Country Overview - United States of America

Water Indicators

Indicator	Value	Description	Source
Overall Basin Risk (score)	2.68	Overall Basin Risk (score)	
Overall Basin Risk (rank)	94	Overall Basin Risk (rank)	
Physical risk (score)	2.42	Physical risk (score)	
Physical risk (rank)	122	Physical risk (rank)	
Regulatory risk (score)	2.33	Regulatory risk (score)	
Regulatory risk (rank)	137	Regulatory risk (rank)	
Reputation risk (score)	3.79	Reputation risk (score)	
Reputation risk (rank)	6	Reputation risk (rank)	
1. Quantity - Scarcity (score)	2.03	1. Quantity - Scarcity (score)	
1. Quantity - Scarcity (rank)	110	1. Quantity - Scarcity (rank)	
2. Quantity - Flooding (score)	2.73	2. Quantity - Flooding (score)	
2. Quantity - Flooding (rank)	126	2. Quantity - Flooding (rank)	
3. Quality (score)	2.82	3. Quality (score)	
3. Quality (rank)	117	3. Quality (rank)	
4. Ecosystem Service Status (score)	2.87	4. Ecosystem Service Status (score)	
4. Ecosystem Service Status (rank)	61	4. Ecosystem Service Status (rank)	
5. Enabling Environment (Policy & Laws) (score)	3.00	5. Enabling Environment (Policy & Laws) (score)	
5. Enabling Environment (Policy & Laws) (rank)	75	5. Enabling Environment (Policy & Laws) (rank)	
6. Institutions and Governance (score)	2.00	6. Institutions and Governance (score)	
6. Institutions and Governance (rank)	164	6. Institutions and Governance (rank)	
7. Management Instruments (score)	2.58	7. Management Instruments (score)	
7. Management Instruments (rank)	112	7. Management Instruments (rank)	
8 - Infrastructure & Finance (score)	1.20	8 - Infrastructure & Finance (score)	
8 - Infrastructure & Finance (rank)	147	8 - Infrastructure & Finance (rank)	
9. Cultural Diversity (score)	5.00	9. Cultural importance (score)	
9. Cultural Diversity (rank)	5	9. Cultural importance (rank)	
10. Biodiversity Importance (score)	2.73	10. Biodiversity importance (score)	

Indicator	Value	Description	Source
10. Biodiversity Importance (rank)	151	10. Biodiversity importance (rank)	
11. Media Scrutiny (score)	3.55	11. Media Scrutiny (score)	
11. Media Scrutiny (rank)	34	11. Media Scrutiny (rank)	
12. Conflict (score)	3.89	12. Conflict (score)	
12. Conflict (rank)	4	12. Conflict (rank)	
1.0 - Aridity (score)	1.84	The aridity risk indicator is based on the Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial data sets by Trabucco and Zomer (2009). These data sets provide information about the potential availability of water in regions with low water demand, thus they are used in the Water Risk Filter 5.0 to better account for deserts and other arid areas in the risk assessment.	Trabucco, A., & Zomer, R. J. (2009). Global potential evapo-transpiration (Global-PET) and global aridity index (Global-Aridity) geo-database. CGIAR consortium for spatial information.
1.0 - Aridity (rank)	69	The aridity risk indicator is based on the Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial data sets by Trabucco and Zomer (2009). These data sets provide information about the potential availability of water in regions with low water demand, thus they are used in the Water Risk Filter 5.0 to better account for deserts and other arid areas in the risk assessment.	Trabucco, A., & Zomer, R. J. (2009). Global potential evapo-transpiration (Global-PET) and global aridity index (Global-Aridity) geo-database. CGIAR consortium for spatial information.
1.1 - Water Depletion (score)	1.92	The water depletion risk indicator is based on annual average monthly net water depletion from Brauman et al. (2016). Their analysis is based on model outputs from the newest version of the integrated water resources model WaterGAP3 which measures water depletion as the ratio of water consumption-to-availability.	Brauman, K. A., Richter, B. D., Postel, S., Malsy, M., & Flörke, M. (2016). Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments. Elem Sci Anth, 4.
1.1 - Water Depletion (rank)	87	The water depletion risk indicator is based on annual average monthly net water depletion from Brauman et al. (2016). Their analysis is based on model outputs from the newest version of the integrated water resources model WaterGAP3 which measures water depletion as the ratio of water consumption-to-availability.	Brauman, K. A., Richter, B. D., Postel, S., Malsy, M., & Flörke, M. (2016). Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments. Elem Sci Anth, 4.
1.2 - Baseline Water Stress (score)	2.12	World Resources Institute’s Baseline Water Stress measures the ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use. A higher percentage indicates more competition among users.	Hofste, R., Kuzma, S., Walker, S., ... & Sutanudjaja, E.H. (2019). Aqueduct 3.0: Updated decision relevant global water risk indicators. Technical note. Washington, DC: World Resources Institute.

Indicator	Value	Description	Source
1.2 - Baseline Water Stress (rank)	84	World Resources Institute’s Baseline Water Stress measures the ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use. A higher percentage indicates more competition among users.	Hofste, R., Kuzma, S., Walker, S., ... & Sutanudjaja, E.H. (2019). Aqueduct 3.0: Updated decision relevant global water risk indicators. Technical note. Washington, DC: World Resources Institute.
1.3 - Blue Water Scarcity (score)	2.28	The blue water scarcity risk indicator is based on Mekonnen and Hoekstra (2016) global assessment of blue water scarcity on a monthly basis and at high spatial resolution (grid cells of 30 × 30 arc min resolution). Blue water scarcity is calculated as the ratio of the blue water footprint in a grid cell to the total blue water availability in the cell. The time period analyzed in this study ranges from 1996 to 2005.	Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323.
1.3 - Blue Water Scarcity (rank)	105	The blue water scarcity risk indicator is based on Mekonnen and Hoekstra (2016) global assessment of blue water scarcity on a monthly basis and at high spatial resolution (grid cells of 30 × 30 arc min resolution). Blue water scarcity is calculated as the ratio of the blue water footprint in a grid cell to the total blue water availability in the cell. The time period analyzed in this study ranges from 1996 to 2005.	Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323.
1.4 - Projected Change in Water Discharge (by ~2050) (score)	1.65	This risk indicator is based on multi-model simulation that applies both global climate and hydrological models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). To estimate the change at 2°C of global warming above 1980-2010 levels, simulated annual water discharge was averaged over a 31-year period with 2°C mean warming. Results are expressed in terms of relative change (%) in probability between present day (1980-2010) conditions and 2°C scenarios by 2050.	Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250.
1.4 - Projected Change in Water Discharge (by ~2050) (rank)	122	This risk indicator is based on multi-model simulation that applies both global climate and hydrological models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). To estimate the change at 2°C of global warming above 1980-2010 levels, simulated annual water discharge was averaged over a 31-year period with 2°C mean warming. Results are expressed in terms of relative change (%) in probability between present day (1980-2010) conditions and 2°C scenarios by 2050.	Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250.

