

## Appendix B: Norwood Project Design Criteria

The following design criteria are listed by resource area and do not suggest any particular order of priority or importance. In addition to the design criteria listed here, the project must be consistent with Forest Plan direction. Implementation of all activities proposed in this project, including any post-sale activities or monitoring, must implement these design criteria.

### **Soil and Water**

Utilize the most current State BMPs and Watershed Conservation Practices (WCPs). The following is a subset of management direction and does not preclude the need to meet all other BMPs and WCPs.

- Manage land treatments to limit the sum of severely burned and detrimentally compacted, eroded, and displaced land to no more than 15 percent of any land unit.
- Conduct prescribed fires to minimize the residence time on the soil while meeting the burn objectives. This is usually done when the soil and duff are moist.
- On soils subject to compaction when wet, machinery operations must be restricted to dry or frozen soil conditions. Low impact equipment or equipment operating on slash may be used with close monitoring. See the following tables for specific site locations.
- On soils with severe erosion potential or with high mass wasting potential and slopes steeper than 40 percent, ground skidding must be avoided.
- On soils with severe erosion potential or with high mass wasting potential and slopes between 20 and 40 percent, machinery operations must be restricted to dry or frozen soil conditions. See following tables for specific site locations.
- On soils with low organic matter, retain 50% or more of such slash after each shelterwood and group-selection harvest.
- Limit roads and other disturbed sites to the minimum feasible number, width, and total length consistent with the purpose of specific operations, local topography and climate.
- Stabilize and maintain roads and other disturbed sites during and after construction to control erosion.
- Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage.
- Initiate revegetation as soon as possible, not to exceed 6 months, after termination of ground-disturbing activities.
- Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes and wetlands.
- Limit the amount of skid trails in the WIZ.
- Skid trails will be designated in the WIZ.
- No mechanical site preparation will be allowed within the WIZ.

The following tables display information about each site pertaining to the different Soil Design Criteria's by alternative. They display the percentage of the site that the appropriate Soil Design Criteria applies to. The Soil Design Criteria is designed to minimize the impacts to the soil.

The 'No Activity Design Criteria' is to protect soils with a Very High Erosion Hazard Rating or soils with a high mass wasting potential on slopes greater than 40%. No machinery operations activities will be allowed on slopes greater than 40%.

The 'Dry or Frozen Design Criteria' is to protect soils with a Very High Erosion Hazard Rating or soils with a high mass wasting potential on slopes 20 to 40%. Machinery operations are only permitted when there are dry or frozen conditions. Mechanical site preparation must be restricted to dry soil conditions.

The 'Compaction Design Criteria' is to protect soils that are subject to compaction when they are wet. Machinery operations are only permitted when there are dry or frozen conditions or low impact equipment (such as cut-to-length systems) or equipment operating on slash may be used with close monitoring. Mechanical site preparation must be restricted to dry soil conditions.

Some of the sites have low percentages of the area that the Design Criteria actually apply to. Any site that has some area affected was listed in the following tables. If the site has 15% or less of the site that the Design Criteria applies to, operation restrictions does not need to be placed on the site because these areas could possibly be avoided. The 15% comes from Forest Plan Standard 1103 which allows up to 15% of an activity area to be detrimentally impacted.

**No Activity Design Criteria**

These are areas with slopes greater than 40% with very high erosion hazard or high mass wasting potential. Machinery operations including mechanical site preparation are not permitted on these areas.

**Table 27 – No Activity Design Criteria – Alternative 2**

<b>No Activity Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40301	38	133	1	1
40501	31	90	3	3
40901	108	94	2	2
40901	109	76	12	16
40901	110	40	8	20
40901	153	41	1	3
40901	159	67	1	2
40901	172	32	1	3
40902	101	53	8	16

<b>No Activity Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40902	102	13	3	20
40902	103	47	2	5
40902	106	40	5	12
40902	128	32	2	5
40902	130	59	1	2
40902	134	66	3	5
40902	138	89	2	2
40902	140	48	2	5
40902	180	143	3	2

<b>No Activity Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40902	187	44	2	4
40902	217	26	1	3

<b>No Activity Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40904	121	44	3	6
40904	144	39	19	48

**Table 27 continued – No Activity Design Criteria – Alternative 2**

<b>No Activity Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40904	145	59	39	66
40904	152	22	11	50

<b>No Activity Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40904	153	61	24	39
40904	160	30	6	21

**Table 28 – No Activity Design Criteria – Alternative 3**

<b>No Activity Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40301	38	133	1	1
40501	31	90	3	3
40901	108	94	2	2
40901	109	76	12	16
40901	110	40	8	20
40901	137	93	19	20
40901	11	106	2	2
40901	153	41	1	3
40901	159	67	1	2
40901	172	32	1	3
40902	101	53	8	16
40902	102	13	3	20
40902	103	47	2	5
40902	106	40	5	12
40902	128	32	2	5

<b>No Activity Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40902	130	59	1	2
40902	134	66	3	5
40902	138	89	2	2
40902	140	48	2	5
40902	180	143	3	2
40902	187	44	2	4
40902	217	26	1	3
40904	121	44	3	6
40904	144	39	19	48
40904	145	59	39	66
40904	152	22	11	50
40904	153	61	24	39
40904	160	30	6	21

**Table 29 – No Activity Design Criteria – Alternative 4**

<b>No Activity Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40301	38	133	1	1
40501	31	90	3	3
40901	108	94	2	2
40901	109	76	12	16
40901	110	40	8	20

<b>No Activity Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40901	153	41	1	3
40901	159	67	1	2
40901	172	32	1	3
40902	101	53	8	16
40902	102	13	3	20

<b>No Activity Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40902	103	47	2	5
40902	106	40	5	12
40902	128	32	2	5
40902	130	59	1	2
40902	134	66	3	5
40902	138	89	2	2
40902	140	48	2	5

<b>No Activity Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>No Activity Acres</b>	<b>% of Site</b>
40902	180	143	3	2
40902	187	44	2	4
40902	217	26	1	3
40904	121	44	3	6
40904	152	22	11	50
40904	153	61	24	39
40904	160	30	6	21

**Dry or Frozen Design Criteria**

These are areas with slopes 20% to 40% with very high erosion hazard or high mass wasting. Machinery operations must be restricted to dry or frozen soil conditions.

