SANBI
Biodiversity for Life
South African National Biodiversity Institute

METADATA REPORT

DATA IDENTIFICATION:	
Title	NBA 2018 Rivers
Additional title	NBA2018_Rivers
Description (detailed)	This spatial rivers dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released with the National Biodiversity Assessment (NBA) 2018. In the NBA 2018 the National Freshwater Ecosystem Priority Area (NFEPA) rivers GIS layer was used to represent the diversity of rivers nationally. It used the 1:500 000 river network coverage available from the Department of Water and Sanitation (DWS) and can be downloaded from the following website: http://www.dwaf.gov.za/iwqs/gis_data/river/rivs500k.aspx. This GIS layer summarizes the river ecosystem types, river condition, Ecosystem Threat Status (ETS) and Ecosystem Protection Level (EPL) as well as the free-flowing (62 identified by the NFEPA project) and flagship river information.
Purpose	To determine the threat status and protection level (i.e. headline indicators) of river ecosystems across the country using the proportion of each river ecosystem type in a natural/near-natural condition against a series of thresholds. This GIS layer also represent examples of river ecosystem types that are intact from source to mouth (i.e. free-flowing and flagship rivers).
Status	Completed
Maintenance and update frequency	Completed
Topic category	Inland waters

Lineage	The GIS layer of origin is the 1:500 000 rivers data layer (DWAF, 2006) that the Department of Water Affairs (DWA) ran the first geomorphological zonation process on (Rowntree and Wadeson, 1999; Moolman, 2008). Only minor river arc edits (e.g. deleting duplicate vertices) were performed during the NBA 2018 (Van Deventer et al., 2018). The Counsel of Scientific and Industrial Research (CSIR) subsequently used this layer to add information during the NPEPA project (Nel et al., 2011). This included the 97 1:50 000 coastal rivers from the Department of Land Affairs: Chief Directorate of Surveys and Mapping (DLA:CDSM), now the Department of Rural Development and Land Reform: National Geo-spatial Information (DRDLR:NGI) which were associated with missing estuaries along the coast line mapped for the NBA 2011 (Van Niekerk and Turpie, 2012). Other attributes attached to the rivers GIS layer, for example, included the river ecosystem type and river condition (Nel et al., 2011; Nel and Driver, 2012). River ecosystem types were developed by the NFEPA project and also used in the NBA 2011. They represent the diversity of river ecosystems and are components of rivers with similar physical features such as climate, flow and geomorphology. The river ecosystem types used in the NBA 2018 (Van Deventer et al., 2019; Skowno et al., 2019) remains largely unchanged from the previous NBA (Driver et al., 2012). The NFEPA river network spatial layer was coded using 31 Level 1 ecoregions, flow variability (permanent to not permanent) and geomorphological zones or slope categories (mountain stream, upper foothill, lower foothill and lowland river) to produce 223 river ecosystem types. These were reduced to 222 types in the NBA 2018 (i.e. deletion of a subtype located outside South Africa) (Van Deventer et al., 2019). The methods used for assessing the ecological condition of the river ecosystem types differed from the NBA 2011 in that Present Ecological State (PES) categories were not modelled in the NBA 2018. The river condition data was determined by using DWS (2014) Present Ecological State/Ecological Importance/Ecological Sensitivity (PES/EI/ES) (also referred to as PES/EIS) data, which included mainstems and tributaries at a sub-quaternary level. These desktop data were updated with data that became available between 2011 and 2017 from Reserve or Ecological Water Requirement (EWR) and Water Resource Classification System (WRCS) studies. The ecological category was either updated or remained unchanged depending on which assessment was most recent (Van Deventer et al., 2019). Free-flowing rivers were also expertly reviewed and updated during the NFEPA project in 2011 following set criteria (Nel et al., 2011). This included for example selecting permanent or seasonally flowing intact rivers (AB rivers) and rivers with no instream dam throughout its length. The PES of rivers was updated during the NBA 2018 process, which included the free-flowing and flagship rivers. The artificial wetland GIS layer was also updated and together with the DWS dams 2016 dataset the free-flowing and flagship rivers were reassessed using the same criteria identified during NFEPA. Where dams and artificial wetlands intersected with the free-flowing and flagship rivers and condition change occurred. River condition in free-flowing rivers also changed after the confluence with a degraded tributary. In these cases the free-flowing/flagship rivers' PES status was updated to reflect the change resulting in some free-flowing/flagship rivers being removed from the list identified during the NFEPA process. However, where the free-flowing river was identified in the expert consultation process, regardless of the "C" PES condition, the river remained free-flowing/flagship. Where no river condition changes were recorded the free-flowing/flagship rivers remained unchanged.

