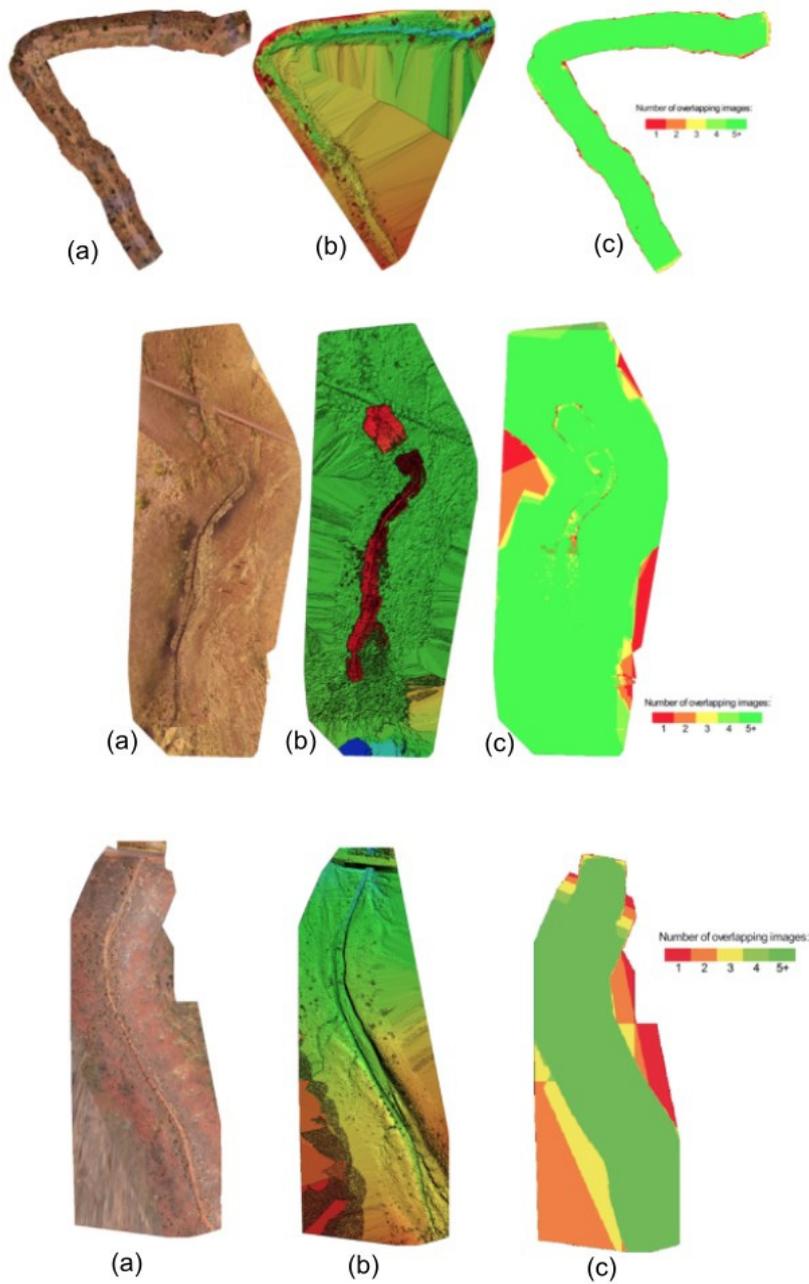
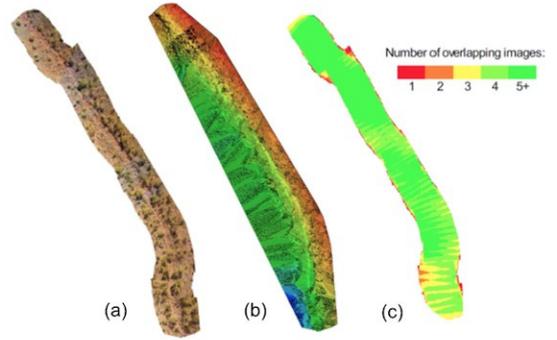
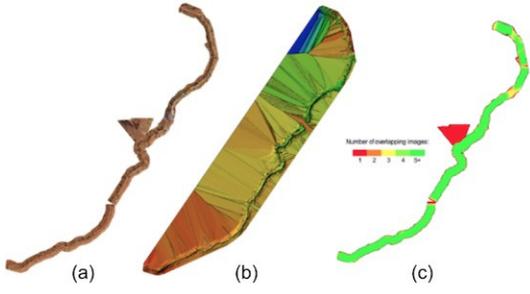
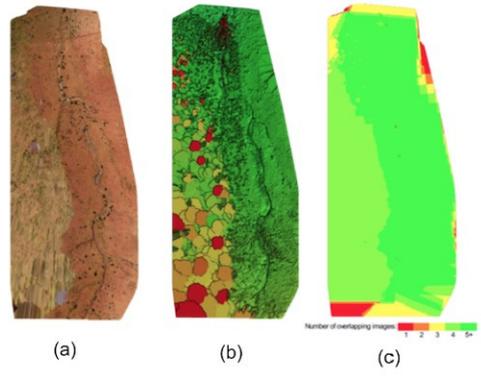
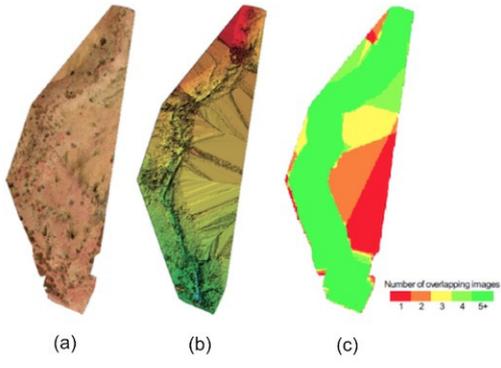


