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Public Comments Processing
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U.S. Fish and Wildlife Service
5275 Leesburg Pike
Falls Church, VA 22041-3803

Submitted electronically via https://www.regulations.gov

RE: Deschutes River Basin Habitat Conservation Plan and Draft Environmental Impact Statement Comments

Trout Unlimited (TU) appreciates the opportunity to provide comments on the draft Deschutes Basin Habitat Conservation Plan (DBHCP) prepared by the eight irrigation districts that comprise the Deschutes Basin Board of Control (Districts) and the City of Prineville and the accompanying draft Environmental Impact Statement (DEIS). The DBHCP was developed to support the issuance of incidental take permits (ITPs) by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) (collectively, "Services") under the Endangered Species Act (ESA)[1]. The Services have prepared a Draft Environmental Impact Statement (DEIS) to support issuance of the ITPs. TU's comments on the DBHCP and the DEIS are below.

TU is a non-profit organization with a mission to conserve, protect and restore North America's coldwater fisheries and their watersheds. With more than 300,000 members and supporters nationwide, TU works to restore wild trout, salmon, and steelhead and their watersheds throughout the U.S. TU has over 3000 members in Oregon and over 650 in its local Deschutes Redbands Chapter. Restoring instream flows and suitable aquatic habitat conditions to the Deschutes watershed is a key objective of TU and its members. To that end, TU engaged in the Upper Deschutes Basin Study (Basin Study), a collaborative effort that was intended to help resolve long-standing water management issues.

[1] 16 USC section 1531 et seq.

Additionally, TU has engaged in numerous projects that help restore habitat, flows and/or fish passage to key watercourses in the Deschutes watershed.

I. Introduction

The upper and middle Deschutes watershed historically supported large populations of anadromous spring chinook, summer steelhead and resident populations of rainbow trout and bull trout. However, significant habitat modification from many factors including the construction of dams and irrigation practices fragmented and/or significantly reduced suitable habitat for these species leading, in some cases, to listing under the ESA. It has now been over 10 years since summer steelhead (Middle Columbia River steelhead Distinct Population Segment) and over 20 years since Deschutes Bull Trout were listed under ESA.[2] The most recent Recovery Plans for these species found a familiar suite of causes impeding their recovery, including degraded tributary habitats and impaired fish passage.[3]

Historically, Oregon Spotted Frog (OSF) occupied 31 subbasins ranging from British Columbia to northeastern California. DEIS, Oregon Spotted Frog Technical Supplement, p. 9. Oregon Spotted Frogs now occupy 15 subbasins in a much more restricted range. Id. OSF was listed as threatened under the Endangered Species Act (ESA) in 2014.[4] Irrigation activities were identified as a primary cause of OSF's imperiled status in the Upper Deschutes and Little Deschutes sub-basins. Id.

While many praiseworthy actions are proceeding in the watershed that attempt to address some of the impacts to aquatic species, mostly in the form of habitat restoration and fish passage projects, they are not enough on their own to stabilize or reverse the trajectory of key fish species or address the needs of OSF. Improved timing, magnitude, duration and frequency of flows in key rivers and streams are necessary to fully realize the benefit of restoration and passage work and meaningfully improve habitat conditions for fish species and OSF. The DBHCP and NEPA process is a logical venue to identify a comprehensive range of actions with the potential to help restore healthy and resilient populations of salmon, steelhead, bull trout, redband trout and other cold-water fish species and OSF, meet legal requirements under ESA, and facilitate critical water management activities that maintain the region's economic vitality. The DBHCP should present a conservation vision that "is founded on the biological needs of species, [is] a structured and logical approach to problem solving, [is] forward thinking to

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[2] *See* Endangered and Threatened Wildlife and Plants; Threatened Status for Oregon Spotted Frog, 79 Fed. Reg. 51, 658, 51, 668-69, 51, 706 (Aug. 29, 2014).

[3] *See* Middle Columbia River Steelhead Recovery Plan, National Marine Fisheries Service West Coast Region (2009); *see also* Recovery Plan for the Coterminous United States Population of Bull Trout, United States Fish and Wildlife Service (2015).

[4] 79 Federal Register 41657.

anticipate future changes, and it must be developed to fit into the larger conservation context occurring around the HCP." HCP Handbook, p. 9-5.[5] The DBHCP as proposed, however, falls short of this comprehensive approach. Instead, the DBHCP offers a skewed framework that errs heavily on the side of meeting existing irrigation demand over a 30-year timeframe while providing little assurance that its conservation measures will effectively maintain or improve habitat conditions for covered species. As a result, the DBHCP fails to meet the requirements of ESA.

The DBHCP must meet the legal standards set forth in ESA and provide for not only the protection of the covered species but also be consistent with the recovery of those species. In order for the Services to issue an ITP to the Districts they must find, among other conditions, that its issuance "will not appreciably reduce the likelihood for survival and recovery of each species in the wild." 16 U.S.C. section 1539(a)(2)(B)(iv). The Services can authorize take only if the applicant minimizes and mitigates the take in a way that will "ensure the continued vitality of the species involved overall." Center for Biological Diversity v. Bartel, 470 F. Supp. 2d 1118 (S.D. Cal. 2006). Additionally, the HCP must be compliant with ESAs overall goal of conservation which allows a species to survive and recover. Id at 1129.

For key fish species, as compared to the no action alternative, many conservation measures in the proposed alternative will produce no meaningful change in habitat conditions, produce some benefit that will erode with time or the purported benefit is speculative. Additionally, the benefits to OSF from the conservation benefits are phased in over an unacceptably long time period and the monitoring and adaptive management regime for all species is insufficiently robust. Given the severely altered habitat conditions and hydrology of the Plan Area that exists today, the current status of the covered species, and projected changes that threaten the future resilience of the species (climate change and increased drought conditions), it is difficult to support a conclusion that essentially maintaining the status quo over several decades will not appreciably reduce the likelihood of recovery of these species or is compliant with ESA's overall goal of conservation. Unfortunately, the DBHCP seems to solidify status quo conditions by failing to meaningfully acknowledge certain impacts to covered species if they already exist. This avoids real discussion of how additional impacts in an already impaired system, and considering climate change predictions, will affect an ESA-listed species over a term of 30 years. In

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[5] U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration, "Habitat Conservation Planning and Incidental Take Permit Processing Handbook," (December 2016), at page 14-14. *Available at:* https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf, hereinafter "HCP Handbook."

sum, it is not clear that the ecological needs of the covered species will be met by the DBHCP now or 30 years into the future.

Additionally, the DEIS is insufficient as it fails to adequately analyze all significant impacts to the covered species, consider all reasonable mitigation measures and identify a reasonable range of alternatives. Accordingly, the DEIS does not meet the requirements of NEPA.

TU encourages the Districts and the Services to consider the comments below. T

II. <u>The DEIS does not meet the legal requirements of NEPA.</u>

Section 101 of NEPA "declares a broad national commitment to protecting and promoting environmental quality."[6] In furtherance of this commitment, NEPA requires federal agencies to analyze the environmental impact of their proposed actions by preparing environmental impact statements for actions "significantly" affecting the environment.[7] The purpose of this requirement is to assure that agencies take a "'hard look' at environmental consequences," and "provide for broad dissemination of relevant environmental information."[8] NEPA does not mandate particular outcomes, only consideration of "every significant aspect of the environmental impact of a proposed action."[9] All impacts must be considered, whether direct, indirect, or cumulative, so long as they are reasonably foreseeable.[10] TU requests that the Services address the following points in the DEIS to ensure compliance with the requirements of NEPA.

A. <u>Purpose and Need Statement</u>

NEPA requires federal agencies to articulate the "purpose and need" for a proposed action for which environmental review is required. 40 CFR 1502.13. The articulation of a purpose and need statement is critical for a properly framed and robust alternatives analysis-- the "heart" of NEPA -- because only a sufficiently broad statement will allow full development of an adequate range of alternatives which enables the EIS to provide "a clear basis for choice among options by the decision-maker and the public."[11] The purpose and need statement cannot be crafted in such a manner that it curtails full assessment of alternatives.[12]

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[6] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989) ("*Robertson*") (citing 42 U.S.C. §4331).
[7] 42 U.S.C. § 4332(2)(C).
[8] *Biodiversity Conservation Alliance v. BLM*, 404 F.Supp.2d 212, 216 (D.D.C.2005).
[9] *Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 97 (1983) (quotation omitted).
[10] *See* 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1508.7, 1508.8.
[11] *See*, e.g., Simmons v. U.S. Army Corps, 120 F.3d 664 (7th Cir. 1997); Davis v. Mineta, 302 F.3d 1104, 1118 (10th Cir. 2002); *see also* 40 CFR 1502.14.
[12] *City of Carmel-by-the-sea v. United Dep't of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997).

The purpose and need statement in the DEIS would benefit from additional detail and expanded scope. At present, it reads as if it is limited by the contents of the District's application. As noted in the HCP Handbook, the purpose can be expanded to clarify, that in fulfilling section 10(a) obligations the Services must comply with its other legal obligations and has an obligation to "ensure that issuance of the incidental take permit and implementation of the HCP achieve long-term species and ecosystem conservation objectives at ecologically appropriate scales." HCP Handbook, p. 13-2. Additionally, the need extends beyond responding to the applicants' request for an ITP. The need also includes informing the public of the proposed action and the effect of the proposed action and its alternatives to secure additional relevant information and make better informed decisions concerning the incidental take permit. Id.

Additionally, a statement of project objectives should accompany the purpose and need statement, as is custom in many NEPA documents. Measurable project objectives allow a ready mechanism for the Services (and the public) to assess whether and to what degree the stated alternatives meet the purpose and need. In particular, the objectives will help quantify how the Proposed Action and alternatives will fulfill conservation obligations under section 10 of ESA and ensure that activities are consistent with species recovery objectives. TU recommends that the DEIS include detailed objectives for the species that are covered by DBHCP (Covered Species). For fish species, biological and habitat objectives related to improving water quality, spawning and rearing habitat and life history diversity to increase survival and reproductive rates would be appropriate. For frogs, objectives aimed at providing more even and natural flow patterns by increasing flow rates in winter and mimicking more natural summer and spring conditions would be appropriate. While some biological objectives can be found in the appendices, they do not appear to be guiding the analysis of alternatives or future adaptive management actions with the exception of some objectives related to OSF.

B. <u>Analysis of potentially significant impacts and benefits from the continued storage, release, diversion and return of irrigation water by the Districts and the City of Prineville and the implementation of the Conservation Strategy is flawed.</u>

Under NEPA, the analysis in an EIS must consider direct, indirect, and cumulative effects of the proposed alternatives. "Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative." 40 C.F.R. § 1508.8.

Unfortunately, the DEIS impacts analysis is weakened by its reliance on modeling tools that are structurally flawed. Problematically, the modeling appears to overstate winter releases and thereby exaggerates the economic impacts of minimization and mitigation measures. *See* Attachment 1 where this issue is discussed in more detail. This calls into question the validity of the DEIS conclusions regarding the significance of potential impacts and whether measures are sufficient to mitigate those impacts.

Additionally, the impacts assessments are not completely realistic in that they fail to adequately assess the impacts of climate change. First, climate change impacts were assessed qualitatively which suggests that the uncertainty level regarding those impacts is high. Even with the uncertainty, the DEIS predicts significant detrimental changes over the permit term. "[C]limate change effects on hydrology will include increased snowpack, earlier snowmelt, earlier runoff, and potentially slightly more precipitation. Peak flows will be higher and summer low flows lower compared to existing conditions." DEIS, p. 3.2-12. Summer streamflow losses of 40-60% is possible by 2040. Id. In many cases, the DEIS does not offer sufficient support for its conclusions that the impact of the proposed actions on fish species in light of these conditions would not be adverse.

1. <u>Water Resources and Hydrology</u>

The DEIS uses Riverware modeling to predict how the proposed action and alternatives "affect water distribution, streamflow, reservoir storage and water supply, reservoir water surface elevation and flood storage capacity and flood flows." DEIS, p. 3.1-2. However, as noted above, the flaws in the model (discussed in Attachment 1) skew the results such that winter releases and supply deficits for the different scenarios are over-stated. This is a significant concern that affects many of the conclusions that stem from the water resources analysis.

Additionally, the modeling does not seem to analyze scenarios of extended dry year periods. This is particularly the case in the Crooked River where fish species are vulnerable during the irrigation season in almost all scenarios. The effects are particularly pronounced during the later stages of the DBHCP and during normal and dry years. However, the risk of extended dry year periods and droughts is increasing and should be examined more thoroughly in the DEIS.

Finally, there does not appear to be adequate analysis of coldwater springs and refugia areas in the Plan area and how the alternatives will affect those over time, including the potential effects of piping affecting groundwater seepage. The DEIS does acknowledge that piping will affect groundwater but focuses on the few projects that are currently underway to conclude that they are "not adverse because

minor local scale declines in the groundwater levels associated with these conservation projects would be attenuated." DEIS, p. ES-11. The DEIS however does not appear to address changes to groundwater levels that would be expected as the pace and scale of piping projects increases over the 30-year period to meet the supply need of the Districts.

2. <u>Water Quality</u>

The DEIS Fish and Mollusks Technical Supplement notes that "changes in seasonal streamflows under the alternatives have the potential to alter a variety of water quality variables." DEIS Appendix, 3.4-C, p. 30. Additionally, the DEIS notes that the baseline (no-action alternative) against which all the alternatives are measured is one of significant degradation where water quality is projected to continue to fall below state-set water quality standards. DEIS, pp.3.3-17, 18. Given the magnitude of this impact, it is concerning that the analysis was not robust for many of the water quality parameters. "Most of the assessment of effects on water quality were qualitative because quantitative models were not available or unnecessary." DEIS, p. 30. The DEIS focuses mostly on temperature impacts and gives cursory analysis to other water quality parameters that should be considered such as dissolved oxygen, pH, sedimentation, turbidity, nitrogen, phosphorus, and chlorophyll a. Additionally, the DEIS does not adequately consider how covered activities impact covered species especially given that water quality in the Plan Area is already failing to meet state protective levels,[13] due largely to the covered agricultural activities.

One of the most concerning omissions is the lack of robust analysis regarding the impacts of return flows on water quality parameters and covered species. The pollutants contained in tailwaters degrade water quality to the detriment of covered species and their habitats. The DEIS failed to analyze how the tailwater pollutants can increase nutrient loads, contribute to algal blooms, contribute to disease, disrupt food chains for covered species and otherwise affect species habitat by raising water temperatures and lowering dissolved oxygen. The DEIS notes that tailwater returns into the Crooked River and Trout Creek/Mud Springs Creek are covered activities under the DBHCP yet there is no analysis regarding return flows into any of these locations. Additionally, the DBHCP fails to consider the proper geographic scope of this impact. It is unclear why the study area for water quality did not include effects in the lower Deschutes River. It is clear that the covered activities impact water quality in the Crooked River. Recent water quality modeling completed for Portland General Electric and the

[13] U.S. Fish and Wildlife Service, "Draft Environmental Impact Statement for the Deschutes Basin Habitat Conservation Plan, Volume I: Chapters 1-7" (2019), at page 3.3-8.

Confederated Tribes of Warm Springs confirmed that impaired water quality from the Crooked River is the predominant component of the surface water that is released into the lower Deschutes from the Selective Water Withdrawal (SWW) tower from the Pelton Round-Butte Project.[14] This is detrimental to the water quality in the lower river and the model confirmed that improved water quality in the Crooked would positively impact the lower river.

