The research regarding grasping present condition and dynamic state of biotope miniaturization and fragmentation in geographical scale, and the factor analysis.

## [ Point ]

In alluvial fans, groundwater level was lowered by pumping for agricultural water, causing depletion of river-bed water and spring water. In this reason, flow decease and spring decrease occurred on alluvial fans, then river fragmentation occurred, such as loosing water flow in some parts of rivers, not only physical fragmentations, which vertically and horizontally integrated, but also, large effect on organisms, were concerned. This research aimed to grasp regarding effects of environment manipulation on rivers and organisms, objecting Nasu Nogahara alluvial fan, based on the environment change there, we researched present condition of river fragmentation, including flow fragmentation and its effect on fish. Nasu Nogahara alluvial fan was changed from forest to water fields especially from Showa 20th to 40th (1945-1965), usage of groundwater was increased and groundwater level was lowered. In such a environment change, many agricultural water diversion weirs were installed on small-sized rivers, and then, physical fragmentations occurred, vertically integrated discontinuity flow by diversion and discharged of water, depletion of springs by lower groundwater level, clarified flow fragmentation was occurring. And also, drop flow method blocks fish behaviour, and flow fragmentation can make fish variation poor were indicated.

Keyword : fragmentation, Naka River, fish, drop flow, spring water