Supplementary Information:

Figure S1. Structure-from-Motion derived pointclouds. a) shows the orthomosaic produced in the Pix4D software b) derived digital elevation model (DEM) from the pointcloud and c) shows the reference for overlapping images in each scene.





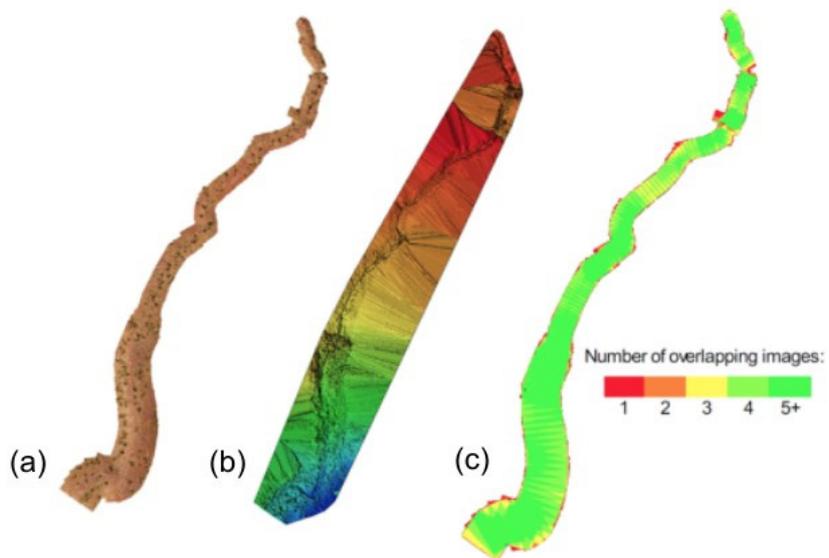
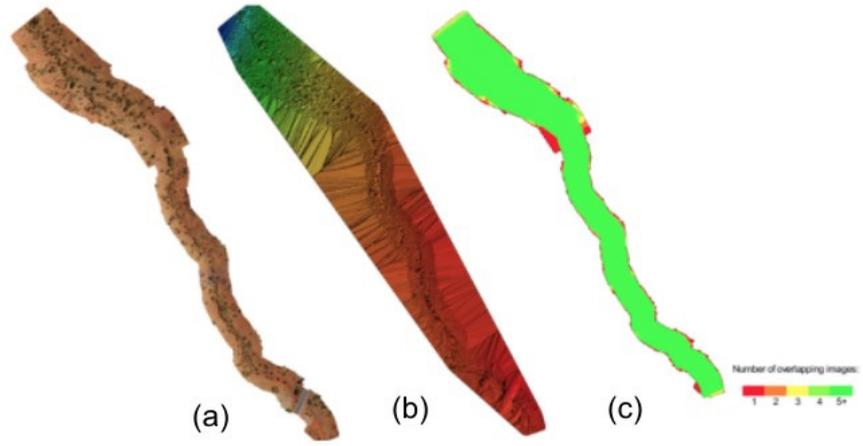
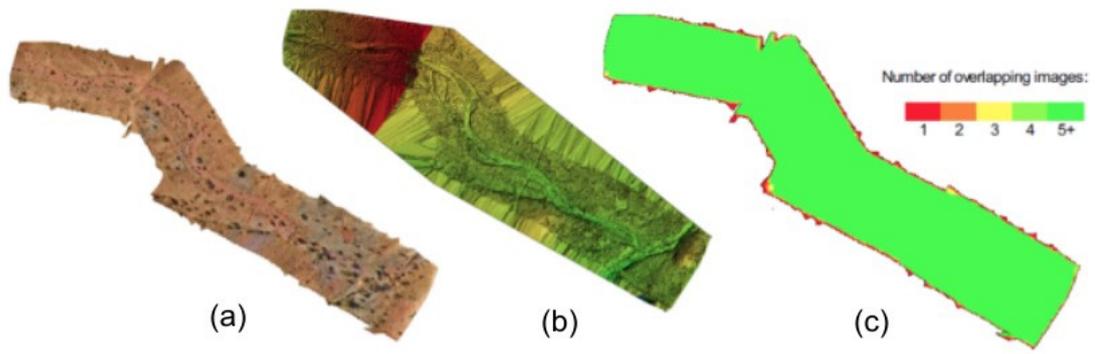