Additionally, it is unclear why the DEIS did not address all non-point sources of pollution from District activities (both as direct and cumulative impacts). While the Districts can choose to include only certain tailwaters (those that return to rivers and streams through the District's canals, pipes, and drains) in their HCP application, the Services still have an obligation to analyze all the impacts of all tailwater returns in the DEIS. Accordingly, the analysis should consider the impacts of all tailwaters (even those that directly return to streams, bypassing Districts' conveyances).

Finally, even if most of the water quality analysis is qualitative, the DEIS must contain sufficient information to support its conclusions. For instance, the qualitative conclusion that "potential negative effects on water quality associated with climate change and ongoing developments in the basin would likely be offset somewhat by beneficial effects associated with water conservation and river restoration projects assumed under the non-action alternative over the analysis period" is not only speculative but completely avoids the magnitude of the challenge concerning water quality degradation. Significant water quality impairment affects almost every part of the Plan Area and is driven in large part by District and irrigator activities. It will be exacerbated by climate change and drought. Planned projects are at too small a scale to move the needle to meaningfully offset effects. It is critically important that this process identify the magnitude of the water quality impact, including the Districts' role in it and identify reasonable mitigation that will be of a scale to meaningfully address it.

In sum, the DEIS neither sufficiently addresses water quality impacts nor identifies and includes reasonable mitigation measures to address them. Any measures should be accompanied by a comprehensive water quality monitoring program to ensure the effects of covered activities are adequately mitigated over the term of the permit.

3. <u>Aquatic Resources</u>

The DEIS has not adequately analyzed all of the significant impacts to aquatic resources

a. Bull Trout (*Salvelinus confluentus)*

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[14] *See* Pelton Round Butte Project and the Lower Deschutes River: Monitoring & Modeling Report, Eilers and Vache MaxDepth Aquatics, June 27, 2019 available at: https://www.portlandgeneral.com/corporate-responsibility/environmental-stewardship/water-quality-habitat-protection/deschutes-river/deschutes-water-quality.

Bull trout are listed as threatened under ESA and the Deschutes basin is considered a stronghold. DEIS, Appendix, 3.4-C, p. 7. The DEIS notes that four locations within the study area contain bull trout including Lower Deschutes River, Lake Billy Chinook, Deschutes River to Big Falls, the Crooked River to Bowman Dam and lower Whychus Creek. Id. While the DEIS states that the Middle Deschutes flows should have a beneficial effect on bull trout (DEIS, p. 3.4-36), it notes that there will be negative impacts to bull trout in the Crooked River during the summer. For instance, "habitat quantity and quality during bull trout critical life stages could decline in dry and normal water years." Id, p. 71. Additionally, water management in dry and normal years "indicate a potential for adverse effect on bull trout that may attempt to rear through the summer in the reach downstream of Bowman." Id. Presumably, this becomes more of a concern given that Opal Springs Fish ladder is functional and fish, including bull trout, can now pass into the upper watershed. Despite these impacts, the DEIS notes that impacts to bull trout are "overall" not adverse because impacts are limited to summer months when existing conditions are already not favorable and remaining impacts are mitigated by the Crooked River Fund. DEIS, p. 3.4.-38.

The challenge, however, is that "bull trout have perhaps the most narrowly-defined habitat requirements of any native salmonid species in the Pacific Northwest." DBHCP, p. 5-2. Bull trout have specific temperature requirements and climate change effects will reduce their available habitat further without protective measures. These factors make the existing habitat that is available to them even more important to protect. It is clear that the covered activities continue to impact bull trout habitat. These impacts are not insignificant, and it is unclear how the Crooked River Fund appropriately mitigates them given the vague requirements and small amount of money allocated to the Fund. The DEIS must better support its position that the conservation measures adequately mitigate impacts to bull trout. Additionally, the DEIS does not appear to have adequately accounted for all locations within the Plan Area where bull trout presence is likely which suggests that potential impacts have been understated.[15] Notably, Alternatives 3 and 4 seem to help mitigate some of the additional impacts to bull trout but some of the most concerning impacts in the normal and dry years during the summer months remain (and in some cases are worse) and therefore neither is completely sufficient.

b. Steelhead (*Oncorhynchus mykiss)*

[15] *See* https://www.fs.fed.us/rm/boise/AWAE/projects/BullTrout_eDNA/SampleSites.html. Several Plan Area sites that were not identified in the DBHCP have a 90-100% probability of bull trout presence including Browns Creek, a tributary to the reach between Wickiup and Crane Prairie, Tumalo Creek and tributaries and Cultus River, a tributary to Craine Prairie. Additionally, an unnamed small tributary to the Upper Deschutes just below Wickiup dam at 43 41'47.84"N, 121 39'23.56"W is listed between 50-75% probability.

The Deschutes Steelhead population is part of the Middle Columbia River Distinct Population Segment (DPS) that is threatened under ESA. It is currently designated as a nonessential experimental population but that status will expire in 2025. The DEIS has not sufficiently analyzed how the Proposed Action and alternatives affect steelhead spawning and migration especially in areas with irrigation return flows such as the Crooked River and Trout Creek.

The DEIS notes that the alternatives will be detrimental to steelhead rearing in the Crooked River given that there will be in an increase in days where temperature thresholds are exceeded and that an adverse effect will occur in all water year types during the later years of permit. DEIS, Appendix, 3.4-C, p. 74. However, the DEIS notes that releases from Bowman Dam have less of an effect as travel time increases. Id. Additionally, decreased streamflows downstream of North Unit ID pumps from May through September would have an adverse effect on steelhead over half of the years given that North Unit will be diverting more water to compensate for decreased upper Deschutes water supply. Id., p.79. Overall, the DEIS concludes that these impacts are not adverse because impacts are occurring where conditions are already unfavorable and that remaining impacts will be mitigated by the Crooked River Fund and screening requirements. DEIS, p. 3.4-40.

Similar to the bull trout, the "overall" not adverse determination is not supported by the existing information. First, the DEIS has failed to consider water quality impacts stemming from irrigation return flows in the Crooked River and Trout Creek systems. *See* water quality section II(B)(2) *supra*. The Trout Creek watershed supports one of the few wild native runs of summer steelhead in the Deschutes basin. Past studies have noted that Trout Creek is the spawning destination for approximately 30% of returning wild Deschutes Summer Steelhead that pass over Sherars Falls. [16] There is no analysis regarding the effects of return flows into this this critical spawning habitat nor identification of any measures to mitigate it. The same is true for the Crooked River. The DEIS must adequately analyze this impact and offer reasonable mitigation measures.

Second, the DEIS does not adequately take into account that steelhead are particularly impacted by climate change conditions given that they traditionally rear in freshwater for longer periods than other anadromous fish. Finally, the DEIS has failed to justify its conclusion that impacts to steelhead (which are expected to get progressively worse under the alternatives) are sufficiently mitigated by the proposed

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[16] *See* Trout Creek Watershed Assessment, prepared for Bonneville Power Administration and Trout Creek Watershed Council, August 2002, available at: https://nrimp.dfw.state.or.us/web%20stores/data%20libraries/files/Watershed%20Councils/Watershed%20Councils_383_DOC_Trout%20Creek%20Assessment%20Action%20Opportunities%20-%20Part%202%20of%202.pdf.

conservation measures most which expressly state they will have a) no effect, b) a detrimental effect or c) "possibly suggesting a benefit" for steelhead. DEIS, Appendix, 3.4-C, p. 80. The conclusions seem mostly to hinge on the Crooked River Fund and screening measures (CR 4, 5 and 6). As with the bull trout, it is not clear how the Crooked River Fund appropriately mitigates impacts to steelhead given the vague requirements and small amount of money. Additionally, the screening measures, while beneficial, mostly memorialize a requirement of existing law.

c. Middle Columbia Spring Chinook Salmon (*Oncorhynchus tshawytscha)*

Middle Columbia spring-run Chinook salmon are non-listed but covered under the HCP. Similar to bull trout and steelhead, the DEIS concludes that impacts to spring Chinook are overall "not adverse." However, several adverse impacts were noted in the DEIS especially in the Crooked River. "Water management under the proposed action would result in adverse effects on habitat quantity and quality during juvenile Chinook salmon summer rearing and adult holding in dry and normal water years" beginning in year 11 and worsening as the permit term proceeds. DEIS, Appendix, 3.4-C, p. 84. Additionally, the DEIS notes that irrigation season (early) diversions will increase as water supply availability on the Crooked decreases leading to a possibly adverse effect on summer migration due to temperature. The DEIS must better support its not adverse finding given these impacts and the lack of sufficient mitigation.

d. Redband Trout

The redband trout in the Deschutes Basin are part of the Columbia River redband trout subspecies. While redband trout are not a listed species under ESA they have experienced a significant decline in range and abundance in the Deschutes Basin due to lack of habitat diversity. They are also listed as a sensitive species by the state of Oregon and the Forest Service. The DEIS acknowledges several potentially adverse effects to redband trout including to rearing habitat in Wickiup Reservoir and to spawning, egg incubation and rearing habitat in the upper Deschutes given variation in flows in the spring especially in the last decade of the permit term. DEIS, Appendix, 3.4-C, pp. 93-95. Additionally, increases in upper Deschutes winter flows will likely increase nonnative brown trout populations and bullheads and therefore there is a potential impact to redbands from displacement. DEIS, p. 3.4-48. While there are benefits to redband due to some of the conservation measures, the DEIS notes that, for the upper Deschutes in particular, "these benefits would be substantially offset by an increase in variability in streamflows in critical months and years when Wickiup Reservoir storage is low and

streamflows increase at the start of the irrigation season and then sharply decline when redband trout are spawning or eggs are in the gravel." DEIS, Appendix, 3.4-C, p. 95.

Additionally, there will be impacts to redbands in the Crooked watershed during irrigation season due to decline in streamflows and an increase in the number of warm temperature days. DEIS, Appendix, 3.4-C, p.95. Overall, the DEIS concludes that there will be an adverse effect on redbands from the proposed alternatives given the importance of the reaches where the impacts will occur. DEIS, Appendix, 3.4-C p.98. While the DEIS conclusion seems supported by the best available information, there is little identification or analysis of measures available that might mitigate these impacts. NEPA requires identification of mitigation measures for adverse impacts. Monitoring of redband populations, at a minimum, should be considered and included in the DBHCP.

e. Oregon Spotted Frog (*Rana pretiosa)*

The Oregon Spotted Frog (OSF) is a federally threatened species under ESA and is a native aquatic species to the Deschutes. The DEIS notes that "flows under the proposed action at full implementation would likely improve conditions for OSF in most reaches and life stages, but it would take 20 years to reach its full implementation. Until then, a highly modified hydrograph would persist. During this time, flows would not adequately support the life history requirements of OSF…" DEIS, p. 3.4-31. It is clear that the proposed alternative will have limited benefits for OSF until year 21 and the best available scientific information suggests that the maximum flow requirement of 400 cfs is inadequate to restore sufficient overwintering habitat for OSF. The USFWS 2017 Biological Opinion (BiOp) for OSF states that higher flows are required for overwintering habitat and below 500 cfs there is significant loss of wetlands with increased dominance of mudflats.[17] The Appendix to the BiOp (Wickiup Ram Down 2014, Deschutes River and Wetland Monitoring) suggests that more than 500 cfs is necessary to reconnect wetlands and/or actively restore riparian vegetation. Id. Additionally, the Upper Deschutes River Instream Flow Assessment identifies 500 cfs as the minimum flow necessary to recruit and sustain riparian vegetation. (p. 34).

The flow conditions offered in Alternatives 3 and 4 offer improved conditions for OSF. DEIS, Oregon Spotted Frog Technical Supplement, p. 85. In particular, "Alternative 3 appears to offer the most improved conditions for Oregon spotted frogs and their habitat among the alternatives." Id. Alternatives 3 and 4, or variations of those alternatives such as TU's suggestion in section II(C) *infra*, should be pursued over the proposed alternative.

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[17] OSF 2017 BiOp, at page 56.

C. <u>The DEIS Fails to Analyze a Reasonable Range of Alternatives Under NEPA</u>

The DEIS focuses on alternatives that modify the pace and scale of the upper Deschutes winter flow measure with a few additions to ameliorate negative impacts to fish species. However, many of the negative impacts to fish species persist or are worsened with alternatives 3 and 4 given that the flow regimes will be modified more quickly under these alternatives. Accordingly, certain impacts to covered fish species will occur sooner under Alternatives 3 and 4. Inclusion of an Upper Deschutes River Conservation Fund is helpful given its expanded scope and level of funding as compared to the proposed alternative's fund. However, without more detail and guidelines regarding the scope and scale of benefit expected from the fund, it is not clear how effectively it will mitigate impacts to both fish species and OSF. TU suggests analysis of an alternative that retains key features of Alternative 3 with additional conservation measures and more robust monitoring and adaptive management to better mitigate impacts to both fish and OSF. "A 'viable but unexamined alternative renders [the] environmental impact statement inadequate.'"[18]

Additionally, the DEIS should provide a clearer statement of the Districts' costs to implement the alternative. As noted in section Attachment 1, the Riverware modeling has significant flaws that overestimate the water shortages that the Districts will encounter with implementation of the conservation measures. Additionally, it should be clear what mechanisms exist for the Districts to minimize the impacts of the projected shortages. The Services have an obligation to make an independent finding that any alternative is impracticable as opposed to relying on applicant's claims. Gerber v. Norton, 294 F 3d. 173 (D.C. Cir. 2002). Note, the Services merely "[r]eferencing a requirement is not the same as complying with that requirement." Sugar Cane Growers Coop. v. Veneman, 289 F. 3d 89 (D.C. Cir. 2002). The analysis that is required does not dictate to Permittees how they must comply with the terms of the ITP. Instead, it must be an independent investigation by the Services of all the options available to the Districts to comply with potential conservation measures such that they can make a supported finding that the minimization and mitigation measures are the maximum that can be practicably required of the Districts. Providing stakeholders with a thorough assessment of the available actions and the cost/benefit of choosing certain actions over others will increase the likelihood that thoughtful discussion ensues and an efficient, effective, widely supported plan emerges in the Basin.

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[18] *Muckleshoot Indian Tribe, supra,* 177 F.3d at 814 (*quoting Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985)).

Accordingly, TU recommends that an alternative with the components below be analyzed. TU requests revisions to the Riverware modeling be considered in accordance with Attachment 1. In addition, a more thorough assessment of the mechanisms available to reduce the impacts of the water supply shortages should be prepared and used as a basis for more accurate cost estimates to the Districts.

1. Upper Deschutes

The DEIS modeling suggests that in somewhat less than half of modeled years adequate water is available for winter releases from Wickiup above the minimums specified in the proposed alternative. DBHCP, fig. 11-1, p. 11-6. This is contrary to the assessment of the Districts that providing more than 100 cfs in the early years of implementation would be infeasible due to the impacts to storage levels. Attachment 1 contains a simplified model (that has accounted for the errors) which demonstrates the utility of adaptive management of Wickiup releases. In the hypothetical scenario, adaptive use of flexible conservation tools complements infrastructure-based conservation measures. Higher winter flows in years of scarcity with minimal impacts on irrigators is found. This is achieved with minimal investment in fixed infrastructure. The analysis suggests that the Districts could achieve 200 cfs in the near-term with minimal disruption to their irrigators.