Indicator	Value	Description	Source
1.5 - Drought Frequency Probability (score)	1.86	This risk indicator is based on the Standardized Precipitation and Evaporation Index (SPEI). Vicente-Serrano et al. (2010) developed this multi-scalar drought index applying both precipitation and temperature data to detect, monitor and analyze different drought types and impacts in the context of global warming. The mathematical calculations used for SPEI are similar to the Standard Precipitation Index (SPI), but it has the advantage to include the role of evapotranspiration.	Vicente-Serrano, S. M., Beguería, S., & López-Moreno, J. I. (2010). A multiscalar drought index sensitive to global warming: the standardized precipitation evapotranspiration index. Journal of climate, 23(7), 1696-1718.
1.5 - Drought Frequency Probability (rank)	156	This risk indicator is based on the Standardized Precipitation and Evaporation Index (SPEI). Vicente-Serrano et al. (2010) developed this multi-scalar drought index applying both precipitation and temperature data to detect, monitor and analyze different drought types and impacts in the context of global warming. The mathematical calculations used for SPEI are similar to the Standard Precipitation Index (SPI), but it has the advantage to include the role of evapotranspiration.	Vicente-Serrano, S. M., Beguería, S., & López-Moreno, J. I. (2010). A multiscalar drought index sensitive to global warming: the standardized precipitation evapotranspiration index. Journal of climate, 23(7), 1696-1718.
1.6 - Projected Change in Drought Occurrence (by ~2050) (score)	2.50	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) . A drought threshold for pre-industrial conditions was calculated based on time-series averages. Results are expressed in terms of relative change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
1.6 - Projected Change in Drought Occurrence (by ~2050) (rank)	188	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) . A drought threshold for pre-industrial conditions was calculated based on time-series averages. Results are expressed in terms of relative change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
2.1 - Estimated Flood Occurrence (score)	2.75	This risk indicator is based on the recurrence of floods within the 34-year time frame period of 1985 to 2019. The occurrence of floods within a given location was estimated using data from Flood Observatory, University of Colorado. The Flood Observatory use data derived from a wide variety of news, governmental, instrumental, and remote sensing source.	Brakenridge, G. R. (2019). Global active archive of large flood events. Dartmouth Flood Observatory, University of Colorado.
2.1 - Estimated Flood Occurrence (rank)	127	This risk indicator is based on the recurrence of floods within the 34-year time frame period of 1985 to 2019. The occurrence of floods within a given location was estimated using data from Flood Observatory, University of Colorado. The Flood Observatory use data derived from a wide variety of news, governmental, instrumental, and remote sensing source.	Brakenridge, G. R. (2019). Global active archive of large flood events. Dartmouth Flood Observatory, University of Colorado.

Indicator	Value	Description	Source
2.2 - Projected Change in Flood Occurrence (by ~2050) (score)	2.27	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). The magnitude of the flood event was defined based on 100-year return period for pre-industrial conditions. Results are expressed in terms of change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
2.2 - Projected Change in Flood Occurrence (by ~2050) (rank)	97	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). The magnitude of the flood event was defined based on 100-year return period for pre-industrial conditions. Results are expressed in terms of change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
3.1 - Surface Water Contamination Index (score)	2.82	The underlying data for this risk indicator is based on a broad suite of pollutants with well-documented direct or indirect negative effects on water security for both humans and freshwater biodiversity, compiled by Vörösmarty et al. (2010). The negative effects are specific to individual pollutants, ranging from impacts mediated by eutrophication such as algal blooms and oxygen depletion (e.g., caused by phosphorus and organic loading) to direct toxic effects (e.g., caused by pesticides, mercury). The overall Surface Water Contamination Index is calculated based on a range of key pollutants with different weightings according to the level of their negative effects on water security for both humans and freshwater biodiversity: soil salinization (8%), nitrogen (12%) and phosphorus (P, 13%) loading, mercury deposition (5%), pesticide loading (10%), sediment loading (17%), organic loading (as Biological Oxygen Demand, BOD; 15%), potential acidification (9%), and thermal alteration (11%).	Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., ... & Davies, P. M. (2010). Global threats to human water security and river biodiversity. Nature, 467(7315), 555.

