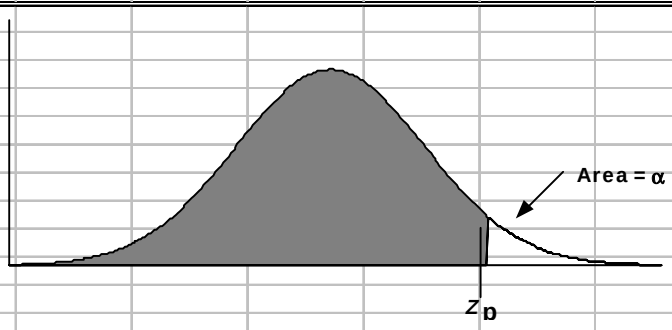
APPENDIX A

Statistical Tables

Table A1. Cumulative areas under the Normal distribution (values of p corresponding to Z_p)

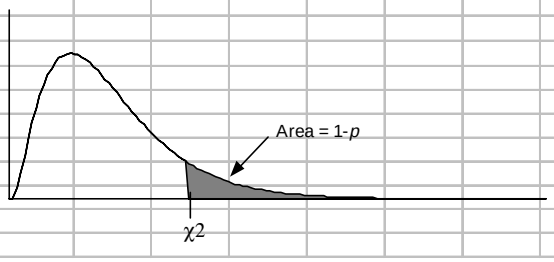


Z_p	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

Table A2. Percentiles of the $t_{\alpha,df}$ distribution (values of t such that $100(1-\alpha)\%$ of the distribution is less than t)

df	α = 0.40	α = 0.30	α = 0.20	α = 0.10	α = 0.05	α = 0.025	α = 0.010	α = 0.005
1	0.3249	0.7265	1.3764	3.0777	6.3137	12.7062	31.8210	63.6559
2	0.2887	0.6172	1.0607	1.8856	2.9200	4.3027	6.9645	9.9250
3	0.2767	0.5844	0.9785	1.6377	2.3534	3.1824	4.5407	5.8408
4	0.2707	0.5686	0.9410	1.5332	2.1318	2.7765	3.7469	4.6041
5	0.2672	0.5594	0.9195	1.4759	2.0150	2.5706	3.3649	4.0321
6	0.2648	0.5534	0.9057	1.4398	1.9432	2.4469	3.1427	3.7074
7	0.2632	0.5491	0.8960	1.4149	1.8946	2.3646	2.9979	3.4995
8	0.2619	0.5459	0.8889	1.3968	1.8595	2.3060	2.8965	3.3554
9	0.2610	0.5435	0.8834	1.3830	1.8331	2.2622	2.8214	3.2498
10	0.2602	0.5415	0.8791	1.3722	1.8125	2.2281	2.7638	3.1693
11	0.2596	0.5399	0.8755	1.3634	1.7959	2.2010	2.7181	3.1058
12	0.2590	0.5386	0.8726	1.3562	1.7823	2.1788	2.6810	3.0545
13	0.2586	0.5375	0.8702	1.3502	1.7709	2.1604	2.6503	3.0123
14	0.2582	0.5366	0.8681	1.3450	1.7613	2.1448	2.6245	2.9768
15	0.2579	0.5357	0.8662	1.3406	1.7531	2.1315	2.6025	2.9467
16	0.2576	0.5350	0.8647	1.3368	1.7459	2.1199	2.5835	2.9208
17	0.2573	0.5344	0.8633	1.3334	1.7396	2.1098	2.5669	2.8982
18	0.2571	0.5338	0.8620	1.3304	1.7341	2.1009	2.5524	2.8784
19	0.2569	0.5333	0.8610	1.3277	1.7291	2.0930	2.5395	2.8609
20	0.2567	0.5329	0.8600	1.3253	1.7247	2.0860	2.5280	2.8453
21	0.2566	0.5325	0.8591	1.3232	1.7207	2.0796	2.5176	2.8314
22	0.2564	0.5321	0.8583	1.3212	1.7171	2.0739	2.5083	2.8188
23	0.2563	0.5317	0.8575	1.3195	1.7139	2.0687	2.4999	2.8073
24	0.2562	0.5314	0.8569	1.3178	1.7109	2.0639	2.4922	2.7970
25	0.2561	0.5312	0.8562	1.3163	1.7081	2.0595	2.4851	2.7874
26	0.2560	0.5309	0.8557	1.3150	1.7056	2.0555	2.4786	2.7787
27	0.2559	0.5306	0.8551	1.3137	1.7033	2.0518	2.4727	2.7707
28	0.2558	0.5304	0.8546	1.3125	1.7011	2.0484	2.4671	2.7633
29	0.2557	0.5302	0.8542	1.3114	1.6991	2.0452	2.4620	2.7564
30	0.2556	0.5300	0.8538	1.3104	1.6973	2.0423	2.4573	2.7500
35	0.2553	0.5292	0.8520	1.3062	1.6896	2.0301	2.4377	2.7238
40	0.2550	0.5286	0.8507	1.3031	1.6839	2.0211	2.4233	2.7045
50	0.2547	0.5278	0.8489	1.2987	1.6759	2.0086	2.4033	2.6778
60	0.2545	0.5272	0.8477	1.2958	1.6706	2.0003	2.3901	2.6603
80	0.2542	0.5265	0.8461	1.2922	1.6641	1.9901	2.3739	2.6387
100	0.2540	0.5261	0.8452	1.2901	1.6602	1.9840	2.3642	2.6259
150	0.2538	0.5255	0.8440	1.2872	1.6551	1.9759	2.3515	2.6090
200	0.2537	0.5252	0.8434	1.2858	1.6525	1.9719	2.3451	2.6006
inf.	0.2533	0.5244	0.8416	1.2816	1.6449	1.9600	2.3264	2.5758

