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Mr. Urbanic:

Please put my comments on the following pages into the record as a response to the June 2015 NISP Supplemental Draft Environmental Impact Statement. Though it is likely that many or most of my comments will mirror others you receive, I believe it is important to weigh in on one of the most potentially significant proposals affecting natural resources in the Northern Colorado plains region.

As you will see below, my primary concern is protecting and restoring the health of the Cache la Poudre River. As an ecologist with over 30 years experience with the US Fish and Wildlife Service and the US Geological Survey, I have looked at and studied rivers around the country and the world along with other scientists of many disciplines, and have repeatedly seen firsthand the enormous ecological, social and economic costs of their mistreatment. I am also the current chair of the Fort Collins Natural Resource Advisory Board (though I do not speak for that board or the city here).

I hope that you find my comments constructive despite my very serious concerns regarding the alternatives presented.

I did comment substantively on the first draft and plan to comment during all subsequent comment periods.

Thank you.

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Overall Comments

On the whole, I am pleased by the progress that has been made fleshing out this Supplemental DEIS from the first draft. It is far more thorough (if somewhat redundant), uses terms that are relatively standard and fairly well defined, contains a new alternative that may point in the right direction, and may prove useful in soliciting constructive comments from a wide array of stakeholders. I believe that the Common Technical Platform was a very positive contribution, and really the only way to adequately deal with cumulative hydrologic impacts.

However, because of my interest in protecting and restoring the Cache la Poudre River, I am greatly disappointed by a tone that permeates the SDEIS, namely that the River's health is already declining and that NISP would merely *accelerate* or *reinforce* that decline, not *cause* further decline. Such an attitude fails to recognize widespread local, state and national goals to improve the health and resilience of our rivers, especially one recognized in the SDEIS as nationally important (p S-27).

The SDEIS portrays the proposed project as just a small, incremental nuisance in the presumed inevitable decline of the Poudre, as if saying, 'What difference does it make if we violate a few more water quality standards or lose another species; it's simply the price we must pay. And besides, we can add a tiny bit of water to make the river healthier in the winter. Isn't that a fair trade?' Such an attitude completely fails to recognize that the reason the Poudre is so chemically, physically, and biologically challenged today is because of just such incremental impacts. That attitude also does not acknowledge the degree of restoration that remains possible – indeed is being done today – but only if we retain peak flows.

Related to this permeating attitude, it is my understanding that the Corps looks to see if environmental "thresholds" might be crossed as a criterion for issuing or denying a permit. One trouble is, of course, that we don't always know about thresholds until they become obvious in retrospect. The SDEIS acknowledges the loss of several aquatic species over the last century (p S-29) and attributes those losses to crossing thresholds, but (a) could those thresholds have been foretold, or (b) can we definitively prove whether "thresholds" were responsible? Isn't it equally plausible that many small changes simply continue to reduce the <u>probability</u> of extinction and that no one could foresee the time or place that we last find individuals of a species?

Further, I must admit that I am perplexed by how much work remains to be done. I think that most people expected a fuller treatment of impacts, especially water quality, in the SDEIS. This is especially true since the river is already exceeding (violating) some, and very close to exceeding other, water quality standards. To say that this work (and much more) remains to be completed and will not appear until the "final" EIS seems out of step with the requirements of NEPA.

Below I comment more specifically on several topics I believe worthy of further discussion:

Stated Purpose and Need Does Not Warrant Rejection of Two Publicly Developed Alternatives

Although there may be legitimate reasons to question the efficacy of the proposed *Healthy River*s or *Better Future Alternatives*, I believe that some of the rationale offered in the SDEIS for rejecting those good-faith alternatives is faulty. The purpose for the proposed project surely must be to meet

the water needs for a projected number of people and associated industry by a specified date. If it can be objectively shown that both the number of people initially estimated was too high, especially as highlighted in the *Better Futures Alternative*, and that their requirements for "new" water were similarly overestimated – and I believe these two proposals did that – then it seems completely unwarranted to reject such an alternative based on the rationale that the project must produce "approximately 40,000 AF" of firm yield. Further, if I understand it correctly, the "preferred alternative" itself (Alternative 2) is not expected to fully yield 40,000 AF, making the elimination of the other alternatives even more questionable and seemingly vulnerable to a court challenge.

