Three-dimensional stratigraphic models of the Lower Cretaceous can be very effective in understanding the depositional environment in which heavy oil and bitumen bearing sediments were deposited. They can also form the basis for more detailed models that show reservoir continuity, thickness of shale barriers and cemented zones, occurrence of gas accumulations and water zones. Within each of these detailed models the variation in porosity, bitumen and water saturation and many other properties can be modeled. By using government and economic criteria, these models can be used in assessing the suitability of various reservoirs for specific production methods and strategies.