

3.0 Appendix H - Hydrology

3.1 Inland Water West Reconnaissance

The following is an explanation of the ratings used in the study.

3.1.1 Geomorphic Integrity

Emphasis is on soil-hydrologic function as a sponge-and-filter system to absorb and store water, and on geomorphic resilience of streams. Geomorphic integrity classes are adapted and modified from Forest Service Manual Sec. 2521 and the Resource Planning Act.

Rating 1: The watershed has high soil and water integrity relative to its natural potential condition. Disturbance does not compromise soil-hydrologic function or soil/stream resilience. Criteria are:

- Soil-hydrologic function is judged to be excellent or good throughout the watershed; **AND**
- All streams are judged to be in dynamic equilibrium relative to their own potential; **AND**
- All riparian areas are judged to be in properly functioning condition.

Rating 2: The watershed has moderate soil and water integrity relative to its natural potential condition. Disturbance partly compromises soil-hydrologic function or soil/stream resilience. Recovery can occur naturally or through revised management with minimal capital investment. Criteria are:

- Soil-hydrologic function is judged to be degraded in isolated areas (e.g., less than 20%) of the watershed; **OR**
- A minor part (e.g., less than 20%) of stream miles are judged not to be in dynamic equilibrium, relative to their own potential; **OR**
- A minor part (e.g., less than 20%) of riparian miles are judged to be functioning at risk or non-functioning.

Rating 3: The watershed has low soil and water integrity relative to its natural potential condition. Disturbance widely compromises soil-hydrologic function or soil/stream resilience. Recovery requires capital investments and revised management. Land-disturbing actions are not precluded, but must complement recovery. Criteria are:

- Soil-hydrologic function is judged to be degraded over much (e.g., more than 20%) of the watershed; **OR**
- A major part (e.g., more than 20%) of stream miles are judged not to be in dynamic equilibrium, relative to their own potential; **OR**
- A major part (e.g., more than 20%) of riparian miles are judged to be functioning at risk or non-functioning.

Dynamic Equilibrium: The continual adjustment of land-and-stream forms and processes within a natural range of conditions, interrupted only by extreme disturbance (reset) events (Dunne and Leopold 1978).

Soil-Hydrologic Function: The ability of land to absorb and store water based on organic ground cover (plants, litter, humus), soil porosity, and soil structure relative to natural potential condition (FSM 2521).

3.1.2 Water Quality Integrity

The Water Quality Integrity layer is derived from the Damaged Segments layer (Enclosure G). Impacts to water quality from Enclosure G include bank damage, sediment loads, channel modification, flow disruption, thermal changes, chemical contamination, and biological stress.

Rating 1: No segment is damaged by physical, chemical, or biological impacts such that any designated beneficial use is not fully supported or any resource value is seriously degraded.

Rating 2: A minor part (e.g., less than 20%) of segment miles are damaged by physical, chemical, or biological impacts such that any designated beneficial use is not fully supported or any resource value is seriously degraded.

Rating 3: A major part (e.g., more than 20%) of segment miles are damaged by physical, chemical, or biological impacts such that any designated beneficial use is not fully supported or any resource value is seriously degraded.

3.1.3 Watershed Vulnerability

Watershed vulnerability reflects inherent risks of conditions becoming degraded if certain sensitive lands in the watershed are disturbed. Existing conditions are addressed under Geomorphic Integrity. Some sensitive lands may overlap, and are not double-counted.

Low: A minor part (e.g., less than 20%) of the watershed is in sensitive lands (defined below).

Moderate: A moderate part (e.g., 20-50%) of the watershed is in sensitive lands (defined below).

High: A major part (e.g., more than 50%) of the watershed is in sensitive lands (defined below).

Sensitive Lands: Areas where disturbances pose a high probability of degrading watershed soil-hydrologic functions or segments. Sensitive lands include:

- Areas with highly-dissected slopes.
- Highly-erodible soils (can infer from surficial geology, slope, and precipitation maps if soil maps are inadequate).
- Landslide deposits and potential landslides (can infer from geology, slope, precipitation, and landslide maps if soil maps are inadequate).

