The Impact of Patterns in Land Use

The patterns of land cover that we see in a landscape relate to the underlying landscape characteristics. Pattern in the landscape is often referred to as landscape structure.

Pattern is often described in terms of landscape patches. Patches are formed as a result of complex interactions between physical, biological and anthropogenic processes. Underlying landscape features such as climate, terrain, soil, water and biota interact with disturbance to form a hierarchy of patches of different size and origin.

Patches of vegetation that makeup the land cover are made up of subunits. This means that smaller patches are found within larger patches. Structural complexity is therefore a function of vertical and horizontal layers of vegetation and the resulting spatial complexity is pattern in the landscape that varies in space and time.

The spatial arrangement of landscape elements and the relationship between these elements (complexity between and within patches) influences the distribution and abundance of species in the landscape.

Pattern can also affect the functioning of landscape. Pattern has an impact on the processes that operate in the landscape and the ecosystem services provided by the landscape.

The formation of structure in the landscape is a dynamic, complex and evolutionary process. This means that the pattern visible in the landscape is a response to the integration of physical, biological and disturbance factors over long periods. Pattern is a result of the interrelation of these different processes at different spatial and temporal scales. The elements that define any given landscape will therefore be representative of a particular snapshot in time.

Pattern in the New Zealand agricultural landscapes today largely follows a rectangular grid arrangement. The landscape structure consists of blocks of agricultural land with inter-dispersed clumps of remnant vegetation that are joined by fence lines or road verges.

Pattern can also influence the flow and movement of water and nutrients through the landscape. This means that understanding landscape pattern is important for addressing water quality and pollution. In agricultural landscapes for example the removal of important landscape structure can be seen to have a detrimental impact on the landscape. Removal of wetlands for example which act like kidneys in the landscape to adsorb and filter nutrients has a considerable negative impact on water quality. New Zealand has experience about a 90% loss of wetlands since intensification of agriculture. This has had serious implications so much so that to address water quality issues the reconstruction of wetlands is being considered as an approach to environmental management.

Vegetation found along riparian strips is important not only for biodiversity, it is also seen as important vegetation structure in the landscape that can help with water quality. Vegetation in the riparian can help to reduce sediment run off into river systems. This means that replanting riparian strips is seen as an important approach to help reduce erosion and improve sediment loads in river systems.