DRAFT Desired Future Conditions

The Ecological Function and Water Supply Needs Working Groups (WG) met to discuss Desired Future Conditions (DFCs) as they relate to instream and out of stream water needs. The Data, Studies, and Monitoring WG further refined the DFCs and identified proposed metrics as well as sources to track progress towards achieving the DFCs. The table below includes discussion questions, DFCs, proposed metrics to measure progress, and potential sources to identify the proposed metrics. The matrix is divided into the following subsections:

Water Supply Needs Desired Future Conditions Matrix:

Category	Sub-category	DFCs: Responses	Metrics to Measure Progress	Potential sources for metrics:

Agriculture	**Use/Demand**	• Maintain or increase irrigation water supply in June-Oct
		• Increase irrigation water supply in fall through spring
		• Conserve water by strategic piping of ditches, e.g. pipe Gardena upper ditch, which currently loses 15 cfs in Spring
		  ○ Co-benefit to Ag and ecosystem; put water back instream for Spring Chinook.
		• Recharge MAR sites in the winter-early spring with high flows to mimic the function of river freshets
		• Enhance recharge to ***Shallow Alluvial Aquifer (SAA)*** to sustain farmers dependent on its groundwater
		• Augment flow in the Tumalum branch by leaving Ag water instream and exchanging this water with "new water" through a future big water project. Current water supply is adequate for ag use now and into the future with proper conservation measures, implementation, and planning efforts
		• Manage climate-related Ag water supply variability by building a reliable water system
		• Improve soil-water retention capacity, e.g. compost
		• Use soil-water sensors to irrigate efficiently and conserve water
			• What % of wells are metered each year (multi-year)
			• Water availability/reliability
			• No call on junior water right users - maintain water rights (enough water available to meet their needs)
			• Track trends with climate change and agricultural water use over time
			  ○ Weather data
			  ○ Water usage
			  ○ # of stations
			  ○ Snowpack measurements/predictions ahead of spring irrigation season
			• How much land is using compost to improve soil
			• Conserved water in trust (& quantifying)
			  ○ % in trust
			  ○ IDs benefiting the basin through conservation; leaving water in stream - ways to help other IDs conserve more water (any metrics?)
			• More strategic water conservation in basin
				• Metering
				• Snowpack analysis (anecdotal?)

	LWWR Flow Management	• Expand MAR strategically
		• Increase surface flows down LWWR
		  ○ This will naturally recharge the SAA and may reduce local need for additional MAR sites
		  ○ This will naturally enhance flow at springs and in spring-fed creeks
		  ○ Benefits would be to ecosystem function and water users
			• See comments above (Use/Demand)
			• Water quality improvements in LWWR	

	Basin-Wide Metering	• Meter surface water diversions and groundwater withdrawals
		  ○ Procure and install robust meters that function in water with suspended sediment and batteries powered by solar
		• Strategically deploy telemetry
		  ○ Employ new tech in telemetry to capture basin water use in real time
		  ○ Find ways to fund and create revenue source
			• Telemetry	

Municipal		• Continued successful conservation by detecting and repairing leaks
		• Continue ongoing collaboration with WWT and CTUIR
		• Collaborate with others
		• Strategically plan to supply water to development outside city limits
		  ○ Potentially annex rural development areas into city limits where there are ecosystem benefits
		• Keep development small and compact in urban growth areas
		  ○ Develop incentives for such compact growth
		• Expand and support ASR
			• Per capita use to quantify overall usage
			• Flood management
			  ○ Floodplain connection
			  ○ Max peak
			  ○ Analysis of what constitutes a flood flow & frequency of flows
			  ○ People displaced
			  ○ $$$ of FEMA damage
			  ○ Economic impacts
			• # of linear feet of levees set back
			• Per capita reclaimed water volume available for multiple uses
			• Identify how many people live within network that cities can reach (target # to bring on public water instead of on PE wells)	

Rural-Domestic		• Increase and incentivize metering, water measurement, and reporting.
		  ○ Provide information to change water use
		• Mitigate rural domestic water use
			• Telemetry
			  ○ Areas near UGA?
			  ○ Mitigation certificates - increase % of eligible PE wells (confusion on whether County or ECY implements or regulates)
			  ○ Find a way to use mitigation certificates to avoid Hirst scenario	

Commercial-Industrial		• Expand water treatment operations and beneficial use of reclaimed water ○ Beverage industry creates wastewater challenges for municipal water treatment facilities-- funding and novel approaches needed for wastewater treatment		

