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The space of good functionment in fluvial geomorphology, a tool for mitigating flood risk. Application to the left-bank tributaries of the Aude River, Mediterranean France.

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Present management of river hydrosystems is more viewed with an approach based on sustainable development. This logic implies that the hydraulic, engineering works made in the floodplain are of quality and that flood risk is minimum. In the Mediterranean area, it is difficult to reduce the risk because floods are rapid and often very destructive. In November 1999, a flashflood (1:30 years recurrence interval) had very damaging effects in the South of France (33 human losses). Along the torrential northern tributaries (rank 4, Strahler) of the Aude River, the current system of flood-risk management proved to be rather inefficient during this flood. Following this event, several schemes were conceived to improve water flowing and floodplain draining. Two contrasted examples are illustrated. Along the Argent Double tributary, the solution chosen by the competent decision-making authorities (SIAHBAD, the community water association) consists in the restoration of the capacity of the flood plain, occupied by extensive vineyards and local settlements. Yet, this does not account for mitigating the effects of larger floods, nor does it consider the vulnerability of the population living nearby the river. This option even leads to increase locally the human vulnerability in the flood plain, by attracting new settlements. We proposed another option, based on the concept of stream-way or freedom space, which enables us to quantify the optimal width for the channel to divagate and avulse in its flooplain. Tested along the Peyriac-Minervois section of the Argent-Double River, the application of this model should be successful in reducing the flooding process, and in restoring a sufficient channel

capacity, namely the capacity that it had before its artificial narrowing. Along the less populated Clamoux tributary, the same option was chosen, keeping the flood channels naturally open during the last 1999 flood and utilizing the riparian trees as natural, sediment traps; this option was locally reinforced by low cost structures. These two examples illustrate two different conceptions of river management: on the one hand, heavy (and costly) flood control structures are developed in relation to the protection of local assets; on the other hand, “environmentally friendly”, low cost structures proved to be efficient and should be encouraged along reaches where the rivers are still natural and freely flowing.