Accordingly, TU recommends an alternative similar to Alternative 3: 200 cfs shall be provided immediately, then 300 cfs in year 6 and 400-500 cfs in year 11-30. This will put the Districts on a trajectory to achieve 300 cfs in the near-term. The DEIS notes that "[f]lows of at least 300 cfs increase the quality of [OSF] overwintering habitat within the river channel." DEIS, Appendix 3.4-B, p. 24. Additionally, the Districts should be required to demonstrate progress of at least 20 cfs annually in the years 0-15. Phasing in such a manner reflects the reality that OSF and other aquatic species require meaningful flow improvement in the near-term and that its both reasonable and feasible for the Districts to provide such flows with minimal irrigation impact and minimal impact to summer OSF habitat.[19] It

[19] The general contention of the DBHCP is that increased winter flows below Wickiup should be increased gradually to reduce impacts to OSF summer habitat in Wickiup. Generally, the DEIS analyzes the impacts to hydrology using the "fully implemented alternatives, meaning the flows predicted under each alternative when operating at their highest minimum instream fall and winter flow below Wickiup Dam." DEIS, Appendix 3.4-B, p. 6. This makes it a challenge to assess the expected changes to hydrology, and thus to OSF habitat conditions, with early implementation flow increases. DEIS, Appendix 3.4-B helpfully includes boxplots that break apart the different flow intervals for the alternatives for the purposes of assessing impact/benefit to different OSF life stages. However, a boxplot analysis is not included for Reach Des-13, Wickiup Reservoir. The Appendix does note, however, that under all alternatives, OSF habitats associated with Wickiup will experience adverse habitat conditions because wetland vegetation will experience larger year to year fluctuations in water availability. Id at 23. The DEIS should include analysis regarding the potential impacts to Wickiup summer OSF habitat from the early release schedules in the different alternatives. It is reasonable to assume that the Districts could feasibly move from a 100 to 200 cfs flow release target below Wickiup with little difference to the impact to summer habitat especially given that its in furtherance of returning to a more natural hydrologic regime which will be very beneficial to OSF overall.

also reflects that achieving flows greater than 300 cfs will likely require more time as it will necessitate modernization projects and/or water marketing and on-farm efficiency projects to move forward at an enhanced pace and scale.

However, to guard against complacency, there should be an annual flow requirement to ensure that progress continues to be made at a steady pace. As noted above, TU recommends that a minimum of 20 cfs be required annually as well as minimum flow targets that increase at certain intervals. Additionally, the amount of water available for winter release has the potential to increase above the required minimums if the pace and scale at which conservation projects, water marketing and on-farm efficiency projects are implemented is accelerated. Accordingly, the DBHCP should include a process, and a commitment, to increase winter releases in these water years. The process should include all water users (including conservation groups) and at least one annual meeting. The objective for this meeting of the "water budget group" would be to review real-time water conditions in the Basin in order to commonly understand snowpack, precipitation forecasts, reservoir status and the implications for the upcoming irrigation season in addition to the status of District conservation and efficiency projects and water marketing efforts. This process should be done on or about November 1 of each year and coordinated with the Districts before they set water allotments for their patrons. The end result should be a set of commonly understood factors that drive water demand and forecast projected stream flows through the irrigation season such that a winter flow target below Wickiup can be agreed to by the group (although it shall not fall below the required minimum). Such a process will ensure that enhanced flows are provided "to the maximum extent practicable" but will also facilitate common understanding and relationship building in the watershed amongst diverse stakeholders.

2. Whychus Creek

Historically, Whychus Creek was a very productive native steelhead and chinook fishery. In addition to these two species, the Creek supports populations of redband and bull trout. The current alternatives for Whychus do not sufficiently explain why the flow target is biologically sufficient for all the key fish species that utilize the river. A revised alternative should consider flow ranges in the 45-65 cfs range during irrigation season. This quantity has been identified in the Whychus Creek Watershed Restoration Plan Update as necessary for successful restoration of flows and water quality in the

summer.[20] Additionally, the alternative should analyze the effects if all of the instream flow rights secured priority over irrigation rights through a subordination process.

3. Crooked River

The lower Crooked River historically supported large populations of spring Chinook, steelhead and bull trout. However, dam operations, water diversions and irrigation practices have degraded instream habitat and water quality. All of the current alternatives will cause impacts to cold-water fish species, including steelhead and redband trout, especially during irrigation season. For instance, with the proposed alternative, "[t]he number of warm days during the summer increased substantially in the normal water year type indicating potentially less suitable environment for temperature sensitive salmonids." Appendix, 3.4-C, p. 61. Additionally, the required minimum flow during the non-irrigation season is inadequate and not based on the needs of the covered species. It is not clear how effectively a conservation fund will mitigate the impacts to the covered species.

A revised alternative should analyze a requirement to maintain minimum flows below Bowman Dam at 80 cfs during the storage season. ODFW has recommended a minimum of 80 cfs during the storage season to protect the resources in the tailwater fishery and Northwest Planning and Conservation Council has recommended the same to support the reintroduction of anadromous salmonids.[21] Additionally, the alternative should consider a measure to mitigate temperature exceedances and water quality impacts and the effects of return flows during the irrigation season including a minimum flow requirement, a temperature target, targets for effective shade or other measures that will measurably improve conditions for fish. This Alternative should retain the features of Alternatives 3 and 4 where uncontracted flow releases are legally protected instream to Lake Billy Chinook and the fund. However, the fund should contain more resources and better articulate guidelines for how money will be distributed, pursuant to what method and how effectiveness will be assessed and modified if needed.

4. Trout Creek/Mud Creek

Return flows from NUID into Trout Creek and Mud Creek are covered activities yet the impacts of

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[20] *See* Whychus Creek Watershed Restoration Plan Update. 2013. Upper Deschutes Watershed Council. The Update used Chinook salmon, steelhead trout and resident rainbow trout as target species and identified the 45-65 cfs range in the summer as a "good" range to provide adequate streamflow.

[21] *See* Deschutes Subbasin Plan, Northwest Power and Conservation Council, 2005 recommending the maintenance of a minimum instream flow of 80 cfs from Bowman Dam to Lake Billy Chinook to support the reestablishment of anadromous populations. *See also* Modeling flow alternatives to balance fish, reservoir, and out-of-stream needs in the Crooked River below Prineville Reservoir, Draft White Paper, Oregon Department of Fish and Wildlife. July, 2011. Available at: https://www.dfw.state.or.us/fish/water/docs/official%20white%20paper%20Crooked%20R%20flow%20alternatives.pdf. *See also* https://mailtribune.com/oregon-outdoors/fishing/redband-trout-in-decline-on-the-crooked.
regarding ODFW's position that 80 cfs be maintained year-round on the Crooked River.

these activities have not been adequately analyzed in the DEIS or DHBCP nor have conservation measures been identified to mitigate this impact. TU recommends an alternative that considers mitigation measures to address this impact such as securing a certain number of acres of riparian improvements to attempt to mitigate the effects of the return flows on water quality. Exploring conservation easements with willing landowners would also be beneficial.

D. <u>The DEIS does not adequately consider the cumulative effects of the Proposed Action.</u>

NEPA regulations specify that an EIS should consider any cumulative impacts of agency action. 40 C.F.R. § 1508.25(c). "Cumulative impact" is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency... undertakes such other actions." *Id.* § 1508.7.[22]A "likely" or "reasonably foreseeable" effect is interpreted to mean, "that the impact is sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision.…"[23] Additionally, more than a cataloguing of related past, present, and future actions is needed; the DEIS must provide detailed analysis.[24] "[V]ery broad and general statements devoid of specific, reasoned conclusions," will not suffice.[25] However, the DEIS mostly seems to catalogue applicable actions with no real analysis of the total impact on the environment expected over the life of the project from the proposed action in conjunction with all the other activities that have and will occur in the basin. Additionally, the DEIS fails to give more than a cursory analysis to certain impacts, such as forestry and non-point sources of pollution.

Cumulative impacts analysis requires a geographic and temporal scope of analysis sufficient to determine the significance and incremental impacts of the Proposed Action on resources of concern when considered in combination with other past, present and reasonably foreseeable future actions. Hydrology, water quality and aquatic resources in the Deschutes River watershed will be significantly

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[22] Sierra Club v. Marsh, 976 F.2d 763, 767 (1st Cir. 1992).

[23] Id. A Project need not have received final approval to be "reasonably foreseeable." Surfrider Foundation v. Dalton, 989 F. Supp. 1309, 1324 (S.D. California 1998).

[24] Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d 800, 810 (1999).

> [The EIS] must <u>analyze</u> the combined effects of the actions in sufficient detail to be "useful to the decision maker in deciding whether, or how, to alter the program to lessen cumulative impacts' [*quoting City of Carmel-By-The Sea v. U.S. Dept. of Transp.*, 123 F.3d 1142, 1160 (9th Cir. 1997)]. <u>Detail</u> is therefore required in describing the cumulative effects of a proposed action with other proposed actions. *Neighbors of Cuddy Mountain*, 137 F.3d at 1379; *see also Blue Mountains Biodiversity Action v. Blackwood*, 161 F.3d 1208, 1214-15 (9th Cir. 1998).

[25] Id. at 811.

impacted by many past and present actions, both individually and cumulatively. In the Upper Deschutes particularly there has been a significant and cumulative degradation of aquatic habitat for sensitive species such as bull trout, OSF and redband trout since the major dams (Bowman, Wickiup) went into service and were operated primarily for irrigation needs. The cumulative effects analysis should situate the effects of the Proposed Action in the context of the aquatic resources of the Deschutes watershed under today's conditions. These aquatic resources are seriously degraded, and some native species are at an enhanced risk of extinction. The impact of incremental modifications to flow and habitat under these degraded conditions is greater than it would be under conditions where the aquatic ecosystem were not already so damaged.

Accordingly, the DEIS should better analyze how all the past, present and reasonably foreseeable future activities in the watershed cumulatively affect key aquatic resources especially in light of climate change. Relevant activities are included below.

- Other management activities of all State and Federal agencies. This includes Bureau of Land Management and Forest Service resource management activities relating to roads, fire (fuels management and suppression), and timber harvest.
- Road building (the excess sediment it generates has a high potential for take through impacts to spawning and rearing habitat).
- Forest road culvert instillation in regard to fish and other aquatic species. Passage has proven to be a significant problem in all Forest Service regions. Culvert inventories have shown as much as 75% of culverts do not pass fish at least some time of the year.
- Climate change which will result in rising temperatures, earlier snowpack melt, reductions in snowpack and reductions in stream flows in late summer. Some information on this topic is being generated in the Basin Study.
- Other hydropower operations and fish passage impediments (such as Pelton Round Butte facilities).
- Other water diversions (both surface and groundwater) that are not covered under the HCP.
- Ocean conditions.
- Non-point source discharges that are not covered under the HCP.
- Drought conditions which are expected to increase in frequency and intensity in the future.
- Projected population growth and expected conversion of additional land from agricultural use to urban use.

- Fires of increasing frequency and severity. Future fires may see more "high intensity" burns that can significantly affect aquatic resource habitat and result in after-effects such as flooding and erosion. Fire suppression activities can also significantly affect aquatic resources.
- Reasonably foreseeable fish passage projects such as Opal Springs Fish Passage Project

E. <u>The DEIS must identify reasonable mitigation measures.</u>

NEPA requires that "all relevant, reasonable mitigation measures that could improve the Proposed Action …be identified," including those outside the Services' jurisdiction.[26] This includes feasible measures for any adverse environmental impact, even those that are not considered significant.[27] Therefore, the DEIS must include an analysis of relevant, reasonable mitigation measures. The description of any such mitigation measure should include key components such as timing of implementation, cost to implement, possible location and net impacts/benefits to specific species and habitats.

The Services have not provided a sufficient record showing that all reasonable mitigation measures were considered or that those contained in the alternatives are the "maximum that can be reasonably required" of the Districts. *See* Service's HCP Conservation Planning Handbook. The Handbook states that [w]here the minimization and mitigation measures do not fully offset the impacts of the taking, the applicant must provide the Services with sufficient documentation and justification to support the "maximum extent practicable" finding. The Services must then conduct an independent analysis of the information provided by the applicant to make the required finding. HCP Handbook, p. 9-34.

Understandably, the Districts should have some discretion to determine how mitigation obligations will be met. However, it is incumbent on the Services to ensure that they independently verify whether and to what degree mitigation measures are feasible so that an informed decision can be made regarding what level of minimization/mitigation constitutes the "maximum extent practicable." Accordingly, this section should include more detailed information on the barriers (legal, financial or otherwise) that the Districts have claimed are limiting their ability to offer more robust conservation measures. For instance, the DEIS notes that basin-wide water markets are unlikely due to legal barriers. Appendix 3.5-A, p. 4. More detailed information should be provided regarding the barriers and the potential options to remove barriers over the permit term such as obtaining a WaterSMART grant to scale up water marketing actions in the basin. Additionally, the DEIS should be clear about why certain barriers were

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[26] *See* NEPA's 40 Most Asked Questions, 19b, *available at http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm.*
[27] 40 CFR section 1502.16(h).

deemed more surmountable (e.g., COID conserved instream releases and NUID storage swap) than others (water market).

In sum, the Services must analyze all reasonable mitigation measures including those identified in section III(A)(2) *infra* and must include an alternative that includes all measures that represent the maximum that can be required of the Districts. Of note, neither the DEIS nor the DBHCP include any conservation measures to address tailwater impacts.

III. The DBHCP does not meet the legal requirements of the Endangered Species Act.

The DBHCP does not meet the requirements of the Endangered Species Act (ESA). The most fundamental flaw is that the DBHCP does not support its conclusion that impacts to covered species will be minimized and mitigated to the maximum extent practicable by the conservation measures. The conservation measures for fish species and OSF seem to be based mostly on what the Districts are willing to do as opposed to the biological needs of the species. The Services have an affirmative duty to promote the conservation (i.e., recovery) of threatened and endangered species. Section 2(c) of the ESA provides that it is "…the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." 16 U.S.C. §1531(c)(1). Section 7(a)(1) also establishes an affirmative duty to conserve. 16 U.S.C. § 1536(a)(1). If the Services grant a permit on the basis of this HCP without requiring additional minimization and mitigation of impacts to species, it will be in violation of its duties under Sections 2 and 7 of the ESA. Additionally, the DBHCP would be stronger if it articulated specific, measurable, achievable, realistic and time-bound "SMART" objectives for each affected species and clearly described how the Proposed Action will achieve those objectives and what scientific assumptions have been made to support that conclusion.

A. Incidental Take Permit (ITP) Requirements

Section 10(a) of the ESA provides criteria for issuing Incidental Take Permits (ITP) for the take of endangered or threatened species. In particular, the HCP must articulate the likely impact of the proposed taking of species and then must show that the projected take will be minimized to the "maximum extent practicable" and mitigated. 16 U.S.C. section 1539(a)(2)(B)(ii). In determining whether applicant meets this standard, courts generally look to two factors; (1) the adequacy of minimization and mitigation program and (2) whether it's the maximum that can practically be implemented by the applicant. *See* Center for Biological Diversity v. USFWS, 202 F. Supp. 2d 594, 609. *See also* Revised HCP Handbook, 9-19 that notes "if mitigation measures are uncertain, then more

measures are required to fully offset take." Additionally, the HCP is required to show that the Applicant considered reasonable alternatives to the Proposed Action to minimize and mitigate take (a separate analysis from the NEPA alternatives analysis).