In this context, it is worth pointing out a few things I have recently learned about municipalities saving water: (1) Increasing residential lot density to between 7 and ten dwellings per acre has realized water savings of 10 to 60% over larger lot sizes; (2) Multifamily units consume 35 to 50% less water than single-family detached units; (3) Turf area restrictions commonly achieve savings of 35 to 50% (Best, 2015). Thus, I think that the *Healthy River* and *Better Future* proposals are conservative, and if the NISP subscribers are serious about slowing the decline in agricultural productivity, they will even more seriously apply best management practices to both water conservation and land use planning. The argument that such actions are always "someone else's responsibility" cannot persist.

Level Playing Field Among Alternatives

It does not appear that the SDEIS treats all of the four proposed alternatives equally. Though I remain puzzled about why discussing potential mitigation has been postponed until after the SDEIS, presenting one alternative, Alternative 2 (the applicant's "preferred alternative"), with mitigation and the other alternatives without mitigation is a recipe for an imbalanced evaluation.

It seems clear to me that the winter flow augmentation proposed for Alternative 2 is mitigation no matter what it is called in the SDEIS. I say this because winter flow augmentation cannot be justified as addressing the proposal's purpose and need no matter how beneficial augmentation may prove to be[1]. It is hard to believe that such an imbalance would stand up in court if challenged.

Labeling Impacts

I am uncomfortable with the way the SDEIS has labeled impacts using the terms No Effect, Negligible, Minor, Moderate, and Major. Can one "minor" impact coupled with another "minor" impact, and yet another, ever amount to a "major" impact when viewed collectively? Said another way, labeling each component impact may not be the same as labeling the constellation of impacts. Further, how can a water quality impact be labeled as "minor" (page 4-85) if the result is the exceedence of an existing or planned water quality standard? And then the SDEIS then introduces new, undefined terms "Medium" and "High" regarding exceedences of water quality standards (p S-41).

In much the same vein, in my introductory comments above, I expressed disappointment that the SDEIS characterized the declining trend in the river's health as no reason to deny yet another

[1] In fact, is it not true that adding environmental benefits was disallowed by the Corps on the original Halligan-Seaman proposal?

negative impact (sorry about all the double negatives, but I hope you get my point). If this attitude is seen as fair by some, it strikes me that it would also be fair to say that there is already a declining trend in prime agricultural land and the wetlands they help foster. And since both of these resources are already declining, why should we care about those resources any more than a river with declining health? In other words, why should the SDEIS bother to tally the acres of buy-and-dry or the value of the agricultural economy since they are themselves already in jeopardy?

Carrying this 'logic' a step further, why would it be fair to call unmitigated effects on ag wetlands from the various alternatives "Major" (Table 4-68, p 4-250) while calling the loss of 1% of prime farmland in the NAA "Moderate" when these both arise from the same displacement? (If the effect on farmland is 1%, wouldn't their (replaceable) wetlands loss also be roughly 1%?)

As it stands, the SDEIS risks misleading the public in the way these terms have been employed.

New, Improved Alternative 4

Though I remain convinced that the minimally-structural *Healthy River* and *Better Future* are superior approaches, I must make room to consider other possibilities. I was one DEIS commenter that encouraged the SDEIS to examine diversions farther downstream of Fort Collins. Thank you for doing so. Advancing Alternative 4 in the SDEIS <u>may</u> be a step in the right direction if such an alternative were further developed to take all the water out of the river <u>below</u> Fort Collins. What if, for example, a new forebay were constructed near the New Cache diversion, or an existing irrigation reservoir were enlarged below Fort Collins, such that the water could be pumped into (and still mostly rely on gravity out of) Cactus Hill. Though the elevation gain would be greater than for pumping into Glade, it is nowhere near an order of magnitude greater.

I know that constructing a new (or heavily modified) alternative along these lines is not a trivial task, but the benefits of maintaining water in the Poudre at least as far as I-25 should not be discounted. Though such an alternative may foreclose some management options, it may facilitate others. Given that Thornton is willing to pay for a pipeline from the Poudre above Fort Collins to their city, piping infrastructure costs cannot be considered prohibitive. Who knows, maybe Thornton could be convinced to share some piping and/or storage advancing the cause of a "regional" project, which might include terminal (wind powered) reverse osmosis or aquifer storage. Such a partnership might also be constructed to preclude or reduce Thornton taking any more water out of the Poudre, or even the elimination of -- or super-sizing of -- Galeton.

Creating such a new alternative fits the SDEIS public interest review criterion that reads "Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work" (p 1-20) as well as the purpose and need statement: "To provide the Project Participants with approximately 40,000 acre-feet of new reliable municipal water supply annually through a regional project coordinated by the District, which will meet a portion of the Participants' current and reasonably projected future additional water supply needs" (p S-15).