**Table 30 – Dry or Frozen Design Criteria – Alternative 2**

<b>Dry or Frozen Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40204	42	54	3	6
40301	38	133	5	4
40301	59	109	1	1
40301	64	331	9	3
40301	67	157	15	10
40301	72	106	8	8
40304	12	175	23	13
40304	26	80	11	14
40304	30	125	5	4
40304	42	107	2	2
40304	52	8	1	12
40304	53	29	6	21
40304	54	41	6	15
40304	68	55	2	4
40304	71	58	1	2
40304	73	31	2	6
40304	79	57	4	7
40304	81	15	8	55
40304	82	33	3	9
40501	31	90	30	33
40501	32	49	12	25
40501	37	36	13	37
40501	84	21	1	5

<b>Dry or Frozen Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40901	108	94	12	13
40901	109	76	15	20
40901	110	40	12	30
40901	111	36	2	5
40901	130	45	1	2
40901	153	41	1	2
40901	159	67	8	12
40901	172	32	5	16
40901	173	23	2	9
40901	174	30	7	24
40901	175	15	1	6
40901	185	45	1	2
40902	101	53	4	8
40902	102	13	3	24
40902	103	47	1	2
40902	106	40	3	7
40902	108	26	3	11
40902	123	53	7	13
40902	124	20	1	5
40902	128	32	8	25
40902	130	59	16	27
40902	134	66	25	38
40902	138	89	2	2

<b>Dry or Frozen Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40902	140	48	19	40
40902	141	72	2	3
40902	156	30	2	7
40902	160	57	20	35
40902	163	58	6	10
40902	166	45	7	16
40902	180	143	4	3
40902	187	44	21	48
40902	193	78	9	12
40902	217	26	15	57
40904	109	37	6	16

<b>Dry or Frozen Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40904	119	63	3	5
40904	121	44	13	29
40904	144	39	14	36
40904	145	59	9	15
40904	146	104	7	7
40904	152	22	3	14
40904	153	61	16	26
40904	160	30	5	17
40904	178	40	2	5
40904	181	12	1	8

**Table 31 – Dry or Frozen Design Criteria – Alternative 3**

<b>Dry or Frozen Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40204	42	54	3	6
40301	38	133	5	4
40301	43	55	10	18
40301	59	109	1	1
40301	64	331	9	3
40301	67	157	15	10
40301	72	106	8	8
40304	12	175	23	13
40304	26	80	11	14
40304	30	125	5	4
40304	35	50	4	8
40304	38	22	1	4
40304	39	22	2	9
40304	42	107	2	2
40304	52	8	1	12
40304	53	29	6	21
40304	54	41	6	15
40304	68	55	2	4
40304	71	58	1	2
40304	73	31	2	6
40304	79	57	4	7
40304	81	15	8	55
40304	82	33	3	9
40501	31	90	30	33

<b>Dry or Frozen Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40501	32	49	12	25
40501	37	36	13	37
40501	84	21	1	5
40901	108	94	12	13
40901	109	76	15	20
40901	110	40	12	30
40901	111	36	2	5
40901	130	45	1	2
40901	137	93	10	11
40901	151	106	8	8
40901	153	41	1	2
40901	159	67	8	12
40901	172	32	5	16
40901	173	23	2	9
40901	174	30	7	24
40901	175	15	1	6
40901	185	45	1	2
40902	101	53	4	8
40902	102	13	3	24
40902	103	47	1	2
40902	106	40	3	7
40902	108	26	3	11
40902	123	53	7	13
40902	124	20	1	5

<b>Dry or Frozen Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40902	128	32	8	25
40902	130	59	16	27
40902	134	66	25	38
40902	138	89	2	2
40902	140	48	19	40
40902	141	72	2	3
40902	156	30	2	7
40902	160	57	20	35
40902	163	58	6	10
40902	166	45	7	16
40902	180	143	4	3
40902	187	44	21	48
40902	193	78	9	12
40902	217	26	15	57
40903	131	83	3	4

<b>Dry or Frozen Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40903	142	34	4	12
40903	160	46	1	2
40903	184	41	4	10
40903	193	20	9	44
40904	109	37	6	16
40904	119	63	3	5
40904	121	44	13	29
40904	144	39	14	36
40904	145	59	9	15
40904	146	104	7	7
40904	152	22	3	14
40904	153	61	16	26
40904	160	30	5	17
40904	178	40	2	5
40904	181	12	1	8

**Table 32 – Dry or Frozen Design Criteria – Alternative 4**

<b>Dry or Frozen Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40204	42	54	3	6
40301	38	133	5	4
40301	59	109	1	1
40301	64	331	9	3
40301	67	157	15	10
40301	72	106	8	8
40304	12	175	23	13
40304	30	125	5	4
40304	52	8	1	12
40304	53	29	6	21
40304	54	41	6	15
40304	68	55	2	4
40304	71	58	1	2
40304	73	31	2	6
40304	79	57	4	7
40501	31	90	30	33
40501	32	49	12	25
40501	37	36	13	37
40501	84	21	1	5

<b>Dry or Frozen Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40901	108	94	12	13
40901	109	76	15	20
40901	110	40	12	30
40901	111	36	2	5
40901	130	45	1	2
40901	153	41	1	2
40901	159	67	8	12
40901	172	32	5	16
40901	173	23	2	9
40901	174	30	7	24
40901	175	15	1	6
40901	185	45	1	2
40902	101	53	4	8
40902	102	13	3	24
40902	103	47	1	2
40902	106	40	3	7
40902	108	26	3	11
40902	123	53	7	13
40902	124	20	1	5

<b>Dry or Frozen Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40902	128	32	8	25
40902	130	59	16	27
40902	134	66	25	38
40902	138	89	2	2
40902	140	48	19	40
40902	141	72	2	3
40902	156	30	2	7
40902	160	57	20	35
40902	163	58	6	10
40902	166	45	7	16
40902	180	143	4	3
40902	187	44	21	48

<b>Dry or Frozen Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Dry or Frozen Acres</b>	<b>% of Site</b>
40902	193	78	9	12
40902	217	26	15	57
40904	109	37	6	16
40904	119	63	3	5
40904	121	44	13	29
40904	146	104	7	7
40904	152	22	3	14
40904	153	61	16	26
40904	160	30	5	17
40904	178	40	2	5
40904	181	12	1	8

**Compaction Design Criteria**

These are areas that have soils that are subject to compaction when wet. Machinery operations must be restricted to dry or frozen soil conditions. Low impact equipment (such as cut-to-length systems) or equipment operating on slash may be used with close monitoring.