Table A3. Upper and lower percentiles of the Chi-square distribution



	p											
df	**0.001**	**0.005**	**0.010**	**0.025**	**0.050**	**0.100**	**0.900**	**0.950**	**0.975**	**0.990**	**0.995**	**0.999**
1	....	....	....	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879	10.827
2	0.002	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597	13.815
3	0.024	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838	16.266
4	0.091	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860	18.466
5	0.210	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.832	15.086	16.750	20.515
6	0.381	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548	22.457
7	0.599	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278	24.321
8	0.857	1.344	1.647	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955	26.124
9	1.152	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589	27.877
10	1.479	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188	29.588
11	1.834	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757	31.264
12	2.214	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300	32.909
13	2.617	3.565	4.107	5.009	5.892	7.041	19.812	22.362	24.736	27.688	29.819	34.527
14	3.041	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319	36.124
15	3.483	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801	37.698
16	3.942	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267	39.252
17	4.416	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718	40.791
18	4.905	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156	42.312
19	5.407	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582	43.819
20	5.921	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997	45.314
21	6.447	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401	46.796
22	6.983	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796	48.268
23	7.529	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181	49.728
24	8.085	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.558	51.179
25	8.649	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928	52.619
26	9.222	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290	54.051
27	9.803	11.808	12.878	14.573	16.151	18.114	36.741	40.113	43.195	46.963	49.645	55.475
28	10.391	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.994	56.892
29	10.986	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.335	58.301
30	11.588	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672	59.702
35	14.688	17.192	18.509	20.569	22.465	24.797	46.059	49.802	53.203	57.342	60.275	66.619
40	17.917	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766	73.403
50	24.674	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490	86.660
60	31.738	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952	99.608
70	39.036	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.43	104.21	112.32
80	46.520	51.172	53.540	57.153	60.391	64.278	96.578	101.88	106.63	112.33	116.32	124.84
90	54.156	59.196	61.754	65.647	69.126	73.291	107.57	113.15	118.14	124.12	128.30	137.21
100	61.918	67.328	70.065	74.222	77.929	82.358	118.50	124.34	129.56	135.81	140.17	149.45
200	143.84	152.24	156.43	162.73	168.28	174.84	226.02	233.99	241.06	249.45	255.26	267.54

APPENDIX B

Sample Evaluation Forms

Best Management Practices Evaluation

UTM Coordinates Zone __ __
Easting __ __ __ __ __ __
Northing __ __ __ __ __ __ __

Form E08: Road Surface, Drainage and Slope Protection
(BMP 2.2, 2.4, 2.5, 2.7, 2.10, 2.23)