Citations	Department: Water Affairs and Forestry (DWAF). 2006. The construction of a hydrologically-correct, annotated 1:500 000 spatial dataset of the rivers of South Africa and contiguous basins, Report Number N/0000/00/REH/0701. DWAF: Resource Quality Services. Pretoria, South Africa. Department of Water and Sanitation (DWS). 2014. A desktop assessment of the present ecological state, ecological importance and ecological sensitivity per subquaternary reaches for secondary catchments in South Africa. Department of Water and Sanitation. Compiled by RQIS-RDM. Available at: http://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx. Driver, A., Sink, K.J., Nel, J.L., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. and Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria. Skowno, A.L., Poole, C.J., Raimondo, D.C., Sink, K.J., Van Deventer, H., Van Niekerk, L., Harris, L.R., Smith-Adao, L.B., Tolley, K.A., Zengeya, T.A., Foden, W.B., Midgley, G.F. and Driver, A. 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1–214. Moolman, J. 2008. River long profiles aid in ecological planning. PositionIT Jan/Feb (43-45). Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. 2011. Technical report for the National Freshwater Ecosystem Priority Areas project. WRC Report No 1810/2/11, Water Research Commission, Pretoria, South Africa. Nel, J.L. and Driver, A. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 2: Freshwater Component. CSIR Report Number CSIR/NRE/ECO/IR/2012/0022/A. Council for Scientific and Industrial Research, Stellenbosch. Rowntree, K.M., Wadeson, R.A., 1999. A Hierarchical Geomorphological Model for the Classification of Selected South African Rivers. Water Research Commission Report No 497/1/99, Water Research Commission, Pretoria. Van Deventer, H., Smith-Adao, L., Mbona, N., Petersen, C., Skowno, A., Collins, N.B., Grenfell, M., Job, N., Lötter, M., Ollis, D., Scherman, P., Sieben, E. and Snaddon, K. 2018. South African National Biodiversity Assessment 2018: Technical Report. Volume 2a: South African Inventory of Inland Aquatic Ecosystems (SAIIAE). Version 3, final released on 3 October 2019. Council for Scientific and Industrial Research (CSIR) and South African National Biodiversity Institute (SANBI): Pretoria, South Africa. Report Number: CSIR report number CSIR/NRE/ECOS/IR/2018/0001/A; SANBI report number http://hdl.handle.net/20.500.12143/5847. Van Deventer, H., Smith-Adao, L., Collins, N.B., Grenfell, M., Grundling, A., Grundling, P-L., Impson, D., Job, N., Lötter, M., Ollis, D., Petersen, C., Scherman, P., Sieben, E., Snaddon, K., Tererai, F. and Van der Colff, D. 2019. South African National Biodiversity Assessment 2018: Technical Report. Volume 2b: Inland Aquatic (Freshwater) Realm. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6230.
Keywords	River ecosystem types, inland aquatic, freshwater, river condition, Present Ecological State, free-flowing rivers, flagship rivers, National Biodiversity Assessment 2018 and headline indicators.

ORIGINATOR OF THE DATASET:	
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RESOURCE CONSTRAINTS:	
Access constraints	There are no access limitations for this item.
Other restrictions	none
Use constraints	There are no use limitations for this item.
Other restrictions	none

SPATIAL RESOLUTION:	
Spatial representation type	Geodatabase, Vector
Equivalent scale - Denominator	1:500 000

COORDINATE REFERENCE SYSTEM:	
Projected/Geographic coordinate system	WGS 1984 Projection: Albers False_Easting: 0.0

	False_Northing: 0.0 Central_Meridian: 25.0 Standard_Parallel_1: -24.0 Standard_Parallel_2: -33.0 Latitude_Of_Origin: 0.0 Linear Unit: Meter (1.0)
Geographic bounding box - East bound longitude	33.498783
Geographic bounding box - North bound latitude	-21.956894
Geographic bounding box - South bound latitude	-34.906802
Geographic bounding box - West bound longitude	15.927209

TEMPORAL EXTENT (time period covered by the content of the dataset):	
Temporal extent - Begin date	2011
Temporal extent - End date	2018
Identification info	NBA 2018 Rivers map

ONLINE RESOURCE (additional resources available online):		
Description	South African Inventory of Inland Aquatic Ecosystems (SAIIAE). Volume 2a	South African National Biodiversity Assessment 2018: Technical Report. Volume 2b: Inland Aquatic (Freshwater) Realm
Linkage	http://hdl.handle.net/20.500.12143/6462	http://hdl.handle.net/20.500.12143/6230
Name	Volume 2a: SA Inventory of Inland Aquatic Ecosystems (SAIIAE)	Volume 2b: Inland Aquatic (Freshwater) Realm
Protocol		

LEGEND PROPERTIES:	
Classification	See attribute table

DETAILED NOTES:	
Supplemental information	For the NBA 2018 the PES of rivers was updated during 2011/17, which included the free-flowing and flagship rivers. The artificial wetland was also updated during the NBA 2018

	process and together with the DWS dams2016 GIS layer the free-flowing and flagship rivers were reassessed according to the set criteria above. Where dams and artificial wetlands intersected with the free-flowing and flagship rivers, condition change occurred. River condition in free-flowing rivers also changed after the confluence with a degraded tributary. In these cases, the free-flowing/flagship rivers' PES status was updated to reflect the change resulting in some free-flowing/flagship rivers being removed from the list identified during the NFEPA process (Van Deventer, et al., 2019; Skowno et al., 2019).

