

Appendix 1: Sample Localities

(GPS=latitude-longitude coordinates from Global Positioning System)

CP9: Upper sandstone member of Toreva Formation at Shungopovi AZ. Cross-bedded fluviodeltaic sandstone near middle of 15 m (E-W) segment of distributary channel in roadcut at top of grade on AZ Highway 264 on east side of Hopi Second Mesa ~100 m east of sign for Shungopovi and 2.8 mi west of intersection of AZ Highway 264 with AZ Highway 87 at Second Mesa AZ. GPS (~1 m from white line marking north side of roadway directly below sample horizon): 35° 48.835' N, 110° 31.677' W.

CP13: Westwater Canyon Member of Morrison Formation near White Mesa UT. Crossbedded multistory fluvial sandstone on benchlands of Recapture Creek in roadcut on north side of UT Highway 262 at a point 1.3 mi east of junction with US Highway 191 (between Bluff and Blanding). GPS (at white line marking edge of roadway ~2 m from roadcut face and midway along sample horizon extending for ~10 m along strike): 37° 25.088' N, 109° 27.011' W.

CP14: Burro Canyon Formation near White Mesa UT. Trough cross-bedded and locally pebbly fluvial sandstone overlying Brushy Basin Member of Morrison Formation at edge of McCracken Mesa in roadcut on north side of UT Highway 262 at a point 4.9 mi east of junction with US Highway 191 (between Bluff and Blanding). GPS (adjacent to sample at white line marking edge of roadway ~2 m from roadcut face): 37° 26.163' N, 109° 23.506' W.

CP19: Salt Wash Member of Morrison Formation near Slick Rock CO. Massive trough-crossbedded fluvial sandstone of mid-member channel complex containing abundant mudchips in roadcut beside Dolores River on side road to Slick Rock 1.1 mi downstream from CO Highway 141 bridge over Dolores River and <0.1 mi downstream from old loading chute for ore at Burros Mine. GPS (at edge of pavement ~2.5 m from roadcut face): 38° 02.676' N, 108° 53.617' W.

CP21: Westwater Canyon Member of Morrison Formation near Todilto Park NM. Horizontally laminated and locally cross-bedded fluvial sandstone midway up steep hillside (middle of three bold sandstone ledges) northeast of dirt road to Twin Buttes from Todilto Park (north of gorge through hogback of Dakota Sandstone). GPS (on sidehill at sample): 35° 55.000' N, 108° 55.615' W.

CP22: Menefee Formation of Mesaverde Group near Gallup NM. Trough-crossbedded fluviodeltaic sandstone (sandy horizon ~1 m thick exposed 5-10 m along strike) within distributary-channel complex 6-8 m thick in roadcut

on south side of US Highway 491 at crest of hill 3.5 mi south of junction with NM Highway 264 at Ya-Ta-Hey Junction. GPS (midway across spacing of ~7.5 m from edge of pavement to roadcut face): 35° 34.929' N, 108° 45.632' W.

CP23: Gallup Sandstone Member of Mancos Shale near Gallup NM. Cross-bedded and locally pebbly fluviodeltaic channel sandstone at top of progradational (sh to ss) marine-nonmarine transition on west flank of prominent hogback north of Interstate Highway I40 just east of Gallup NM (natural outcrop on hillock capping small spur on sidehill of ridge extending off frontage road reached by following Miyashiro Drive at Exit 22 of Interstate Highway I40). GPS (atop hillock ~2.5 m from sample): 35° 32.116' N, 108° 41.596' W.

CP25: Recapture Member of Morrison Formation near Gallup NM. Horizontally bedded and locally concretionary fluvial white sandstone (above redbeds and below eolianite) in low bluff off Church Rock Road (NM Highway 566) east of sweeping curve at foot of grade with summit 2.3 mi north of turnoff to Red Rock Park. GPS (ledge on outcrop ~1 m west of sample): 35° 33.623' N, 108° 35.203' W.

CP27: Burro Canyon Formation near Ghost Ranch NM. Trough cross-bedded fluvial sandstone of multistory channel complex (with green shaly partings between channel lenses), scoured into Brushy Basin Member of Morrison Formation and overlapped by marine Dakota Sandstone, in ledgy roadcut on west side of US Highway 84 at a point 5.4 mi south of intersection with NM Highway 115 to Canjilon. GPS (midway across spacing of ~10 m between edge of pavement and roadcut face): 36° 25.325' N, 106° 28.033' W.

CP29: Salt Wash Member of Morrison Formation in Montezuma Canyon UT. Trough-crossbedded fluvial sandstone in natural ledgy outcrop ~50 m west of San Juan County Road 246 (unpaved) in Montezuma Canyon SE of Monticello UT where SJC Road 246 crosses section line (Secs 25-26, T38S, R24E). GPS (atop ledge within 2-4 m of sample): 37° 32.720' N, 109° 14.430' W.

CP32: Buckhorn Conglomerate Member of Cedar Mountain Formation near Green River UT. Sandstone horizon of fluvial fining-upward cycle (~2.5 m thick from conglomerate base to shale above) in roadcut along south side of eastbound lanes of Interstate Highway I70 at a point 0.75 mi east of its intersection with UT Highway 24 and 20-25 m west of milepost 150. GPS (~5 m south of white line marking edge of roadway and ~4 m from roadcut face): 38° 55.646' N, 110° 21.771' W.