Since the Corps has already demonstrated an ability to revisit the NISP proposal's screening criteria, perhaps far more of a win-win alternative could be developed. All we need is a good imagination grounded in reality.

Salinity of Irrigation Water

I was disappointed in the SDEIS's handling of Galeton's irrigation water salinity. By continuing to rely on Hoffman's (2012) qualitative analysis, the SDEIS is ignoring far better site-specific quantitative information as I pointed out in my 2007 letter to Chandler Peter, citing Gates (1999).

Water from the Poudre River watershed is relatively low in dissolved salts. As it exits the canyon mouth, the river averages about 50 mg/l. By the time it reaches the Larimer-Weld canal just upstream of Fort Collins, concentrations during the irrigation season have increased to about 60 mg/l; below Fort Collins, Windsor and Kodak, water entering the New Cache canal system has concentrations of about 380 mg/l. In both canals, and the Poudre River, concentrations continue to increase in a downstream direction as treated sewage, return flows and erosive salts accumulate.

However, the water in these two irrigation canals generally does not approach the average concentrations on the South Platte below the Poudre's confluence – and of course below Denver and its many suburbs, as well as cities and towns along the S. Platte upstream of the Poudre's confluence. Here, concentrations average about 950 mg/l during the times when that water is most likely to be diverted into Galeton Reservoir.

Unfortunately, Galeton, because of its low elevation and shallow configuration, would likely evaporate around 5-10% of its volume annually, further concentrating the salinity by a comparable amount. Thus, South Platte water with roughly 1000 mg/l of salts would be substituted for Poudre River water with far lower concentrations, increasing the salinity of irrigation water from 40 to 120% depending on exactly how much water is diverted through Galeton and how much it may be diluted with any Poudre water remaining in the canals.

The effect of this increased salinity on crop yields has been estimated by Gates as up to 20% or more, depending on the exact location, soil type, irrigation method, annual rainfall, and crop type. In addition, there are several thousand acres of irrigated farmland in the region receiving this water that are already considered "salt affected", meaning salt concentrations are dangerously high. Using irrigation water with such high dissolved salt concentrations will eventually put these fields out of production. In my opinion, the SDEIS did not adequately address this crop yield and associated economic issues.

In addition to extra salinity, the S. Platte water will have much higher levels of relatively long-lived microbial contaminants (fecal coliform bacteria, protozoa, worms, and viruses) from insufficiently treated human and animal sewage than what is found in Poudre River waters. Such wastes are potentially hazardous to farm workers through direct contact with irrigation water or wet vegetation, or by inhalation of sprinkler-produced aerosols. They are also, of course, potentially harmful if irrigated vegetables are marketed for raw (or organic) consumption.

For more on these topics, please see Dennehy et al. (1998), Elmund et al. (2010), Haby and Loftis (2000 and 2010), Mountain River Associates, Inc. (2005), Oropeza and Billica (2010), and West Greeley Soil Conservation District (1999) in addition to Gates (1999).

Long-term Viability of NISP Yield

If I understand it correctly, the viability of the NISP proposal is predicated on keeping water on the acres irrigated by the Larimer-Weld and New Cache systems. As these water rights are inevitably sold off the land, the ability to make upstream trades will decline acre-foot for acre-foot, directly reducing the proposed project's firm yield. NISP participants who thought they had contracted for a given firm yield will find that their yields are not guaranteed. In other words, NISP subscribers who were led to believe they were getting water and helping agriculture will in fact lose water, thus hastening the sale of other water from ag land.

I did not see any evidence that such long-term contingencies been considered in the SDEIS. Am I wrong?

Long-term Channel Change Considerations

I am sure that the Corps will be getting a lot of input from geomorphologists with far more experience in sediment and channel change dynamics than I, but I must say that I am skeptical of the rationale offered in the SDEIS regarding the sediment supply-limited nature of the Poudre upstream of I-25. I firmly agree that downstream of I-25, the river is transport-limited, but upstream is very likely just on the threshold of also being transport-limited as evidenced by the growing number of islands and gravel bars, even though most sport only limited vegetation today. [Google Earth can easily confirm this observation at locations that could prove to be vulnerable flood risks zones, e.g., just above and below the Spring Creek outfall, above Timberline Rd, and immediately below Lemay Ave.] There are also worrisome cobble accretions underneath several bridges (e.g., Prospect) and the acknowledged need to replace the Interstate-25 bridge due to the flood risk associated with accretions at that location (as I mentioned in my 2008 comments).