1. <u>Impact of the Proposed Taking</u>

The HCP must quantify the level of expected take and describe its method for doing so. While, the DBHCP is clear that the covered activities adversely modify habitat, there is not a clear quantification of how much habitat is being altered. This seems necessary to understand the impacts of the proposed taking.

a. <u>Return Flows</u>

In particular, the DBHCP is light on details regarding impact of return flows. The DBHCP notes that "[f]our of the covered irrigation districts (COID, LPID, NUID and OID) operate irrigation returns to the Crooked River and its tributaries" and regarding Trout Creek "NUID maintains two irrigation returns at the north end of its distribution system in an area known as Agency Plains." DEIS, pp. 4-62 and 4-39. It's clear that these returns can impact temperature and water quality in the Crooked River, Trout Creek and Mud Springs Creek (which contributes the majority of flow to Trout Creek in July through November). Id. All of these waterways are already water quality limited. Trout Creek is water quality limited for temperature under 303(d) and frequently exceeds salmonid spawning criteria. It is also limited for habitat modification, sedimentation and biological criteria. Mud Springs Creek is limited for pH. The Crooked River is 303(d) listed for temperature, pH and E. coli among other parameters. The DBHCP does not attempt to quantify the take and/or habitat degradation that is occurring due to the return flows such that they can be appropriately minimized and mitigated.

b. <u>Covered Species</u>

The DBHCP does not adequately assess the impacts of the covered activities on covered species. This conclusion is detailed below.

1. <u>Bull trout</u>

The DBHCP states that the covered activities will have minor effects on bull trout because, although the basin is considered a stronghold for bull trout, the majority of the bull trout in the basin spawn and rear in the Metolius River subbasin. DBHCP, p.1-17. Despite the covered activities having a significant role in the contraction of habitat available to bull trout (the DBHCP acknowledges that "morphologies of many surface waters in the basin have been altered from their natural conditions by several decades of irrigation storage and release." p. 2-9), the Districts are able to narrow their responsibility by comparing

their actions to a baseline where "[a]ctivities that permanently affected or altered habitat for covered species prior to implementation of the DBHCP are also held constant in the analysis of effects." DBHCP, 6-1.

The challenge, however, is that "bull trout have perhaps the most narrowly-defined habitat requirements of any native salmonid species in the Pacific Northwest." DBHCP, p. 5-2. Bull trout have specific temperature requirements and climate change effects will reduce their available habitat further without protective measures. These factors make the existing habitat that is available to them even more important to protect. It is clear that the covered activities continue to impact bull trout habitat. The DEIS notes that "habitat quantity and quality during bull trout critical life stages could decline in dry and normal water years." DEIS Appendix, 3.4-C, p. 71. Additionally, water management in dry and normal years "indicate a potential for adverse effect on bull trout that may attempt to rear through the summer in the reach downstream of Bowman." Id. These impacts are not insignificant, and it is not clear how the Crooked River fund appropriately mitigates them. Additionally, the DBHCP does not appear to have adequately accounted for all plan areas where bull trout presence is likely.[28]

In summary, the DBHCP has not appropriately captured the significance of the impact to bull trout from covered activities.

2. <u>Steelhead</u>

The DBHCP concludes that overall it will be beneficial to steelhead because it will increase April flows in lower Deschutes and will maintain "existing high-quality steelhead spawning and rearing habitat between Bowman and the Crooked diversion…." DBHCP, p. 1-18. The DBHCP relies on having storage water for summer release, and Reclamations' use of uncontracted water in Prineville will provide flows to support winter rearing habitat. The DBHCP relies on studies indicating that steelhead juvenile rearing capacity increased with increasing summer flow conditions and reduced temperatures. DBHCP, p. 5-22.

However, the DBHCP also acknowledges that the "Crooked River operation of irrigation systems is included as a land use activity that negatively impacts summer steelhead by alternating seasonal hydrographs and increasing summer water temps." DBHCP, p. 5-26. Similar to the DEIS, the DBHCP seems to discount thermal impacts to steelhead because they already exist. This avoids real discussion

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[28]*See* https://www.fs.fed.us/rm/boise/AWAE/projects/BullTrout_eDNA/SampleSites.html. Several Plan Area sites that were not identified in the DBHCP have a 90-100% probability of bull trout presence including Browns Creek, a tributary to the reach between Wickiup and Crane Prairie, Tumalo Creek and tributaries and Cultus River, a tributary to Craine Prairie. Additionally, an unnamed small tributary to the Upper Deschutes just below Wickiup dam at 43 41'47.84"N, 121 39'23.56"W is listed between 50-75% probability.

of how additional impacts in an already impaired system, and considering climate change predictions, will affect an ESA-listed species over a term of 30 years. Maintaining existing conditions is not sufficient. Additionally, the DBHCP avoids any analysis of impacts to steelhead from irrigation return flows in the Crooked River and Trout Creek watershed. The Trout Creek watershed supports one of the few wild native runs of summer steelhead in the Deschutes basin. Past studies have noted that Trout Creek is the spawning destination for approximately 30% of returning wild Deschutes Summer Steelhead that pass over Sherars Falls. *See* Trout Creek Watershed Assessment.[1] There is no analysis regarding effects of return flows into this habitat nor identification of any measures to mitigate it. The same is true for the Crooked River.

3. <u>Spring Chinook</u>

Similar to the analysis for steelhead, the DBHCP concludes that it will "have positive effects on Chinook salmon in the Deschutes Basin" due to increased April flows in the lower Deschutes and because "[s]pawning and rearing habitat in the Crooked River between Bowman Dam and the Crooked River diversion, as well as high quality habitat near Opal Springs, will be maintained…." DBHCP, p. 1-19. Conditions elsewhere will show little change, show slight improvements or will do nothing to reverse existing stressors." Id. For example, the DBHCP states that "current conditions that restrict adult access to potential spawning habitat will continue." Id.

However, the DBHCP acknowledges that "[t]hermal conditions and the presumed presence of the fish parasite Ceratomyxa shasta in the mainstem Deschutes River below Steelhead Falls (at River Mile 127) and the mainstem Crooked River below the Lone Pine Bridge (at River Mile 30) are also noteworthy threats to the successful reintroduction of spring Chinook salmon in the upper Deschutes Basin (ODFW and CTWSRO 2008)." DBHCP, p. 5-44. The DEIS also identifies thermal impacts to spring Chinook especially on the Crooked River from the proposed alternative. "Water management under the proposed action would result in adverse effects on habitat quantity and quality during juvenile Chinook salmon summer rearing and adult holding in dry and normal water years" beginning in year 11 and worsening as the permit term proceeds. DEIS, Appendix, 3.4-C, p.84. Additionally, the DEIS notes that irrigation season (early) diversions will increase as water supply availability on the Crooked decreases leading to a possibly adverse effect on summer migration due to temperature.

As with steelhead, the DBCHP must address how additional impacts from covered activities in an already impaired system, and considering climate change predictions, will affect spring Chinook over a term of 30 years. The DBHCP appears to heavily weigh the positives to spring Chinook associated with

lower Deschutes flows and ignore or minimize the negatives associated with aspects of the upper watershed flow regime. The DBHCP needs to provide additional detail regarding whether this approach is sufficient to adequately capture the impacts to spring Chinook from the covered activities.

4. OSF

The DBHCP concludes that it will have a net positive effect on overwintering Oregon spotted frogs in the upper Deschutes Basin "because the areas that will improve the most (Crane Prairie Reservoir, Crescent Creek and Little Deschutes River) are areas with the highest concentrations of habitat and highest numbers of known Oregon spotted frogs." DBHCP, p. 1-20. Additionally, it concludes that "[b]reeding conditions for Oregon spotted frogs will improve on all covered lands except Wickiup Reservoir and the reach of the Deschutes River between Crane Prairie Dam and Wickiup Reservoir" and summer rearing and foraging habitat will improve on some covered lands and worsen on others. Id. The DBHCP has not adequately assessed the impacts to OSF from the covered activities especially given that many of these impacts will endure until the conservation measures achieve full implementation in twenty years and given that the maximum flow target is below what the best available science suggests is necessary to provide sufficient overwintering habitat. The DBHCP must adequately assess the impacts to OSF from covered activities and provide sufficient scientific justification to support its contention that it will have an overall net positive effect on OSF.

2. Minimize and mitigate

The DBHCP must minimize and mitigate impacts to the maximum extent practicable. While some of the conservation benefits are likely to benefit covered species, the record does not support the conclusion that the measures minimize and mitigate impacts to the "maximum extent practicable." Many of the conservation measures do not include sufficient metrics, timelines and effectiveness monitoring to ensure they will actually mitigate impacts to covered species. Other conservation measures are either required by existing law or reliant on third party actions so it's not clear how they contribute to the DBHCP meeting ESA standards. Many of the most concerning impacts to fish species are proposed to be mitigated through the use of a yet to be defined "Conservation Fund". However, it lacks sufficient guidelines, metrics, funding levels and oversight to provide needed confidence that it will sufficiently mitigate impacts. Finally, it is not sufficiently clear that required instream flows will be legally and permanently protected. Where appropriate, conservation measures should specify that the Districts will use available legal mechanisms to permanently protect conserved water for instream use.

TU's comments and recommendations on specific proposed measures are below.

a. Measures for the Upper Deschutes

1. Winter Flow Releases (WR-1)

The DBHCP's proposed flow release schedule from Wickiup during the winter is not supported by the best available scientific information. The DBHCP proposes to gradually increase winter flows culminating in 400cfs being achieved in the HCP's 21st year. As noted by the DEIS, "flows under the proposed action at full implementation would likely improve conditions for OSF in most reaches and life stages, but it would take 20 years to reach its full implementation. Until then, a highly modified hydrograph would persist. During this time, flows would not adequately support the life history requirements of OSF…." DEIS, p. 3.4-31. It is clear that the DBHCP will have limited benefits for OSF until year 21 and the best available scientific information suggests that the maximum flow requirement of 400 cfs is inadequate to restore sufficient overwintering habitat for OSF. For instance, the USFWS 2017 Biological Opinion (BiOp) for OSF states that higher flows are required for overwintering habitat and below 500 cfs there is significant loss of wetlands with increased dominance of mudflats.[29] The Appendix to the BiOp (Wickiup Ram Down 2014, Deschutes River and Wetland Monitoring) suggests that more than 500 cfs is necessary to reconnect wetlands and/or actively restore riparian vegetation. Id. Additionally, the Upper Deschutes River Instream Flow Assessment identifies 500 cfs as the minimum flow necessary to recruit and sustain riparian vegetation. (p. 34).

The DBHCP pursues a gradual increase in winter flows below Wickiup for two main reasons. The first is to accommodate concerns that increasing winter flows will decrease summer flows and summer flows may drop too low to support existing OSF habitat. Additionally, the Districts are relying on the efforts of other parties to restore channel habitats such that they can support more and better habitat with lower flows. DHBCP, p. 2-9. Such efforts presumably take time although there is little information in the DBHCP regarding the exact projects that are planned to be implemented and the assurances that such projects will actually move forward. The second reason is economic. The DBHCP notes that the "Districts will make system improvements to reduce overall demand for irrigation water…[t]he conservation and movement of water in this way will require several decades and several hundred million dollars to complete." DBHCP, p. 2-10.

While both arguments have some merit, they appear to be overstated. As noted in section Attachment 1, modeling suggests that water shortages are overstated and that, in fact, more water can be provided by the Districts on a faster timeline without requiring significant system improvements. The

[29] OSF 2017 BiOp, at page 56.

scenario examined in Attachment 1 notes that with adaptive use of flexible conservation tools along with infrastructure-based conservation measures, higher winter flows in years of scarcity can be secured with minimal impacts on irrigators. This is achieved with minimal investment in fixed infrastructure. This additional flow can be provided without significantly compromising summer habitat as compared to the proposed alternative.[30] Accordingly, a more aggressive flow schedule is both ecologically appropriate and economically feasible.

TU suggests that 200 cfs shall be provided immediately, then 300 cfs in year 6 and 400-500 cfs in year 11-30. Additionally, the Districts should be required to demonstrate progress of at least 20 cfs annually in the years 0-15. Phasing in such a manner reflects the reality that OSF and other species require meaningful flow improvement in the near-term and that its both reasonable and feasible for the Districts to provide such flows with minimal irrigation impact and minimal impact to summer OSF habitat.[31] Additionally, the amount of water available for winter release has the potential to increase above the required minimums if the pace and scale at which conservation projects, water marketing and on-farm efficiency projects are implemented is accelerated. Accordingly, the DBHCP should include a process, and a commitment, to increase winter releases in these water years. The process should include all water users (including conservation groups) and at least one annual meeting. The objective for this meeting of the "water budget group" would be to review real-time water conditions in the Basin in order to commonly understand snowpack, precipitation forecasts, reservoir status and the implications for the upcoming irrigation season in addition to the status of District conservation and efficiency projects. This process should be done on or about November 1 of each year and coordinated with the Districts before they set water allotments for their patrons. The end result should be a set of commonly understood factors that drive water demand and forecast projected stream flows through the irrigation

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[31] The general contention of the DBHCP is that increased winter flows below Wickiup should be increased gradually to reduce impacts to OSF summer habitat in Wickiup. Generally, the DEIS analyzes the impacts to hydrology using the "fully implemented alternatives, meaning the flows predicted under each alternative when operating at their highest minimum instream fall and winter flow below Wickiup Dam." DEIS, Appendix 3.4-B, p. 6. This makes it a challenge to assess the expected changes to hydrology, and thus to OSF habitat conditions, with early implementation flow increases. DEIS, Appendix 3.4-B helpfully includes boxplots that break apart the different flow intervals for the alternatives for the purposes of assessing impact/benefit to different OSF life stages. However, a boxplot analysis is not included for Reach Des-13, Wickiup Reservoir. The Appendix does note, however, that under all alternatives, OSF habitats associated with Wickiup will experience adverse habitat conditions because wetland vegetation will experience larger year to year fluctuations in water availability. Id at 23. The DEIS does not, however, include an analysis regarding the potential impacts to Wickiup summer OSF habitat from the early release schedules in the different alternatives. It is reasonable to assume that the Districts could feasibly move from a 100 to 200 cfs flow release target below Wickiup with little difference to the impact to summer habitat especially given that it's in furtherance of returning to a more natural hydrologic regime which will be very beneficial to OSF overall.

season such that a winter flow target below Wickiup can be agreed to by the group (although it shall not fall below the required minimum). Such a process will ensure that enhanced flows are provided "to the maximum extent practicable" but will also facilitate common understanding and relationship building in the watershed amongst diverse stakeholders.

2. Spring Flow Increases (WR-1)

The DBHCP proposes that North Unit Irrigation District (NUID) will increase flows to at least 600 cfs in April for OSF breeding. Additionally, ramping rates will be implemented to help protect downstream fish. The DBHCP should explain why an April 1 start date is sufficient when the DEIS notes that OSF breeding begins March 15. Oregon Spotted Frog Technical Supplement, p. 5. This measure lacks concrete biological goals and objectives for both OSF and the impacted fish species such that its effectiveness can be measured. Additionally, it is not clear how it might be modified in adaptive management.