CP33: Ferron Sandstone Member of Mancos Shale in Dry Wash UT. Coarse sandstone in middle part (~3 m above base) of trough-crossbedded distributary-channel sandstone lens ~8 m thick in alcove of cliff beside Dry Wash Road at fenceline with cattleguard 3.1 mi toward Interstate Highway I70 from turnoff of Dry Wash Road off loop road through Moore UT (off UT Highway 10). GPS (on ledge ~1 m north of sample): 38° 56.070' N, 111° 07.140' W.

CP34: Castlegate Sandstone of Mesaverde Group on Willow Creek UT. Fluvial sandstone forming multiple stacked channel lenses within braided-channel complex (sample from prominent channel lens ~5 m thick) exposed on steep slope west of first bridge over Willow Creek (tributary to Price Canyon) on US Highway 191 north of its intersection with US Highway 6 in Price Canyon. GPS (on hillside outcrop within ±5 m along strike of composited sample): 39° 44.834' N, 110° 50.034' W.

CP35: Salt Wash Member of Morrison Formation near Hanksville UT. Trough-crossbedded fluvial sandstone containing lenticular pebble conglomerate lenses within multistory channel complex in roadcut on north side of UT Highway 24 up Fremont River 3.9 mi west of Hanksville UT. GPS (~1 m from white line marking edge of roadway and ~2 m from roadcut face): 38° 22.305' N, 110° 45.945' W.

CP36: Salt Wash Member of Morrison Formation near Bullfrog Creek UT. Trough-crossbedded fluvial sandstone and pebble conglomerate of compound stacked channel complex exposed beside Burr Trail Road 1.5 mi north of ford across Bullfrog Creek just above switchback at top of grade and on point of spur east of road in line with first rise in road above switchback. GPS (on bare rock outcrop ~1m from sample): 37° 36.809' N, 110° 47.791' W.

CP39: Upper Member of Wahweap Formation on Henrieville Creek UT. Fluviodeltaic channel sandstone (with convolute lamination locally) in roadcut on west side of UT Highway 12 just upstream from parking area beside Henrieville Creek 7.3 mi north of Senior Citizens Center in Henrieville UT. GPS (~1 m from white line marking edge of roadway and ~3 m from roadcut face): 37° 35.531' N, 111° 54.161' W.

CP40: Capping Member of Wahweap Formation on Henrieville Creek UT. Fluvial sandstone containing abundant pebble stringers and lenses in cliff on west side of Henrieville Creek across from end of 4WD track leading off UT Highway 12 at power pole 8.2 mi north of Senior Citizens Center in Henrieville UT and bearing right to fire circle beside Henrieville Creek opposite cliff face. GPS (on low ledge just west of tall conifer tree at base of cliff and ~5 m vertically below base of cliff): 37° 37.251' N, 111° 53.562' W.

CP41: Tidwell Member of Morrison Formation near Notom UT. Horizontally laminated and ripple cross-stratified sandstone bed ~ 1 m thick ~1 m above base of Tidwell Member (marked by green zone of discoloration at top of underlying red Summerville Formation) in roadcut near top of grade on back road from Notom toward Hanksville 0.4 mi uphill from paved road to Notom from Capitol Reef National Park. GPS (~1 m from eroded edge of sandstone bed exposed in roadcut): 38° 14.557' N, 111° 06.797' W.

CP49: Salt Wash Member of Morrison Formation near Beclabito NM. Trough-crossbedded fluvial sandstone on south flank of Beclabito Dome in roadcut on Navajo Route 63 (now largely abandoned) at locale 30-35 m uphill from sharp curve at foot of grade 3.2 mi south of US Highway 64 in Beclabito NM (turnoff 0.3 mi east of Beclabito Dome Historical Marker in front of Beclabito Trading Post). GPS (on slickrock slab in middle of roadway beside roadcut face): 36° 47.854' N, 109° 00.515' W.

CP52: Fiftymile Member of Morrison Formation at Fiftymile Bench UT. Trough-crossbedded and locally pebbly fluvial sandstone of sandy channel complex in roadcut at edge of Fiftymile Bench on Grand Staircase-Escalante National Monument (GSENM) Road 280 (the more southerly of two roads leading up to Fiftymile Bench from GSENM Road 200 from Escalante to Hole-in-the-Rock) at 35 m downgrade from cattle guard just below switchback 2.5 mi up GSENM Road 280 from GSENM Road 200. GPS (on flat orange rock beside road ~1 m from roadcut face): 37° 17.150' N, 111° 03.417' W.

CP53: Jackpile Sandstone Member of Morrison Formation near Paguete NM. Trough-crossbedded fluvial sandstone unconformably beneath overlapping Dakota Sandstone off east face of Clay Mesa south of Paguete NM in roadcut (0.1 m downhill from Dakota contact) on Old NM Highway 279 at a point 1.4 mi north of intersection with modern NM Highway 279 at turnoff 3.0 mi NE of junction of NM Highways 279 and 124 near Laguna Pueblo. GPS (~1 m from white line marking edge of roadway and ~2 m from roadcut face): 35° 05.766' N, 107° 21.856' W.