Figure S2. Illustration showing the pointcloud processing steps for the estimation of channel boundary roughness (using Limerinos, 1970) and the contribution of riparian vegetation, using an equation from (Petryk and Bosmajian, 1975).

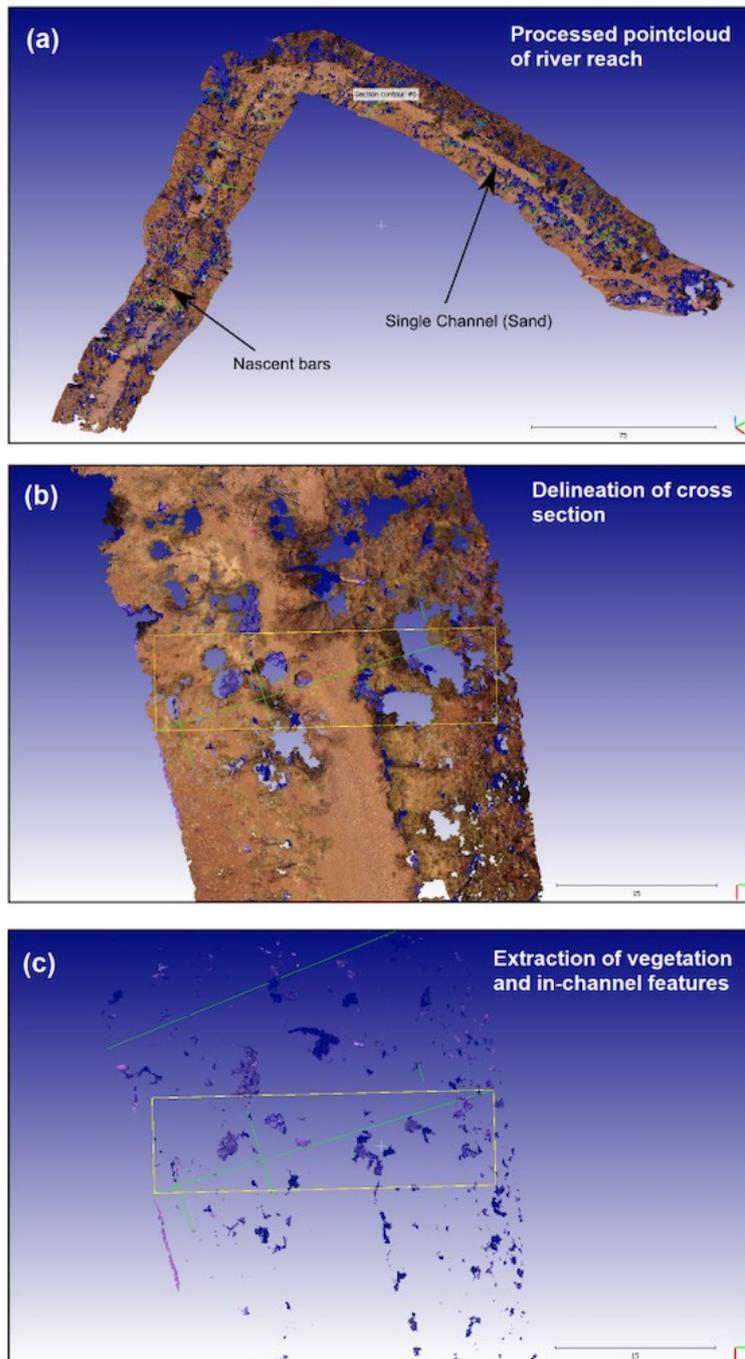
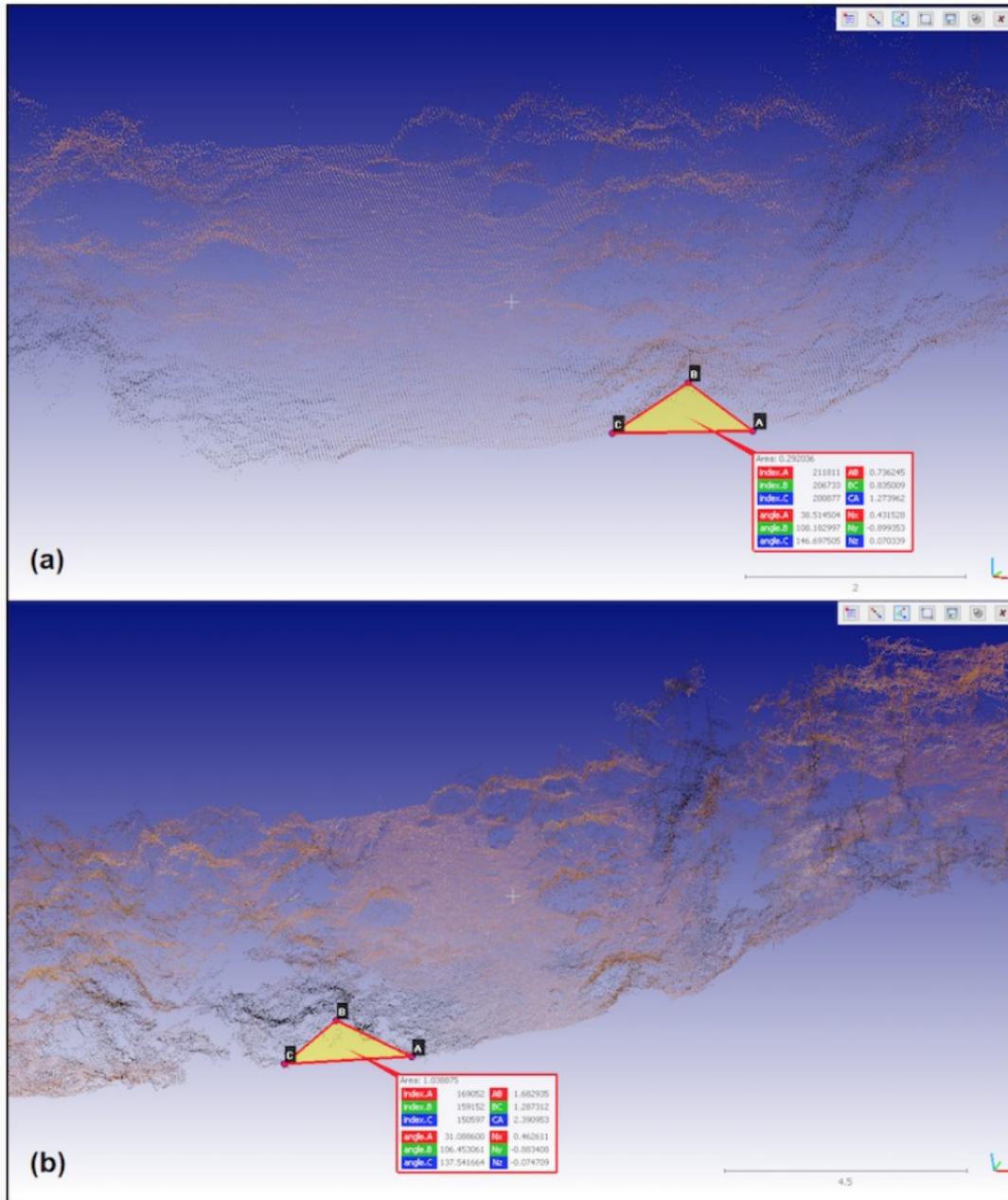


