



Impact of Oil and Gas Infrastructure Development in La Manga Canyon, NM

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La Manga Canyon is a small watershed (~20km²) in the San Juan Basin that has historically been developed for natural gas and recently for coal bed methane. Since gas production began in the 1940s, an extensive network of dirt roads have transected the watershed, providing access to well sites. There are currently eleven and a half wells per square mile with sometimes multiple wells in each well-pad. Land degradation due to energy extraction and historic livestock grazing make this area a good model for similar Great Basin landscapes, particularly in the understanding of soil and vegetation dynamics in high impact areas. Remote sensing was conducted from aerial photography taken in 1955, 1981, 1997, 2005 and 2006 to verify historic extent of well-pads, roads, and pipelines. Well-pads were digitized manually and roads / pipelines were remotely sensed with a supervised classification. Temporal vegetation change in the watershed was assessed at the ecological site level. Organic carbon was also estimated from soil cores (top 10cm) collected from roads, well-pads, and "undisturbed" vegetated areas within each ecological site. Linear disturbances increased from 100 to 250 ha between 1955 and 2006; total well-pad area increased from 12 to 72 ha over the same period. Roadless volume decreased by almost 50%. Tree cover (primarily pinyon-juniper) increased along north facing slopes and decreased on south, west and east slopes. Herbaceous vegetation shifted to annual grasses. Vegetation dynamics in this watershed have been overwhelmed by energy infrastructure.

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