

APPENDIX W—DESIRED CONDITIONS AND WATERSHED AND AQUATIC CONDITION INDICATORS

AQUATIC HABITATS

Desired Conditions (Plan Component)

Within designated conservation and restoration watersheds the desired condition is to provide aquatic habitat to support native and non-native vertebrate and invertebrate populations. Stream channel conditions are within the range consistent with the riparian and aquatic ecosystems in which they developed.

The dynamic nature and complexity of aquatic systems can result in a wide range of values that make selection of precise target values difficult. These habitat features may not all occur within a specific stream segment all the time, but generally should be achievable through time and be represented within the watershed. However, these desired stream features may change as scientists gain a greater understanding of aquatic ecosystems processes and function. It is recognized that because of past land uses and current conditions, it may not be possible to achieve desired stream features to reach desired conditions during the life of the RMP (15-20 years), even with intensive restoration actions taking place.

Within non-designated (conservation/restoration) watersheds, BLM authorized land uses would be evaluated at the project level or reach level and authorized uses would strive to support achievement of desired conditions, or not impede achievement of desired conditions in the long term. Existing desired conditions would be maintained and would not be adversely affected in the long term.

The lower and upper thresholds defining this range are the desired stream and riparian habitat conditions listed below.

Habitat Connectivity: Native fish species have access to historically occupied habitats. Decisions to remove barriers would be dependent on evaluations of the potential impacts from nonnative species competition and/or maintenance of genetic integrity of special status and other native fish species.

Water Temperature - Cold Water Biota: Habitat complexity provides daily, seasonally, annually and spatially variable water temperatures within expected normal ranges. Generally this is less than 22° C with a maximum daily average no greater than 19° C. Specific life stage desired water temperatures are:

- Salmonid summer rearing temperature is less than 16° C;
- Salmonid spawning and incubation temperature is less than 14° C;
- Bull trout summer rearing temperature less than 12° C;
- Bull trout spawning temperature is 4 to 9° C; and
- Bull trout egg incubation is 2 to 5° C.

Pool Frequency: One pool every five to seven channel widths in pool-riffle stream channels and one to four channel widths in step-pool stream channels.

Width to Depth Ratio: Less than or equal to 10:1 for confined channel types (Rosgen channel types A, E and G); less than 20:1 for moderately confined channel types (Rosgen channel type B); and less than 40:1 for unconfined channel types (Rosgen channel types C and F).

Channel Substrate Condition: Spawning gravel surface fines (<6.4 mm) < 10% C channels (e.g., pool tails); spawning gravels surface fines < 5% A and B channels; spawning gravel fines by depth, < 25%; or cobble embeddedness less than 30% in Rosgen channel types A2 and A3, B2 and B3, C2 and C3, E3, G2 and G3.

Large Woody Debris (applies to forested systems): Near-natural patterns in size and amount of in-channel, large woody debris and potential wood on stream banks and flood plain.

Bank Stability: Bank stability greater than 95% for A and B and E channel types; greater than 90% for C channel types within 80% of any stream reach.

Riparian and RCA Vegetation: Riparian and wetland conditions in proper functioning condition. Conditions reflect natural disturbances processes. In forest habitats, desired conditions generally mature to late seral condition. Percent similarity of riparian vegetation to the potential natural community composition is >75% (good and excellent ecological condition). Over 75% of the plant community type along the streambank provides high bank stability, deep fibrous roots, and good resistance to streambank erosion. The riparian vegetation provides adequate shade, large wood debris recruitment, and connectivity.

The desired conditions identified above are updates or the same specific high quality conditions identified in **Table W-1** below.

AQUATIC SPECIES

Desired Conditions

Native and desired non-native aquatic species (fish, amphibians, invertebrates, plants and other aquatic-associated species) are present and generally well distributed in historically occupied habitats, when the majority of the watershed is in federal ownership. In some watersheds where the majority of lands are private, species may not be well distributed in historically occupied habitats. Stronghold populations continue to thrive and expand into neighboring unoccupied habitats and depressed populations increase in numbers. Native aquatic animals exhibit genetic integrity and life history strategies necessary to assure self-sustaining populations. Spatial extents of habitat disturbances are less than the area occupied by aquatic species of concern, in order to preserve their population structure and life history strategies.