**Table 33 – Compaction Design Criteria – Alternative 2**

<b>Compaction Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
11703	47	24	24	98
40103	41	21	1	5
40201	6	32	31	96
40201	7	7	7	94
40201	8	63	63	100
40201	9	6	6	103
40201	14	24	23	96
40201	18	40	40	99
40201	23	88	86	97
40203	2	54	51	95
40204	5	45	43	96
40204	8	10	9	92
40204	9	9	9	102
40204	29	132	1	1
40204	36	15	15	103
40204	37	54	52	97
40204	39	42	42	99
40204	42	54	44	82
40204	44	86	84	97
40204	46	85	73	86
40204	48	46	43	93
40204	49	13	13	96
40204	51	34	30	89
40204	52	45	45	100
40204	54	48	47	99
40204	55	199	199	100
40204	56	90	89	99
40204	59	123	123	100
40204	65	10	9	94
40204	72	21	21	101
40204	84	6	6	94
40204	87	16	16	102
40204	88	20	20	100
40204	89	9	9	101
40204	92	40	40	101
40204	93	24	23	98
40204	94	12	3	24
40204	95	14	14	102
40204	98	44	44	100

<b>Compaction Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40204	99	5	5	109
40204	107	67	67	100
40204	110	29	29	99
40301	5	22	21	94
40301	6	54	46	84
40301	11	12	12	104
40301	12	54	53	98
40301	14	60	60	100
40301	16	68	64	94
40301	18	35	33	95
40301	19	43	37	86
40301	20	36	36	100
40301	31	47	45	97
40301	32	21	20	96
40301	36	20	20	101
40301	37	67	67	99
40301	38	133	123	93
40301	41	28	6	21
40301	48	78	78	99
40301	49	53	53	100
40301	51	47	47	100
40301	54	59	59	100
40301	55	15	15	98
40301	56	83	75	91
40301	58	119	115	96
40301	59	109	101	92
40301	64	331	291	88
40301	65	81	81	99
40301	66	30	30	100
40301	67	157	114	73
40301	69	18	18	99
40301	72	106	82	77
40301	78	29	29	99
40301	79	95	94	99
40301	84	18	17	94
40301	85	27	22	82
40301	92	5	5	101
40301	94	7	7	103
40301	95	10	10	104

**Table 33 continued – Compaction Design Criteria – Alternative 2**

<b>Compaction Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40301	97	30	30	100
40301	98	18	17	93
40301	99	64	64	100
40301	100	52	52	100
40301	101	25	25	101
40301	103	22	22	99
40301	105	12	12	101
40301	107	8	8	96
40301	108	41	41	100
40301	109	23	20	89
40301	110	24	24	101
40301	111	16	15	93
40301	112	86	84	97
40304	12	175	110	63
40304	13	3	1	29
40304	17	29	26	89
40304	26	80	39	49
40304	30	125	73	58
40304	52	8	8	95
40304	53	29	19	65
40304	54	41	5	12
40304	78	25	25	99
40304	79	57	26	46
40304	81	15	11	75
40304	82	33	29	87
40501	14	27	26	97
40501	22	81	81	100
40501	31	90	49	54
40501	32	49	21	43
40501	34	68	68	99
40501	37	36	2	6
40501	43	29	29	98
40501	52	29	29	100
40501	53	26	25	98
40501	60	20	20	102
40501	61	37	37	100
40501	63	6	6	93
40501	69	3	3	113
40501	81	14	14	103

<b>Compaction Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40501	84	21	19	91
40502	9	30	30	101
40502	12	39	38	97
40502	16	33	33	101
40502	29	81	80	99
40502	35	64	64	100
40502	36	17	17	101
40502	53	42	42	101
40502	54	16	16	99
40801	15	7	7	96
40901	102	25	25	100
40901	105	61	60	98
40901	108	94	73	77
40901	109	76	45	59
40901	110	40	19	47
40901	111	36	35	96
40901	128	30	30	99
40901	130	45	44	98
40901	132	51	51	99
40901	133	43	43	101
40901	134	51	51	99
40901	138	55	55	100
40901	144	35	34	97
40901	145	21	19	89
40901	146	70	69	99
40901	153	41	38	93
40901	155	80	77	96
40901	157	38	37	97
40901	159	67	57	85
40901	160	91	91	100
40901	162	17	17	103
40901	163	50	50	101
40901	164	65	65	100
40901	166	28	27	97
40901	167	32	32	101
40901	168	43	43	100
40901	169	22	22	99
40901	170	14	12	86
40901	171	22	21	95

**Table 33 continued – Compaction Design Criteria – Alternative 2**

<b>Compaction Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40901	172	32	25	78
40901	173	23	19	84
40901	174	30	20	67
40901	175	15	15	97
40901	185	45	43	96
40901	186	59	59	101
40901	187	34	34	99
40901	188	36	36	99
40901	215	59	17	29
40901	218	16	16	101
40901	221	7	7	106
40902	101	53	40	76
40902	102	13	6	48
40902	103	47	44	93
40902	106	40	32	80
40902	108	26	22	84
40902	109	15	15	98
40902	114	23	23	98
40902	118	42	42	100
40902	123	53	43	81
40902	124	20	9	45
40902	125	19	19	100
40902	126	96	95	99
40902	128	32	22	69
40902	130	59	36	61
40902	134	66	32	49
40902	138	89	82	93
40902	140	48	15	31
40902	141	72	68	94
40902	146	42	42	99
40902	156	30	26	88
40902	158	41	41	99
40902	160	57	26	46
40902	162	64	63	99
40902	163	58	51	88

<b>Compaction Design Criteria – Alt 2</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40902	166	45	37	82
40902	168	43	43	101
40902	176	56	55	99
40902	180	143	133	93
40902	187	44	11	25
40902	193	78	63	81
40902	203	52	41	78
40902	207	9	9	100
40902	208	6	6	97
40902	217	26	9	34
40902	223	55	55	99
40903	174	46	39	85
40903	176	68	64	95
40903	188	38	35	93
40903	241	51	51	100
40904	108	32	32	100
40904	109	37	27	73
40904	118	27	26	95
40904	119	63	52	82
40904	121	44	25	56
40904	125	52	52	101
40904	144	39	3	8
40904	145	59	8	13
40904	146	104	85	82
40904	147	45	44	99
40904	152	22	7	32
40904	153	61	14	23
40904	160	30	17	56
40904	165	40	38	96
40904	166	10	10	96
40904	177	16	16	98
40904	178	40	36	90
40904	181	12	11	90
40904	185	14	14	98

**Table 34 – Compaction Design Criteria – Alternative 3**

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
11703	47	24	24	98
40103	41	21	1	5
40201	6	32	31	96
40201	7	7	7	94
40201	8	63	63	100
40201	9	6	6	103
40201	10	31	30	98
40201	14	24	23	96
40201	18	40	40	99
40201	23	88	86	97
40203	2	54	51	95
40204	5	45	43	96
40204	8	10	9	92
40204	9	9	9	102
40204	29	132	1	1
40204	36	15	15	103
40204	37	54	52	97
40204	39	42	42	99
40204	42	54	44	82
40204	44	86	84	97
40204	46	85	73	86
40204	48	46	43	93
40204	49	13	13	96
40204	51	34	30	89
40204	52	45	45	100
40204	54	48	47	99
40204	55	199	199	100
40204	56	90	89	99
40204	59	123	123	100
40204	65	10	9	94
40204	72	21	21	101
40204	84	6	6	94
40204	87	16	16	102
40204	88	20	20	100
40204	89	9	9	101
40204	92	40	40	101
40204	93	24	23	98
40204	94	12	3	24
40204	95	14	14	102