ID#: _____
Selection Code: _____

Reviewer(s) _____ Title(s) _____ Date _____ Forest _____ District _____ T _____ R _____ S _____
Project _____ Road # _____ Year Construction Completed _____ Last Maintenance _____
Project is: ☐ Construction ☐ Reconstruction ☐ Maintenance ☐ Other (describe) _____ NPS Watershed

Implementation

Rating

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

For construction or reconstruction projects:

1) Design objectives developed that address water quality issues identified by ID or review team ..... _____
2) Design meets objectives ..... _____
3) Construction/Reconstruction contract requirements met for:
   a) Surfacing ..... _____
   b) Drainage ..... _____
   c) Slope stabilization ..... _____
   d) Slash disposal ..... _____

For maintenance projects:

1) Check appropriate means of maintenance accomplishment: ☐ Timber sale contract
   ☐ Force account
   ☐ Maintenance contract
   ☐ Other (_____)
2) Maintenance specifications were met for:
   a) Surface blading/repair/treatment ..... _____
   b) Drainage structure repair/treatment ..... _____
   c) Slope treatment/sidecast ..... _____

If any rating is "3" or "4", complete the following:
Problem occurred in which phase(s) of the project: ☐ Location ☐ Design ☐ EA ☐ Contract ☐ Construction ☐ Maintenance
Describe deficiencies and corrective actions:

SITE NUMBER:_____ DATE:_____
OWNERSHIP:_____ OPERATOR:_____
LEGAL DESCRIPTION:_____ SALE OR PROJECT NUMBER:_____
PROJECT ACRES REVIEWED:_____ TEAM INITIALS:_____

SITE CONDITIONS	PRACTICES
LANDFORM:_____ GENERAL SOILS:_____ DRAINAGE:_____ SLOPE RANGE:_____ WATER BODIES PRESENT (type):_____ _____ _____ DEPTH/WIDTH OF STREAMS(type):_____ _____ _____ OTHER:_____ _____	STAGE ("x" if completed) PREHARVEST ( ) ROAD CONSTRUCTION ( ) HARVEST ( ) SLASH DISPOSAL ( ) SITE PREP ( ) DATE OF ACTIVITY_____ ROADS: NEW CONSTRUCTION (length):_____ RECONSTRUCTION (length):_____ HARVEST ACRES:_____ HARVEST METHOD:_____ SITE PREP ACRES:_____ SITE PREP METHOD:_____ SLASH DISPOSAL:_____ PESTICIDES USED:_____ OTHER:_____ _____

RATING GUIDE

APPLICATION

5–OPERATION EXCEEDS REQUIREMENT OF BMP
4–OPERATION MEETS REQUIREMENT OF BMP
3–MINOR DEPARTURE FROM BMP
2–MAJOR DEPARTURE FROM BMP
1–GROSS NEGLECT OF BMP

EFFECTIVENESS

6–IMPROVED PROTECTION OF SOIL AND WATER RESOURCES OVER PRE-PROJECT CONDITION.
5–ADEQUATE PROTECTION OF SOIL AND WATER RESOURCES.
4–MINOR AND TEMPORARY IMPACTS ON SOIL AND WATER RESOURCES.
3–MAJOR AND TEMPORARY IMPACTS ON SOIL AND WATER RESOURCES.
2–MINOR AND PROLONGED IMPACTS ON SOIL AND WATER RESOURCES.
1–MAJOR AND PROLONGED IMPACTS ON SOIL AND WATER RESOURCES.

DEFINITIONS (BY EXAMPLE)

ADEQUATE: Small amount of material eroded; material does not reach drainages, streams, lakes or wetlands
MINOR: Erosion and delivery of material to drainages but not to streams, lakes or open-water wetlands.
MAJOR: Erosion and subsequent delivery of sediment to streams, lakes or open water wetlands.
TEMPORARY: Impacts lasting one year or less; no more than one runoff season.
PROLONGED: Impacts lasting more than one year.
* It is possible to have a departure from BMPs and still adequate protection.