Ecological Function Desired Future Conditions Matrix:

Category	Sub-category	DFCs: Responses	Metrics to Measure Progress	Potential sources for metrics:

Groundwater	**Shallow alluvial aquifer**	• Aquifer water levels stabilized
		• Natural surface to groundwater exchange with sinuous channel well-connected to floodplains for recharge
		• Sustaining springs flowing at historical rates (aquifer full and functioning)
		• Physical protection and healthy vegetation around spring sources (in upland forests and valley)
			• Flow rates at springs (return to historic)
			• Temperature (decline) in late spring - fall in springs, creeks, and rivers
			• Instream, hyporheic zone*, and groundwater monitoring to show complex beneficial exchanges between surface water and groundwater along rivers and creeks
			  ○ Metrics include but not limited to: water levels, temperature, conductivity, flow gains/losses; presence of microbes, macroinvertebrates, and fish
			• Floodplain water level, temperature, and conductivity monitoring to show seasonal hydraulic to connection to adjacent river and creek
			
			*Hyporheic zone - volume of sediments or rock beneath the streambed where surface water and groundwater mix creating an important ecosystem for stream health.
			
			• Recurring vegetation surveys around springs
				• Transducers in basin
				• Weather stations (climatology, record precip, temp)
				  ○ WSU has extensive network
				• WWBWC seepage runs, gages & operations
				• Groundwater study - monitoring wells

	Deep basalt aquifer	• Stable or increasing water levels • Established Aquifer protection zones	• Water level monitoring in OR and WA • ECY water resources program - groundwater monitoring program • ASR	• USGS study to understand rate of decline • Well levels • OWRD monitoring

Surface water quantity	**Year-round hydrograph (Peak flows, freshet flows, low flows)**	• Enough water for fish, agriculture, and other water users • Floodplain connectivity • Protect surface flows from further groundwater development • Activate LWWR natural function	• Amount of useable habitat area and riparian area in acres (Increase in) • % of increase in floodplain area • Improve channel complexity • River complexity index (sinuosity, mid channel, side channel)	• Stillwater Report • LIDAR to model flows? • HEC-RAS • WUA curves • Touchet Restoration Plan (John F) • Flow study

Fish/Wildlife	**Critical and ESA-listed species**	• Full recovery of Steelhead, Bull Trout and Spring Chinook
		• Steelhead Recovery
		  ○ Cite goals stated in other plans (NMFS criteria)
		  ■ Subbasin plans
		  ■ Recovery plans - broad sense goals
		  ■ WA version of steelhead recovery plans (WA and OR specific sections of plans)
		  ■ Columbia basin partnership targets for healthy and harvestable targets (vetted through NOAA, WA, and Columbia river tribes)
		• Bull trout recovery
		  ○ USFW to provide info
		• Spring chinook recovery
		• Lamprey & Freshwater Mussels recovery
		  ○ CTUIR has vision targets but not numeric
		  ○ PHS- priority habitat species - includes info on WW (no hard #s)
		• Elimination of invasive fish species
		  ○ invasive fish species (bass, walleye, catfish, pike minnow)
			• Productivity rates to get to juvenile abundance targets (more control of juvenile) (egg → smolt stage for fish goals in freshwater system
			• Juvenile production & abundance #s
			• Pit tagging of adults could measure upstream migration rates/ delays/ survival etc.
				• Stillwater Sciences report includes data on flow requirements for species
				• Columbia basin partnership targets for healthy and harvestable targets (vetted through NOAA, WA, and Columbia river tribes)
				• Snake River salmon recovery plan

