Appendix J: Ecosystem Services Results

This Appendix provides details of the Ecosystems Services Assessment of the Constrained Options of the WRMP19.

Following comments made on our draft WRMP19 in relation to leakage reductions and the revisions to our plan made in response to these comments, a number of the distribution management options have been removed from the Constrained List as they now feature in our baseline leakage reduction programme and therefore are not available to address the residual baseline supply deficit. The initial ALC leakage reduction options (D21) that were included as options in the draft WRMP along with the pressure management options (D22) are now included in the revised draft WRMP19 as part of our baseline leakage reduction activities to reduce total leakage to 39.33 Ml/d by 2024/25 (rather than to the 43.0 Ml/d baseline position included in the draft plan). For the revised draft WRMP19, Options D21.01, D21.02 and D23 have also been revised to reflect the new baseline starting position on leakage (39.33 Ml/d by 2024/25).

Following representations made on the draft WRMP19, we have now agreed a change to our Wessex Water bulk export with Wessex Water as reported in the revised draft WRMP19. These agreed changes will be implemented after 2024/25 and result in an agreed reduction to the bulk export from 11.37 Ml/d to 4.4 Ml/d. This change is incorporated into the revised draft WRMP19 baseline supply forecast. Consequently, Option R32 to reduce this Wessex Water bulk export has been excluded from the revised draft WRMP19 Constrained Options list as it is already agreed included in the baseline supply-demand forecast. Option R32 has therefore been removed from this Appendix for the revised draft WRMP19.

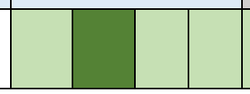
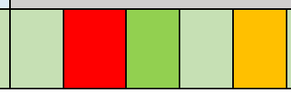
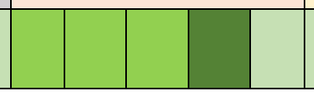
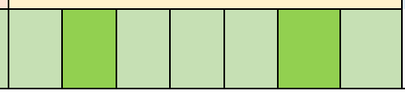
Option ID	Option Name	Scenario	Provisioning services				Regulating services						Cultural services					Supporting services							Overview of Assessment
			Fresh water	Food (e.g. crops, fruit, fish etc.)	Fibre and fuel (e.g. timber, wool, etc.)	Water for non-consumptive use	Air Quality regulation	Climate regulation (local temperature/ precipitation, greenhouse gas sequestration)	Water regulation (timing and scale of run-off, flooding, etc.)	Natural hazard regulation (i.e. storm protection)	Erosion regulation	Water purification and waste treatment	Cultural heritage	Recreation and tourism	Aesthetic value	Existence Values	Social relations (e.g. fishing, grazing or cropping communities)	Soil formation	Primary production (in river)	Nutrient cycling	Water recycling	Photosynthesis (production of atmospheric oxygen)	Provision of habitat	Fresh water	
C08	Selective metering of domestic customers based on (a) high consumption e.g. sprinkler use and/or (b) zones of high demand	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Key effect of the scheme is an increase in freshwater for potable use (0.57 Ml/d). Scheme is expected to have a small negative effect on climate regulation resulting from carbon emissions, however the scheme will result in reduced demand and therefore avoided carbon. Scheme has limited social and environmental effects as work is undertaken within property boundaries and/or within urban areas. Scale of work is small scale over the supply area.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+	+++	+	+	++	-	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
C12	Enhanced promotion of free meter option to unmeasured households beyond the promotion assumed in baseline demand forecast	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Key effect of the scheme is an increase in freshwater for potable use (0.572 Ml/d). Scheme is expected to have a small negative effect on climate regulation resulting from carbon emissions, however the scheme will result in reduced demand and therefore avoided carbon. Scheme has limited social and environmental effects as the work is undertaken within property boundaries and/or within urban areas. Scale of work is small scale over the supply area.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+	+++	+	+	++	-	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
C20	Installation of rainwater harvesting in new build households and non-households	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Key effect of the scheme is an increase in freshwater for potable use (0.029 Ml/d). Scheme is expected to have a small negative effect on climate regulation resulting from carbon emissions, however there will be avoided carbon from the use of rainwater. Scheme has limited social and environmental effects as work would be undertaken at existing building sites and assumed best practice is implemented.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	N	+++	+	+	++	-	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	+	+	