3. Peak summer flows

As noted above, the DBHCP states that increased winter flows and corresponding decreased summer flows under WR-1 will be phased to accommodate restoration activities. (DBHCP, p. 1-4.) While the DBHCP addresses annual summer flow totals in the Deschutes, it does not sufficiently address daily peak flows. Such flows have dramatically widened the river channel below Wickiup more than 20 percent feet from its historical channel. DEIS Appendix 2-C, p.3. Lack of a protective measure is a concern because there are no measures to mitigate against the risk of daily peak flows causing erosive damage to adapting wetlands even if such flows are only present for a few days. The DBHCP should more clearly address how the initial flow regimes from the different alternatives will affect the ability of sedge wetlands to rebuild.

4. Channel Restoration

The DBHCP notes that "[i]t is anticipated that efforts by other parties outside the scope of the DBHCP will restore the channels and floodplains of the Upper Deschutes River and its tributaries, and eventually enable lower summer flows to provide habitats comparable to those that exist today." DBHCP, p. 2-9. The minimization and mitigation measures contained in the DBHCP (those contained within the control of the Districts) must be sufficient on their own to meet ESA standards. One of the most consequential measures contained in the DBHCP is the modification of hydrology in the upper Deschutes watershed to more closely approximate natural conditions. Yet, the efficacy of this measure hinges on actions by other parties outside the scope of the DBHCP to conduct channel restoration

activities. In this scenario, it is unclear how the DBHCP actions on their own can meet ESA standards. The Districts should have responsibility for conducting and ensuring appropriate restoration actions are implemented such that their flow measures provide sufficient habitat conditions for covered species.

5. Upper Deschutes Conservation Fund (Fund)

DEIS Alternatives 3 and 4 both include an Upper Deschutes Conservation Fund (Fund) although it is not included in the proposed alternative. Specifically, Alternatives 3 and 4 require $150,000 annually "for restoration and/or habitat maintenance activities, instream leasing, and/or to benefit the covered species within the Deschutes River." DEIS, p. 2-13. The proposed alternative is inadequate to meet the needs of OSF and covered fish species in the upper Deschutes and the requirements of ESA. Accordingly, the use of a fund may be a mechanism to help close that gap and should be included as part of the proposed alternative. However, such a measure must include significantly more detail and assurance before it can be claimed to be an effective mitigation measure.

To support the need for the fund, the DEIS notes that OSF are vulnerable to "rapid population declines" and climate change has the potential to exacerbate stressors. *See* DEIS, Appendix 2-C. The DBHCP covers 35% of geographic area designated as OSF critical habitat deemed essential for conservation of species. Id. Further, that the "proposed HCP conservation measures that increase winter flow may not be sufficient to improve hydrological conditions that support spotted frog habitat for a number of years post implementation." Id. And these flow improvements are necessary before habitat restoration can occur in certain areas. The DEIS describes many different actions that could be implemented with the Fund yet provides no real analysis of the magnitude or scale of improvement that could be achieved with the annual amount.

The Fund should articulate specific biological metrics for all the applicable species that the Fund will seek to support. Appendix 2-C notes that the Services are outlining a recovery strategy for OSF and these include several biological goals such as increasing connectivity between disjunct populations. However, none of the goals expressed in Appendix 2-C make it into the DBHCP. DEIS, Appendix 2-C. Funding guidelines are necessary to explain the biological goals the Fund will seek to meet or support, what entity will make the funding determinations, how funding decisions will be prioritized, how projects that are funded will be monitored and evaluated for effectiveness and potential adaptive management changes. It is appropriate that guidelines and funding decisions be subject to public input. It also appropriate that funding decisions be made by an independent entity with experience in grant-making. Finally, an estimate needs to be developed and included in the DBHCP to facilitate an

understanding regarding the scale of actions and outcomes that can be expected with the level of funding that is required over the 30-year timeframe.

b. Measures for the Crooked River watershed (Crooked, Ochoco, McKay)

The DBHCP includes measures for the Crooked River watershed including a Crooked River Conservation Fund (8,000 annual allotment for activities that benefit covered species within the Crooked River) and a requirement for 50 cfs flows below Prineville during non-irrigation season (April 15 to October 15 usually). However, these measures provide inadequate assurance that the impacts to covered species will be minimized and mitigated to the maximum extent practicable.

1. Goal Statement

First, there are no biological metrics for covered species included in the goals and objectives or monitoring of covered species such that the effectiveness of the measures on the status of the species can be meaningfully tracked. Instead the goal notes that the intent of the measures is to "assist in the reintroduction of anadromous salmonids." (DBHCP, p.6-76). This goal is not sufficiently S.M.A.R.T. (specific, measurable, achievable, realistic, timely) to either track effectiveness or guide adaptive management.

2. CR-1

There are several challenges with CR-1 that impede a determination that it is sufficient to meet the requirements of ESA. First, the DBHCP proposes to measure compliance with this measure right below Bowman Dam. This will only ensure a certain flow is released not necessarily that it makes it the length of the river where it will provide maximum benefit to fish. The Districts should include a measurement point that is closer to Lake Billy Chinook to truly track the effectiveness of this measure.

Second, measure CR-1 does not sufficiently protect covered species during the summer months and dry years. The DBHCP does not contain sufficient information demonstrating that the 50 cfs will meet the biological needs of steelhead and/or bull trout. It is meaningfully below the minimum amount that ODFW has determined is necessary in the storage season to protect the resources in the tailwater fishery (80 cfs). The DBHCP needs to explain how its proposed flow recommendation is sufficient to minimize and mitigate effects to covered species. Additionally, the DBHCP needs to specify how these flows releases will be legally protected. Without legal protection, the released flows are vulnerable to diversion from live flow water right holders and any purported benefits to the covered species will be lost or dramatically reduced.

The Districts should support an effort by the Bureau of Reclamation (BOR) and/or ODFW to proceed with a secondary water right application to protect the stored water releases from Prineville to Lake Billy Chinook. This is consistent with the requirements of the Collaborative Water Security and Jobs Act (H.R. 2640 (113th)) (Crooked River Act). Section 7(a)(1) of the Crooked River Act requires the Secretary to store and release from Prineville Reservoir water for downstream fish and wildlife between Bowman Dam and Lake Billy Chinook. Section 7(a)(4) states that all releases and downstream uses stall be in accordance with state water law. BOR must secure a secondary water right to comply with this provision. See ORS 537.400, 537.147. Absent a secondary right, stored water that is released in "excess" of water rights becomes live flow which is available to live flow diverters. ORS 540.045(3). The DBHCP needs to provide assurance that flow releases will be legally protected such that they can reasonably be expected to minimize and mitigate impacts to covered species. At present, there is no commitment from the Districts to support an effort to secure a secondary water right for uncontracted water or an instream water right. Additionally, there is no explanation regarding how, absent use of these regulatory tools, the flows released from Bowman Dam will be adequately protected to Lake Billy Chinook.

Third, measure CR-1 is at odds with the language and intent of the Crooked River Act. The Districts commit to maintaining 50 cfs during the non-irrigation season (usually October 15 to April 15) but only as a backstop if three conditions occur first: BOR holds up to 13,000 acre feet of uncontracted storage (fish water) until the end of the active irrigation season, the City of Prineville mitigation storage that is not required for another mitigation use is held and not released until December and the combined total releases from the two conditions above is insufficient to maintain a daily average flow of 50 cfs. In effect, the Districts are attempting to dictate how the BOR manages the uncontracted water. This is in direct conflict with the language of the Crooked River Act which requires that release schedules be developed annually by BOR, USFWS and NOAA, for the maximum biological benefit for fish consistent with the recommendations for in-channel strategies in the Deschutes Subbasin Plan. (Crooked River Act, Section 7(b)). The plan identifies 80 cfs as a minimum instream flow target. Id. The DBHCP cannot ascribe authority to the Districts where none exists. The Districts do not have authority to manage the uncontracted fish water and therefore this provision should be modified.

Additionally, the DBHCP is in violation of the Crooked River Act by including language that insulates OID and NUID from obligations to bypass BOR flow releases during the irrigation season or release storage on their behalf to maintain specific instream flows. This is inconsistent with several

provisions of the Crooked River Act. First, Section 6 of the Crooked River Act mandates that any water stored for irrigation is subject to a year-round minimum 10 cfs release. H.R. 2640 (2014), § 6(a). Second, the Crooked River Act also makes clear that if water is needed to meet ESA needs, while it must first come from the uncontracted storage, it is in no way limited to uncontracted storage if that water runs out. Id. § 7(3). The Act also is clear that contracted water can be released to meet ESA obligations. Id. §8(2), 9. In summary, the DBHCP cannot include conservation measures that limit the scope and applicability of the Crooked River Act. This measure should be modified to address this concern.

3. Ochoco Flows (CR-2)

CR-2 provides for release of additional flow from the Ochoco Main Canal to contribute to flow increases in Ochoco Creek during the irrigation season. This measure contains little detail regarding how it will meet the biological needs of fish species. In certain months, it falls short of what has been deemed to be necessary for fish species pursuant to the instream water right issued for this reach. The DBHCP should provide additional information regarding how this measure will provide protection for covered fish species.

4. Screening of Diversion Structures (CR-5)

CR-5 provides for the maintenance and operation of fish screens on Ochoco-ID diversions and provides funding for screening Ochoco ID patron diversions. Fish screening and passage is required by state law and this provision is contingent upon the "voluntary" participation of patrons so it is unclear how this measure will contribute to meeting ESA standards.

5. Crooked River Conservation Fund (CR-4)

The Crooked River Conservation Fund (CR-4) does not contain sufficient detail to assure that it will meaningfully mitigate for the impacts to covered species especially for the impacts to fish species during the irrigation season and the impacts to covered species from return flows. CR-4 should detail what can reasonably be expected to be accomplished with the required $8,000/year. There should be concrete goals and metrics to support this measure and effectiveness monitoring to track how it performs over time. Additionally, it should be clear what entity will hold the funds and make allocation decisions. This measure is significantly relied upon by the Districts to reach the conclusion that the impacts to covered fish species will be minimized and mitigated. In addition to the recommendations above, the Districts should consider a greatly enhanced level of funding.

6. Summer flow and/or temperature requirements from Prineville

The DBHCP lacks sufficient minimization/mitigation measures to address impacts to cold-water species from summer irrigation operations. The DBHCP acknowledges that "on the Crooked River, the release of cold water from Prineville Reservoir during the summer has created high-quality habitat for salmonids in the 14-mile reach between the reservoir and the Crooked River Diversion." (DBHCP, p. 1-6.) The DEIS notes that impacts to steelhead, Chinook, redband and bull trout are expected in the summer. Accordingly, the DBHCP should include a measure to mitigate the temperature/flow issues in the summer for the benefit of fish species.

The DBHCP should also consider whether NUID can call on its 10,000 acre/feet storage allocation from Prineville reservoir later in the season (perhaps July 1 through October 1 when most of the temperature impacts are occurring) such that minimum flows could be maintained in the Prineville reach later into the season. NUID could coordinate with Reclamation and the Services on releases to ensure that the NUID allocation in conjunction with the uncontracted fish water ensures the maximum protection possible to downstream fish resources.

7. Measures to address return flows in the Crooked River watershed

The DBHCP should include conservation measures to mitigate for the impacts from return flows into the Crooked River.

c. Whychus Creek Measures

1. Instream Flows (WC-1)

The main DBHCP measure for Whychus Creek (WC-1) memorializes instream water right transfers of 30 cfs made by Three Sisters Irrigation District (TSID) during development of the DBHCP. The challenge with WC-1 is that the water right "priority" is the same between irrigation rights and instream rights so "water will be shred proportionally between irrigation and instream rights whenever there is insufficient natural flow above the TSID diversion to meet all of the rights." (DBHCP, p. 6-64.) While TSID agrees to maintain a minimum of 20 cfs minimum flow while TSID is diverting, instream resources are not realizing the full benefit of the 30 cfs that has been secured.

TU has several concerns with these measures. As noted above, the Districts are responsible for ensuring that impacts to covered species are minimized and mitigated to the maximum extent practicable. The DBHCP has not sufficiently explained why the WC-1 flow target (minimum of 20 cfs) is sufficiently protective of all the covered species that utilize the waterway, notably steelhead and spring Chinook. Additionally, the DBHCP has not sufficiently explained why it is not practicable to subordinate the irrigation rights to the instream water rights such that the instream water rights would

have priority in times of shortage. The measure should also be modified to ensure that compliance monitoring occurs at the gage at the low point of the river (Sisters gage) as opposed to right below the TSID diversion.

2. Instream Leasing/On Farm Conservation (WC-2, WC-3, WC-4)

WC-2 and WC-4 "promote" further increases in instream flow by supporting on-farm conservation and temporary leasing. Regarding WC-2, the DBHCP does not explain the likely benefit of the 6000/year temporary instream leasing program on covered species so it is not clear how it contributes to mitigating the impacts of the project or how its effectiveness will be monitored. The analysis should provide some estimates regarding expected outcomes (e.g., how much water will be produced and during what times) from implementation of this measure. There should be a quantifiable target (drought year cfs secured or a certain amount of acres restored in priority reaches) that can be subject to effectiveness monitoring and adaptive management.

WC-3 provides for the maintenance and operation of fish screens on TSID diversions. Fish screening and passage is required by state law so it is unclear how this measure will contribute to meeting ESA standards. WC-4 seeks to pipe patron laterals "subject to patron willingness and funding." DBHCP, p. 6-64. Given that WC-4 is completely based on patron cooperation, it is unclear how this measure will be modified if patrons are not willing to engage to make sure the expected ESA benefits materialize. The DBHCP should provide additional clarification on these points.

d. <u>Crane Prairie Measures</u>

DBHCP measure CP-1 aims to reduce annual fluctuations in Crane Prairie (CP) water surface elevation to provide improved breeding, summer rearing and overwintering conditions for OSP (fluctuations will go from 9 feet current to a maximum of 2.25 feet). The measure includes a goal with measurable objectives to guide adaptive management DBHCP, p. 6-3. DBHCP measure CP-2 requires, when possible, the maintenance of 75 cfs below CP dam. This is due to the fact that operation fluctuations will increase and may be detrimental to resident trout and spawning kokanee.

The DBHCP proposes effectiveness monitoring for these conditions and TU believes the OSF monitoring should be expanded to include fish species given the dramatic changes that have already been documented from early implementation of this measure. Fly fishermen who frequent the area have already noted a receding wetland/water boundary of hundreds of feet along the north shore in the 3 years of the new regime. And aquatic vegetation within the reservoir has increased in density and distribution during those years (Mike Tripp, personal communication). Additionally, in the early summer of 2019

fly fishers noted, during a brief heat wave, increasing water temperatures to 75-78 degrees F within a few days of the heat wave. Such rapid water heating was not noted previously in 35 years of fishing the reservoir (M. Tripp, personal communication). It is reasonable to hypothesize that the large shallows exposed by regressing wetland vegetation could be creating a heat sink when exposed to solar radiation. Finally, there is high potential that this measure will provide additional habitat for brown bullhead and large-mouth bass and other warm water predators while at the same time impacting cold-water fish species, such as redband trout, below the reservoir.

In summary, a strong adaptive management program and robust monitoring is called for given the dramatic changes noted within 3 years of the current management plan. Funding for control of invasive species - especially the brown bullhead – is also merited.

e. Other recommended conservation measures

1. Trout Creek

One of the major weaknesses in the DBHCP is its lack of minimization and mitigation measures to address the impacts of return flows on water quality and aquatic habitat. DBHCP notes that the covered activities include the return of water to natural streams yet no conservation measure directly addresses this impact. One of the major areas of return flow is from North Unit Irrigation District (NUID) into Trout Creek tributaries. Conservation measures are needed to address return flow impacts on temperature and sedimentation in Mud Springs Creek and Trout Creek as they have the potential to adversely affect salmonid rearing and spawning habitat.

