

**Table S3.** Full description of the categories listed in Table 2

Topic	Attribute	Categories
A. Landsat data analysis	A1. Change detection	<b>Diachronic:</b> processing of two images with different dates
		<b>Multitemporal:</b> processing of more than two images with several different dates
		<b>Time series:</b> processing of all available images
		<b>Classification:</b> classification (supervised or unsupervised) of land use/land cover applied to one or more images
	A2. Methods	<b>Regression:</b> regression of parameters retrieved from the Landsat archive
		<b>Profile analysis:</b> time-series analysis, such as methods applied to all available Landsat images to study one or more parameters over time
	A3. Artificial intelligence	<b>Yes:</b> use of artificial intelligence ( <i>e.g.</i> machine learning, deep learning) to process the Landsat archive
		<b>No:</b> no use artificial intelligence ( <i>e.g.</i> spectral index interpretation)
	A4. Deep learning	<b>Yes:</b> use of deep-learning methods to process the Landsat archive
		<b>No:</b> no use of deep-learning methods
B. Wetland monitoring	A5. Supervised method	<b>Yes:</b> use of supervised methods to process the Landsat archive
		<b>No:</b> use of unsupervised methods
		<b>Field data:</b> validation of results using field reference data
		<b>Visual image interpretation:</b> validation of results using visual interpretation of image sources other than Landsat ( <i>e.g.</i> very-high-resolution imagery such as Google Earth images)
	A6. Validation	<b>Both:</b> combination of using field reference data and visual image interpretation for validation
		<b>None:</b> validation not mentioned
	B1. Wetland type	Defined based on level 2 Ramsar classification (see Supplementary material 3)
		<b>Local:</b> study sites covering less than 10,000 km <sup>2</sup>
		<b>Regional:</b> study sites covering more than 10,000 km <sup>2</sup> or at the country scale
		<b>Continental:</b> studies covering several countries in the same continent
	B2. Spatial extent	<b>Global:</b> global coverage or study sites spread over several continents

---

	<p><b>LULC:</b> land use/land cover changes in wetland habitats</p> <p><b>Fragmentation and connectivity:</b> wetland fragmentation and connectivity</p> <p><b>Biophysical parameters:</b> differences in wetland biophysical parameters (<i>e.g.</i> water surface temperature, chlorophyll-a concentration, biomass, phenology)</p>
B3. Topic	<p><b>Hazards:</b> impacts of natural hazards (<i>e.g.</i> hurricanes, storms, earthquakes) on wetlands</p> <p><b>Ecosystem services:</b> ecosystem services of wetlands and their economic value</p> <p><b>Biodiversity:</b> wetland biodiversity (<i>e.g.</i> species composition)</p> <p><b>Hydrology:</b> floods, water extent, and water levels or availability in wetlands</p> <p><b>LULC changes:</b> land use/land cover changes</p> <p><b>Climate change:</b> phenomena related to climate change (<i>e.g.</i> increasing temperature or sea level)</p>
B4. Drivers of change	<p><b>Invasive species:</b> appearance and spread of invasive species in wetland ecosystems</p> <p><b>Restoration and/or conservation:</b> restoration and conservation practices and policies applied to wetlands</p> <p><b>Combination:</b> combination of the previous drivers of change</p> <p><b>No drivers of change:</b> no drivers of change mentioned</p> <p><b>Species population:</b> spatial and temporal variability in the distribution and abundance of species populations</p> <p><b>Species traits:</b> within-species differences in trait measurements along the axis of taxonomic diversity</p>
B5. Essential Biodiversity Variables	<p><b>Community composition:</b> abundance and diversity of organisms in ecosystems</p> <p><b>Ecosystem function:</b> attributes related to ecosystem performance resulting from the collective activities of organisms</p> <p><b>Ecosystem structure:</b> spatial arrangement of ecosystem units collectively defined by the organisms that form these units</p>

---

---

	<p><b>Examples of remote-sensing products for these variables (from the supplementary information of [1])</b></p> <p><b>Species phenology:</b> Green-up (start of the season); Senescence (end of the season); Peak season (maximum of the season)</p> <p><b>Species morphology:</b> Leaf dry matter content; Specific leaf area</p> <p><b>Species physiology:</b> Gross primary production; Net primary production; Leaf area index; chlorophyll-a concentration</p> <p><b>Population structure by age/size class:</b> Population density; Forest species and age class</p> <p><b>Species distribution:</b> Species richness; Species diversity indices (<i>e.g.</i> Shannon index)</p> <p><b>Species abundance:</b> Species abundance; Relative species abundance</p>
B6. Remote Sensing – Essential Biodiversity Variables	<p><b>Community diversity:</b> Taxonomic diversity; Functional diversity</p> <p><b>Species composition:</b> Number or percentage of species occurring together</p> <p><b>Ecosystem phenology:</b> Land surface green-up (start of the season); Land surface senescence (end of the season); Land surface peak (maximum of the season)</p> <p><b>Ecosystem physiology:</b> Gross primary production; Net primary production; Leaf area index; Specific leaf area; Evapotranspiration; Fraction of absorbed photosynthetically active radiation; Ecosystem soil moisture; Carbon cycle; Chlorophyll content and flux</p> <p><b>Ecosystem disturbances (natural source):</b> Biological effects of infrequent floods; Biological effects of fire</p> <p><b>Spatial configuration:</b> Variability in ecosystem structure; Ecosystem fragmentation</p> <p><b>Habitat structure:</b> Land cover; Fraction of vegetation cover; Above-ground biomass; Leaf area index; Urban habitat; Ice-covered habitat; Vegetation height; Habitat structure</p>