Indicator	Value	Description	Source
3.1 - Surface Water Contamination Index (rank)	117	The underlying data for this risk indicator is based on a broad suite of pollutants with well-documented direct or indirect negative effects on water security for both humans and freshwater biodiversity, compiled by Vörösmarty et al. (2010). The negative effects are specific to individual pollutants, ranging from impacts mediated by eutrophication such as algal blooms and oxygen depletion (e.g., caused by phosphorus and organic loading) to direct toxic effects (e.g., caused by pesticides, mercury). The overall Surface Water Contamination Index is calculated based on a range of key pollutants with different weightings according to the level of their negative effects on water security for both humans and freshwater biodiversity: soil salinization (8%), nitrogen (12%) and phosphorus (P, 13%) loading, mercury deposition (5%), pesticide loading (10%), sediment loading (17%), organic loading (as Biological Oxygen Demand, BOD; 15%), potential acidification (9%), and thermal alteration (11%).	Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., ... & Davies, P. M. (2010). Global threats to human water security and river biodiversity. Nature, 467(7315), 555.
4.1 - Fragmentation Status of Rivers (score)	3.08	This risk indicator is based on the data set by Grill et al. (2019) mapping the world's free-flowing rivers. Grill et al. (2019) compiled a geometric network of the global river system and associated attributes, such as hydro-geometric properties, as well as pressure indicators to calculate an integrated connectivity status index (CSI). While only rivers with high levels of connectivity in their entire length are classified as free-flowing, rivers of CSI < 95% are considered as fragmented at a certain degree.	Grill, G., Lehner, B., Thieme, M., Geenen, B., Tickner, D., Antonelli, F., ... & Macedo, H. E. (2019). Mapping the world's free-flowing rivers. Nature, 569(7755), 215.
4.1 - Fragmentation Status of Rivers (rank)	55	This risk indicator is based on the data set by Grill et al. (2019) mapping the world's free-flowing rivers. Grill et al. (2019) compiled a geometric network of the global river system and associated attributes, such as hydro-geometric properties, as well as pressure indicators to calculate an integrated connectivity status index (CSI). While only rivers with high levels of connectivity in their entire length are classified as free-flowing, rivers of CSI < 95% are considered as fragmented at a certain degree.	Grill, G., Lehner, B., Thieme, M., Geenen, B., Tickner, D., Antonelli, F., ... & Macedo, H. E. (2019). Mapping the world's free-flowing rivers. Nature, 569(7755), 215.
4.2 - Catchment Ecosystem Services Degradation Level (tree cover loss) (score)	2.30	For this risk indicator, tree cover loss was applied as a proxy to represent catchment ecosystem services degradation since forests play an important role in terms of water regulation, supply and pollution control. The forest cover data is based on Hansen et al.'s global Landsat data at a 30-meter spatial resolution to characterize forest cover and change. The authors defined trees as vegetation taller than 5 meters in height, and forest cover loss as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000 – 2018.	Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A. A., Tyukavina, A., ... & Kommareddy, A. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853.

Indicator	Value	Description	Source
4.2 - Catchment Ecosystem Services Degradation Level (tree cover loss) (rank)	78	For this risk indicator, tree cover loss was applied as a proxy to represent catchment ecosystem services degradation since forests play an important role in terms of water regulation, supply and pollution control. The forest cover data is based on Hansen et al.'s global Landsat data at a 30-meter spatial resolution to characterize forest cover and change. The authors defined trees as vegetation taller than 5 meters in height, and forest cover loss as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000 – 2018.	Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A. A., Tyukavina, A., ... & Kommareddy, A. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853.
4.3 - Projected Impacts on Freshwater Biodiversity (score)	2.72	The study by Tedesco et al. (2013) to project changes [% increase or decrease] in extinction rate by ~2090 of freshwater fish due to water availability loss from climate change is used as a proxy to estimate the projected impacts on freshwater biodiversity.	Tedesco, P. A., Oberdorff, T., Cornu, J. F., Beauchard, O., Brosse, S., Dürr, H. H., ... & Hugueny, B. (2013). A scenario for impacts of water availability loss due to climate change on riverine fish extinction rates. Journal of Applied Ecology, 50(5), 1105-1115.
4.3 - Projected Impacts on Freshwater Biodiversity (rank)	84	The study by Tedesco et al. (2013) to project changes [% increase or decrease] in extinction rate by ~2090 of freshwater fish due to water availability loss from climate change is used as a proxy to estimate the projected impacts on freshwater biodiversity.	Tedesco, P. A., Oberdorff, T., Cornu, J. F., Beauchard, O., Brosse, S., Dürr, H. H., ... & Hugueny, B. (2013). A scenario for impacts of water availability loss due to climate change on riverine fish extinction rates. Journal of Applied Ecology, 50(5), 1105-1115.
5.1 - Freshwater Policy Status (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Policy" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.1 - Freshwater Policy Status (SDG 6.5.1) (rank)	65	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Policy" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.2 - Freshwater Law Status (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Law(s)" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.

Indicator	Value	Description	Source
5.2 - Freshwater Law Status (SDG 6.5.1) (rank)	77	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National Water Resources Law(s)” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.3 - Implementation Status of Water Management Plans (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National IWRM plans” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.3 - Implementation Status of Water Management Plans (SDG 6.5.1) (rank)	78	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National IWRM plans” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
6.1 - Corruption Perceptions Index (score)	2.00	This risk Indicator is based on the latest Transparency International’s data: the Corruption Perceptions Index 2018. This index aggregates data from a number of different sources that provide perceptions of business people and country experts on the level of corruption in the public sector.	Transparency International (2019). Corruption Perceptions Index 2018. Berlin: Transparency International.
6.1 - Corruption Perceptions Index (rank)	166	This risk Indicator is based on the latest Transparency International’s data: the Corruption Perceptions Index 2018. This index aggregates data from a number of different sources that provide perceptions of business people and country experts on the level of corruption in the public sector.	Transparency International (2019). Corruption Perceptions Index 2018. Berlin: Transparency International.
6.2 - Freedom in the World Index (score)	1.00	This risk indicator is based on Freedom House (2019), an annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. The 2019 edition involved more than 100 analysts and more than 30 advisers with global, regional, and issue-based expertise to covers developments in 195 countries and 14 territories from January 1, 2018, through December 31, 2018.	Freedom House (2019). Freedom in the world 2019. Washington, DC: Freedom House.

Indicator	Value	Description	Source
6.2 - Freedom in the World Index (rank)	149	This risk indicator is based on Freedom House (2019), an annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. The 2019 edition involved more than 100 analysts and more than 30 advisers with global, regional, and issue-based expertise to covers developments in 195 countries and 14 territories from January 1, 2018, through December 31, 2018.	Freedom House (2019). Freedom in the world 2019. Washington, DC: Freedom House.
6.3 - Business Participation in Water Management (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "Business Participation in Water Resources Development, Management and Use" indicator, which corresponds to one of the six national level indicators under the Institutions and Participation category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
6.3 - Business Participation in Water Management (SDG 6.5.1) (rank)	78	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "Business Participation in Water Resources Development, Management and Use" indicator, which corresponds to one of the six national level indicators under the Institutions and Participation category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
7.1 - Management Instruments for Water Management (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "Sustainable and efficient water use management" indicator, which corresponds to one of the five national level indicators under the Management Instruments category. For SDG 6.5.1, management instruments refer to the tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
7.1 - Management Instruments for Water Management (SDG 6.5.1) (rank)	68	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "Sustainable and efficient water use management" indicator, which corresponds to one of the five national level indicators under the Management Instruments category. For SDG 6.5.1, management instruments refer to the tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.