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40204	98	44	44	100
40204	99	5	5	109
40204	107	67	67	100
40204	110	29	29	99
40301	5	22	21	94
40301	6	54	46	84
40301	11	12	12	104
40301	12	54	53	98
40301	14	60	60	100
40301	16	68	64	94
40301	18	35	33	95
40301	19	43	37	86
40301	20	36	36	100
40301	21	63	63	99
40301	23	38	38	100
40301	30	128	128	100
40301	31	47	45	97
40301	32	21	20	96
40301	33	102	101	99
40301	36	20	20	101
40301	37	67	67	99
40301	38	133	123	93
40301	41	28	6	21
40301	43	55	34	62
40301	44	61	61	100
40301	45	43	43	101
40301	48	78	78	99
40301	49	53	53	100
40301	51	47	47	100
40301	54	59	59	100
40301	55	15	15	98
40301	56	83	75	91
40301	58	119	115	96
40301	59	109	101	92
40301	64	331	291	88
40301	65	81	81	99
40301	66	30	30	100
40301	67	157	114	73
40301	69	18	18	99

**Table 34 continued – Compaction Design Criteria – Alternative 3**

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40301	72	106	82	77
40301	78	29	29	99
40301	79	95	94	99
40301	84	18	17	94
40301	85	27	22	82
40301	92	5	5	101
40301	94	7	7	103
40301	95	10	10	104
40301	97	30	30	100
40301	98	18	17	93
40301	99	64	64	100
40301	100	52	52	100
40301	101	25	25	101
40301	103	22	22	99
40301	105	12	12	101
40301	107	8	8	96
40301	108	41	41	100
40301	109	23	20	89
40301	110	24	24	101
40301	111	16	15	93
40301	112	86	84	97
40301	116	35	35	99
40304	12	175	110	63
40304	13	3	1	29
40304	17	29	26	89
40304	26	80	39	49
40304	30	125	73	58
40304	35	50	7	14
40304	36	24	5	21
40304	38	22	21	94
40304	52	8	8	95
40304	53	29	19	65
40304	54	41	5	12
40304	78	25	25	99
40304	79	57	26	46
40304	81	15	11	75
40304	82	33	29	87
40501	14	27	26	97
40501	22	81	81	100

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40501	31	90	49	54
40501	32	49	21	43
40501	34	68	68	99
40501	37	36	2	6
40501	43	29	29	98
40501	52	29	29	100
40501	53	26	25	98
40501	60	20	20	102
40501	61	37	37	100
40501	63	6	6	93
40501	69	3	3	113
40501	81	14	14	103
40501	84	21	19	91
40502	9	30	30	101
40502	12	39	38	97
40502	16	33	33	101
40502	29	81	80	99
40502	35	64	64	100
40502	36	17	17	101
40502	53	42	42	101
40502	54	16	16	99
40801	15	7	7	96
40901	102	25	25	100
40901	105	61	60	98
40901	108	94	73	77
40901	109	76	45	59
40901	110	40	19	47
40901	111	36	35	96
40901	128	30	30	99
40901	130	45	44	98
40901	132	51	51	99
40901	133	43	43	101
40901	134	51	51	99
40901	135	38	36	95
40901	136	18	17	95
40901	137	93	58	62
40901	138	55	55	100
40901	144	35	34	97
40901	145	21	19	89

**Table 34 continued – Compaction Design Criteria – Alternative 3**

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40901	146	70	69	99
40901	151	106	94	88
40901	153	41	38	93
40901	155	80	77	96
40901	157	38	37	97
40901	159	67	57	85
40901	160	91	91	100
40901	162	17	17	103
40901	163	50	50	101
40901	164	65	65	100
40901	166	28	27	97
40901	167	32	32	101
40901	168	43	43	100
40901	169	22	22	99
40901	170	14	12	86
40901	171	22	21	95
40901	172	32	25	78
40901	173	23	19	84
40901	174	30	20	67
40901	175	15	15	97
40901	185	45	43	96
40901	186	59	59	101
40901	187	34	34	99
40901	188	36	36	99
40901	215	59	17	29
40901	218	16	16	101
40901	221	7	7	106
40902	101	53	40	76
40902	102	13	6	48
40902	103	47	44	93
40902	106	40	32	80
40902	108	26	22	84
40902	109	15	15	98
40902	114	23	23	98
40902	118	42	42	100
40902	123	53	43	81
40902	124	20	9	45
40902	125	19	19	100
40902	126	96	95	99

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40902	128	32	22	69
40902	130	59	36	61
40902	134	66	32	49
40902	138	89	82	93
40902	140	48	15	31
40902	141	72	68	94
40902	146	42	42	99
40902	156	30	26	88
40902	158	41	41	99
40902	160	57	26	46
40902	162	64	63	99
40902	163	58	51	88
40902	166	45	37	82
40902	168	43	43	101
40902	176	56	55	99
40902	180	143	133	93
40902	187	44	11	25
40902	193	78	63	81
40902	203	52	41	78
40902	207	9	9	100
40902	208	6	6	97
40902	217	26	9	34
40902	223	55	55	99
40903	116	24	22	93
40903	131	83	75	91
40903	138	25	25	101
40903	142	34	24	71
40903	160	46	44	96
40903	169	27	27	98
40903	174	46	39	85
40903	176	68	64	95
40903	184	41	34	83
40903	188	38	35	93
40903	193	20	8	40
40903	209	52	45	87
40903	213	77	74	96
40903	241	51	51	100
40903	242	45	44	99
40904	108	32	32	100

**Table 34 continued – Compaction Design Criteria – Alternative 3**

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40904	109	37	27	73
40904	118	27	26	95
40904	119	63	52	82
40904	121	44	25	56
40904	125	52	52	101
40904	144	39	3	8
40904	145	59	8	13
40904	146	104	85	82
40904	147	45	44	99

<b>Compaction Design Criteria – Alt 3</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40904	152	22	7	32
40904	153	61	14	23
40904	160	30	17	56
40904	165	40	38	96
40904	166	10	10	96
40904	177	16	16	98
40904	178	40	36	90
40904	181	12	11	90
40904	185	14	14	98

**Table 35 – Compaction Design Criteria – Alternative 4**

<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
11703	47	24	24	98
40103	41	21	1	5
40201	6	32	31	96
40201	7	7	7	94
40201	8	63	63	100
40201	9	6	6	103
40201	18	40	40	99
40201	23	88	86	97
40203	2	54	51	95
40204	5	45	43	96
40204	8	10	9	92
40204	9	9	9	102
40204	29	132	1	1
40204	36	15	15	103
40204	37	54	52	97
40204	39	42	42	99
40204	42	54	44	82
40204	44	86	84	97
40204	46	85	73	86
40204	48	46	43	93
40204	49	13	13	96
40204	51	34	30	89
40204	52	45	45	100
40204	54	48	47	99

