Metadata Sheet: Threat to Fish
(Indicator No. 8)

Title:	*Threat to Fish*
Indicator Number:	*8*
Thematic Group:	*Ecosystems*
Rationale:	*In addition to loss of fish habitat and environmental degradation, the principal factors threatening inland fisheries are fishing pressure and non-native species. Overfishing is a pervasive stress in rivers worldwide due to intensive, size-selective harvesting for commerce, subsistence, and recreation (Vörösmarty, et al., 2010). More commonly, non-native species introductions may result from species being released for hunting or biological control as well as to form part of fish catches. Invasive alien species threaten native species as direct predators or competitors, as vectors of disease, by modifying the habitat, or altering native species dynamics.*
Interlinkages:	*Lakes (as fish are free to move along rivers, fishing or introductions in one river basin area can have consequences for species diversity and composition of lakes in other basin areas). LMEs owing to anadromous fish migration.*
Description:	The Threat to Fish indicator is composed of two sub-indicators: **a) Fishing Pressure (sub-indicator 8a)** **b) % Non-native Fish (sub-indicator 8b)** All data were computed in 30' latitude-longitude (i.e., 0.5° degree) gridded format in the geographic projection over the TFDD basin-country-unit (BCU) and transboundary basin regions.
Metrics:	C.J. Vorosmarty, P.B. McIntyre, M.O. Gessner, D. Dudgeon, A. Prusevich, P. Green, S. Glidden, S.E. Bunn, C.A. Sullivan, C. Reidy Liermann, and P.M. Davies Nature 467, 555-561 (30 September 2010) doi:10.1038/nature09440 UN Food and Agriculture Organisation's (FAO) FishStat Plus database (http://www.fao.org/fishery/statistics/software/fishstat/en) LePrieur, F., Beauchard, O., Blanchet, S., Oberdorff, T. & Brosse, S. Fish invasions in the world's river systems: when natural processes are blurred by human activities. PLoS Biol. 6, e28 (2008).
Computation:	**1. Fishing Pressure (Sub-indicator 8a):** Computed as the Fishing Pressure threat driver from Vörösmarty et al. 2010 at 30-minute grid cell resolution. Fishing pressure distribution was calculated based on a scaling relationship between country-level fish catches, net primary productivity and discharge. **2. Number of Non-native Fish (Sub-indicator 8b):** Computed as the % Non-native Fish threat driver from Vörösmarty et al. 2010 at 30-minute grid cell resolution. The number of non-native fish species in each river basin was taken from LePrieur et al. **Threat to Fish (Main indicator):** For the final indicator score, the numerical average of the two sub-indicators was calculated at the 30-minute grid cell level then rescaled to fit a 0-1 scale. Average Threat to Fish over the BCU and basin regions was calculated as the area-weighted average of the grid cell values within each TFDD BCU and basin. To maintain the integrity of the approach, only results for basins greater than 25,000 –

	30,000 km2 can be provided with a scientifically credible level of certainty and thus used in the ranking system. Results for basins smaller than 25,000 – 30,000 km2 have been provided with the tabular information for reference only and were not used in the calculation of rankings.
Units:	See description
Scoring system:	Due to the standardized nature of the original Vörösmarty et al. 2010 datasets, risk categories were defined as 20% equal-interval classes with the lowest corresponding to very low risk and the highest corresponding to very high risk. Table below summarizes results of the combined indicator: TABLE_PLACEHOLDER

Relative risk category	Range (normalized score)	No. of Basins	Proportion of Basins	No. of BCUs	Proportion of BCUs
1 - Very low	0.00 – 0.19	22 (13*)	10%	69 (50*)	13%
2 - Low	0.20 – 0.39	73 (29*)	32%	185 (95*)	36%
3 - Moderate	0.40 – 0.59	82 (36*)	37%	170 (90*)	33%
4 - High	0.60 – 0.79	32 (10*)	14%	74 (31*)	14%
5 - Very high	0.80 - 1.00	15 (4*)	7%	22 (14*)	4%

* Number of basins/BCUs for which results have been calculated, but bear a lower level of confidence due to modelling limitations. See more in section 'Computation'

Limitations:	• The indicator assumes that terrestrial primary productivity either directly supports fish production or serves as an adequate proxy for the aquatic primary production that supports fish. A proxy is necessary owing to the lack of sufficient observational data. • Annual catch for each grid cell has been based on estimated fish catches from rivers. However, historical trends in fisheries statistics are normally available only for a few well-studied rivers, and because of the multispecies composition of the catch in most inland water bodies, particularly in developing countries, assessments on the condition of the resources are hard to carry out. • The negative impacts of non-native species on aquatic ecosystems are a function of both the absolute number of non-native species and the proportion of fauna represented by non-native species. Here, only proportion is considered. Moreover, these data cover 1 055 basins which amount to 80 % of global land area.
Spatial Extent:	Global
Spatial Resolution:	
Year of Publication:	2010
Time Period:	2000
Additional Notes:	For detailed information on the threat drivers see http://www.nature.com/nature/journal/v467/n7315/extref/nature09440-s1.pdf.
Date:	16.02.2015.
Format:	Excel Spreadsheets
File Name:	TWAP_RB_indicator_08_results.xlsx TWAP_RB_indicator_08a_results.xlsx TWAP_RB_indicator_08b_results.xlsx
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