To the extent, the DBHCP is relying on the use of a “fund” to mitigate this impact, it needs to be more specific. Any fund that seeks to address these impacts needs to dedicate meaningful dollars toward projects that will help “treat” the water such as riparian and wetland filtration projects. Additionally, the DBHCP could prioritize activities that will minimize the runoff in the first place. Certain “on-farm efficiencies” may be appropriate to consider also.

2. Haystack Reservoir

Attachment 1 suggests that higher winter flows can be supplied from Wickiup in the early years of the ITP with arguably manageable supply deficits to the Districts. Attachment 1, p.8. However, Attachment 1 also suggests that in years 6-10 NUID water supply will be more stressed. Id. All options including supply supplementation should be explored. For instance, the Districts should explore utilizing re-regulating reservoirs, such as Haystack, to accommodate providing April releases to the Districts.

3. Reintroduction of bull trout

The DBHCP should include a conservation measure to assess the feasibility of reintroducing bull trout above Big Falls. Bull trout have been extirpated from the Upper Deschutes since the 1950's due to "a combination of factors including the construction of irrigation storage dams (Crane Prairie, Crescent Lake, and Wickiup) which blocked access to and inundated spawning grounds, increased water temperatures and altered flow regimes, overharvest, and competition with nonnative trout." *See* 2005 Oregon Native Fish Status Report Volume II - Assessment Methods and Population Results, ODFW, 2005. Historically, bull trout "existed in Crescent Lake and the upper Deschutes River." The bull trout in Crescent Lake have been identified as a "discreet historical population due to the expression of an adfluvial life history strategy other possible populations in the upper Deschutes River are treated as a single entity." Id.

As noted in the "Impacts" section, "bull trout have perhaps the most narrowly-defined habitat requirements of any native salmonid species in the Pacific Northwest." DBHCP, p. 5-2. Bull trout have specific temperature requirements and climate change effects will reduce their available habitat further without protective measures. These factors make, not only protecting existing habitat, but providing opportunities to access historical habitat and exhibit diverse life history strategies, important to the preservation and conservation of this species. Given that the Districts past and continuing activities have impacted and will continue to impact bull trout habitat and that the Districts have benefitted from the infrastructure that continues to threaten the persistence of bull trout, it is appropriate that they commit to securing an understanding of whether it is feasible to proceed with bull trout reintroduction to the upper Deschutes. As part of this effort, the Districts should also consider funding the eDNA collection and lab processing of high probability bull trout sites.

4. On-farm efficiencies

On farm efficiencies have the potential to significantly decrease District water diversions. This measure should be pursued more aggressively, with Districts committing to work with the Water Resources Department to enforce against waste, develop water conservation and management plans where they don't already exist, and set efficiency standards for their patrons as outlined in OAR 690-410.

3. Funding, Monitoring and Assurances

The DBHCP has not clearly described how each required conservation measure will be developed, funded and monitored for both for compliance and effectiveness.

a. Compliance Monitoring

The DBHCP states the Districts will engage in "compliance monitoring" to verify that the conservation measures are being implemented as required and will share the monitoring reports with the Services annually. DBHCP, p.1-17. TU appreciates that the Districts recognize the importance of compliance monitoring however, self-reporting can lead to conflict of interest allegations. Given the critical importance of robust monitoring to the success of DBHCP, the Districts should use independent third-party experts to conduct monitoring and report the collected information to the Districts and Services. Additionally, that information should be available to the public to promote transparency and accountability. Further, the reporting intervals should be shortened especially for certain measures that would benefit from timely information, such as flow measures.

b. Effectiveness Monitoring

The Districts commit to undertaking effectiveness monitoring for only two conservation measures. This is inadequate. Effectiveness monitoring is a critical part of the DBHCP that helps provide assurance that the conservation measures are performing as intended to minimize and mitigate impacts to covered species. However, to accomplish this, all conservation measures must have effectiveness monitoring and must specify biological goals and objectives for the covered species that can provide benchmarks to track the success of the implementation and guide adaptive management. Unfortunately, the DBHCP contains no biological or habitat metrics regarding covered fish species or monitoring requirements. As a result, the DBHCP cannot provide any level of accountability regarding its effectiveness at mitigating impacts to aquatic resources.

For most conservation measures, the DBHCP claims that effectiveness monitoring is not necessary because "there have been no areas of uncertainty identified…" DBHPC, p. 7-12. This is a confounding statement especially given that many of the impacts to aquatic species are proposed to be mitigated through disbursement of funds to as-yet-to-be determined projects or through flow measures that, as drafted, are highly contingent on the actions of others. Not to mention the uncertainty around the pace and scale at which climate change will affect conditions in the watershed. In sum, there is a lot of uncertainty surrounding the conservation measures and how effective they will be in mitigating the impacts on covered species. The lack of recognition of this fact is a critical flaw in the DBHCP. As noted with the compliance monitoring, the DBHCP would benefit from an independent oversight committee/entity to evaluate program compliance and effectiveness at achieving biological goals and

objectives and the requirements of ESA. This is necessary to ensure transparency and that monitoring methods are consistent with best available standards and protocols.

c. Funding and Implementation Assurances

The DBHCP must contain legally adequate assurances that measures will be implemented and adequate funding for the plan will be provided. The DBHCP should provide additional detail regarding the inter-District coordination and how the effectiveness of the plan as a whole is compromised if any one District is out of compliance with its obligations. The DBHCP also needs to provide more concrete assurances that conserved flow will be permanently returned in-stream and legally protected as modernization projects are completed. The DEIS notes that its analyses were based on the assumption that all water conserved through piping would be dedicated to instream flow except Lone Pine and Swalley projects. DEIS, Appendix 3.5-A, p. 4. However, permanent, legal protection of conserved flows needs to be made a specific requirement of the DBHCP. Additionally, where possible, District water rights should be subordinated to instream water rights to ensure that impacts to covered species are minimized and mitigated to the maximum extent practicable in all water years.

4. Adaptive Management

The DBHCP's proposal for adaptive management is inadequate to meet ESA requirements because it lacks specific biological goals and metrics for all covered species and specific triggers and responses should conservation measures not perform as intended. Adaptive management is meant to respond to scientific uncertainty. ESA requires that mitigation programs, including adaptive management, "must be reasonably specific, certain to occur and capable of implementation." NRDC v. Kempthorne, 506 F. Supp. 2d 322 (E.D.Cal. 2007). Adaptive management should provide some certainty that their terms will actually protect endangered species should the original measures fail. Greater Yellowstone Coal., Inc. v. Servheen, 665 F.3d 1015, 1029 (9th Cir. 2011). "It is not enough to invoke 'adaptive management' as an answer to scientific uncertainty. Instead, "specific management responses, tied to…specific triggering criteria, are required." Id.

While the DBHCP does contemplate effectiveness monitoring and adaptive management for two particular measures (CP-1 and WR-1), this is not sufficient for a 30-year license especially considering climate change effects that are expected to increase in decades ahead. "Earlier snowmelt could result in summer streamflow losses of 40 to 60% by 2040." Fish and Mollusks Technical Supplement, p. 47. Streamflow conditions will likely look significantly different 20 years into permit term. This fact alone interjects uncertainty which needs to be accounted for with a robust adaptive management regime. To

the extent, there is significant uncertainty about the effectiveness of conservation measures and future conditions, a shorter permit duration should be contemplated as well. Additionally, the adaptive management regime that is considered by the DBHCP seems mostly geared at increasing flexibility for the Districts as opposed to ensuring better protection of the covered species. For instance, WR-1 allows NUID to reduce outflow at WICO in April if irrigation demand decreases. "Increases in the allowable fluctuation will enable NUID to reduce outflow at WICO if irrigation demand decreases during April. DBHCP, p .7-11. And minimum flows below Wickiup can be decreased to 100 cfs "to ensure there is sufficient storage for release during the following summer." DBHCP, p. 7-11.

In sum, the DBHCP must include comprehensive effectiveness monitoring, reporting and adaptive management guided by biological goals and objectives and other metrics to provide necessary assurance that the proposed conservation measures are sufficient to minimize and mitigate project effects to the maximum extent practicable over the 30-year permit term.

5. <u>Changed Circumstances and Unforeseen Circumstances</u>

The DBHCP must establish clear procedures to deal with changed circumstances and unforeseen circumstances including identification of additional commitments that will be required of the Districts under these conditions. The DBHCP identifies a broad range of changed circumstances including changes to the biological status of species, changes to habitat due to flooding and climate change. The DBHCP purports to benefit the Districts from the "no surprises" provision by identifying a broad range of potential changed circumstances yet includes no increased protections or alterations of the DBHCP in the face of changed circumstances. This contrary to ESA. *See* Southwest Center for Biological Diversity v. Bartel, 470 F. Supp. 2d 1118.

Essentially, for many of the most significant foreseeable changes to species, such as a change in biological status or climate change, the DBHCP does not require the Districts to commit additional land, water or funding, or place additional restrictions on the covered activities. DBHCP, p. 9-4. The changed circumstances addressed in the DBHCP will negatively impact covered species and the covered activities will exacerbate those impacts. DBHPC, p. 9-4. Yet, this section gives the Districts a free 30-year pass to ignore their role and provides no assurances that the DBHCP benefits to covered species will be maintained over the permit term. The DBHCP does include vague language that, with certain changed circumstances, the Districts will "consult with Services to determine the appropriate actions for meeting the biological goals and objectives of the DBHCP." DBHCP, p. 9-4. However, as discussed above, there are not sufficiently defined biological goals and objectives in the DBHPC to make this

meaningful. To be consistent with ESA, the changed circumstances section must be revised to offer specific actions and additional commitments from the Districts to meet specific biological goals and objectives if and when changed circumstances actually occur.

6. <u>Alternatives</u>

The DBHCP dismisses several viable alternatives without adequate justification. For instance, several higher flows alternatives were dismissed due to the Districts' inability to "identify a practicable means of ensuring the required minimum winter flows without jeopardizing the viability of irrigated agriculture within its district." As noted in Attachment 1, the shortages identified by the Riverware model are misrepresented and it appears that significantly more flow can be provided instream in the early stages without significant impact to the irrigators. This has potential implications for both the Deschutes and the Crooked river conservation measures as NUID deficits in Deschutes/Wickiup supply triggers the model to invoke NUID use of Prineville Reservoir reserves more frequently, with consequences in that system, as well as presenting different perspectives on NUID diversions. Attachment 1, p. 8. The Districts must revise their model and reconsider higher flow alternatives in light of the new information.

7. <u>Proposed Term and timeline</u>

The DBHCP proposed term is 30 years. The DBHCP says that 30 year was selected "to balance the risks associated with shorter and longer terms." DBHCP, p. 3-4. The DBHCP notes that the longer timeframe will increase the certainty to allow them to make long-term plans and investments and notes that the conservation strategy of 30 years is a "safe amount of time to commit to a specific conservation strategy" given that it can take a decade or more for response.

A final determination on the duration should be informed by a risk and certainty analysis. The timeframe has been selected mostly to provide regulatory certainty to the Districts with little assurance that species needs will be met over the permit term. The DBHCP Plan area is highly altered from historic conditions and species response to proposed measures are based on significant assumptions. To the extent the predicted species response to these measures does not materialize, the permit timeframe itself presents significant risk to the continued health and persistence of the Covered Species. In this scenario, comprehensive monitoring and adaptive management is critical to ensure that species needs continue to be met throughout the license term.

Additionally, the next several decades are expected to be dynamic with more frequent and varied changes resulting from climate change. However, the DBHCP does not contain sufficient monitoring,

reporting and adaptive management to warrant a longer timeframe. Regardless of the term, however, the DBHCP should include a rigorous adaptive management regime which becomes all the more critical under a longer-term permit timeframe. As noted above, the DBHCP should define what it is trying to accomplish through biological goals, what steps will be taken to track progress at meeting the goals and how implementation of the DBHCP will be adjusted through adaptive management if the biological goals are not being met. In essence, the adaptive management program must be guided by the biological needs of the species which must be quantified to allow for rigorous assessment of whether or not they are being met. This allows the DBHCP to respond to uncertainty and lack of information without the species shouldering all of the risk.

IV. Clarifications and Technical Errors

As noted previously, comments regarding errors and needed clarifications related to the Riverware model can be found in Attachment 1. Additionally, TU has identified several other technical errors and/or items that require further clarification in both the DBHCP and the DEIS. These items can be found in Attachment 2.

V. Conclusion

TU looks forward to continued collaboration with the Services, the Districts and the City of Prineville and others to develop and implement water management solutions in the Deschutes watershed. In particular, TU encourages the Districts and Services to consider our comments and articulate an alternative that (1) increases the pace and scale of winter releases from Wickiup Dam to better protect OSF, (2) includes additional protections for covered fish species especially in summer and dry years, (3) articulates biological goals and objectives for all covered species, (4) includes a robust monitoring and adaptive management regime and (5) properly accounts for impacts to water quality. TU appreciates the opportunity to comment on this effort. Please contact us with any questions.

Chandra Ferrari
Senior Policy Advisor/Staff Attorney
Trout Unlimited
cferrari@tu.org
(916) 214-9731

Shaun Pigott
President
Deschutes Redband Chapter of Trout Unlimited
spigott@teleport.com

Mike Tripp
Board Member and former President
Deschutes Redband Chapter of Trout Unlimited
mtripp@bendcable.com

Attachment 1

Wickiup Reservoir Management M. Tripp December 1, 2019

Abstract

In the recently released draft DBHCP proposal, analyses regarding Wickiup Reservoir management options are heavily dependent on modeling completed by the Bureau of Reclamation. Concerns about modeling results are addressed in the first section of the current communication; the modeling appears to overstate winter releases and thereby exaggerates economic impacts of mitigation. An alternative approach focused on Wickiup storage is developed. That simplified model demonstrates the utility of adaptive management of Wickiup releases. In the hypothetical scenario, adaptive use of flexible conservation tools complements infrastructure based conservation measures. Higher winter flows in years of scarcity with minimal impacts on irrigators is found. This is achieved with minimal investment in fixed infrastructure. Challenges for future study and planning are suggested by this exercise.

Bureau of Reclamation modeling

First, multiple minor errors such as inconsistent use of units or labeling of graphs create an impression of lack of rigor. Those can be easily corrected and put aside initially.

The major problem is that the modeling portrays misleading large supply deficits for NUID. The logic of this conclusion follows.

To model over sequential years, a formula for calculation of storage season flow releases from Wickiup Reservoir is required. The Riverware modeling uses this formula for storage season releases, as printed in Appendix 3.1-B.

$$\begin{aligned}&\text{Minimum Outflow in acre} - \text{feet (AF)}\\&\quad = 100\,cfs + (Wickiup\,Storage\,on\,November\,1 - 10{,}000\,AF)\\&\quad * \frac{500\,cfs - 100\,cfs}{100{,}000\,AF - 10{,}000AF}\end{aligned}$$

Standards for modeling require clear documentation of the algorithms used. That is not provided in the DBHCP draft, but some logical interpretations can be made.

One can question why the November 1st value from the prior year, as stated in the text, is used instead of the current year being calculated. Logic would suggest adjusting release flows based on filing at the start of the storage season should use fill at the start of the storage season being modeled. See below.