But let's say for discussion that I am wrong. The SDEIS observation that the upstream reach may be supply-limited comes from examining the channel <u>today</u>. That says nothing about whether the upstream reach would remain supply-limited if a project were constructed such that the magnitude, frequency, and duration of flushing flows were reduced. As I understand it, sediment in the water diverted for Glade would be shunted back into the Poudre to limit accretion in the diversion canal; thus the river below that diversion would simultaneously have less water and a higher sediment concentration. For these reasons, I have serious doubts that the SDEIS assumption that the channel would remain supply-limited is valid.

I hope this issue can be more objectively evaluated in the next draft as it has serious implications for long-run, maximum-risk flood damage in Fort Collins.

Mitigating the Present?

Since mitigation was only presented for one alternative, and because it was described more or less as an "opening bid," I did not pay close attention to the description in Appendix F. But one element did catch my attention since I had highlighted ramping rates in my DEIS comments (and in Bartholow, 2010). There is no doubt that the daily ramping described in Section 3.2.7, is a problem that could be mitigated, at least in part. The odd thing is that mitigating that problem is proposed for a predicament that exists today, not one that would be caused by the applicant's preferred alternative.

Conceptually I suppose there is nothing wrong with such mitigation, but I must admit that it rubs me the wrong way in the sense that I would have hoped that the applicant would already be working to reduce adverse impacts from today's operations rather than hold out a carrot for tomorrow's impacts. It makes me wonder what elements of tomorrow's impacts might be offered as a concession for the day-after-tomorrow's proposal.

Health of the Poudre River

My primary interest is in protecting and improving the health of the hard working Poudre River. I am disappointed, that the SDEIS did not cite the peer-reviewed journal article I sent to Mr. Peter in 2010 (Bartholow, 2010) in which I developed a monthly flow regime and other guidance to achieve the bare minimum for a healthy river. This article (which is factually almost identical to the one I submitted to the Corps during the DEIS comment period in 2008) clearly shows that, on average, flows in the Poudre River at Fort Collins are well below the recommended flow in all months of the year and removing more water, especially the critical peak flows as in Alternative 2, would prove counterproductive to the health of the river and its associated ecosystems – even with Alternative 2's proposed flow augmentation (mitigation). It would be a disgrace to permit a project that would further cripple an already stressed riverine system.

In my opinion, as one who has been in the position of studying multiple river ecosystems, permitting NISP as described in the SDEIS would amount to a "significant degradation of waters of the United States".

Final Thoughts

If I fire up Google Earth and adjust the map image on the screen, I can get the Poudre River from the mouth of the canyon to North Platte, Nebraska, all on the screen if my viewpoint is from about 1 million feet up. What I see when I do that is a river system greatly challenged by the changes we have already made. Along the Platte River in Nebraska, we have a train wreck of endangered species -- whooping crane, piping plover, interior least tern, and pallid sturgeon -- that will in all likelihood eventually die out. Closer to home, we find that half of Colorado's native fish are either already extinct or threatened by extinction, with non-native vegetation displacing natives all along the rivers; many mussels, amphibians and the otters are gone too; and the S. Platte is found to have the highest ammonia and nitrate concentration and the second highest phosphorus concentration among 20 major rivers sampled by USGS, all leading to water quality violations – many chronic. Zoom closer and we find flooding in Greeley from sediment accretion, and that both cold and warm water fish as well as several bird species have disappeared from that reach. Zoom closer again and we find the ever-so-slightly robust transition zone where the Poudre quiets from the mountains to the plains. Here we have extirpated the Colorado Butterfly plant along the river and are close to or at the tipping point for many other chronic problems. [Fertig 2000; OtterTail Environmental 2009; Strange 1999; Wohl 2001]

There is a story here, one of stressing these rivers with physical changes, flatlining their snow-melt flow regimes, heating them up, and draining them of their life – squeezing them upstream as well as down, and paying millions of dollars of rate- and taxpayer money annually to try to slow the losses and pay the damage. We have a choice today to try and keep what we still have, or sacrifice our

common-wealth and hope that we can ignore our regrets, and those of our posterity, tomorrow. I can hope that wise decisions will be made.

Miscellaneous Questions Requiring Further Explanation

It may be that I could have found answers to some of these questions by reading the technical reports associated with the SDIES, but I did not. These specific issues arose from the SDEIS proper:

1. I do not understand what is meant by the statement (p. S-12 and S-37) "Determine the method to return water to Glade Reservoir that was released from Glade Reservoir for streamflow augmentation." To me, this implies further undocumented hydrologic changes.

