Gromov and Memarian (2003--2011) have established the waist inequality asserting that for any continuous map $f$ from the sphere $S^n$ to $R^{n-k}$ there exists a fiber $f^{-1}(y)$ such that every its $t$-neighborhood has measure at least the measure of the $t$-neighborhood of an equatorial subsphere $S^k$ of $S^n$. Going to the limit we may say that the $(n-k)$-volume of the fiber $f^{-1}(y)$ is at least that of the standard sphere $S^k$. We extend this limit statement to the exact bounds for balls in spaces of constant curvature, tori, parallelepipeds, projective spaces and other metric spaces. By the volume of preimages for a non-regular map $f$ we mean its lower Minkowski content, some new properties of which will be also presented in the talk. (based on the joint work with Roman Karasev and Alfredo Hubard)