Note also the error in units; AF do not equal flows in cubic feet per second (cfs).

A re-ordering of the formula makes its elements clearer:

$$\text{Minimum outflow(cfs)} = 100\text{(cfs)} + 400\text{(cfs)} \times \left\{ \frac{[\text{Wickiup storage Nov 1-10,000 AF}]}{[100{,}000\text{ AF}-10{,}000\text{AF}]} \right\}$$

The formula simply uses a minimum base flow, here 100 cfs for proposed years 1-5 (or No Action scenario), and increases release rates based on a ratio of initial fill to half fill multiplied by 400 cfs. There are several ways one can demonstrate the consequences of the model formula.

Consider first the modeled result versus realized historic results for the Wickiup storage year 2018-2019:

From the database of the Hydromet Pacific Northwest Region, Bureau of Reclamation:

.Wickiup fill on November 1st, 2017 (prior year) = 103,221 AF .
.model formula releases(modified 2018 to'19) = 100 cfs +400x((103221-10000)/(100000-10000)) = 514 cfs
.releases in acre-feet = 2*514*151 days = 155,228 AF
.Wickiup fill November 1, 2018 = 26634 AF
.Wickiup fill on April 1, 2019 = 136708 AF
.Flow below Wickiup (WICO gauge) = 33,674 AF (sum of WICO flows, 11/01/2018 to 4/01/2019)
.Extra releases above actual = {releases modeled - summed WICO} = 121,554 AF
Then modeled Wickiup fill Apr 1, 2019 = [Actual fill - modeled extra releases] = 15,154 AF

<u>This is a bizarre result: by the model Wickiup lost volume from 26,634 AF on November 1st to a volume of 15,154 AF on April 1st the next spring!!</u>

So maybe the technical memo was in error, in several places, when stating the formula uses Nov 1 of the prior year. If the above calculation is repeated using Nov 1 of the modeled storage year, a logical correction, the results are
...Modeled minimum outflow = 174 cfs
...Modeled April 1 Wickiup fill = 117,834 AF

So even with this presumptive correction to the formula, <u>the modeling formula still calculates a deficit of 18,874 AF compared to the actual historic Wickiup fill in 2018-2019.</u> And actually, the model uses more days for storage season than used in this illustrative calculation which could increase the modeled deficits further.

Based on these points, in the following the Reclamation formula is modified for exposition of changes more consistent with irrigation seasons. October 15th of the year in question is used for calculations, not November 1 of the prior year. Calculations for the storage season is considered October 15th to April 15th. This is elected because firstly upper Deschutes irrigation districts effectively end irrigation diversions by Oct 15, and secondly the settlement flows alluded to earlier include provision of maintenance of a minimum flow of 600 cfs from April 1st on. While technically NUID could use releases after April 1 for irrigation, in practice this is not the case; NUID calls on Wickiup stored water later in the season. So releases will be modeled with minimum flows from October 15 to April 1, plus flows of 600 cfs from April 1 to April 15. This is considered a more

realistic calculation of water released for frog requirements, as that impacts water supply for NUID operations.

Annual total inflows

The basis of further calculations in this communication is the concept of total annual inflow to the Deschutes basin at Wickiup's level, in acre-feet (AF).

Every storage season inflow to the basin above Wickiup dam equals the sum of fill of Crane Prairie Reservoir, fill of Wickiup Reservoir, that lost to seepage or evaporation and finally water passed into the Deschutes River below Wickiup dam. For the current exercise seepage losses and evaporative losses will be ignored; seasonal variations in these variables are small compared to other volumes but most importantly those volumes are not available for irrigation or Wickiup releases for river instream flows.

Data used is from the database accessible on the Hydromet Pacific Northwest Region, Bureau of Reclamation site. From this one can compile annual inflow to the Deschutes basin at Wickiup's level in acre-feet (AF) by simple calculations. This is historic data; no modeling is involved.

This total annual storage season inflow can then be apportioned to storage or releases, as it was historically for the years addressed, or under different scenarios. The database is presented graphically below.

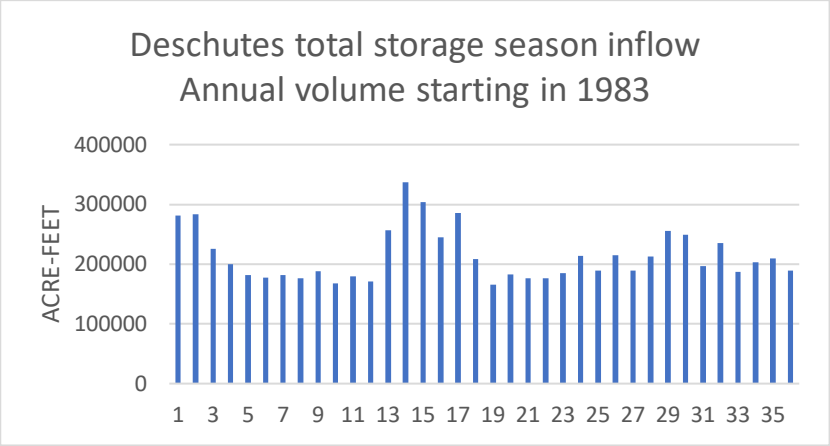


fig 1

Comparison of release scenarios

Impacts of two release schedules are first calculated for individual years.

First will be the current operations under the 2016 settlement, which is the same as years 1-5 in the Proposed Action. For this scenario:

total releases October 15 to April 15 (WICO gauge in Hydromet database)
= sum of daily flows{100 cfs from Oct 15 to April 1
plus 600 cfs from April 1 to April 15.} x 2 to convert to AF

The second release schedule uses the modified Reclamation formula for storage season releases instead of 100 cfs minimums, for years 1-5 of the proposal. April breeding season releases are still added for total releases.

Each release schedule releases more water than was the case historically in many years. The "storage deficit" calculated is the difference from historic Wickiup fills to the calculated scenario fills for each year individually, shown graphically below.

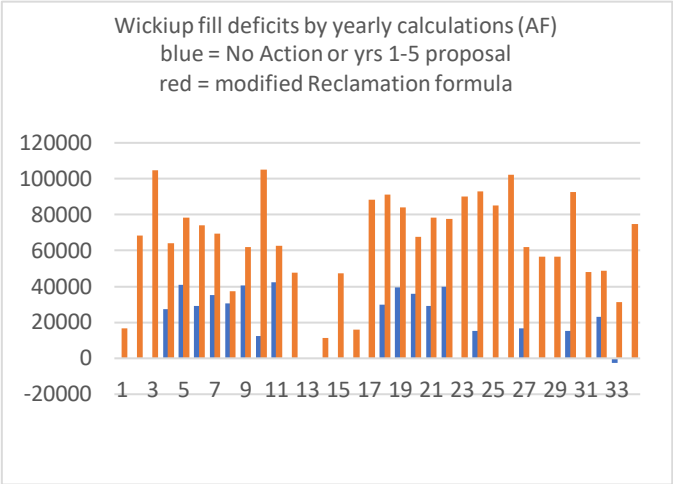


fig 2

What this shows is that the formula problem demonstrated in the 2018-2019 example used earlier is found also over most historic years; the modeling formula yields exaggerated deficits compared to the base release schedule for proposal years 1-5.

However, if the Reclamation formula drains the reservoir aggressively in one year, then the fill the next year will be lower and the formula will then calculate a smaller winter release in that subsequent year. So a meaningful analysis requires sequential year calculations, presented next.

For sequential year calculations an assumption is needed to carry water balances year to year.

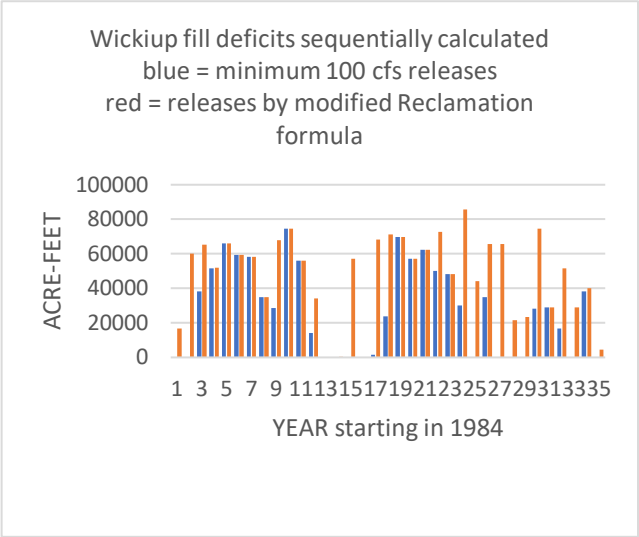
In Reclamation modeling single daily averages were obtained from one set of years to derive NUID demand (live flow plus storage water) and that single set of single daily averages were then used in Riverware for all years in the historic but different year set.

In the current exercise a different approach is used. It focuses only on Wickiup filling and releases. The yearly change in Wickiup historical levels from April 15 to October 15th is used to estimate the NUID call on stored water for that year; that will be termed the stored water supply (demand) for NUID. It is acknowledged that evaporative losses are not accounted for. Also in some seasons Wickiup is already on its refill curve by October 15th; the current exercise does not strive to be precise to that degree. For these calculations one last point is noted: Wickiup can only fill to 200,000 acre-feet. A

lower emptying limit of 10,000 acre-feet was also imposed as in the Reclamation modeling formula.

Of course for every irrigation season NUID uses a total of live flows plus stored water for their irrigation year. The stored water use then is a function of availability of live flows that year along with management decisions for crop choice, weather, fallowing etc. The current modeling of stored water does not require analyses of live flow usage.

Imposition of a release scenario on historic water years is useful; it entails minimal assumptions or extrapolations; it demonstrates the projected play of the scenario on what was otherwise 35 years of real historic experience. The outputs are displayed in the graphs below. The first graph shows the change in Wickiup filling, as was used in the draft DBHCP.



...fig 3

<u>While it is intuitive to think in terms of Wickiup fills, that is actually not the most useful analysis. Storage supply can be met if Wickiup cycles below full fills. When the scenarios are broken down into deficits in storage supply shortage a different perspective is gained.</u>

Storage supply deficits equal the difference between historic yearly storage draws vs available storage draws in any scenario for that year. Storage draws will be limited when Wickiup empties to a 10,000 AF level. Calculations are again made sequentially.

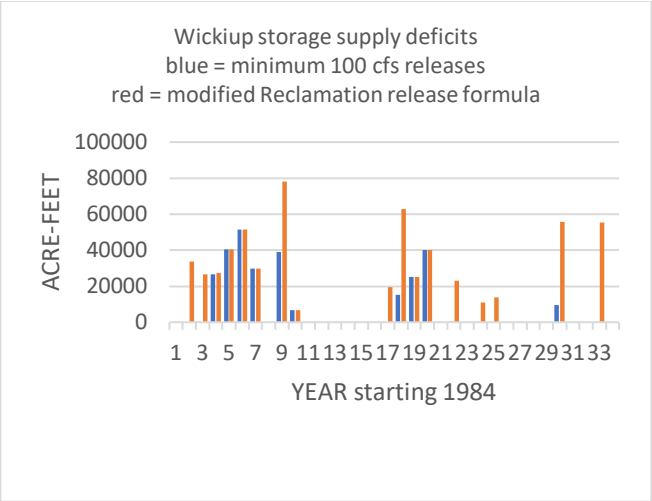
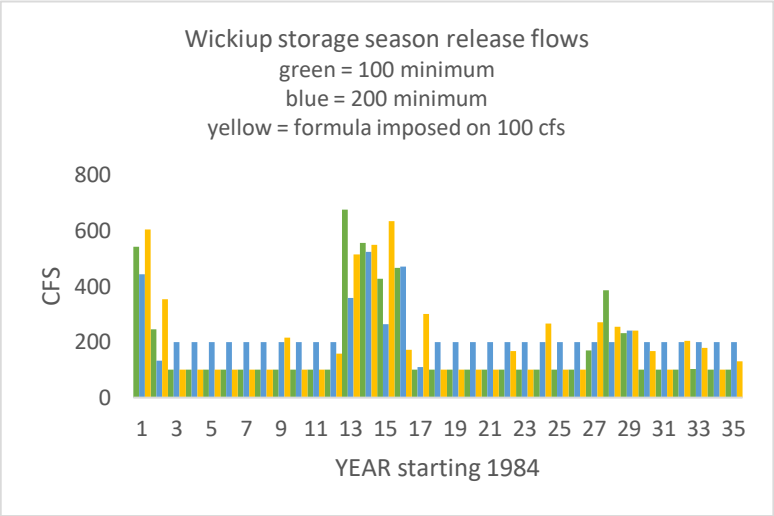


fig 4

The consequences of the release minimums appear much less draconian than in the fill graph, but the Reclamation release formula again models greater deficits.

Another logical modification of the Reclamation formula would be to base the ratio for release ramp up on 200,000 AF, the full capacity of Wickiup, instead of 100,000. But further exploration of Reclamation modeling with its extensive use throughout the draft DBHCP proposal and the EIS documents is beyond the scope of this exercise.

While the preceding looks at deficits, the other outcome of interest is storage season flows below Wickiup. The following graph shows sequentially calculated flows for scenarios that include the 18,000 April releases. Minimum flows occur when Wickiup fills are below 200,000 AF, but in years of calculated fills above 200,000, there are excess inflows. For these years of excess inflows, flows in cfs are the excess inflows spread over storage season days. Notably wet cycles are such that high flows are noted for either 100 or 200 cfs minimal releases. The modified Reclamation formula releases higher flows in some years consistent with calculations showing it increases fill deficits. In wet year cycles flows can be well above the minimums.



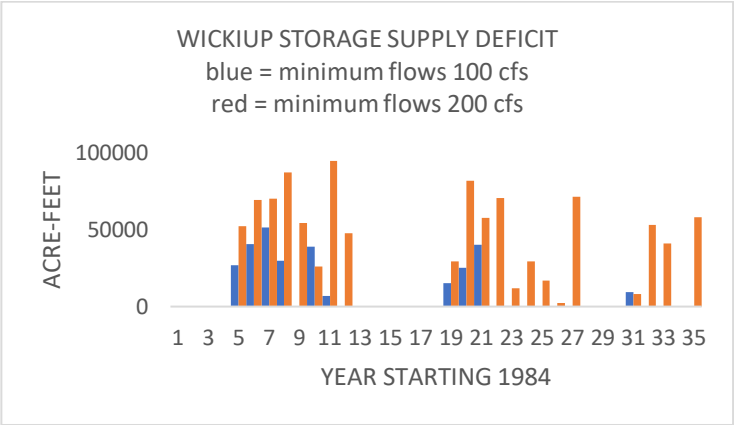
...fig 5

Modeling is commonly used to gain perspective on a problem, but as this exercise shows, those perspectives are easily slanted depending on assumptions and choices for output presentations. Rather than look to modeling for answers, modeling should be used to guide further inquiry.

DBHCP implications

In the above sections it was demonstrated that the Reclamation modeling generates greater storage supply deficits for NUID than a simpler calculation based on Hydromet data. This is primarily of note with regards to the significance placed on practicability limits for irrigation districts mitigation efforts in the draft DBHCP proposal. It does however also create questions for the Crooked River modeling, as Reclamation chose to combine the modeling. NUID deficits in Deschutes/Wickiup supply triggers the model to invoke NUID use of Prineville Reservoir reserves more frequently, with consequences in that system, as well as presenting different perspectives on NUID diversions. These compounding results are hard to unravel. The current exercise avoids that by focusing only on Wickiup storage. In what follows, calculations are made using the Hyromet datbase for various specified release schedules; the Reclamation modeling formula is not used further.