<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40204	55	199	199	100
40204	65	10	9	94
40204	72	21	21	101
40204	84	6	6	94
40204	87	16	16	102
40204	88	20	20	100
40204	89	9	9	101
40204	92	40	40	101
40204	93	24	23	98
40204	94	12	3	24
40204	95	14	14	102
40204	98	44	44	100
40204	99	5	5	109
40204	107	67	67	100
40204	110	29	29	99
40301	5	22	21	94
40301	6	54	46	84
40301	11	12	12	104
40301	12	54	53	98
40301	14	60	60	100
40301	16	68	64	94
40301	18	35	33	95
40301	19	43	37	86
40301	20	36	36	100

**Table 35 continued – Compaction Design Criteria – Alternative 4**

<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40301	31	47	45	97
40301	32	21	20	96
40301	36	20	20	101
40301	37	67	67	99
40301	38	133	123	93
40301	41	28	6	21
40301	51	47	47	100
40301	54	59	59	100
40301	55	15	15	98
40301	56	83	75	91
40301	58	119	115	96
40301	59	109	101	92
40301	64	331	291	88
40301	65	81	81	99
40301	66	30	30	100
40301	67	157	114	73
40301	69	18	18	99
40301	72	106	82	77
40301	78	29	29	99
40301	79	95	94	99
40301	84	18	17	94
40301	85	27	22	82
40301	92	5	5	101
40301	94	7	7	103
40301	95	10	10	104
40301	97	30	30	100
40301	98	18	17	93
40301	99	64	64	100
40301	100	52	52	100
40301	101	25	25	101
40301	103	22	22	99
40301	105	12	12	101
40301	107	8	8	96
40301	108	41	41	100
40301	109	23	20	89
40301	110	24	24	101
40301	111	16	15	93
40304	12	175	110	63
40304	13	3	1	29

<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40304	17	29	26	89
40304	30	125	73	58
40304	52	8	8	95
40304	53	29	19	65
40304	54	41	5	12
40304	78	25	25	99
40304	79	57	26	46
40501	14	27	26	97
40501	22	81	81	100
40501	31	90	49	54
40501	32	49	21	43
40501	34	68	68	99
40501	37	36	2	6
40501	43	29	29	98
40501	52	29	29	100
40501	53	26	25	98
40501	60	20	20	102
40501	61	37	37	100
40501	63	6	6	93
40501	69	3	3	113
40501	81	14	14	103
40501	84	21	19	91
40502	9	30	30	101
40502	12	39	38	97
40502	16	33	33	101
40502	29	81	80	99
40502	35	64	64	100
40502	36	17	17	101
40502	53	42	42	101
40502	54	16	16	99
40801	15	7	7	96
40901	102	25	25	100
40901	105	61	60	98
40901	108	94	73	77
40901	109	76	45	59
40901	110	40	19	47
40901	111	36	35	96
40901	128	30	30	99
40901	130	45	44	98

**Table 35 continued – Compaction Design Criteria – Alternative 4**

<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40901	132	51	51	99
40901	133	43	43	101
40901	134	51	51	99
40901	138	55	55	100
40901	144	35	34	97
40901	145	21	19	89
40901	146	70	69	99
40901	153	41	38	93
40901	155	80	77	96
40901	157	38	37	97
40901	159	67	57	85
40901	160	91	91	100
40901	162	17	17	103
40901	163	50	50	101
40901	164	65	65	100
40901	166	28	27	97
40901	167	32	32	101
40901	168	43	43	100
40901	169	22	22	99
40901	170	14	12	86
40901	171	22	21	95
40901	172	32	25	78
40901	173	23	19	84
40901	174	30	20	67
40901	175	15	15	97
40901	185	45	43	96
40901	186	59	59	101
40901	187	34	34	99
40901	188	36	36	99
40901	215	59	17	29
40901	218	16	16	101
40901	221	7	7	106
40902	101	53	40	76
40902	102	13	6	48
40902	103	47	44	93
40902	106	40	32	80
40902	108	26	22	84
40902	109	15	15	98
40902	114	23	23	98

<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40902	118	42	42	100
40902	123	53	43	81
40902	124	20	9	45
40902	125	19	19	100
40902	126	96	95	99
40902	128	32	22	69
40902	130	59	36	61
40902	134	66	32	49
40902	138	89	82	93
40902	140	48	15	31
40902	141	72	68	94
40902	146	42	42	99
40902	156	30	26	88
40902	158	41	41	99
40902	160	57	26	46
40902	162	64	63	99
40902	163	58	51	88
40902	166	45	37	82
40902	168	43	43	101
40902	176	56	55	99
40902	180	143	133	93
40902	187	44	11	25
40902	193	78	63	81
40902	203	52	41	78
40902	207	9	9	100
40902	208	6	6	97
40902	217	26	9	34
40902	223	55	55	99
40903	174	46	39	85
40903	176	68	64	95
40903	188	38	35	93
40903	241	51	51	100
40904	108	32	32	100
40904	109	37	27	73
40904	118	27	26	95
40904	119	63	52	82
40904	121	44	25	56
40904	125	52	52	101
40904	146	104	85	82

**Table 35 continued – Compaction Design Criteria – Alternative 4**

<b>Table 35 continued – Compaction Design Criteria – Alternative 4</b>				
<b>Compaction Design Criteria – Alt 4</b>				
<b>Location</b>	<b>Site</b>	<b>Site Acres</b>	<b>Compaction Acres</b>	<b>% of Site</b>
40904	147	45	44	99
40904	152	22	7	32
40904	153	61	14	23
40904	160	30	17	56
40904	165	40	38	96
40904	166	10	10	96
40904	177	16	16	98
40904	178	40	36	90
40904	181	12	11	90
40904	185	14	14	98

Protected stream courses have an activity buffer called the Water Influence Zone (WIZ) which is 200 ft. total width, 100 feet each side of the stream. Activities can occur in the WIZ but care will need to be taken to minimize impacts in the WIZ. Use designated skid trails in these areas.

Keep heavy equipment out of streams, swales, and lakes, except to cross at designated points, build crossings, or do restoration work, or if protected by at least 1 foot of packed snow or 2 inches of frozen soil. Keep heavy equipment out of streams during fish spawning, incubation, and emergence periods (FSH 2509.25).

Ensure at least one-end log suspension in the WIZ. Fell trees in a way that protects vegetation in the WIZ from damage. Keep log landings and skid trails out of the WIZ, including swales (FSH 2509.25).

The protected stream courses in the Norwood project area include all perennial and intermittent streams shown on map 12 in Appendix A. Ephemeral streams, also shown on map 12, are not protected streamcourses. The following table provides a list of protected streamcourses by name. Some of the WIZ is located on private land.

**Protected Stream Courses in Norwood**

Stream Name
Bear Run
Bear Spring*
Beaver Creek
Cold Creek
Cold Springs Creek
Sherwood Spring*
Slicker Dick Spring*
Stots Spring*
Summit Spring*
Thompson Spring*
Tributary to Beaver Creek*

## Wet Parmlee Canyon

\*These protected stream courses are isolated perennial streams. They pop up as springs and flow for a ways and then disappear. The channels below these perennial sections are ephemeral. The others, only four, are streams that flow off of the forest.

