



Figure Des-21. Model of the heterogeneities and spatial relations of the sandstone reservoirs in the Benson E-4 interval at different scales (between fields, between wells, and within wells). Subfacies dimensions are indicated in Table Des-3. See legend (below) for explanation.

SCALE	HETEROGENEITY IN INTERGRANULAR POROSITY
Mega — Between Fields	<p>Facies:</p> <ol style="list-style-type: none"> 1. Distal facies — sandstones and siltstones less than shales unless abundantly bioturbated. 2. Proximal facies — sandstones and siltstones dominant over shale interbeds, with recognizable Bouma structures and common bioturbation.
Macro — Between wells within field	<p>Subfacies:</p> <ol style="list-style-type: none"> 1. Subfacies of distal facies <ol style="list-style-type: none"> a. dominant shales basinward. b. abundantly bioturbated siltstones and sandstones of graded beds. 2. Subfacies of proximal facies — recognizable Bouma structures. <ol style="list-style-type: none"> a. inner lobe — sandstone and siltstone dominant in multiple graded beds; thickest sandstone units; channel-like. b. outer lobe — siltstones of multiple thin graded beds about equal to shale beds; levee-like. c. outer lobe (flanking outer lobe) — shales equal or greater than thin siltstones of multiple graded beds; bioturbation masks Bouma couplets.
Meso — Between wells within field and within well	<p>A. Sandstone/siltstone units mainly of inner lobe subfacies of proximal facies or abundantly bioturbated siltstone subfacies of distal facies:</p> <ol style="list-style-type: none"> 1. sandstone units (siltstones included in unit) consist of multiple graded beds where sandstone or siltstone are dominant. <ol style="list-style-type: none"> a. upper Benson — sandstone units 1 (oldest) to 4 (youngest); usually one or two units per facies per well of proximal facies. b. middle Benson — sandstone unit d, found in eastern 30-field consolidated area, of distal facies. c. lower Benson — sandstone units a (oldest) to c (youngest) of distal facies. <p>B. Shale partings between graded beds — laminae sets.</p>
Micro — Within well — laminae scale	<p>Fabric of illite-rich, argillaceous and micaceous sandstones and siltstones (>18% matrix); average percent framework grains is 74%, with 5 to 15% porosity in pay-zone inner lobe subfacies.</p>