The attribute field data can also be provided as a MS Excel spreadsheet and uploaded as an online resource.

ATTRIBUTE FIELDS		
Field Name	**Description**	**Alias**
OBJECTID	System generated field, object number.	
LENGTH	River Length (m).	
REACHCODE	Code for reach. Corresponding to the 2007 version of the DWA 1 500 000 rivers layer generated by Mike Silberbauer.	
UNIT_ID	Planning unit identifier. All sub-quaternaries have a unique identifier. This identifier also serves as a look-up identifier for each the biodiversity features contained in each river and wetland FEPA and fish support area. This look-up table is an Excel spreadsheet that is available on BGIS or the NFEPA data DVD that accompanies the NFEPA Atlas.	
REACHNUM	Number for reach. This distinguishes connected river reaches within a primary river drainage system.	
ORDER	River order.	
MAINSTEM	Mainstem = 1 is a quaternary mainstem; the rest of the 1:500 000 rivers are tributaries that are nested within quaternary catchments.	
NAME	Name of river as per the 2007 version of the DWA 1 500 000 rivers layer generated by Mike Silberbauer.	
L1_ECOREGN	Dominant Level 1 Ecoregion within the sub-quaternary catchment.	
L2_ECOREGN	Dominant Level 2 Ecoregion within the sub-quaternary catchment.	
FLOW	Flow variability where "P" = permanent or seasonal; "E" = ephemeral.	
GEOZONE	Geomorphic zone as calculated per slope category of Rowntree and Wadeson (1999). • A = Mountain Headwater Stream • B = Mountain Stream • C = Transitional Zone	

	• D = Upper Foothills • E = Lower Foothills • F = Lowland River • Z = Unclassified (Subsequently Classified In Gzlump)	
GZLUMP	Lumped geomorphic zone used by NFEPA • U (Upper Foothills) = Lumping of Classes C and D • L (Lower Foothills) = Class E • F (Lowland River) = Class F	
RIVTYPE	River type used by NFEPA which comprises the level 1 ecoregion number followed by the flow (N= NOT Permanent/Flashy; P = Permanent or Seasonal), followed by the geomorphological zone (M = Mountain Stream; U = Upper Foothills; L= Lower Foothills; F = Lowland River).	
PES1999	DWA's present ecological state 1999 with desktop modification. A = Unmodified, Natural B = Largely Natural with few Modifications C = Moderately Modified D = Largely Modified E = Seriously Modified F = Critically/Extremely Modified	
RIVCON	River condition used by NFEPA A or B is considered intact and able to contribute towards river ecosystem biodiversity targets. A = Unmodified, Natural B = Largely Natural with few Modifications AB = A or B Above C = Moderately Modified D = Largely Modified E = Seriously Modified F = Critically/Extremely Modified EF = E or F Above Z = Tributary condition modelled as not intact, according to natural land cover	
FFRID	Free flowing river identification. Each system and its tributaries has the same identifier.	
FFRREGION	The lumped ecoregion into which free-flowing rivers fall, used to achieve representation of free-flowing rivers across the country.	
FFRFLAGSHP	Flagship free-flowing rivers as identified through an expert review process 1 = Flagship River 0 = Not a Flagship River	
PES_2018	NBA 2018 Ecological condition category. The process involved using the Department of Water and Sanitation (DWS, 2014) Present Ecological State/Ecological Importance/Ecological Sensitivity (PES/EI/ES), also referred to as PES/EIS data, which included mainstems and tributaries at a sub-quaternary level. These desktop data were updated with data that became available between 2011 and 2017 from Reserve or Ecological Water Requirement (EWR) and Water Resource Classification System (WRCS) studies.	
NBA2018ETS	Ecosystem threat status (ETS) of river ecosystem types: this was based on the extent to which each river ecosystem type had been altered from its	

	natural condition. Ecosystem types are categorised as critically endangered (CR), endangered (EN), vulnerable (VU) or least concern (LC), with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer, et al., 2019; Skowno et al., 2019).	
NBA2018EPL	Ecosystem protection level (EPL) of river ecosystem types: river ecosystem types in protected areas needed to be in good condition rivers (A or B ecological category) to be considered as protected. Well protected, moderately protected, poorly protected river ecosystem types have at least 100%, 50%, 5% of their biodiversity target in protected areas and in natural or near-natural ecological condition; not protected river ecosystem types have < 5% (Van Deventer, et al., 2019; Skowno et al., 2019).	
FFRID_2018	Free-flowing river ID. Each system and its tributaries has the same identifier. Where ID = 0 not a free-flowing river; all other numerics are free-flowing rivers.	
FRFAG_2018	In NBA 2018 where no river condition changes were recorded the free-flowing/flagship rivers remained unchanged. 1 = flagship river 0 = not a flagship river.	