Indicator	Value	Description	Source
7.2 - Groundwater Monitoring Data Availability and Management (score)	1.00	This risk indicator is based on the data set by UN IGRAC (2019) to determine the level of availability of groundwater monitoring data at country level as groundwater management decisions rely strongly on data availability. The level of groundwater monitoring data availability for groundwater management is determined according to a combination of three criteria developed by WWF and IGRAC: 1) Status of country groundwater monitoring programme, 2) groundwater data availability for NGOs and 3) Public access to processed groundwater monitoring data.	UN IGRAC (2019). Global Groundwater Monitoring Network GGMN Portal. UN International Groundwater Resources Assessment Centre (IGRAC).
7.2 - Groundwater Monitoring Data Availability and Management (rank)	165	This risk indicator is based on the data set by UN IGRAC (2019) to determine the level of availability of groundwater monitoring data at country level as groundwater management decisions rely strongly on data availability. The level of groundwater monitoring data availability for groundwater management is determined according to a combination of three criteria developed by WWF and IGRAC: 1) Status of country groundwater monitoring programme, 2) groundwater data availability for NGOs and 3) Public access to processed groundwater monitoring data.	UN IGRAC (2019). Global Groundwater Monitoring Network GGMN Portal. UN International Groundwater Resources Assessment Centre (IGRAC).
7.3 - Density of Runoff Monitoring Stations (score)	2.22	The density of monitoring stations for water quantity was applied as proxy to develop this risk indicator. The Global Runoff Data Base was used to estimate the number of monitoring stations per 1000km2 of the main river system (data base access date: May 2018).	BfG (2019). Global Runoff Data Base. German Federal Institute of Hydrology (BfG).
7.3 - Density of Runoff Monitoring Stations (rank)	161	The density of monitoring stations for water quantity was applied as proxy to develop this risk indicator. The Global Runoff Data Base was used to estimate the number of monitoring stations per 1000km2 of the main river system (data base access date: May 2018).	BfG (2019). Global Runoff Data Base. German Federal Institute of Hydrology (BfG).
8.1 - Access to Safe Drinking Water (score)	1.00	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.
8.1 - Access to Safe Drinking Water (rank)	133	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.
8.2 - Access to Sanitation (score)	1.00	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.

Country Overview - United States of America

Indicator	Value	Description	Source
8.2 - Access to Sanitation (rank)	151	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.
8.3 - Financing for Water Resource Development and Management (SDG 6.5.1) (score)	3.00	This risk indicator is based on the average 'Financing' score of UN SDG 6.5.1. Degree of IWRM Implementation database. UN SDG 6.5.1 database contains a category on financing which assesses different aspects related to budgeting and financing made available and used for water resources development and management from various sources.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
8.3 - Financing for Water Resource Development and Management (SDG 6.5.1) (rank)	105	This risk indicator is based on the average 'Financing' score of UN SDG 6.5.1. Degree of IWRM Implementation database. UN SDG 6.5.1 database contains a category on financing which assesses different aspects related to budgeting and financing made available and used for water resources development and management from various sources.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
9.1 - Cultural Diversity (score)	5.00	Water is a social and cultural good. The cultural diversity risk indicator was included in order to acknowledge that businesses face reputational risk due to the importance of freshwater for indigenous and traditional people in their daily life, religion and culture. This risk indicator is based on Oviedo and Larsen (2000) data set, which mapped the world's ethnolinguistic groups onto the WWF map of the world's ecoregions. This cross-mapping showed for the very first time the significant overlap that exists between the global geographic distribution of biodiversity and that of linguistic diversity.	Oviedo, G., Maffi, L., & Larsen, P. B. (2000). Indigenous and traditional peoples of the world and ecoregion conservation: An integrated approach to conserving the world's biological and cultural diversity. Gland: WWF (World Wide Fund for Nature) International.
9.1 - Cultural Diversity (rank)	5	Water is a social and cultural good. The cultural diversity risk indicator was included in order to acknowledge that businesses face reputational risk due to the importance of freshwater for indigenous and traditional people in their daily life, religion and culture. This risk indicator is based on Oviedo and Larsen (2000) data set, which mapped the world's ethnolinguistic groups onto the WWF map of the world's ecoregions. This cross-mapping showed for the very first time the significant overlap that exists between the global geographic distribution of biodiversity and that of linguistic diversity.	Oviedo, G., Maffi, L., & Larsen, P. B. (2000). Indigenous and traditional peoples of the world and ecoregion conservation: An integrated approach to conserving the world's biological and cultural diversity. Gland: WWF (World Wide Fund for Nature) International.
10.1 - Freshwater Endemism (score)	2.24	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Companies operating in basins with higher number of endemic fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.

Country Overview - United States of America

Indicator	Value	Description	Source
10.1 - Freshwater Endemism (rank)	165	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Companies operating in basins with higher number of endemic fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.
10.2 - Freshwater Biodiversity Richness (score)	3.23	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Count of fish species is used as a representation of freshwater biodiversity richness. Companies operating in basins with higher number of fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.
10.2 - Freshwater Biodiversity Richness (rank)	90	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Count of fish species is used as a representation of freshwater biodiversity richness. Companies operating in basins with higher number of fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.
11.1 - National Media Coverage (score)	4.00	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware local residents typically are of water-related issues due to national media coverage. The status of the river basin (e.g., scarcity and pollution) is taken into account, as well as the importance of water for livelihoods (e.g., food and shelter).	WWF & Tecnoma (TYPSA Group)
11.1 - National Media Coverage (rank)	42	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware local residents typically are of water-related issues due to national media coverage. The status of the river basin (e.g., scarcity and pollution) is taken into account, as well as the importance of water for livelihoods (e.g., food and shelter).	WWF & Tecnoma (TYPSA Group)
11.2 - Global Media Coverage (score)	3.00	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware people are of water-related issues due to global media coverage. Familiarity to and media coverage of the region and regional water-related disasters are taken into account.	WWF & Tecnoma (TYPSA Group)
11.2 - Global Media Coverage (rank)	49	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware people are of water-related issues due to global media coverage. Familiarity to and media coverage of the region and regional water-related disasters are taken into account.	WWF & Tecnoma (TYPSA Group)