2. I am puzzled by the statement (p S-25) that reads "Historical return flows associated with these agricultural water rights would remain at the headgates for maintenance of ditch losses and return flows. It is assumed that historical diversion locations and amounts would be maintained for water right transfers within the Big Thompson [and Poudre?] Basin and thus no streamflow impacts are predicted as a direct result of these transfers." How can any return flows "remain at headgates", especially if they would be expected to be used for maintenance of ditch losses? And if they will be used for maintenance of ditch losses, doesn't this at least partially call into question the SDEIS assumption of large losses of wetlands associated with irrigated agriculture?

Related, the SDEIS states (p 4-178) "The No Action Alternative would result in a large percentage reduction in irrigated land in the Poudre River Basin (Figure 2-1), which would likely result in a large percentage reduction in the current ground water return flows to the Poudre River, particularly during the mid to late summer, and possibly into the fall." I am no expert on this, but I thought that native return flows must by law be retained in amount, location, and timing. If so, the SDEIS statement regarding groundwater cannot be completely true and, as above, may call into question the SDEIS estimates for irrigation-related wetland losses.

3. I need help understanding why the Alternative 2 Reclamation Action Option would require a total average annual diversion of 63,500 AFY (p S-36) for a project designed to produce a firm yield of 40 KAF. This implies an average loss of 37% of diverted water, far more than what I expect through evaporation and transit losses alone. Alternatives 3 and 4 are comparatively worse.

Maybe there is something I don't understand. Perhaps the 63.5 KAF figure includes Larimer-Weld and New Cache diversions but at a 'new' location. That said, can the Corps give a better accounting of all the "lost" water and show what junior water rights holders (junior to the Grey Mountain and SPWCP rights) would be precluded from exercising all or a portion of their water rights if NISP were constructed? Do these precluded junior rights figure into economic losses tallied to compare alternatives? How does this diversion-to-yield ratio compare to other Front Range water development projects? Would Coloradoans accept a loss rate of 37% as the highest and best use of a scarce resource (assuming that's what it is)?

This reminds me that I did not see a response to my 2008 DEIS comment about there possibly being too much storage in the Poudre basin. At some point the increase in evaporative losses due to increased reservoir surface area more than offset any gains in firm yield associated with additional surface storage. A study of U.S. river basins by Hardison (1972) suggests that safe yield reaches a maximum when the ratio of storage to average annual renewable supply is in the range of 1.6 to 4.6.

By this criterion, the point of negative returns may have already been reached in three major basins -- the Lower Colorado, the Upper Colorado, and the Rio Grande, where the ratios of storage to average renewable supply are now within this range. (http://www.gcrio.org/CONSEQUENCES/spring95/Water.html)

For the Poudre basin, I believe the relevant values are:

- Existing total storage without Horsetooth is 240 KAF (George Varra, Poudre River Commissioner, personal communication, 2007)

- Horsetooth is 156.735 KAF (George Varra, personal communication, 2007)

- Average annual native inflow averages 284.4 KAF (http://www.ncdc.noaa.gov/paleo/streamflow/poudre.txt as of 2007)

- C-BT (Hansen supply canal) inflows average 72.9 KAF (BOR, personal communication, 2007) but would be reduced by 30 to 40+ KAF if Glade were built (NISP planning documents)

If applied to the Poudre basin, including C-BT inflows and Horsetooth, the Hardison ratio would be approximately 1.11. Expanding Halligan or Seaman Reservoirs would, it appears, squeak in just under the line, but adding a Glade-sized reservoir at 177 KAF (or larger, not to mention Galeton), pushes this ratio to about 1.8. If the Poudre's transbasin inflows were added into the total basin water "supply," it would dampen the risk of crossing Hardison's threshold, but we should carefully consider the wisdom of ever more large reservoirs.

In short, it is possible that expanding storage in the Cache la Poudre basin may actually diminish overall water yield, a result that would fly in the face of closing the water supply gap. This is another good reason why pushing the envelope on aquifer storage to reduce evaporation should be a priority.

4. I do not understand Figure S-7 (p S-39). I was under the impression that Alternatives 3 and 4 would not – indeed could not – augment flows at the Lincoln Street gage, yet this figure certainly seems to illustrate the contrary.

5. If Cactus Hill would not require a 404 permit, why would the applicant prefer Glade?

6. What in the world does the statement "The District's Preferred Alternative is not 'water dependent' for the purposes of the 404(b)(1) Guidelines and the rebuttable presumptions apply" (p S-16) mean? Certainly sounds peculiar.

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