### Recreation

- Recognize the importance of the snowmobile trails and Beaver Creek Ski Area location and plan harvest activities around the Dec 15 to March 31 snowmobile and ski area closure season dates. Move a trail section temporarily, as a last resort, to achieve sale objectives. Give at least six months advance notice to the State of South Dakota Trails Staff if a snowmobile trail must be moved in order to allow adequate time to find, plan and prepare a reroute.
- Feature provisions in sale contracts to protect ski and snowmobile trails such as season of operation, protecting trail signs from damage and clearing trail locations of all logging debris prior to December 15<sup>th</sup> annually. Avoid using trail locations as skid roads and log decks, skid 90 degrees to trails.
- Harvest prescriptions for Beaver Creek Ski Trails should be “retention” of low risk larger diameter trees within 100 feet of a trail. Whole tree skidding should occur within 100 feet of ski trails and campgrounds to limit slash.
- Implement fuels projects to clean woody debris left from sale harvesting as early as possible to leave an open, park like setting for the recreation visitor. Mechanical chipping and shredding and small “tepee” style burn piling is preferred over large slash piles especially in high visibility public areas such as along main roads or intersections for aesthetic reasons.
- Slash pile and prescribed burning should be accomplished when air quality will be least affected. Winter fuels work should utilize snowmobile access to not affect groomed snowmobile trails. Forest Service snowmobile use in Beaver Creek Winter Motorized Closure Area is possible with administrative approval but the least preferred option for winter access. Off trail snowmobile tracks encourage more snowmobile use of the area.
- For safety, adequate road signing and campground bulletin board posting should warn the public of logging activity including trucks hauling, closed roads or other items associated with harvesting.
- Any fencing of open spring water sources for wildlife or other protection purposes should be designed to allow recreational horse rider access to obtain water for their animals, where appropriate.
- Any new gates or other closure devices should be designed for passage by allowable recreational traffic to the area such as horse use, hiker, skier and/or OHV, appropriate to width dimensions of allowable vehicle.

### Fuels

- Slash pile burning should be accomplished when air quality would be least affected.
- Activity fuels will be removed, lopped, scattered, or piled for later burning. Slash piles, other than those created for wildlife habitat, should be burned within one year if conditions allow. This will reduce the risk of mortality from Ips beetle.

- Broadcast prescribed burning should be designed to limit mortality in polesize and sawtimber sized pine stands to that prescribed in the site specific silvicultural prescription, based on the particular objectives for each site.

## **Timber**

- The practices outlined in “Best Management Practices for the control of Non-Point Pollution from Silvicultural and Related Road Activities” will be followed.
- Within harvest units, trees identified as diseased or insect infested would be removed in order to prevent any future infestations.
- Aspen stands should be whole tree harvested when removing commercial sized conifers to insure conifers can be removed without excess damage to remaining aspen. This will also eliminate shading of the ground by logging slash. If conifer slash is to be piled and burned, piles need to be placed at least one tree height away from the edge of the aspen to avoid damage to the roots from the intense fire (Sheppard, 10-2004). Fencing the aspen regeneration will keep cattle from browsing on the aspen suckers but will not keep the elk and deer out. Other temporary barriers will need to be developed to prevent browsing by deer and elk.

## **Scenery**

- Follow the most current Black Hills NF “Visual Marking Guides & Map” - at the time of project layout & marking implementation.
- Visual marking will be used within site distance of arterial and collector roads and private land with dwellings.
- The overstory removals along the northwest side of the planning area (Sites 040204-16 ; 040203-45 ; 040301-38 ; 040304-12, -13, -30, -47, -48, -49 -53, -54, -78, -79 ) will be evident from private lands to the west. Feather the edges of these sites to meet an assigned SIO of Moderate.
- Along Sensitivity Level 1 corridors: U.S. Hwy. 85 and Wyoming State Hwy. 585, and Sensitivity Level 2 corridors: County Road 809 (Wyoming), Forest Development Road (FDR) 109, 110, 111, 117, 231, 265, 284, 294, 301, 384, 807, 809, include the following:
  1. Where prescribed fire occurs adjacent to these travel corridors, burn **toward** the road or trail to limit scorch height to 2 feet above the ground, where possible. Where this is not possible due to terrain, cooler firing conditions and firing techniques, should be considered and used, to limit scorch heights.
  2. Clean up log decks within 300 feet of travel corridors by returning to original contours, scarify to eliminate compaction (as necessary), and plant with native grass seed.
  3. Slash should be cleaned up to natural levels within 300 feet of these travel corridors.
  4. Skid trails are utilized during dry, or frozen, conditions to minimize soil disturbance. Where soil is displaced, re-contour to adjacent slope, and seed with native grasses.
  5. Slash, once placed on the ground, needs to be treated in accordance with Forest Plan Guideline 5606. (“Where the SIO criterion is High or Moderate, meet the criterion within one full growing season after completion of a project. In WUI (Wildland Urban Interface) areas, the moderate SIO should be met within 2-4

years after fire – hazard objective is met. Future management activities in WUI (area)s shall meet SIO within 1 year of treatment. Where it is Low or Very Low, meet the criterion within three full growing seasons after completion of a project.”).

6. Treatments around private lands, in forested areas, should blend with the current condition on those lands, where possible. Avoid creating strong lines between private and Forest Service boundaries. Avoid creating an obvious edge between the treated and un-treated areas, particularly where one boundary line, or more, runs straight up a slope (at a right angle to the contours) creating a very un-natural appearing form in the landscape. The transition zone width is dependent upon management and use of private lands, slope, and variety of vegetation. A feathered horizontal transition zone of 1.5 times the height of the overstory is recommended – at a minimum. Within this zone reduce the density and tree size to transition from the treated to the un-treated. Units that create an obviously un-natural vegetative pattern will draw attention to itself and not meet LRMP, or national handbook direction. Particular locations where this is evident are all Special Cut units.

### **Noxious Weeds and Botany**

- Noxious weed control, as proposed in identified post harvest (kv) projects is essential, as is monitoring the effectiveness of the noxious weed control.
- The known occurrences of plant species of local concern, and South Dakota state listed plant species will be identified on the map as sensitive areas to be avoided during treatment and flagged on the ground when necessary.
- Areas of mesic white spruce forest, riparian areas, and meadows may be habitat for R2 sensitive plant species. These areas should be left undisturbed as much as possible; no roads, skid trails, landings or burn piles should be constructed in these areas.
- Follow all Forest Plan Objectives, Standards, and Guidelines relating to R2 sensitive species, weed control, and revegetation. These include, but may not be limited to the following:

**Standard 1110** Initiate revegetation as soon as possible, not to exceed 6 months after termination of ground-disturbing activities. Revegetate all disturbed soils with native species in seed/plant mixtures that are noxious weed-free. On areas needing the immediate establishment of vegetation, non-native, non-aggressive annuals (e.g., wheat, oats, rye) or sterile species may be used while native perennials are becoming established, or when native species are not available (e.g., during drought years or years when wildfires burn large acreages in the United States). Other aggressive non-native perennials (e.g. smooth brome, timothy) will not be used. Seed will be tested for noxious weeds. If mulches are used they are to be noxious weed free.