---

---

**Examples of terrestrial remote-sensing products for these variables (from [2]):**

**Lakes:** Lake water level; Water extent; Lake surface water temperature; Lake ice thickness; Lake ice cover; Lake color

**Soil moisture:** Surface soil moisture; Surface flooding; Freeze/thaw; Root-zone soil moisture

**River discharge:** River discharge; Water level; Flow velocity; Cross-section

**Groundwater:** Groundwater volume; Groundwater level; Groundwater recharge; Groundwater discharge; Wellhead level; Water quality

**Glaciers:** Glacier area; Change in glacier elevation; Change in glacier mass.

**Ice sheets and shelves:** Change in surface elevation; Ice velocity; Change in ice mass; Grounding line location and thickness

**Snow cover:** Area covered by snow; Snow depth; Snow water equivalent

**Permafrost:** Thermal state of permafrost; Active layer thickness.

**Albedo:** Maps of directional hemispherical reflectance albedo for adaptation and modeling; Maps of bi-hemispherical reflectance albedo for adaptation and modeling

**Land use/land cover:** Maps of land cover; Maps of high-resolution land cover; Maps of key IPCC land uses; Related changes and land-management types

**Above-ground biomass:** Maps of above-ground biomass

**Land surface temperature:** Maps of land surface temperature

**Evapotranspiration:** Land heat flux; Sensible heat flux

**Fire:** Burnt areas; Active fire maps; Fire radiative power

**Leaf area index:** Maps of leaf area index for adaptation and modeling

**Soil carbon:** Percentage carbon in soil; Mineral soil bulk density to depths of 30 and 100 cm; Total depth of profile, area, and location of peatlands

**FAPAR:** Maps of the fraction of absorbed photosynthetically active radiation for adaptation and modeling

---

		<p><b>Anthropogenic greenhouse gas fluxes:</b> Emissions from fossil fuel use of the industry, agriculture, and waste sectors; Emission/sequestration by IPCC land-use category; Estimated fluxes by inversion of observed atmospheric composition – continental; Estimated fluxes by inversion of observed atmospheric composition – national; High-resolution CO<sub>2</sub> column concentrations to monitor point sources</p> <p><b>Human water use:</b> Volume of water used per year</p>
	B8. Intra-annual observations	<p><b>Yes:</b> processing of intra-annual images</p> <p><b>No:</b> processing of inter-annual images</p>
	B9. Study period	20-30 years/30-40 years/More than 40 years
C. Landsat products	C1. Satellite	<p>Landsat 1-2-3 (MSS)/Landsat 4-5 (MSS-TM)/Landsat 7 (ETM+)/ Landsat 8 (OLI-TIRS)</p> <p><b>Visible:</b> use of visible spectral bands (<i>i.e.</i> blue to red)</p>
	C2. Spectral domain	<p><b>Infrared:</b> use of near infrared and short-waved infrared spectral bands</p> <p><b>Thermal:</b> use of thermal bands</p> <p><b>Combination:</b> combination of the previous categories</p>
		<p><b>Level 1:</b> use of pre-processing level 1 of the Landsat archive (<i>i.e.</i> radiometrically calibrated and geometrically corrected); pixel data as digital numbers or top-of-atmosphere reflectance or temperature</p> <p><b>Level 2:</b> use of pre-processing level 2 of the Landsat archive (<i>i.e.</i> radiometrically and geometrically corrected, and also corrected for atmospheric disturbances); pixel data as surface reflectance or temperature</p>
	C3. Pre-processing level	<p><b>Derived products:</b> use of products derived from the Landsat archive (<i>e.g.</i> Global Surface Water, Landsat Foliage Projection Cover)</p> <p><b>Composite:</b> use of cloudless composite images retrieved from Landsat archive processing</p>
D. Tools	D1. Cloud computing	<p><b>Yes:</b> use of cloud-computing solutions for processing</p> <p><b>No:</b> use of local-computing solutions for processing</p>
	D2. Open-source software	<p><b>Yes:</b> use of open-source software for processing (<i>e.g.</i> QGIS, R, Python)</p> <p><b>No:</b> no use of open-source software for processing (<i>e.g.</i> ERDAS, ENVI, ArcGis)</p>

---

	<b>Scientists:</b> studies that developed new methods and techniques for the scientific community and fundamental research
E1. Users	<b>Managers:</b> studies aiming to provide elements and results to help policy makers and managers improve wetland conservation (i.e. applied research)
E. Users	<b>Both:</b> studies of interest to both of the previous categories
	Main disciplines of the journals in which the reviewed studies were published:
E2. Journal discipline	Remote sensing; Geography; Earth and planetary science; Forestry; Aquatic, marine and water science; Environmental science; Sociology; Ecology; Multidisciplinary science; Computer science; Land management; Climatology

---

## References:

1. Skidmore, A.K.; Coops, N.C.; Neinavaz, E.; Ali, A.; Schaepman, M.E.; Paganini, M.; Kissling, W.D.; Vihervaara, P.; Darvishzadeh, R.; Feilhauer, H.; et al. Priority List of Biodiversity Metrics to Observe from Space. *Nat. Ecol. Evol.* **2021**, *5*, 896–906, doi:10.1038/s41559-021-01451-x.
2. GCOS *Implementation Plan for the Global Observing System Climate in Support of UNFCCC (2010 Update)*.; GCOS, 2010; p. 186;.