3.1.4 Damaged Segments

Damaged segments are those in which physical, chemical, or biological impacts have caused any water-related resource value to be seriously degraded.

Bank Damage: Bank disturbance by wildlife, livestock, or humans is causing any designated beneficial use to be not fully supported or any resource value to be seriously degraded in any part of the segment. Unstable banks are bare banks with cobble or finer matrix, or vegetated banks with tension cracks.

Sediment Loads: Infilling of pools or riffles by introduced sediment is causing any designated beneficial use to be not fully supported or any resource value to be seriously degraded in any part of the segment.

Channel Modification: Instream disturbances (e.g., channelizing, ditching, dredge or hydraulic mining, diverting, bulldozing, past tie drives, bank stabilization) have caused any designated beneficial use to be not fully supported or any resource value to be seriously degraded in any part of the segment.

Flow Disruption: The flow regime has changed from perennial to intermittent or ephemeral, or altered flow extremes or lowered water tables have caused any resource value to be seriously degraded in any part of the segment. Distinguish Augmented-flow from Depleted-flow impacts.

Thermal Change: The thermal regime has changed so that any designated beneficial use is not fully supported or any resource value is seriously degraded in any part of the segment.

Chemical Contamination: Introduced chemicals (e.g., acid/metals drainage) have caused any designated beneficial use to be not fully supported or any resource value to be seriously degraded in any part of the segment.

Biological Stress: Introduced noxious or pathogenic organisms in any part of the segment have caused any designated beneficial use to be not fully supported, or have removed a critical functional element or process from the aquatic or riparian community.

3.2 Proper Functioning Condition Stream Assessments

“Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

- 1) dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality;
- 2) filter sediment, capture bedload, and aid floodplain development;
- 3) improve flood-water retention and ground-water recharge;
- 4) develop root masses that stabilize streambanks against cutting action;
- 5) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
- 6) and support greater biodiversity.”

Table H1 contains answers to all questions from the PFC Assessments. The Questions themselves are below the table.

Creek -Reach	Rating	Hydrology					Vegetation						Erosion/Deposition					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Home Canyon	NF	yn	-	n	n	n	n	n	n	n	n	n	n	n	-	n	y	n
LF Home Cyn	NF	yn	-	n	n	n	n	n	n	n	n	n	n	n	-	n	y	n
Little Beaver	PFC	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
Montpelier-Upr	F@R mid	y	y	y	yn	n	n	y	y	yn	y	yn	yn	yn	y	y	y	y
Montpelier-Lwr	F@R mid	y	n	n	n	n	y	y	y	y	y	yn	y	yn	yn	yn	y	y
Snowslide Cyn	F@R mid	y	y	yn	n	n	y	y	y	y	y	y	y	y	n	n	y	n
Telephone Draw	F@R low	y	-	yn	n	n	yn	yn	yn	yn	yn	yn	yn	yn	-	y	y	n
Twin Springs	F@R low	y	-	yn	n	n	yn	yn	yn	yn	yn	yn	yn	yn	-	y	y	n
Whiskey	F@R high	y	-	y	n	n	n	y	y	y	y	y	-	y	-	y	y	y

Y = Yes; n = no; - = N/A.

3.2.1 HYDROLOGY

- 1) Floodplain above bankfull is inundated in “relatively frequent” events
- 2) Where beaver dams are present they are active and stable
- 3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
- 4) Riparian-wetland area is widening or has achieved potential extent
- 5) Upland watershed is not contributing to riparian-wetland degradation

3.2.2 VEGETATION

- 6) There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
- 7) There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
- 8) Species present indicate maintenance of riparian-wetland soil moisture characteristics
- 9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events
- 10) Riparian-wetland plants exhibit high vigor

11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows

12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)

3.2.3 EROSION/DEPOSITION

13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy

14) Point bars are re-vegetating with riparian-wetland vegetation

15) Lateral stream movement is associated with natural sinuosity

16) System is vertically stable

17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Questions 3, 5, 13, 15-17 cannot be answered N/A.