**Standard 3104** Do not develop springs or seeps as water facilities where sensitive species or species of local concern exist unless development mitigate an existing risk.

**Standard 3106** Riparian areas or wetlands, where populations of sensitive plants are located, should be protected during and after trail, road, and highway construction activities.

**Standard 3115** A R2 sensitive species or species of local concern located after contract or permit formation will be appropriately managed by active coordination between permittee, contractor or purchaser, Forest Service line officer, project administrator, and biologist and/or botanist. Solutions need to be based on the circumstances of each new discovery and must consider the species need, contractual obligations and costs, and mitigation measures available at the time of discovery.

- **Follow Forest Service Manual Objectives relating to R2 sensitive species.** These include, but may not be limited to the following:

**2672.102 - Objective** In many cases due to timelines involved in project level planning, the irregularity of occurrence of some sensitive plant and animal species, and limitations in budget and personnel, precise population and/or occurrence data can be difficult to obtain. In those cases, individual projects would be required to 'assume presence' if there is evidence of or potential for sensitive species and/or their habitats to occur within the proposed project area. All actions and mitigations would be based on this assumption.

## **Wildlife**

### **Sensitive Species**

*Standard 3111:* From April 1 through August 15, minimize additional human-caused noise and disruption beyond that occurring at the time of nest initiation (e.g. road traffic, timber harvests, construction activities) within one-half mile of all active goshawk nest up until the nest has failed or fledglings have dispersed.

*Standard 3115:* “A R2 sensitive species or species of local concern located after contract or permit issuance will be appropriately managed by active coordination between permittee, contractor or purchaser, Forest Service line officer, project administrator, and biologist and/or botanist. Solutions need to be based on the circumstances of each new discovery and must consider the species need, contractual obligations and costs, and mitigation measures available at the time of discovery.”

### **Snags/Down Woody Material**

No snags will be cut unless deemed a safety hazard. Snags determined to be a safety hazard should be felled and left in place. Existing snags and down woody material (>10” diameter) will be protected during prescribed burning where feasibility and safety permits. Standards 2301, 2305 and 2308 must be met with the proposed broadcast burning in the Norwood Project Area.

Prior to burning treatment consult with the silviculturist and wildlife biologist.

### **Small Mammal Habitat**

*Standard 3117:* “In vegetation treatment units, leave 1 pile of woody material per 2 acres to create near-ground structure for small mammal species, except within 300 feet of buildings.”

If piles are created while accomplishing mechanical vegetation treatments, including mechanical fuel treatments, leave 1 pile per 2 acres for small mammal habitat. Piles do not need to be any particular size. As a pile size guideline aim for approximately 10' x 10' and 6' in height. – *This will benefit American marten and other small mammal predatory species by creating near-ground structure for prey species.*

**Big Game – Screening Cover**

*Guideline 3203:* “Provide big game screening along at least 20 percent of the edges of arterial and collector roads. Consider vegetation, slopes, landform, etc. in evaluating available screening.”

Screening cover could be reduced along FS 117.1 with the proposed non-commercial fuel treatments. Current screening cover is adequate along this road but it is not advisable to drop this level below 20% cover. The following table lists the sites that need screening cover retained for big game.

**Sites Proposed for Non-commercial Treatments that Need Screening Cover Retained**

Location	Site	Acres	Proposed fuel treatment	Comments
040901	200	72	Mechanical only	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040901	217	56	Mechanical slash and broadcast burn	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040902	113	103	Mechanical slash and broadcast burn	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040902	115	120	Mechanical thin and broadcast burn	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040902	117	66	Mechanical thin and broadcast burn	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040902	147	30	Mechanical thin and broadcast burn	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040902	148	24	Mechanical	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1
040902	207	9	Mechanical	Retain seedlings/saplings for screening cover within 200 feet of FS 117.1

**Bats/Caves**

Any caves or mines discovered during sale layout, sale operations, or post sale layout will be reported to the District Wildlife Biologist and District Archaeologist for evaluation.

If caves or mines with bats are found, refer to FS Standards 1401, 3102, 3207, 3208 and 3209. These standards apply to known caves and mines. There are no known caves, mines or bat hibernacula in the Norwood Project Area.

**Raptors**

*Standard 3204:* “Protect known raptor nests. Consider potential effects of disturbance, nesting phenology, human activities existing at onset of nest initiation, species, topography, other R2 sensitive species and plant species of local concern, forest cover, nest protection standards and recommendations used by state or federal agencies, and other appropriate factors when designing protection.”

Prior to starting any activities in the sites listed in Table XIII-2, consult with a District Biologist. A Biologist will check the known raptor nests for any indication of use. If no use is detected the commercial and non-commercial activities may be allowed to proceed during the time period buffer.

**Sites Proposed for Treatment in Raptor Nest Areas Requiring Protection**

<b>Location</b>	<b>Site</b>	<b>Alternatives proposing treatment</b>	<b>Protected nest</b>	<b>Comments***</b>
<b>Commercial Treatments</b>				
040301	37	2, 3 and 4	Turkey vulture	Site 040301-1
040301	41	2, 3 and 4		Buffer: .5 miles May 1- August 15
040301	43	3 only		The time buffer refers to
040301	44	3 only		Activity within the spatial
040301	45	3 only		Buffer.
040301	48	2 and 3		
040301	49	2 and 3		
040301	54	2, 3 and 4		
040103	21	2, 3 and 4	Red-tailed hawk	Border of sites 040103-7 and 26
040103	22	2, 3 and 4		Buffer: .5 miles March 15-August 15
040203	28	2, 3 and 4		
040203	31	2, 3 and 4		
040203	59	3 only		
040203	65	2, 3 and 4		
040203	66	3 only		
011703	47	2, 3 and 4	Red-tailed hawk	Site 040103-30
040103	30	2, 3 and 4		Buffer: .5 miles March 15-August 15
040103	41	2, 3 and 4		
040203	59	3 only		
<b>Non-commercial treatment</b>				<b>Fuel breaks</b>

040103	7	2, 3 and 4	Red-tailed hawk	Border of sites 040103-7 and 26
040103	22	2, 3 and 4		Buffer: .5 miles March 15-August 15
040103	26	2, 3 and 4		
040103	27	2, 3 and 4		
040103	29	2, 3 and 4		
040203	31	2, 3 and 4		
040203	60	2, 3 and 4		
040203	65	2, 3 and 4		
040103	6	2, 3 and 4	Red-tailed hawk	Site 040103-30
040103	26	2, 3 and 4		Buffer: .5 miles March 15-August 15
040103	29	2, 3 and 4		
040103	30	2, 3 and 4		
040203	59	2, 3 and 4		
040203	60	2, 3 and 4		

\*\*\* The spatial buffers of .5 miles have a corresponding time period buffer when activity, such as commercial treatments and fuel breaks, is not to take place.