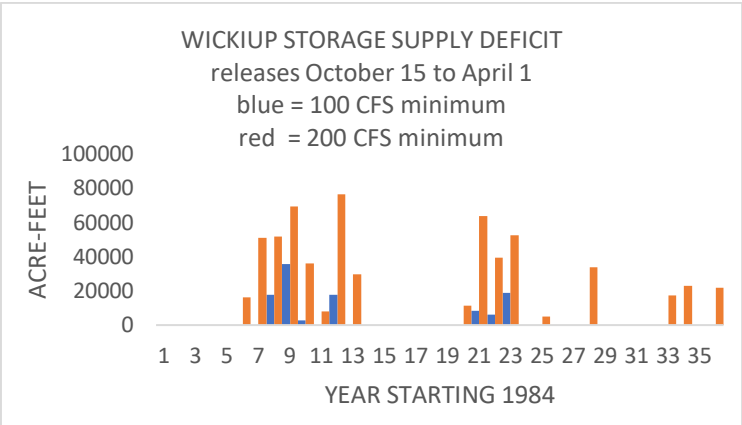
In the DBHCP proposal the schedule for release flows moves from 100 cfs minimums in years 1-5 to 200 cfs minimums in years 6-10. Can we anticipate the stress this will place on supply? The graph below shows storage supply deficits using sequential calculations for these two phases of the proposal.



. fig 6

The results suggest that supply deficits in years 1-5 are arguably manageable with a drought management plan. However in years 6-10 NUID supply will be more stressed. It is unlikely that NUID would undertake this regime without supply supplementation. Various schemes can be brought to bear on that point.

One could suggest reasonably that the April 1 -15th (18,000 AF) releases are available to the districts. They could modify operations to prevent waste of these releases. For example it has been suggested that COID could use this water and repay that to NUID later in live flows. Another possibility would be for the districts to utilize re-regulating reservoirs to accommodate these releases e.g. Haystack in NUID. The following graph shows the storage supply deficits calculated if those 18,000 AF are not included in modeled releases.



...fig 7

Deficits are nicely reduced but it would seem that NUID would still require supply supplementation in around 1 of 3 years during years with 200 cfs minimum releases.

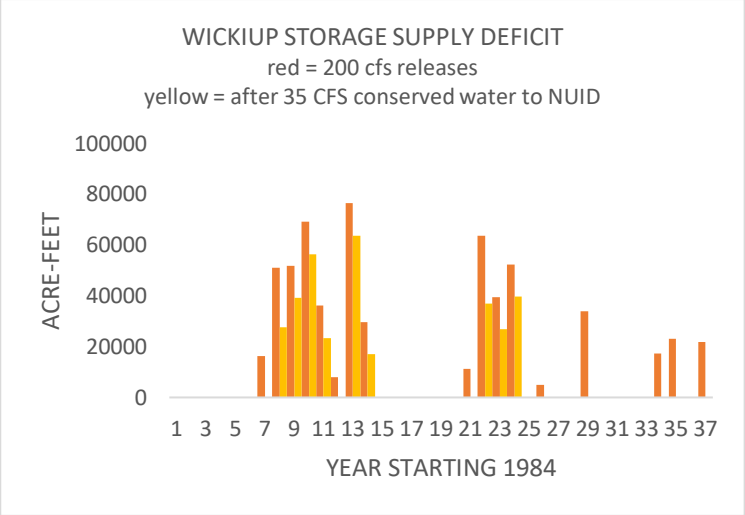
Given then that NUID supply supplementation will be necessary for progressive increases in Wickiup winter releases, how could that be implemented?

The strategy contemplated is that conserved waters in Central Oregon Irrigation District (COID) will be transferred to NUID (live flow supplementation of NUID supply), in exchange for NUID authorization of Wickiup storage season releases (reduced NUID storage supply). This strategy is being addressed in joint efforts with NUID, COID and DRC; a pilot using 5 cfs has been initiated for 2019-2020. These waters could be generated from infrastructure projects, on-farm efficiencies, NIUID calls on Prineville reservoir waters (10,000 AF), fallowing within NUID, or from water markets. Infrastructure conserved water will be available in all years, while flexible options such as water markets eg leasing could generate the needed water flexibly in scarcity years.

Work to this end is underway. COID has announced plans to complete a large piping project in the next 1-2 years, bringing the total of water available to NUID under this concept to 35 cfs. Under the terms of the proposed DBHCP increases in winter flows are bench marked to year intervals. So if COID conserves water in year 2 of a 5 year phase for example, the terms of the DBHCP as written do not require that result be in Wickiup winter releases until year 6. Wickiup storage will be shored up by 12,740 AF per year for years 3-5, a desirable outcome for irrigation water supply but not for instream flows.

However, COID and NUID have entered into a joint resolution through the Deschutes River Conservancy (DRC) that pledges to add conserved water instream additively to the current 100 cfs baseline (November 10, 2017). It would seem that the intent of this resolution would be to complete this transfer upon completion of the conservation project. Would that compromise NUID supply? The answer is no. Balance is found because conceptually NUID will reduce its calls on stored water in proportion to its increased live flows supply.

Consider next the storage supply deficits calculated after these 35 cfs are available to NUID.



...fig 8

With the 12,740 AF conserved by the infrastructure piping project, storage supply deficits (shown in yellow bars) are reduced to 1 in 4 years. The draft DBHCP proposal states shortage years will be managed simply by providing less water to NUID. However several tools could be utilized in scarcity years to further reduce supply deficits. Leased water or temporary transfers could be used in the same format as above - COID water to NUID in exchange for Wickiup storage season releases. Current discussions amongst stakeholders suggest 50 cfs (~18,000 AF) could be available from COID patrons through water marketing strategies under development by a WaterSmart grant with funding of $800,000.

An adaptive strategy based on this could be that whenever Wickiup's April fill is <150,000 AF, a leasing/temporary transfer program is invoked to supplement NUID with 18,000 AF that summer. The following graph shows the supply deficits under this adaptive strategy.

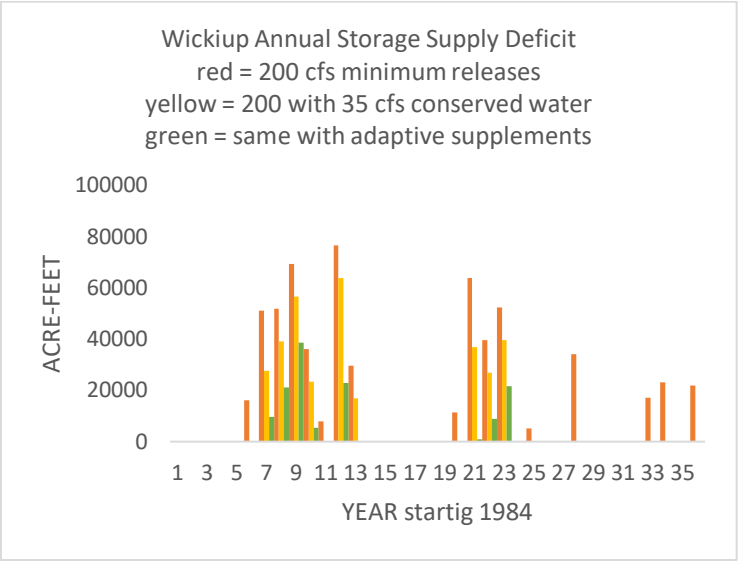


fig 9

Supply was supplemented in 13 of 36 years in the sequential calculations. Deficits were reduced to 8 of 36 years; 4 years had deficits < 10,000 AF, 3 had ~ 20,000 AF deficits and 1 year had ~ 40,000 AF deficit. These remaining deficits could be further reduced by utilizing water markets in more years, could be supplemented using NUID's option to draw 10,000 AF from Prineville reservoir, by fallowing or deficit irrigation of a small number of acres within NUID or by selective reduction in releases.

Adaptive management reduces supply deficits during 200 cfs minimum release years almost completely with only 35 cfs derived from expensive infrastructure piping projects.

A similar hypothetical could be presented for the next step - 300 cfs minimum releases. Given that COID has plans for infrastructure piping projects based on PL-566 funding the results would be qualitatively similar to the above; limited number of scarcity years but with somewhat larger deficits.

Summary

Comprehensive water management is a long standing goal of Deschutes basin stakeholders. The recently released draft DBHCP plan addresses this within the context of ESA species needs. For the upper Deschutes above Bend the ESA species is the Oregon Spotted Frog. The DBHCP proposal is not a plan for comprehensive water management in the basin.

Reclamation's use of a winter Wickiup flow release formula in the draft DBHCP and related EIS is explored and problems identified. A simpler alternative focusing only on Wickiup storage is presented. The Reclamation model appears to generate larger Wickiup supply deficit estimates for NUID compared to the simple model. For purposes of the draft DBHCP proposal this is significant for the arguments regarding practicability of proposed Deschutes mitigation flow alterations, modeling of Crooked River flows and for analyses of habitat and water quality..

Modeling of course is just that, and information based on historic years cannot be overinterpreted. Yet modeling frames our perspectives on problems and possible solutions. For the basin, future unknowns including climate change may lead to much different outcomes than experienced historically.

What then do the current modeling efforts teach us? The outstanding feature of outputs is the variability in supply, with years of abundance and of scarcity found by either model. Given the complexities of basin hydrology, a prudent conclusion is that models will not yield the prescription for year to year management.

The hypothetical adaptive management example supports the perspective that while fixed infrastructure conserved water projects within districts can supplement NUID supply in all years, logically and economically a flexible program seems best suited for meeting supply demand in occasional years of shortage.

The simple hypothetical scenario directs us to consider some of the questions that will arise as the water management challenge is confronted:

...Are adequate predictive tools available to forecast water supply in the fall, winter and spring leading into each irrigation season. Information in each of these seasons impacts agricultural planning and also efforts to implement supplemental supply programs in scarcity years.
...What is required to allow water market options to be scaled up flexibly.
...Have legal impediments to adaptive management options been resolved.
...How will Deschutes and Crooked River management be coordinated
...Have plans for infrastructure (piping) investments been coordinated with flexible tool options.
...Will on-farm conservation measures be used for instream flow restoration; they have not to date
...Measures within NUID have major impacts on water balances e.g. choice of crops, deficit irrigation etc. While these decisions are clearly under NUID management, given the large public investments anticipated, the politics evoked, and far reaching consequences of water management not least of which is whether the Oregon Spotted Frog benefits from the limited proposed mitigation(altered hydrology only), what process is needed to keep the collaborative problem solving model in effect.

And of course there are related questions outside the scope of the simple hypothetical such as
...Will Wickiup strategies be coordinated with habitat restoration; the draft DBHCP hypothesizes wetlands will be dependent on altered hydrology

...Will invasive species e.g. bullfrogs or bullheads be controlled as hydrology below Wickiup is altered
...How will mitigation measures be modified if the hypothesized benefits for the Oregon Spotted Frog are not realized; is it time to consider measures beyond simply altered hydrology as the mitigation plan?

A key change from the draft DBHCP proposal in this exercise is the focus on storage supply rather than Wickiup filling per se or on extrapolated demand involving live flows which have uninterpretable ramifications and uncertainties.

Storage supply can be met with reservoir cycles below maximal fills. The scenarios illustrated are not to be considered a proposal for minimum releases. Rather they illustrate possible bounds within which adaptive management could support higher winter flows in many years based on flexible interventions in years of scarcity, and direct us to key questions and planning efforts needed for successful future management of Wickiup Reservoir.

The draft DBHCP proposal acknowledges the need for adaptive management; on p 6-17 it is stated that USFWS, NMFS and NUID will meet monthly during the storage season to assess water management options. In the EIS proposal (Vol I p 2-10) OWRD is added to the management group.

Given the socioeconomic impacts on the agricultural communities, expected large public investments in the projects, need for flexible water supply options in years of scarcity, uncertainties such as climate change impacts, evaluation of evolving habitat restoration, challenges of invasive species control and finally the evolving status of the ESA frog, decisions on water management will necessarily be complex.

A robust transparent multidisciplinary adaptive water management process involving appropriate additional agencies and environmental stakeholders is called for to meet this multidimensional challenge.

Attachment 2

The following are specific errors that TU has identified in both the DBHCP and the DEIS. Additionally, TU has identified some sections that would warrant from additional clarification.

DBHCP

- page 4-3. it is stated that Fall River is 8.2 miles long. Some general references show the length of Fall River at 12 miles with the Upper Deschutes River Sub basin Fish Management Plan noting its length at 11.2 miles (pg. 77).

- p 6-67. Wychus section 6.4.3.3 line 11
  reads "high summer *flows* downstream." probably should be *temperatures* not flows

- 6-99 states NUI-DRC agreement for minimum flows below pump is "voluntary". TU would like additional clarification regarding whether this is accurate. TU's understanding is that this is an agreement that relates to the controversial Deschutes - Crooked water use exchange between rivers and that it was formally approved by Oregon Water Resources Department. Its implementation has subsequently led to conserved water instream and groundwater mitigation consequences

- p 8-16. table 8-16. all reaches labeled C2; shouldn't they be ranged through C5?

EIS

- EIS Vol II) Appendix 3.2-A, p. 10 upper table heading - *junior* to North Unit should be *senior* to North Unit

- Vol II App 3.1-B formula p 10. error in units: acre-feet does not equal cfs. Later in appendix (p. 16) a similar formula uses cfs units consistently.

- Vol II App 3.1-B ?ERROR. formula p. 11. uses 365 days for "irrigation season"..?typo... or if used, what are consequences for modeling outputs. Per Mike Britton NUI, some Crooked water rights are for 365 days, but use is not spread uniformly over 365 days as apparently modeled.

- Vol II, App 3.1-B..? ERROR..Alt 2 vs Alt 3...covers multiple pages. Was the wrong graph used in the Appendix? Mike Tripp reviewed with Kyle Gorman, OWRD. After looking at it, Kyle concluded that "something is wrong" and "Alt 2 can't be the same as Alt 3" as in graphs in the Appendix; he speculated that the wrong graph was mistakenly printed for Alt 3. But text elsewhere in several places again states Alt 3 minimally different than Alt 2, so not simply an error of which graph is printed.

- And on p. 16 ~ "Alt 3 same as Alt 2 except protection of uncontracted Prineville reservoir". did modeling not use the major scheduled flow differences between Alt 2 and Alt 3? ? an error of omission?

- Vol II, p.31. .....?ERROR
  "Section 4.2. Alternative 2: Districts' DBHCP Proposal"
  "Only the locations that experienced a change from the No Action Alternative are ...shown in this section."
  then ..fig 19, p 34...the "only...location that experienced a change from the No Action alternative" was the proposed action when minimum flows reach 400 cfs winter releases? Winter minimum releases of 400 are found only in years 21-30 in Alt2...?
  If this is not an error, it implies the modeling washes out differences between No Action and DBHCP Proposal for the first 20 years of the Proposed Action. Or one could state, the *"proposed action.is no action for the first 20 years"*...although its doubtful this will hold up as modeling revised
- Vol II p 48..fig 32. legend inconsistent with in-graph labels on right side of graph, and same issues as above... Alt 3 also doesn't get to 400 cfs until later years.