Option ID	Option Name	Scenario	Provisioning services				Regulating services						Cultural services					Supporting services						Overview of Assessment
C26-01	Enhanced water efficiency communications campaign (different messages for different seasons)	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Key effect of the scheme is very little increase in freshwater for potable use (0.08 Ml/d), this is assessed as a small benefit. Scheme is expected to have a small negative effect on climate regulation resulting from carbon emissions, however the scheme will reduce demand resulting in avoided emissions. Scheme has limited social and environmental effects due to a lack of physical assets.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	N	+++	+	+	++	N	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
C26-02	Education programme on water efficiency on different key stages (primary, secondary, further and higher education)	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Key effect of the scheme is little increase in freshwater for potable use (0.08 Ml/d), this is assessed as a small benefit. Scheme is expected to have a small negative effect on climate regulation resulting from carbon emissions. Scheme has limited social and environmental effects due to a lack of physical assets.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	N	+++	+	+	++	N	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
C26-03	Household water efficiency devices installation programme (Partnering or Company led approach, home visit), plus selective water saving devices ranging from 1-5 devices. This could include fitting of showers, low flow shower heads, cistern displacement, low flush toilets, dual flush toilets, timing devices, water butts, flush controllers for urinals, trigger nozzles for hoses, timing devices, fitting people detectors, spray taps and water efficient taps.	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Key effect of the scheme is an increase in freshwater for potable use (0.266 Ml/d), this is assessed as a small benefit. Scheme is expected to have a small negative effect on climate regulation resulting from carbon emissions. Scheme has limited social and environmental effects due to a lack of physical assets.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+	+++	+	+	++	-	++	+	-	+	++	++	++	+++	++	+	++	+	+	+	++	+	
P01-01	Increase performance of existing sources (P01-01R) to increase deployable output to near licensed volume	Baseline	+++	+	N	N	++	+	+	N	+	N	++	+++	+++	++	+	+	N	N	N	++	++	+	Scheme brings a yield of 1.7Ml/d. This is a significant increase. Key effects is a reduction in climate regulation (via carbon emissions) and a potential effect on Existence Values and Habitat (due to the sites proximity to a number of designated sites i.e. North Somerset and Mendip Bats SAC). Scheme not expected to affect freshwater for environment as the scheme would be operating with the existing licence.
		Future Baseline	-	+	N	N	++	+	+	N	+	N	++	+++	+++	++	+	+	N	N	N	++	++	N	
		Future Baseline with the scheme implemented	+	+	N	N	++	-	+	N	+	N	++	+++	+++	+	+	+	N	N	N	++	++	N	
P01-02	Increase performance of existing sources (P01-02R) to increase deployable output to near licensed volume	Baseline	+++	+	N	N	++	+	N	N	-	N	+	++	++	++	+	-	N	N	N	+	+	+	Scheme brings a yield of 2.64Ml/d for potable use. This is a significant increase. Key effects include a reduction in climate regulation via carbon emissions. There are limited social and environmental effects from this scheme due to few designated sites in proximity to the site and the small scale of the works (within the site boundary).
		Future Baseline	-	+	N	N	++	+	N	N	-	N	+	++	++	++	+	-	N	N	N	+	+	N	
		Future Baseline with the scheme implemented	++	+	N	N	++	-	N	N	-	N	+	++	++	++	+	-	N	N	N	+	+	N	