### **Northern Leopard Frog/Black Hills Red-bellied Snake**

*Objective 240-HAB:* “Manage and/or install structures to provide water for livestock and to protect the aquatic, shoreline and upland vegetation around ponds or water catchments containing leopard frogs.”

*Standard 3104:* “Do not develop springs or seeps as water facilities where sensitive species or species of local concern exist unless development mitigates an existing risk.”

*Standard 3106:* “Riparian areas or wetlands where populations of sensitive species are located are to be avoided during ground disturbing activities. Use one or more of the following (or other mitigation measures) tied to the site-specific conditions for disturbances adjacent to known occurrences:

- a. Avoid removing riparian or wetland vegetation; filling or dredging the riparian area or wetland; diverting stream flow from the current channel.
- b. Prevent storm runoff from washing silt into the stream or wetland.
- c. Reseed and/or replant cut and fill slopes with native seed and/or native plants promptly to control erosion and for prevention of noxious-weed infestations. Use appropriate measures to control erosion on disturbed areas that are steep, are highly erosive, and/or adjacent to the riparian area.
- d. Timing, placement, and installation of temporary stream diversions shall allow passage of aquatic life and protect sensitive and species of local concern.”

*Standard 3116:* “Avoid creating barriers (e.g., new open roads) between red-bellied snake hibernacula and wetlands.”

Refer to the Norwood Project Area BA/BE for more information on the northern leopard frog and red-bellied snake, R2 sensitive species, in the project area. Refer to the ‘Wildlife Post-Harvest Project Proposals’ section below for a list of riparian areas that are planned for protection fencing. Consult with a District Biologist prior to any work in a riparian area containing northern leopard frogs. If during any activities in the project area red-bellied snakes are observed or a potential hibernacula is found, contact a District Biologist. If a hibernacula/breeding site is found a buffer may be established around the riparian area and the hibernacula.

## **Heritage**

**Design Criteria:** Within the Norwood Project area there are fourteen cultural resources determined eligible for listing on the National Register of Historic Places. The South Dakota State Historic Preservation Office (SHPO) concurs with these determinations. Furthermore, SHPO concurs with a finding of No Adverse Effect, *provided* that these fourteen cultural resources are avoided by all ground disturbing activities during project implementation. If during the course of any ground disturbance related to this project, any bones, artifacts, foundations, or other indications of past human occupation of the area are uncovered, the project must be temporarily stopped until the SHPO has been notified and had a chance to comment.

### **Action Alternatives 2, 3, and 4:**

There are six sites where specific design criteria need to be implemented in order to achieve No Adverse Effect for the proposed action. The design criteria are the same for each action alternative because the six sites are located in areas where the proposed actions do not vary by alternative.

(39PN0047): The eastern margin of this site is in an area where commercial thinning is proposed. The area where the unit intersects with the site should be avoided. Close off the adjacent road. Lay barrier fabric/road base around stock tank slopes. Monitor more frequently for livestock damage and potential vandalism. Exclude all logging activity from site. No more KV slash piling on site.

Proposed KV activities on site include the installation of improvement identification signs for the adjacent spring, and the construction of enclosure fences around the spring to protect riparian habitat. Digging postholes for both the fence and the sign has the potential to reveal additional buried cultural deposits. As such, an archaeologist should be on site to monitor these ground disturbing activities. In addition, the riparian protection fence would benefit any subsurface cultural deposits by protecting them from cattle traffic. As a ground disturbing activity, this proposed action is subject cultural resource protection laws and policies outlined in FSM 2361.3, 36CFR 800, Section 106 of the NHPA, ARPA, and NAGPRA.

(39PN0340): This site is located in areas where treatment for pine encroachment, commercial thinning, and fuels treatments are proposed. No staging activities should occur on site. Heavy

equipment should not be operated on site. Treatment activities should be limited to winter periods when snow loads are sufficient to prevent ground disturbance or soil compaction. An archaeologist should be on site when activities are initiated. No slash piling or skidding. Hand operations are acceptable; complete avoidance is preferred.

In conjunction with the Thompson Reservoir Enclosure Project (Kjar 2006), a buck and rail fence will enclose the on-site stock dam. This enclosure is intended to protect leopard frog habitat, though it will also protect the archaeological site from damage due to OHVs. Furthermore, the area where livestock access the reservoir will have a gravel pad applied to protect the cultural deposits from hoof traffic. Additionally, barrier cloth and road base must be added to FSR 724 where it cuts through the south end of the site. The road would need to be covered 3 meters wide by approximately 100 meters long.

Proposed KV activities include the addition of a 4-wire enclosure fence to protect riparian habitat around the Thompson drainage. This fence would pass directly through 39PN0340. Once in place, the fence has the potential to protect buried cultural deposits. However, the act of constructing the fence is a potentially ground disturbing activity. As a ground disturbing activity, this proposed action is subject cultural resource protection laws and policies outlined in FSM 2361.3, 36CFR 800, Section 106 of the NHPA, ARPA, and NAGPRA.

(39PN0786): The western margin of the site is in an area where commercial thinning is proposed. This area where this unit intersects with the site should be avoided.

(39PN2719): The site is in an area where commercial thinning is proposed. The area where this unit intersects with the site should be avoided.

(39PN2735): Steps need to be taken to direct cattle traffic away from this site, including moving the salt lick at least 100 meters west of its present location. This would place the salt lick near the head of a drainage area that might alter the floodplain-to-slope traffic patterns. Stringing a barbed wire fence on treeline along the northern border of the site would help train cattle to access the new salt lick via the drainage west of site.

Concerning logging and thinning activities, tracked vehicles should not operate on the roads within the site boundary, nor should staging activities of any kind take place on site. In short, during fuels or logging activities, the site should be avoided for all purposes excepting rubber tired vehicle use on existing roads.

KV activities proposed adjacent to this site include improvements to a reservoir, which is located about 400 meters north of the site. As discussed above, steps need to be taken to redirect cattle away from the site.

(39PN2744): The site is in an area where mechanical fuels treatment is proposed. Avoid.

(39PN2745): The site is in an area where mechanical fuels treatment is proposed. Avoid.

## **Other**

- Keep access open to the private landowners

- Dust abatement should be used on roads used for hauling where they occur next to private living structures
- A Special Closure Order was signed on February 9, 1993 and states that “No person(s) may enter or be within ½ mile of the Designated Seismic Site or on NFSR 711 or 110.4A within ½ mile of the site unless authorized by the Forest Supervisor”. Access should be granted for administrative purposes only during pre-sale, harvesting, and post-sale activities.