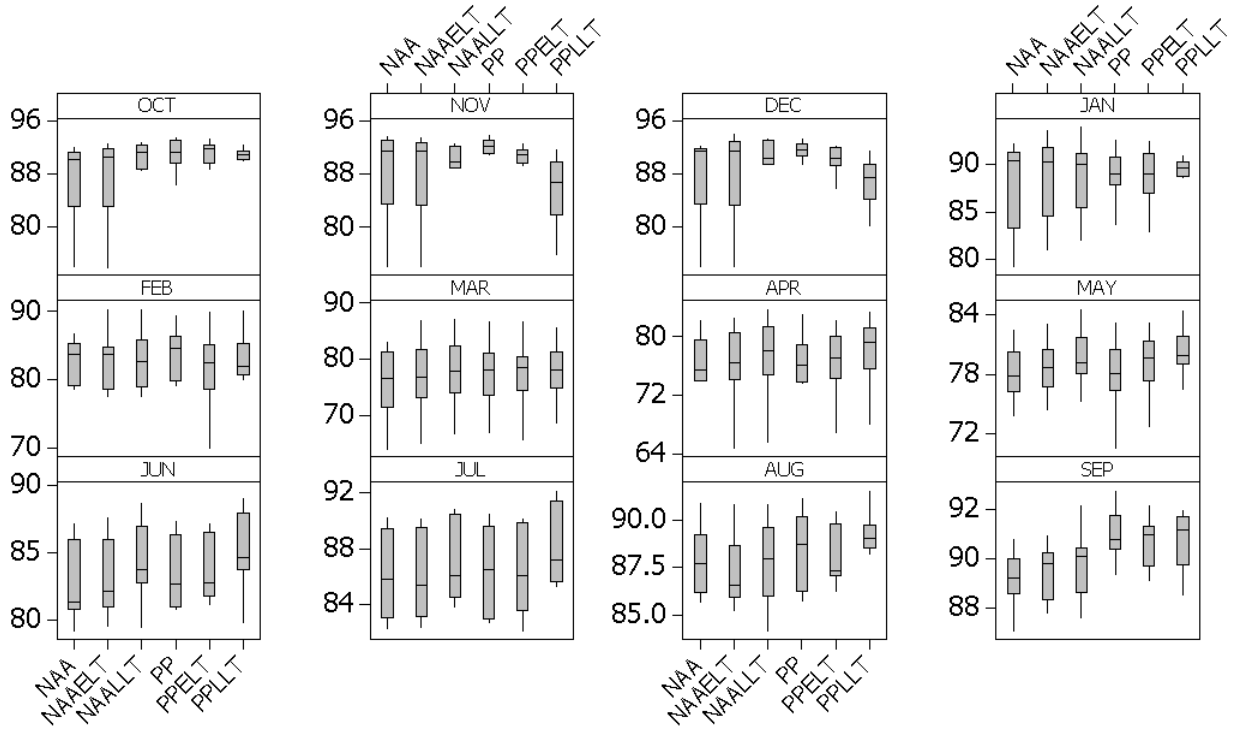
X2 - Critical Years



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