Figure S3. Example of the process of calculating A_i , (streamwise projected area of the plant) using the pointpicking tool in Cloudcompare. Yellow triangles show triangulated area calculations to derive submerged plant area at bankfull.



Results of calculating A_i (streamwide projected area of plant).

Table S1. Calculation of A_i , the streamwide projected area of plants lying below the water surface (at bankfull). The symbol * denotes where A_i have been added together in channels with dense vegetation.

Cross Section	A_{i1}	A_{i2}	A_{i3}	A_{i4}	A_{i5}	A_{i6}
Ampthi-XS1	4.086	4.572	1.150	0.365	-	-
Ampthi-XS2	0.785	0.435	0.161	0.208	-	-
Ampthi-XS3	1.730	0.560	0.269	0.264	0.325	0.479*
Ampthi-XS4	2.804	0.916	-	-	-	-
Ampthi-XS5	0.158	0.287	0.431	0.189	-	-
Burnt-XS1	0.5621	0.4632	0.2823	0.02258	-	-
Burnt-XS2	0.417	0.231	0.041	0.0926	0.0505	0.232
Burnt-XS3	0.044	0.086	0.2968	0.3284	0.3284	0.3515
Burnt-XS4	0.4128	0.1434	0.3313	-	-	-
Burnt-XS5	0.0239	0.02148	0.124	0.1008	-	-
Homestead-XS1	0.502	0.256	0.540	0.110	1.127	*3.362
Homestead-XS2	0.245	0.170	0.438	2.590	0.116	0.498
Homestead-XS3	0.287	2.288	1.246	0.565	2.580	-
Homestead-XS4	0.823	0.302	0.385	-	-	-
Homestead-XS5	0.135	1.004	0.862	0.275	0.283	-
Homestead-XS6	0.077	0.080	0.067	0.305	0.266	-
Homestead-XS7	0.347	0.0454	0.516	-	-	-
Karijini-XS1	0.230	0.091	0.207	0.031	0.188	1.097*
Karijini-XS2	0.325	0.430	0.072	0.134	0.421	0.599*
Karijini-XS3	0.234	1.845	1.293	0.714	0.236	1.441
Robinson1-XS1	0.789	2.62	-	-	-	-
Robinson1-XS2	0.7127	-	-	-	-	-
Robinson1-XS3	1.155	0.232	0.018	0.182	0.059	0.1325
Robinson1-XS4	0.954	0.1579	0.199	0.0578	0.8731	1.6001
Robinson1-XS5	2.6495	-	-	-	-	-
Robinson1-XS6	2.1502	0.594	0.2118	-	-	-
Robinson2-XS1	0.315	0.059	0.606	0.088	-	-
Robinson2-XS2	0.461	0.034	0.191	-	-	-
Robinson2-XS3	0.165	0.286	0.613	-	-	-
Robinson2-XS4	0.371	0.173	0.251	0.193	0.164	0.353*
Robinson2-XS5	0.494	0.126	-	-	-	-
Robinson2-XS6	0.318	0.168	0.163	0.099	0.082	0.441*
Ronnie-XS1	0.180	0.424	0.261	0.439	0.291	-
Ronnie-XS2	2.036	0.286	0.512	0.749	0.505	0.384
Ronnie-XS3	0.260	0.226	0.752	0.439	0.144	-
Ronnie-XS4	2.506	0.300	0.498	0.117	0.300	-
Ronnie-XS5	0.111	0.246	1.022	0.298	-	-
Meekatharra-XS1	2.6	0.552	0.429	0.1172	0.0355	0.993
Meekatharra-XS2	0.349	0.204	0.635	0.115	-	-
Meekatharra-XS3	0.245	0.135	0.376	-	-	-
Meekatharra-XS4	0.220	0.048	0.225	-	-	-
Meekatharra-XS5	0.774	0.208	0.162	0.525	-	-

Table S2. Description of SfM derived vegetation cross sections.