Indicator	Value	Description	Source
12.1 - Conflict News Events (RepRisk) (score)	5.00	This risk indicator is based on 2018 data collected by RepRisk on counts and registers of documented negative incidents, criticism and controversies that can affect a company’s reputational risk. These negative news events are labelled per country and industry class.	RepRisk & WWF (2019). Due diligence database on ESG and business conduct risks. RepRisk.
12.1 - Conflict News Events (RepRisk) (rank)	4	This risk indicator is based on 2018 data collected by RepRisk on counts and registers of documented negative incidents, criticism and controversies that can affect a company’s reputational risk. These negative news events are labelled per country and industry class.	RepRisk & WWF (2019). Due diligence database on ESG and business conduct risks. RepRisk.
12.2 - Hydro-political Risk (score)	2.78	This risk indicator is based on the assessment of hydro-political risk by Farinosi et al. (2018). More specifically, it is based on the results of spatial modelling by Farinosi et al. (2018) that determined the main parameters affecting water cross-border conflicts and calculated the likelihood of hydro-political issues.	Farinosi, F., Giupponi, C., Reynaud, A., Ceccherini, G., Carmona-Moreno, C., De Roo, A., ... & Bidoglio, G. (2018). An innovative approach to the assessment of hydro-political risk: A spatially explicit, data driven indicator of hydro-political issues. Global environmental change, 52, 286-313.
12.2 - Hydro-political Risk (rank)	63	This risk indicator is based on the assessment of hydro-political risk by Farinosi et al. (2018). More specifically, it is based on the results of spatial modelling by Farinosi et al. (2018) that determined the main parameters affecting water cross-border conflicts and calculated the likelihood of hydro-political issues.	Farinosi, F., Giupponi, C., Reynaud, A., Ceccherini, G., Carmona-Moreno, C., De Roo, A., ... & Bidoglio, G. (2018). An innovative approach to the assessment of hydro-political risk: A spatially explicit, data driven indicator of hydro-political issues. Global environmental change, 52, 286-313.
Population, total (#)	323127513	Population, total	The World Bank 2018, Data , hompage accessed 20/04/2018
GDP (current US$)	18624475000000	GDP (current US$)	The World Bank 2018, Data , hompage accessed 20/04/2018
EPI 2018 score (0-100)	71.19	Environmental Performance Index	
WGI -Voice and Accountability (0-100)	58.57	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132

Country Overview - United States of America

Indicator	Value	Description	Source
WGI -Political stability no violence (0-100)	84.24	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Government Effectiveness (0-100)	91.35	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Regulatory Quality (0-100)	91.83	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Rule of Law (0-100)	92.31	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Control of Corruption (0-100)	89.90	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132

Indicator	Value	Description	Source
WRI BWS all industries (0-5)	2.89	WRI Baseline Water Stress (BWS)	Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators." Working paper. Washington, DC: World Resources Institute, December 2013. Available online at http://wri.org/publication/aqueduct-country-river-basin-rankings.
WRI BWS Ranking (1=very high)	71	WRI Baseline Water Stress (BWS)	Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators." Working paper. Washington, DC: World Resources Institute, December 2013. Available online at http://wri.org/publication/aqueduct-country-river-basin-rankings.
Baseline Water Stress (BWS) - 2020 BAU (1=very high)	47	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2020 Optimistic (increasing rank describes lower risk)	47	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2020 Pessimistic (increasing rank describes lower risk)	47	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.

Indicator	Value	Description	Source
Baseline Water Stress (BWS) - 2030 BAU (increasing rank describes lower risk)	48	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2030 Optimistic (increasing rank describes lower risk)	47	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2030 Pessimistic (increasing rank describes lower risk)	48	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2040 BAU (increasing rank describes lower risk)	47	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2040 Optimistic (increasing rank describes lower risk)	48	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2040 Pessimistic (increasing rank describes lower risk)	53	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.

Country Overview - United States of America

Indicator	Value	Description	Source
Total water footprint of national consumption (m3/a/cap)	2842.47	WFN Water Footprint Data	Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No. 50, UNESCO-IHE, Delft, the Netherlands.http://www.waterfootprint.org/Reports/Report50-NationalWaterFootprints-Vol1.pdf
Ratio external / total water footprint (%)	20.25	WFN Water Footprint Data	Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No. 50, UNESCO-IHE, Delft, the Netherlands.http://www.waterfootprint.org/Reports/Report50-NationalWaterFootprints-Vol1.pdf
Area equipped for full control irrigation: total (1000 ha)	26708.00	Aquastat - Irrigation	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Area equipped for irrigation: total (1000 ha)	26708.00	Aquastat - Irrigation	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
% of the area equipped for irrigation actually irrigated (%)	84.58	Aquastat - Irrigation	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Electricity production from hydroelectric sources (% of total)	5.90	World Development Indicators	The World Bank 2018, Data , hompage accessed 20/04/2018
Total internal renewable water resources (IRWR) (10^9 m3/year)	2818.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Total internal renewable water resources (IRWR) (10^9 m3/year)	251.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Water resources: total external renewable (10^9 m3/year)	2818.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13

Country Overview - United States of America

Indicator	Value	Description	Source
Total renewable water resources (10^9 m3/year)	3069.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Dependency ratio (%)	8.18	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Total renewable water resources per capita (m3/inhab/year)	9538.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
World happiness [0-8]	6.89	WorldHappinessReport.org	World Happiness Report, homepage accessed 20/04/2018

Country Aspects

1. PHYSICAL ASPECTS

1.1. WATER RESOURCES

1.1.1. WATER RESOURCES

The United States is divided into hydrologic units which include 21 major geographic areas, or regions. These are the major river drainage basins in the United States. These geographic areas contain either the drainage area of a major river, such as the Missouri region, or the combined drainage areas of a series of rivers, such as the Texas-Gulf region, which includes a number of rivers draining into the Gulf of Mexico. Eighteen of the regions occupy the land area of the conterminous United States. Alaska is region 19, the Hawaii Islands constitute region 20, and Puerto Rico and other outlying Caribbean areas are region 21.

-The US has 3,500,000 miles of rivers.

-The eight longest rivers in the US are (in descending order) Missouri, Mississippi, Yukon, St. Lawrence (if you count the Great Lakes and its headwaters as one system), Rio Grande, Arkansas, Colorado, and Ohio.

-The Missouri River is about 2,540 miles long, making it the longest river in North America.