RECOMMENDED BEST MANAGEMENT PRACTICES	APPLICABLE TO SITE (Y/N)	APPLICATION	EFFECTIVENESS	COMMENTS
MECHANICAL SITE PREP				
15 General Recommendations (p50)				
15a Site prep technique appropriate to the site				
15b Provide adequate filter strips				
15c Avoid operating during periods of saturated soil				
15d Maintain adequate vegetation adjacent to designated trout streams				
15e Site prep technique properly employed (p50-52)				
- Shearing and raking				
- Disking				
- Patch or row scarification				
- Other				
PESTICIDE USE				
16 Prevent entry of pesticide residues into surface and ground waters (p57-75)				
PRESCRIBED BURNING				
17 Planning (p78)				
17a Obtain proper permits				
18 Prescriptions (p79-81)				
18a Locate fire lines on the contour				
18b Use natural or in-place fire barriers				
18c Establish filter strips for fire lines				
18d Avoid placement of debris piles for burning in filter strips or sensitive areas				
18e Limit water quality impacts from fire line construction by using mowing, herbicides, retardant etc.				
19 Maintenance (p81)				
19a Maintain erosion control measures on firelines				

SITE ID No:

TEXAS BMP MONITORING CHECKLIST

GENERAL

1. County_____ 2. Block/Grid_____
3. Latitude_____ Longitude_____
Forester: 4. _____ 5._____
6. Timber Buyer _____
7. Logger _____

8. Activity _____
9. Estimated date of activity _____
10. Acres affected _____
11. Inspector _____

LANDOWNER:

12. Owner Type: N L A I P

13. Name _____
14. Address_____
15. City _____ ZIP _____
16. Phone _____

17. Date of Inspection _____
18. Accompanied by:_____

SITE CHARACTERISTICS

19. Terrain: F H S
20. Erodability hazard: L M H
21. Type stream present P I

22. Distance to nearest permanent water body:
<300' 300-800' 800-1600' 1600'+
23. Predominant soil series/texture: _____ / C CL L SL S

PERMANENT ROADS

[ ] NOT APPLICABLE

24. Avoid sensitive areas.	Y	N	NA
25. Roads meet grade specs.	Y	N	NA
26. Stabilized stream crossing.	Y	N	NA
27. Rutting within allowable specs.	Y	N	NA
28. Ditches do not dump into streams.	Y	N	NA
29. Were BMP's used.	Y	N	NA
Type: RD WD WB RE OC PL RS CU BR LW			
30. Were BMP's effective.	Y	N	NA
31. Stream free of sediment.	Y	N	NA

SKID TRAILS / TEMPORARY ROADS

[ ] NOT APPLICABLE

32. Slopes less than 15%.	Y	N	NA
33. Rutting within allowable specs.	Y	N	NA
34. Water bars evident.	Y	N	NA
35. Water bars working.	Y	N	NA
36. Stream crossings minimized.	Y	N	NA
37. Stream crossings correct.	Y	N	NA
38. Stream crossings restored & stabilized.	Y	N	NA
39. Were BMP's used.	Y	N	NA
Type: RD WD WB RE OC PL RS CU BR LW			
40. Stream free of sediment.	Y	N	NA

SMZ

[ ] NOT APPLICABLE

41. SMZ present on permanent stream.	Y	N	NA
42. SMZ present on intermittent stream.	Y	N	NA
43. SMZ adequately wide.	Y	N	NA
44. Thinning within allowable specs.	Y	N	NA
45. SMZ integrity honored.	Y	N	NA
46. Stream clear of debris.	Y	N	NA
47. SMZ free of roads and landings.	Y	N	NA
48. Stream free of sediment.	Y	N	NA

SITE PREPARATION

[ ] NOT APPLICABLE

49. Site prep method _____
50. Regeneration method _____

51. No soil movement on site.	Y	N	NA
52. Firebreak erosion controlled.	Y	N	NA
53. SMZ integrity honored.	Y	N	NA
54. Windrows on contour / free of soil.	Y	N	NA
55. No chemicals off site.	Y	N	NA
56. Were BMP's used.	Y	N	NA
Type: WB RE OC RS			
57. Stream free of sediment.	Y	N	NA

LANDINGS

[ ] NOT APPLICABLE

58. Locations free of oil / trash.	Y	N	NA
59. Located outside SMZ.	Y	N	NA
60. Well drained location	Y	N	
61. Restored, stabilized.	Y	N	NN

62. Overall compliance with Best Management Practices

NEEDS IMPROVEMENT PASS
NO EFFORT POOR FAIR GOOD EXCELLENT

See Evaluation Criteria for a full description of numbered questions.