Option ID	Option Name	Scenario	Provisioning services				Regulating services						Cultural services					Supporting services						Overview of Assessment
P06	Catchment Management of the Mendip Lakes (Chew, Blagdon and Cheddar) to manage outage risk from algal blooms	Baseline	+++	+++	N	N	++	+	+	N	-	+	++	+++	+++	++	+	+	++	+	+	+	++	+++	Scheme brings a small increase in Yield (0.394 Ml/d). There are limited negative effects from this scheme due to nature of scheme. There are a number of positive benefits to designated sites (i.e. Chew Lake SPA), habitat and freshwater (for the environment) due to actions to reduce sediment and nutrient runoff.
		Future Baseline	-	+++	N	N	++	+	+	N	-	+	++	+++	+++	++	+	+	++	+	+	+	++	++	
		Future Baseline with the scheme implemented	+	++	N	N	++	-	+	N	+	++	++	+++	+++	+++	++	++	++	++	+	+	+++	+++	
P08	P08R WTW (increased production)	Baseline	+++	++	N	N	++	+	+	N	-	+	N	++	++	N	+	+	+	+	+	+	++	++	Scheme brings a significant benefit (2Ml/d). There are limited social and environmental effects from the scheme as the work would be undertaken within the site boundary. Key effects include a reduction in climate regulation resulting from carbon emissions. No effects to freshwater (environment) have been assessed as the work would be within the current licence. The abstraction has had low flow complaints historically and therefore this potential issue should be considered.
		Future Baseline	-	++	N	N	++	+	+	N	-	+	N	++	++	N	+	+	+	+	+	+	++	+	
		Future Baseline with the scheme implemented	++	++	N	N	++	-	+	N	-	+	N	++	++	N	+	+	+	+	+	+	++	+	
P10	P10R WTW (increased production)	Baseline	+++	N	N	N	N	++	-	N	N	+	+	N	N	+	++	N	++	+	+	N	N	++	Scheme brings a Yield of 4 Ml/d which is a significant increase in yield. Whilst the works are confined to the boundary of the site, the scheme is expected to have an effect on air and climate regulation due to vehicle movements in the local area (semi- urban area) and carbon emissions. It is assumed mitigation would be put in place to mitigate any social effects (i.e. noise, dust) due to the sites proximity to urban housing areas.
		Future Baseline	-	N	N	N	N	++	-	N	N	+	+	N	N	+	++	N	++	+	+	N	N	+	
		Future Baseline with the scheme implemented	+++	N	N	N	-	---	-	N	N	+	+	N	N	+	++	N	++	+	+	N	N	+	
P20	Reduced leakage from raw water mains (enhanced leakage detection / raw mains repairs/replacement)	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	The scheme has a supply benefit of up to 5.5 Ml/d following a review of raw water losses for the revised draft WRMP19. The scheme would be operated over a large spatial scale but only around 1% of pipelines would be replaced each year. No significant social and environmental effects are expected.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+++	+++	+	+	++	--	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
R08-02	New water sources within Bristol Water CAMS area for the location R08-02R	Baseline	+++	+	N	N	++	+	++	N	-	++	+	++	+++	++	+	+	++	+	++	+	++	++	Scheme has a small increase in yield (1.4Ml/d). There are some key effects of this scheme which include expected reductions in the provision of food, climate, water, recreation, aesthetic value and existence value due to the route of the pipeline (i.e. via agricultural land, SSSI and ancient woodland) and the location of the assets such as the pumping station and treatment works (near registered park and garden and an AONB). No effects to the aquatic
		Future Baseline	-	+	N	N	++	+	++	N	-	++	+	++	+++	++	+	+	++	+	++	+	++	+	
		Future Baseline with the scheme implemented	+	N	N	N	++	--	+	N	-	++	+	+	++	+	N	N	++	+	++	N	+	+	

Option ID	Option Name	Scenario	Provisioning services				Regulating services						Cultural services					Supporting services						Overview of Assessment
																								environment is expected as abstraction is small and within the EA CAMS assessment.
R08-03	New water sources within Bristol Water CAMS area for the location R08-03R	Baseline	+++	+	N	N	+	N	++	N	-	+	+	++	++	++	+	+	++	+	+	+	++	+	Scheme has a small increase in yield (1.1Ml/d). The route of the pipeline is a mixture of urban (near the abstraction point) and rural (route of the pipeline). The key effects are a reduction in climate regulation due to carbon emissions and the potential effects to Aesthetic and Existence values resulting from the physical assets and the proximity of the pipeline to a number of designated sites. No effect to the aquatic environment is expected due to the small level of abstraction and that the abstraction is within the EA CAMS assessment.
		Future Baseline	-	+	N	N	+	N	++	N	-	+	+	++	++	++	+	+	++	+	+	+	++	N	
		Future Baseline with the scheme implemented	+	+	N	N	+	--	++	N	-	+	+	++	+	+	+	+	++	+	+	+	++	N	
R11	P10R Reservoir Standard WRMP14 design	Baseline	+++	++	N	N	+	++	+	+	-	++	++	++	+++	++	+	+	+	+	+	+	++	++	Scheme is expected to bring a Yield of 16 Ml/d which far exceeds the expected deficit. The key effects of the scheme result from construction (air quality from vehicle moments, carbon emissions, disturbance to designated sites, aesthetic value and recreation). Whilst long term issues include a potential effect on water regulation (reduction in flood storage due to the reservoir) and flow reduction in high in the P10R Yeo (Freshwater, environment).
		Future Baseline	-	++	N	N	+	++	+	N	-	++	++	++	+++	++	+	+	+	+	+	+	++	+	
		Future Baseline with the scheme implemented	+++	N	N	N	-	---	N	N	-	++	+	+	++	N	N	+	+	+	+	+	N	-	
R23-01	Purchase water from third parties	Baseline	+++	+++	N	N	++	++	+	N	-	++	++	+	+	+++	+	N	+	+	+	N	+++	++	Scheme is expected to bring a yield of 10 Ml/d which far exceeds the expected deficit. The scheme is expected to have a significant effect on climate and air regulation due to the construction of the pipeline. Scheme is expected to negatively effects designated sites (Existence Values) which are in close proximity to the pipeline, this include the Mendip Limestone Grasslands and North Somerset and Mendip Bats SAC). The upper reach of the pipeline is within the Mendips AONB and therefore there may be some aesthetic and recreational effects. The operation of this option would involve the transfer of 'spare' resource within the capacity of Wessex Water's distribution system and would be within existing licence limits. Although effects are likely to be negligible, this could have an effect on aquatic non-designated species and habitats. Further modelling would be required.
		Future Baseline	-	++	N	N	++	++	+	N	-	++	++	+	+	+++	+	N	+	+	+	N	+++	+	
		Future Baseline with the scheme implemented	+++	++	N	N	+	---	+	N	-	++	++	+	N	+	N	N	+	+	+	N	++	N	