-The US consumes water at twice the rate of other industrialized nations.

-Eighty per cent of the fresh water used in the US is for irrigating crops and generating thermoelectric power.

According to UN Food and Agriculture Organization (FAO) AQUASTAT data, water resources in the US are as follows:

Internal renewable water resources (IRWR),1977-2001 (km3)	
Surface water produced internally	1,862
Groundwater recharge	1,300
Overlap (shared by groundwater and surface water)	1,162
Total IRWR	2,000
Per capita IRWR, 2001 (m3 per person)	6,932
Natural renewable water resources	
Total, 1977-2001 (k m3)	2,071
Per capita, 2002 (m3 per person)	7,178
Annual river flows:	
From other countries (k m3)	18
To other countries (k m3)	x

Groundwater is among the nation's most important natural resources. It provides half of drinking water and is essential to the vitality of agriculture and industry, as well as to the health of rivers, wetlands and estuaries throughout the country. Large-scale development of groundwater resources with accompanying declines in groundwater levels and other effects of pumping has led to concerns about the future availability of groundwater to meet domestic, agricultural, industrial and environmental needs.

1.1.2. WATER USE

About 410,000 million gallons per day (Mgal/d) of water was withdrawn for use in the United States during 2005. About 80 per cent of the total (328,000Mgal/d) withdrawal was from surface water, and about 82 per cent of the surface water withdrawn was freshwater. The remaining 20 per cent (82,600Mgal/d) was withdrawn from groundwater, of which about 96 per cent was freshwater. If withdrawals for thermoelectric power in 2005 are excluded, withdrawals were 210,000Mgal/d, of which 129,000Mgal/d (62 per cent) was supplied by surface water and 80,700Mgal/d (38 per cent) was supplied by groundwater.

Water withdrawals in four states — California, Texas, Idaho and Florida — accounted for more than a quarter of all fresh and saline water withdrawn in the United States in 2005. More than half (53 per cent) of the total withdrawals of 45,700Mgal/d in California were for irrigation, and 28 per cent were for thermoelectric power. Most of the withdrawals in Texas (26,700Mgal/d) were for thermoelectric power (43 per cent) and irrigation (29 per cent). Irrigation accounted for 85 per cent of the 19,500 Mgal/d of water withdrawn in Idaho, and thermoelectric power accounted for 66 per cent of the 18,300Mgal/d withdrawn in Florida.

Public water supply used 43 billion gallons (163 million m3) per day in 2000 serving 242 million people, corresponding to 21 per cent of total water use in the same year. Residential (home) water use accounts for 66 per cent of publicly supplied water in the United States, with the remainder being used by offices, public buildings, businesses and industry that does not have its own water sources. The USGS estimated water use in the US in 2005 per capita for domestic deliveries ranged from 51 gal/d in Maine to 189 gal/d in Nevada. The national average was 99 gal/d for public-supplied domestic water use.

According to FAO AQUASTAT data, water withdrawals in United States are:

Water withdrawals	
Year of withdrawal data	1990
Total withdrawals (k m3)	467
Withdrawals per capita (m3)	1,834
Withdrawals (as a percentage of actual)	
Renewable water resources	26%
Withdrawals by sector	
Agriculture	42%
Industry	45%
Domestic	13%

1.2. WATER QUALITY, ECOSYSTEMS AND HUMAN HEALTH

In an assessment of river quality, states identified 44 per cent of the assessed miles as being impaired or not supporting one or more of their designated uses. The remaining 56 per cent of assessed miles fully supported all uses; of these, 3 per cent were considered threatened (i.e., water quality supported uses, but exhibited a deteriorating trend).

The states evaluated support of the fish, shellfish and wildlife protection/propagation use most frequently, assessing a total of 466,617 stream miles (or 13 per cent of US stream miles) and reporting that 36 per cent were impaired for this use. In addition, the states assessed 303,317 stream miles for recreation (primary and secondary contact), which was found to be impaired in 28 per cent of these waters.

According to the states, the top sources of river and stream impairment included:

-agricultural activities, such as crop production, grazing and animal feeding operations;

-hydro-modifications, such as water diversions, channelization and dam construction;

-unknown or unspecified sources (i.e., the states could not identify specific sources).

Other leading sources of impairment in streams included habitat alteration (e.g., loss of streamside habitat), natural sources (e.g., floods, droughts, wildlife), municipal discharges/sewage (which includes sewage treatment plant discharges and combined sewer overflows) and unspecified non-point sources.

Other water facts:

-40 per cent of America's rivers and 46 per cent of lakes are too polluted for fishing, swimming or aquatic life.

-Two-thirds of US estuaries and bays are either moderately or severely degraded from eutrophication (nitrogen and phosphorus pollution).

-The Mississippi River – which drains nearly 40 per cent of the continental United States, including its central farm lands – carries an estimated 1.5 million metric tons of nitrogen pollution into the Gulf of Mexico each year. The resulting hypoxic coastal dead zone in the Gulf each summer is about the size of Massachusetts.

-1.2 trillion gallons of untreated sewage, stormwater and industrial waste is discharged into US waters annually. The US EPA has warned that sewage levels in rivers could be back to the super-polluted levels of the 1970s by the year 2016.

-In any given year, about 25 per cent of beaches in the US are under advisories or are closed at least once because of water pollution.

2. GOVERNANCE ASPECTS

2.1. WATER INSTITUTIONS

The US Department of the Interior protects America's natural resources and heritage. It provides leadership and assistance to states, tribes and local communities to address competing demands for water. The Department of the Interior relies on various bureaus:

-The Bureau of Reclamation, the largest wholesaler of water in the country, works to stretch the nation's limited water resources, reduce conflict and facilitate solutions to complex water problems.

-The US Geological Survey (USGS) helps the nation adjust its management of water by providing scientific publications, data, maps and application software on water resources. The Office of Surface Water (OSW) provides national leadership in the science of surface-water hydrology, hydraulics and fluvial geomorphology and ensures the consistency and quality of these activities in the USGS.

-The National Park Service manages the water resources and water-dependent environments that occur within national parks to preserve their natural and cultural values.

-The US Fish and Wildlife Service is engaged in water-resource planning, management and research that conserves, protects and enhances fish, wildlife and plants.