Habitat	**Mainstem Walla Walla** **(Lower, Upper, Headwaters, and LWWR)**	**Mainstem:** ● Improve flow and maintain minimum flows for fish to improve habitat ○ Need sufficient water quantity and quality to sustain all life history phases and locations of native aquatic species ● Naturalize channelized streams as much as possible ○ Can we reduce channelization by 50% or 25%? Currently 75-80% of streams are channelized. ● Set back levees ● Protect current undeveloped floodplain from development ● Remove fish passage barrier at Nursery bridge priority passages **LWWR:** ● Integrate instream and out of stream floodplain restoration ● Meet TMDLs for temp, dissolved oxygen, fecal coliform ● Restore native species and healthy riparian areas ● Remove Reed Canary grass **Channel morphology:** ● Increased natural percolation and infiltration ● Eliminate hardening of channels moving forward and remove existing structures ○ Strategic piping, channeling, and infiltration that could benefit riparian corridor ● Excavation disruptions to domestic wells need to be addressed when thinking about lining distributaries	● Use health indicators/touchstones of floodplains described in the River Vision Report (CTUIR) as DFCs (provide a description of each in Plan): ○ Hydrology ○ Geomorphology ○ Connectivity ○ Riparian ○ Aquatic biota ● TMDLs (note: applied basin wide) ○ Temp ○ Dissolved Oxygen ○ pH ○ Fecal Coliform ● Healthy Floodplain Touchstones/Indicators ○ Define limiting factors ○ Define problem areas ■ Nursery Bridge ■ Temperature in lower WW ■ LWWR needs riparian and instream habitat restoration ● Meet TMDL targets (WW + LWWR) ● Numeric objectives for substrate embeddedness, LWD, pools, riparian function, confinement, bedscour ● Identify maximum % for achieving natural floodplain function (e.g. fixing broken reaches, levee setbacks, increasing channel complexities ○ % of channelized stream reduction ○ % for achieving healthy/natural floodplain function	● River Vision, which includes Healthy Floodplain Touchstones/Indicators (from Gary James) ● Stillwater Report ● WW Subbasin Plan ● Snake River/ ESA Recovery (June 2005) plans ● Steelhead recovery plan ● CTUIR assessment and strategic plan
	Touchet – mainstem (Headwaters and lower)	● Reduce flood risk on peak flows ● Increase riparian cover (especially lower Touchet) ● Increase Stream flow ● Continue CREP leases Address passage issues under highway at confluence with mainstem **Channel morphology:** ● Target should include historical sinuosity, driven by biological plant, riparian, and large wood contributions.(Most of Touchet not in a geomorphically driven channel morphology - it's an alluvial system - will be driven by hard points, biologically driven by plant material.) ● Restore small streams, intermittent streams to extent feasible and historic channel morphology is unknown	● Current floodplain - % of increase in floodplain area ● Upper and Middle Touchet: embeddedness, temperature, large woody debris, floodplain connectivity ● River complexity index (sinuosity, mid channel, side channel) ● Levels of: sediment, temperature, embeddedness, riparian vegetation (large woody debris, complexity, floodplain) specific for habitat - 2-5 year return flow (low flood flows)	● Touchet Assessment - about to be released as final ● WDFW flow targets ● Lower Touchet Passage Study ● River complexity index (channel nodes, side channel length)

	Mill Creek (Headwaters and Mill Creek)	• Focus on access to quality upstream habitat
		• Complete installation of - low flow channel through the weired section.
		• Improve habitat, set back levies below Gose Street-
		• Restore sediment inputs downstream of Gose St
		• Restore flushing flows to Yellowhawk to move sediment
		• Address sediment build-up in Mill Creek in weired section/
		• Address fish passage barriers in Lower Mill Creek
		  ○ Cement portion of the levy system creates barriers during high flows- velocity barrier to upstream migration
		  ○ Complete Bennington diversion dam/ ladder passage improvements (improvement is in design stage now)
		  ○ Fix Gose Street fish passage ladder not currently
		  ○ Address any fish passage barriers in Yellowhawk
			• LWD per 100 meters; #s of pools 3 meters or deeper; measuring is difficult through the ACOE project
			• Floodplain: acreage and duration of inundation
			• Riparian: acreage, what species are present (ages classes, native species), % cover/shade,
			• Species and habitat diversity goals
			• Percent target flow met	

Water Quality	**Mainstem Walla Walla (Lower, Upper, Headwaters, and LWWR)**	• Meet TMDL targets for:
		  ○ Temperature
		  ○ dissolved O2
		  ○ fecal Coliform
		  ○ Chlorinated Pesticides
		  ○ PCBs
			• TMDL target concentration or value	

	Touchet	• Lower temperatures • Address turbidity • Improve riparian function, flow, and temperature • Improve late season flows on the Lower Touchet • More conducive habitat for native species (not exotics) • Improve instream cover and large woody debris • Reduce Nitrate (ag fertilizer run off) levels during spring runoff in shallow wells (how big of an issue is this? Do we have data?)	• TMDL target concentration or value	
	Mill Creek	• Reduce Temperature downstream of Bennington Dam • Address the quality of Stormwater inputs • Address nutrient inputs • Reduce Fecal coliform inputs • Improve flows in Mill Creek • Irrigation return flow - water quality concerns	• TMDL target concentration or value	