Channel XS	Channel Type	Vegetation description	Change %
Amp XS 1	Confined, alluvial, barform	Shrubs, nascent bars, sand	+47.93%
Amp XS 2	Confined, alluvial sand	Sand, shrubs	+36.43%
Amp XS 3	Semi-confined, alluvial sand	LWD, shrubs	+47.84%
Amp XS 4	Semi-confined, alluvial sand	Shrubs	+37.01%
Amp XS 5	Semi-confined alluvial barform	Shrubs and nascent barforms	+38.266%
Burnt XS 1	Unconfined alluvial barform	Shrubs, trees	+40.09%
Burnt XS 2	Unconfined alluvial barform	Shrubs	+37.87%
Burnt XS 3	Unconfined alluvial (\geq cobble)	Shrubs, trees	+36.41%
Burnt XS 4	Unconfined alluvial (\geq cobble)	Shrubs	+36.96%
Burnt XS 5	Unconfined alluvial (\geq cobble)	Shrubs	+35.40%
HS XS 1	Unconfined alluvial single (\geq cobble)	Shrubs,trees	+37.78%
HS XS 2	Unconfined alluvial single (\geq cobble)	Shrubs,trees	+36.10%
HS XS 3	Unconfined alluvial single (\geq cobble)	Shrubs,trees	+40.16%
HS XS 4	Unconfined alluvial islands	Shrubs,trees	+35.36%
HS XS 5	Unconfined alluvial islands	Shrubs,trees	+35.92%
HS XS 6	Unconfined alluvial single (\geq cobble)	Shrubs,trees	+34.34%
HS XS 7	Unconfined alluvial single (\geq cobble)	Shrubs,trees	+34.23%
Karjini XS 1	Unconfined alluvial single (\geq cobble)	Shrubs, trees	+36.91%
Karjini XS 2	Unconfined alluvial barform	Shrubs, trees	+36.20%
Karjini XS 3	Unconfined alluvial single (\geq cobble)	Shrubs	+43.41%
Meek XS 1	Alluvial sand barform	Shrubs and trees	+109.703%
Meek XS 2	Alluvial sand barform	Shrubs and trees	+71.30%
Meek XS 3	Alluvial single (sand)	Shrubs	+52.703%
Meek XS 4	Alluvial single (sand)	Shrubs	+46.49%
Meek XS 5	Alluvial single (sand)	Shrubs and trees	+113.36%
Robinson1 XS 1	Bedrock	Shrubs, trees	+36.37%
Robinson1 XS 2	Bedrock	Shrubs, trees	+34.47%
Robinson1XS 3	Bedrock	Shrubs	+37.31%
Robinson1 XS 4	Bedrock	Shrubs, trees	+36.87%
Robinson1XS 6	Bedrock	Shrubs	+34.97%
Robinson2 XS 1	Unconfined alluvial single (\geq cobble)	Shrubs and trees	+39.9%
Robinson2 XS 2	Unconfined alluvial single (\geq cobble)	Shrubs	+36.87%
Robinson2XS 3	Unconfined alluvial single (\geq cobble)	Shrubs and trees	+42.12%
Robinson2 XS 4	Unconfined alluvial single (\geq cobble)	Shrubs	+38.06%
Robinson2 XS 5	Unconfined alluvial single (\geq cobble)	Shrubs	+36.25%
Robinson2XS 6	Unconfined alluvial single (\geq cobble)	Shrubs	+37.15%
Ronnie XS 1	Unconfined alluvial barform	Shrubs, nascent bars	+37.76%
Ronnie XS 2	Unconfined alluvial single (\geq cobble)	Shrubs, trees and sand	+49.13%
Ronnie XS 3	Unconfined alluvial single (\geq cobble)	Shrubs, nascent bars	+44.03%
Ronnie XS 4	Unconfined alluvial single (\geq cobble)	Shrubs, nascent bars	+54.34 %
Ronnie XS 5	Unconfined alluvial single (\geq cobble)	Shrubs	+47.74%