-The Bureau of Land Management manages water resources and water-dependent environments on public lands to promote healthy, productive ecosystems that support its multiple-use mission.

-The Bureau of Indian Affairs supports the development, management and restoration of water and related natural resources on tribal lands.

US Army Corps of Engineers (USACE) projects are related to water and natural resources management and assessment. Through its Civil Works programme, USACE carries out a wide array of projects that provide coastal protection and restoration, flood protection, hydropower, navigable waters and ports, recreational opportunities and water supply. As part of this work, the corps is the number one provider of outdoor recreation in the US, so there is a significant emphasis on water safety.

US Environmental Protection Agency (EPA) covers water quality as it relates to drinking water, ecosystem health and water resource management. The mission of EPA is to protect human health and the environment. EPA's Office of Wastewater Management (OWM) oversees a range of programmes contributing to the well-being of the nation's waters and watersheds. Through its programmes and initiatives, OWM supports the Federal Water Pollution Control Act, commonly known as the Clean Water Act, by promoting effective and responsible water use, treatment, disposal and management, and by encouraging the protection and restoration of watersheds. EPA has 10 regional offices, each of which is responsible for the execution of the agency's programmes within several states and territories.

US Department of Agriculture (USDA) provides leadership on food, agriculture, natural resources and related issues based on sound public policy, the best available science and efficient management. It includes the Agricultural Research Service, the Economic Research Service, the National Agricultural Statistics Service, the National Institute of Food and Agriculture and the National Resources Conservation Service.

2.2. WATER MANAGEMENT

In the 1920s and 30s, the Bureau of Reclamation dammed numerous rivers in the West to facilitate settling there. These efforts gave birth to the desert cities of the West and turned arid regions into some of the country's most important agricultural centers.

Building on the Tennessee Valley Authority (TVA) experience, President Franklin Roosevelt established the Federal Interagency River Basin Committee (FIARBC) in 1943. The first FIARBC committee was established in 1945 for the Missouri river basin and was followed by similar efforts across the nation. Most of these committees, however, served largely as a means for authorizing and constructing new water projects and did not effectively promote integrated basin-wide programmes.

These committees were eventually terminated and replaced in 1965 by a set of commissions that provided greater roles for the states, but they too were generally viewed as unsuccessful and were terminated in 1981. The independence and flexibility granted to the TVA was never repeated in a river basin administration in the United States.

The most significant river basin planning initiative in the United States in the 1980s and 1990s was in the Columbia River basin. The 1980 Northwest Planning Act created the Northwest Power Planning Council, which is responsible for balancing long-range hydroelectric power production in the Columbia basin with salmon fishery restoration. Other lasting US river basin initiatives are in the Delaware and Susquehanna basins, where the only two river basin commissions that operate via federal-state government compacts exist.

The philosophy of river basin development underwent significant changes during the latter half of the 20th century. In 1950, construction of multiple-purpose dams and other engineering works along a river's main channel was central to the concept, which was embodied by the TVA. By the close of the century, however, the concept had shifted and broadened to include emphases on the values of biodiversity, non-structural means of improved water management and stakeholder participation in watershed-level initiatives.

The federal government remains active in the nation's major river basins, and federal agencies like the Bureau of Reclamation, the Army Corps of Engineers, and the Fish and Wildlife Service are responsible for the management of much of the nation's dams and other water resources infrastructure.

But many creative new planning efforts are being conducted at the sub-basin or watershed scale. These watershed initiatives feature the participation of local citizens and interest groups in cooperation with state and federal agencies. The US federal government supports these efforts by providing technical and scientific support, administrative support, science programmes, and assistance in interpreting and implementing federal policies. No two of these watershed management programmes are alike, but many of them emphasize sustainable development and community-based participation.

The Bureau of Reclamation is the nation's largest wholesale water supplier, operating 348 reservoirs with a total storage capacity of 245 million acre-feet (an acre-foot, 325,851 gallons of water, supplies enough water for a family of four for one year). It provides 1 out of 5 (or, 140,000) Western farmers with irrigation water for 10 million farmland acres that produce 60 percent of the nation's vegetables and one quarter of its fresh fruit and nut crops. It is the second largest producer of hydropower in the United States and operates 58 hydroelectric power-plants that annually produced, on average, 40 billion kilowatt-hours for the last 10 years. It alsp delivers 10 trillion gallons of water to more than 31 million people each year.

Army involvement in works "of a civil nature", including water resources, goes back almost to the origins of the US. Over the years, as the nation's needs have changed, so have the army's civil works missions.

Major areas of emphasis include the following:

-Navigation: Supporting navigation by maintaining and improving channels was USACE's earliest civil works mission, dating to federal laws in 1824 authorizing it to improve safety on the Ohio and Mississippi rivers and in several ports. Today, the corps maintains more than 12,000 miles (19,000km) of inland waterways and operates 235 locks. These waterways – a system of rivers, lakes and coastal bays improved for commercial and recreational transportation – carry about one-sixth of the nation's inter-city freight, at a cost per ton-mile about half that of rail or one-tenth that of trucks. USACE also maintains 300 commercial harbours, through which pass nearly 2 billion tons of cargo a year, and more than 600 smaller harbours.

-Flood risk management: The corps was first called upon to address flood problems along the Mississippi River in the mid-19th century. They began work on the Mississippi River and Tributaries Flood Control Project in 1928, and the Flood Control Act of 1936 gave the corps the mission to provide flood protection to the entire country.

-Recreation: USACE is the nation's largest provider of outdoor recreation, operating more than 2,500 recreation areas at 463 projects (mostly lakes) and leasing an additional 1,800 sites to state or local park and recreation authorities or private interests. The corps hosts about 360 million visits a year at its lakes, beaches and other areas, and estimates that 25 million Americans visit a USACE project at least once a year. Supporting visitors to these recreation areas generates 600,000 jobs.

-Hydroelectric power: USACE was first authorized to build hydroelectric plants in the 1920s, and today operates 75 power plants, producing a quarter of the nation's hydroelectric power, or 3 per cent of its total electric energy. This makes USACE the fifth largest electric supplier in the United States.

-Shore protection: With a large proportion of the US population living near the sea and lake shores, and an estimated 75 per cent of US vacations being spent at the beach, there has been federal interest – and a USACE mission – in protecting these areas from hurricane and coastal storm damage.