Populations of native and non-native fishes are consistent with federal recovery goals and state and tribal population goals. Cooperation and coordination with state agencies, federal agencies, tribes, and other groups ensures efficient and effective program implementation toward conservation of native and desired, non-native aquatic species.

INDICATORS OF WATERSHED AND AQUATIC CONDITION

The three classes of indicator ranking for the environmental baseline portion of the checklist were changed from 1) properly functioning, 2) functioning at risk, 3) not properly functioning to rankings of 1) high, 2) moderate, 3) low indicators of habitat condition. The classification of function was not felt to be appropriate for many of the indicators (i.e., road density) in terms of what was being rated, and the link between the indicators and actual function has not been proven in many cases. The ranking of high-low is a more general statement about overall habitat condition indicated without being a value statement about the indicator or its link to a functioning ecosystem. The Checklist for Documenting Environmental Baseline and Effects of Action(s) on Relevant Indicators (below) identifies a rating of environmental baseline conditions.

The order of the pathways was revised. Instead of starting with fine grain environmental elements and getting bigger, the order was reversed to start with the overall watershed scale indicators and then focus down through the channel condition, and finally specific habitat elements. Flow/hydrology indicators were added to watershed condition pathway.

The definitions of the effects of the action (restore/maintain/degrade) on the checklist were modified. The definitions were expanded to include the concept of the action's effect on the natural rate of recovery (see checklist definitions). Also, the restore definition was modified to include any improvement in this indicator, not just improvement that raised the indicator by a whole class.

The purpose of the matrix of pathways of watershed and aquatic conditions is to provide a rating for baseline conditions, these may be modified with new information or science which is applicable to conditions occurring in north central Idaho. This matrix may be updated, modified, or dropped if the following occurs: updated rating strategy is more appropriate, new science provides updated information, or new area/watershed resource data is more appropriate.

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Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho¹)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Watershed Condition</u>	<u>Watershed Road Density</u>	<u><1 mile per square mile</u>	<u>1-3 mile per square mile</u>	<u>>3 mile per square mile</u>
	<u>Streamside Road Density</u>	<u><1 mile per square mile</u>	<u>1-2 mile per square mile</u>	<u>>2 mile per square mile</u>
	<u>Landslide Prone Road Density</u>	<u><1 mile per square mile</u>	<u>1-2 mile per square mile</u>	<u>>2 mile per square mile</u>
	<u>Riparian Vegetation Condition</u>	<u>Percent similarity of riparian vegetation to the potential natural community composition is >75%. Over 75% of the plant community type along the streambank provides high bank stability, deep fibrous roots, and good resistance to streambank erosion. The riparian vegetation provides adequate shade, large wood debris recruitment, and connectivity. In forest habitats generally mature to late seral condition.</u>	<u>Percent similarity of riparian vegetation to the potential natural community composition is 50-75%. 50-75% of the plant community type along the streambank provides high bank stability, deep fibrous roots, and good resistance to streambank erosion. The riparian vegetation provides adequate shade, large wood debris recruitment, and connectivity. In forest habitats generally mid-seral condition.</u>	<u>Percent similarity of riparian vegetation to the potential natural community composition is 50% or less. Less than 50% of the plant community type along the streambank provides high bank stability, deep fibrous roots, and good resistance to streambank erosion. The riparian vegetation provides moderate loss of function for shade, large wood debris recruitment, and connectivity. In forest habitats generally early seral condition.</u>
	<u>Change in Peak/Base Flow</u>	<u>Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to a watershed functioning within its natural regime.</u>	<u>Some evidence of altered peak flow, base flow, and flow timing characteristics comparable to a watershed functioning within its natural regime.</u>	<u>Pronounced changes in peak flow, base flow, and flow timing characteristics comparable to a watershed functioning within its natural regime.</u>

Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Watershed Condition (continued)</u>	<u>Water Yield³ (ECA)</u>	<u><15% ECA (entire watershed), and all subwatersheds (6th code HUC) <15% ECA and low concentration of disturbance in landslide prone, streamside, or 0-1 order headwater areas.</u>	<u>15-20% ECA (entire watershed), or one or more subwatersheds 15-30% ECA or concentration of disturbance in landslide prone, streamside, or 0-1 order headwater areas.</u>	<u>>20% ECA (entire watershed), or one or more subwatersheds >30% ECA and/or concentration of disturbance in landslide prone, streamside, or 0-1 order headwater areas.</u>
	<u>Sediment Yield Clearwater NF⁴</u>	<u>A channels <=100% B channels <=45% C channels <=35%</u>	<u>A channels <=100%, <=110% B channels <=45%, <=55% C channels <=35%, <=50%</u>	<u>A channels >110% B channels >55% C channels >50%</u>
	<u>Sediment Yield Nez. Perce NF⁵</u>	<u>Current chronic sediment yield <=5% over natural base.</u>	<u>Current chronic sediment yield 6-15% over natural base.</u>	<u>Current chronic sediment yield >15% over natural base.</u>
<u>Channel Conditions & Dynamics</u>	<u>Width/Depth Ratio⁶</u>	<u>A channel types <10 B channel types <20 C channel types <40 E channel types <7 F channel types <35 G channel types <9</u>	<u>A channel types <10-12 B channel types <20-35 C channel types <40-60 E channel types <7-9 F channel types <35-70 G channel types <9-11</u>	<u>A channel types >12 B channel types >35 C channel types >60 E channel types >9 F channel types >70 G channel types >11</u>
	<u>Streambank Stability</u>	<u>A & B ct's >95% C ct's >90% E ct's = 100%</u>	<u>A & B ct's 90-95% C ct's 80-90% E ct's 95-100%</u>	<u>A & B ct's <90% C ct's <80% E ct's <95%</u>

Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Channel Conditions & Dynamics (continued)</u>	<u>Floodplain Connectivity</u>	<u>Off-channel areas are frequently hydrologically linked to main channel; overbank flows occur in the frequency and magnitude expected for the valley bottom or channeltype setting.</u>	<u>Reduced linkage of wetland, floodplains and riparian areas to main channel; overbank flows are reduced or increased relative to historic frequency, as evidenced by moderated aggradation or degradation.</u>	<u>Severe reduction of increase in overbank flows occur relative to the frequency and magnitude expected for the valley bottom or channeltype setting; wetland area drastically reduced and riparian vegetation/succession altered significantly.</u>
<u>Water Quality</u>	<u>Temperature (Steelhead) - Spawning⁷</u>	<u><57 degrees Fahrenheit (14 degrees Celsius)</u>	<u>57-60 degrees Fahrenheit (14-15.5 degrees Celsius)</u>	<u>>60 degrees Fahrenheit (15.5 degrees Celsius)</u>
	<u>Temperature (Steelhead) - Rearing & Migration⁸</u>	<u><57 degrees Fahrenheit (14 degrees Celsius)</u>	<u>57-64degrees Fahrenheit (14-17.8 degrees Celsius)</u>	<u>>64 degrees Fahrenheit (17.8 degrees Celsius)</u>
	<u>Temperature (Bull Trout)⁹</u>	<u>7-day average maximum temperature in a reach during the following life history stages: incubation = 2 - 5 degrees Celsius rearing = 4 - 12 degrees Celsius spawning = 4 - 9 degrees Celsius Also temperatures do not exceed 15 degree C in areas used by adults during migration (no thermal barriers).</u>	<u>7-day average maximum temperature in a reach during the following life history stages: incubation = <2 or 6 degrees Celsius rearing = <4 or 13-15 degrees Celsius spawning = <4 or 10 degrees Celsius Also temperatures in areas used by adults during migration sometimes exceeds 15 degrees Celsius.</u>	<u>7-day average maximum temperature in a reach during the following life history stages: incubation = <1 or >6 degrees Celsius rearing = >15 degrees Celsius spawning = <4 or >10 degrees Celsius Also temperatures in areas used by adults during migration regularly exceed 15 degrees Celsius (thermal barriers present).</u>

Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Water Quality</u> <i>(continued)</i>	<u>Suspended Sediment¹⁰</u>	<u><= 10 days >= 25 milligrams per liter</u> and <u><= 5 days >= 80 milligrams per liter in a year</u>	<u>11-30 days >= 25 milligrams per liter</u> and <u><= 10 days >= 80 milligrams per liter in a year</u>	<u>> 31 days >= 25 milligrams per liter</u> or <u>>= 11 days >= 80 milligrams per liter in a year</u>
	<u>Chemical Contamination / Nutrients</u>	<u>Low levels of chemical contamination from agricultural, grazing, industrial and other sources, no excess nutrients.</u>	<u>Moderate levels of chemical contamination from agricultural, grazing, industrial and other sources, some excess nutrients.</u>	<u>High levels of chemical contamination from agricultural, grazing, industrial and other sources, high levels of excess nutrients.</u>
<u>Habitat Access</u>	<u>Physical Barriers - Adult</u>	<u>Any man-made barriers present in watershed allow full upstream and downstream fish passage at all flow (no barrier).</u>	<u>Any man-made barriers present in watershed are a partial barrier¹¹ to upstream or downstream fish passage.</u>	<u>Any man-made barriers present in watershed are a full barrier to upstream or downstream fish passage at all flows.</u>
	<u>Physical Barriers - Juvenile</u>	<u>Any man-made barriers present in watershed allow full upstream and downstream fish passage at all flow (no barrier).</u>	<u>Any man-made barriers present in watershed are a partial barrier to upstream or downstream fish passage.</u>	<u>Any man-made barriers present in watershed are a full barrier to upstream or downstream fish passage at all flows.</u>
<u>Habitat Elements</u>	<u>Cobble Embeddedness</u>	<u><20%</u>	<u>20-30%</u>	<u>>30%</u>
	<u>Percent Surface Fines (<= 6 mm)</u>	<u>A & B CT's <= 10%</u> <u>C & E CT's <= 20%</u>	<u>A & B CT's = 11-20%</u> <u>C & E CT's = 21-30%</u>	<u>A & B CT's >= 21%</u> <u>C & E CT's >= 31%</u>
	<u>Percent Fines by Depth (<= 6 mm)¹²</u>	<u><20%</u>	<u>20-25%</u>	<u>>25%</u>

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Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Habitat Elements</u> <i>(continued)</i>	<u>Large Woody Debris</u>	<u>Near-natural levels of acting and potential large wood debris.</u>	<u>Acting levels of large wood debris are near-natural, potential levels are below near-natural, or vice versa.</u>	<u>Both acting and potential levels of large wood debris are below near-natural levels.</u>
	<u>Pool Frequency¹³</u> <u>channel</u> <u>number</u> <u>width (feet)</u> <u>pools/mile</u> <u><= 5</u> 184 <u>>5 and <=10</u> 96 <u>>10 and <=15</u> 70 <u>>15 and <=20</u> 56 <u>>20 and <=25</u> 47 <u>>25 and <=50</u> 26 <u>>50 and <=75</u> 23 <u>>75</u> 18	<u>Meets following pool frequency occurrence.</u>	<u>Meets pool frequency standards but large woody debris recruitment or other pool-creating factors are inadequate to maintain pools over time.</u>	<u>Does not meet pool frequency standards.</u>
	<u>Pool Quality¹⁴</u>	<u>Pool quality rating >4</u>	<u>Pool quality rating 3-4</u>	<u>Pool quality rating <3</u>
	<u>Off-Channel Habitat</u> <u>(if applicable for CT's)</u>	<u>Backwaters with cover, and low energy off-channel areas.</u>	<u>Some backwaters and high energy side channels.</u>	<u>Few or no backwaters, no off-channel areas.</u>
	<u>Habitat refugia</u>	<u>Adequate habitat refugia exist within watershed (number, size, condition, species requirements, and connectivity).</u>	<u>Limited habitat refugia exist within watershed (number, size, condition, species requirements, and connectivity).</u>	<u>Inadequate habitat refugia exist within watershed (number, size, condition, species requirements, and connectivity).</u>

Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Take¹⁵</u>	<u>Harassment</u>	<u>Current levels or risks of harassment are thought to be low.</u>	<u>Current levels or risks of harassment are thought to be moderate.</u>	<u>Current levels or risks of harassment are thought to be high.</u>
	<u>Redisturbance</u>	<u>Current levels or risks of redisturbance are thought to be low.</u>	<u>Current levels or risks of redisturbance are thought to be moderate.</u>	<u>Current levels or risks of redisturbance are thought to be high.</u>
	<u>Juvenile Harvest</u>	<u>Current levels or risks of juvenile harvest are thought to be low.</u>	<u>Current levels or risks of juvenile harvest are thought to be moderate.</u>	<u>Current levels or risks of juvenile harvest are thought to be high.</u>
<u>Bull Trout Subpopulation Characterization and Integration of Species and Habitat Indicators¹⁶, the following indicators are for rating bull trout only.</u>				
<u>Subpopulation Characteristics within subpopulation watersheds</u>	<u>Subpopulation Size¹⁶</u>	<u>Mean total subpopulation size or local habitat capacity more than several thousand individuals. All life stages evenly represented in the subpopulation.</u>	<u>Adults in subpopulation are less than 500 but >50.</u>	<u>Adults in subpopulation have less than 50.</u>
	<u>Growth and Survival¹⁶</u>	<u>Subpopulation has the resilience to recover from short term disturbances (e.g., catastrophic events, etc.) or subpopulation declines within one to two generations (5 to 10 years). The subpopulation is characterized as increasing or stable. At least 10+ years of data support this estimate¹⁷.</u>	<u>When disturbed, the subpopulation will not recover to redisturbance conditions within one generation (5 years). Survival or growth rates have been reduced from those in the best habitats. The subpopulation is reduced in size, but the reduction does not represent a long-term trend. At least 10+ years of data support this characterization¹⁷.</u>	<u>The subpopulation is characterized as in rapid decline or is maintaining at alarmingly low numbers. Under current management the subpopulation condition will not improve within two generations (5 to 10 years). This is supported by a minimum of 5+ years of data¹⁷.</u>

Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Subpopulation Characteristics (continued)</u>	<u>Life History Diversity and Isolation¹⁶</u>	<u>The migratory form is present and the subpopulation exists in close proximity to other spawning and rearing groups. Migratory corridors and rearing habitat (lake and larger rivers) are in good to excellent condition for the species. Neighboring subpopulations are large with high likelihood of producing surplus individuals or straying adults that will mix with other subpopulation groups.</u>	<u>The migratory form is present but the subpopulation is not close to other subpopulations or habitat disruption has produced a strong correlation among subpopulations that do exist in proximity to each other.</u>	<u>The migratory form is absent and the subpopulation is isolated to the local stream or a small watershed not likely to support more than 2,000 fish.</u>
	<u>Persistence and Genetic Integrity¹⁶</u>	<u>Connectivity is high among multiple (5 or more) subpopulations with at least several thousand fish each. Each of the relevant subpopulations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.</u>	<u>Connectivity among multiple subpopulations does occur, but habitats are more fragmented. Only one or two of the subpopulations represent most of the fish production. The probability of hybridization or displacement by competitive species is imminent, although few documented cases have occurred.</u>	<u>Little or no connectivity remains for refounding subpopulations in low numbers, in decline, or nearing extinction. Only a single subpopulation or several local populations that are very small or that otherwise are at high risk remain. Competitive species readily displace bull trout. The probability of hybridization is high and documented cases have occurred.</u>

Table W-1
Matrix of Pathways and Indicators of Watershed and Aquatic Condition Local Adaptation for the Clearwater, Salmon, and Snake River Basins (North Central Idaho)¹ (continued)

<u>Pathway</u>	<u>Indicator</u>	<u>High Condition²</u>	<u>Moderate Condition²</u>	<u>Low Condition²</u>
<u>Bull Trout Integration of Species and Habitat Conditions¹⁶</u>		<u>Habitat quality and connectivity among subpopulations are high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth are consistent with pristine habitats. The subpopulation has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The subpopulation is fluctuating around equilibrium or is growing.</u>	<u>Fine sediments, stream temperature, or the availability of suitable habitats has been altered and will not recover to predisturbance conditions within one generation (5 years). Survival or growth rates have been reduced from those in the best habitats. The subpopulation is reduced in size, but the reduction does not represent a long-term trend. The subpopulation is stable or fluctuating in a downward trend. Connectivity among subpopulations occurs but habitats are more fragmented.</u>	<u>Cumulative disruption of habitats has resulted in a clear declining trend in the subpopulation size. Under current management, habitat conditions will not improve within two generations (5 to 10 years). Little or no connectivity remains among subpopulations. The subpopulation survival and recruitment responds sharply to normal environmental events.</u>

¹ Local adaptation of Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale, National Marine Fisheries Service Environmental and Technical Services Division, Habitat Conservation Branch, August 1996. Local adaptation and use by Cottonwood BLM, Clearwater NF, and Nez Perce NF, November 1997, through the level 1 streamlining process.