Option ID	Option Name	Scenario	Provisioning services				Regulating services						Cultural services						Supporting services							Overview of Assessment
R24	Bring R24R source back into supply	Baseline	+++	++	N	N	++	+	++	N	-	+	++	++	+++	++	+	+	+	+	+	+	+	++	Scheme is expected to bring a yield of 2.4Ml/d, this is a significant yield. The key effects of the scheme is a reduction in Climate Regulation (from carbon emissions), Aesthetic Value (the proximity of the pipeline to the Mendips AONB) and Existence Value (potential effects on designated sites due to construction). The scheme may have a negative effect on Freshwater (environment) due to potential reduction in groundwater levels and the associated surface waterbodies (further assessment required)
		Future Baseline	-	++	N	N	++	+	++	N	-	+	++	++	+++	++	+	+	+	+	+	+	+	+	
		Future Baseline with the scheme implemented	+++	++	N	N	++	--	++	N	-	+	++	++	++	+	+	+	+	+	+	+	+	N	
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+++	+++	+	+	++	+++	++	+	-	+	++	++	++	+++	-	+	++	+	+	+	++	+	
D21.01	Active Leakage Control ALC	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Scheme is expected to bring a yield of 2.83Ml/d, this is a significant yield. The scheme predominately addresses leakage and therefore there is limited social and environmental effects. Scheme results in some minor carbon emissions however the avoided carbon once implemented is a greater benefit. Is it expected that the work would be undertaken in urban areas and/or areas of previously disturbed land and therefore limited effects. This assessment has some uncertainty due to the unknown locations of the work.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+++	+++	+	+	++	++	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
D21.02	Active Leakage Control ALC	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Scheme is expected to bring a yield of 1.5 Ml/d. The scheme predominately addresses leakage and therefore there is limited social and environmental effects. Scheme results in some minor carbon emissions however the avoided carbon once implemented is a greater benefit. Is it expected that the work would be undertaken in urban areas and/or areas of previously disturbed land and therefore limited effects. This assessment has some uncertainty due to the unknown locations of the work.
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+++	+++	+	+	++	++	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
D23	Asset Renewal	Baseline	+++	+++	+	+	++	+	++	++	-	+	++	++	++	+++	+	+	++	+	+	+	++	++	Scheme is expected to bring a yield of 0.5Ml/d which is a small increase. The key effects of this scheme is carbon emissions of which there is uncertainty in regard to the total emissions. The majority of the work would be undertaken along existing pipeline routes and therefore within previously disturbed land. As a result, it is assumed there are limited effects to habitat and designated sites (it is also assumed that any effects would be mitigated via best practice). This assessment has some uncertainty due
		Future Baseline	-	+++	+	+	++	+	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	
		Future Baseline with the scheme implemented	+	+++	+	+	+	--	++	+	-	+	++	++	++	+++	+	+	++	+	+	+	++	+	

Option ID	Option Name	Scenario	Provisioning services	Regulating services	Cultural services	Supporting services	Overview of Assessment
							to the unknown locations of the work.