-Dam safety: The Corps of Engineers develops engineering criteria for safe dams, and conducts an active inspection program of its own dams.

-Water supply: USACE first got involved in water supply in the 1850s, when it built the Washington Aqueduct. Today USACE reservoirs supply water to nearly 10 million people in 115 cities. In the drier parts of the nation, water from USACE reservoirs is also used for agriculture.

The Fish and Wildlife Service reviews private and public land and water development proposals with respect to their impacts on Service interests. Proposals can include hydrologic issues such as, irrigation development, dam construction, and water rights negotiations.

2.3. WATER POLICY AND LEGAL FRAMEWORK

The Safe Drinking Water Act (SDWA) is the principal federal law concerning drinking water. SDWA authorized the United States Environmental Protection Agency (USEPA) to promulgate regulations regarding water supply. The major regulations are in title 40 of the Code of Federal Regulations (40CFR141, 40CFR142 and 40CFR143). Parts 141, 142 and 143 regulate primary contaminants, implementation by states and secondary contaminants. Primary contaminants are those with health impacts. State implementation allows states to be the primary regulators of the water supplies (rather than USEPA) provided they meet certain requirements. Secondary contaminants generally cause aesthetic problems and are not directly harmful.

The SDWA also contains provisions that require water suppliers to develop emergency plans, water supply operators to be licensed and watersheds to be protected.

There are a number of federal statutes passed by Congress and signed into law by the President that are central to the Office of Water's mission. In addition, Presidential Executive Orders (EOs) play a central role in a number of Office of Water activities. EOs are legally binding orders that direct USEPA and other federal agencies in their execution of congressionally established laws and policies.

The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. (The Act does not deal directly with groundwater nor with water quantity issues.) The statute employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water".

The Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 is an amendment to the Clean Water Act (Section 406) that authorizes EPA to award grants to eligible states, territories and tribes to develop and implement beach water quality monitoring and notification programmes for coastal and Great Lakes recreational beach waters. The grants also help these governments develop and implement programmes to inform the public about the risk of exposure to disease-causing microorganisms in the water at the nation's beaches.

The Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217 addresses non-point pollution problems in coastal waters. Section 6217 requires states and territories with approved Coastal Zone Management Programmes to develop Coastal Non-point Pollution Control Programmes. In its programme, a state or territory describes how it will implement non-point source pollution controls, known as management measures, that conform with those described in Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters. This programme is administered jointly with the National Oceanic and Atmospheric Administration (NOAA). As of 2010, 34 states and territories participate in this programme.

The Marine Protection, Research and Sanctuaries Act (MPRSA – also known as the Ocean Dumping Act) prohibits the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment. Virtually all material ocean dumped today is dredged material (sediments) removed from the bottom of water bodies in order to maintain navigation channels and berthing areas. Other materials that are currently ocean disposed include fish wastes, human remains and vessels.

The Water Availability and Watershed Management Program develops practices and technologies to manage the nation's agricultural water resources. Research focus areas include developing:

-methods to reuse degraded water, and increase water use efficiency and water availability to mitigate impacts of drought;

-practices and tools to quantify and predict the impact of conservation practices and their net cumulative benefits within watersheds;

-technology and strategies to restore stream corridors and reduce soil erosion and sedimentation;

-technology and strategies to reduce the transport of nutrients, pathogens and pharmaceutically active compounds to enhance water quality.

Results will provide the technologies to manage and deliver safe and reliable fresh water supplies to the agricultural, urban and industrial sectors of society while enhancing the aquatic natural resources of the nation.

3. GEOPOLITICAL ASPECTS

The International Joint Commission was established under the 1909 Boundary Waters Treaty between Canada and the United States to help anticipate, prevent and resolve water disputes over boundary and transboundary waters, in particular the Great Lakes.

The commission, a model of bi-national cooperation for these waters, serves as an independent and objective advisor to governments, typically addressing and recommending ways to resolve transboundary water issues through bilateral arrangements. These often use existing mechanisms at the federal and provincial-state levels of the two countries. Furthermore, for specific water issues or watersheds, Canadian provinces and US states are working together in various bi-national initiatives and forums. For instance, Ontario and Quebec are associate members of the Great Lakes Commission, an American organization created by joint legislative action of the eight

Great Lakes states in 1955.

A special case of the governance challenges facing domestic water management are the transboundary waters that cross the border between Canada and the United States. The Great Lakes–St. Lawrence River system and major rivers such as the Columbia, Yukon, Red and Saint John are among the almost 300 waterways and aquifers that cross or form the Canada–US border. Canada shares many coastal, estuarine and freshwater ecosystems with the US (e.g., Gulf of Maine and Puget Sound). The majority of the Canadian population lives within these watersheds, with much of Canada's economy directly dependent on the industrial, agricultural, transportation and recreational benefits these resources bring.

The Treaty of 3 February 1944 for the "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande" distributed the waters in the international segment of the Rio Grande from Fort Quitman, Texas to the Gulf of Mexico between the US and Mexico. This treaty also authorized the two countries to construct, operate and maintain dams on the main channel of the Rio Grande. The 1944 treaty created the International Boundary and Water Commission (IBWC), and in Article 3 the two governments entrusted the IBWC to give preferential attention to the solution of all border sanitation problems.

Some of the rights and obligations administered by the IBWC include:

-distribution between the two countries of the waters of the Rio Grande and of the Colorado River;

-regulation and conservation of the waters of the Rio Grande for their use by the two countries by joint construction, operation and maintenance of international storage dams and reservoirs and plants for generating hydroelectric energy at the dams;

-protection of lands along the river from floods by levee and floodway projects;

-solution of border sanitation and other border water quality problems;

-preservation of the Rio Grande and Colorado River as the international boundary;

-demarcation of the land boundary.

The treaty assigned to the United States one-third of the flow reaching the main channel of the Rio Grande (Rio Bravo) from the Conchos, San Diego, San Rodrigo, Escondido and Salado Rivers and the Las Vacas Arroyo. Of the waters of the Colorado River allotted to Mexico, the United States is bound to deliver a guaranteed annual quantity of 1,500,000 acre-feet (1.85 billion m3).

http://www.fws.gov/mountain-prairie/wtr/water_rights_activities.htm

http://www.usbr.gov/main/about/fact.html