² Indicators of high, moderate, and low habitat condition.

³ Statistic is for watershed as a whole, while evaluation of concentration is consideration of potential for flow regimes changes in 0-1 channels.

⁴ Rating of current modeled percent over natural base sediment yield.

⁵ Rating of current modeled chronic level as percent over natural base sediment yield, spikes associated with recent activities need to be described in indicator narrative discussions.

⁶ Width/Depth ratio based on bankfull width to bankfull depth.

⁷ Period for spawning and incubation is February 1 through July 15th for steelhead, from Idaho State Water Quality regulations. Temperature is 7-day running average of daily maximums.

⁸ Period for rearing and migration is all year. Temperature is 7-day running average of daily maximums.

⁹ [Taken from A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale, USFWS, February 1998.](#)

¹⁰ [When data are absent, then watershed assumed to meet the categories based on extrapolation from best location of data, or when data for extrapolation is not available, then leave unrated.](#)

¹¹ [May result in restricted fish passage at certain flow regimes.](#)

¹² [Fines by depth in spawning gravels.](#)

¹³ [A pool is defined as a habitat unit classified as a pool \(general\) during a stream survey.](#)

¹⁴ [Pool quality rating methodology from stream survey protocol for Cottonwood BLM, Clearwater National Forest, and Nez Perce National Forest.](#)

¹⁵ [Indicators of direct species take, does not include habitat degradation aspects of take.](#)

¹⁶ [Taken from A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale, USFWS, February 1998.](#)

¹⁷ [If less data is available and a trend cannot be confirmed, a subpopulation will be considered at risk until enough data is available to accurately determine its trend.¹⁶](#)

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**CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND
EFFECTS OF ACTION(S) ON RELEVANT INDICATORS**

Watershed Name: _____ **Subbasin:** _____

PATHWAYS:	ENVIRONMENTAL BASELINE¹			EFFECTS OF THE ACTION(S)		
	INDICATORS:	High	Moderate	Low	Restore²	Maintain³
<u>Watershed Conditions:</u>						
<u>Watershed Road Density</u>						
<u>Streamside Road Density</u>						
<u>Landslide Prone Road Density</u>						
<u>Riparian Veg Condition</u>						
<u>Peak/Base Flow</u>						
<u>Water Yield (ECA)</u>						
<u>Sediment Yield</u>						
<u>Channel Cond. & Dynamics:</u>						
<u>Width/Depth Ratio</u>						
<u>Streambank Stability</u>						
<u>Floodplain Connectivity</u>						
<u>Water Quality:</u>						
<u>Temp - Steelhead Spawning</u>						
<u>Temp- Steelhead Rear/Migration</u>						
<u>Temperature - Bull Trout</u>						
<u>Suspended Sediment</u>						
<u>Chem. Contam./Nutrients</u>						
<u>Habitat Access:</u>						
<u>Physical Barriers - Adult</u>						
<u>Physical Barriers – Juvenile</u>						
<u>Habitat Elements:</u>						
<u>Cobble Embeddedness</u>						
<u>Percent Surface Fines</u>						
<u>Percent Fines by Depth</u>						
<u>Large Woody Debris</u>						
<u>Pool Frequency</u>						
<u>Pool Quality</u>						

<u>PATHWAYS:</u>	<u>ENVIRONMENTAL BASELINE¹</u>			<u>EFFECTS OF THE ACTION(S)</u>		
<u>INDICATORS:</u>	<u>High</u>	<u>Moderate</u>	<u>Low</u>	<u>Restore²</u>	<u>Maintain³</u>	<u>Degrade⁴</u>
<u>Off-channel Habitat</u>						
<u>Habitat Refugia</u>						
<u>Take:</u>						
<u>Harassment</u>						
<u>Redd Disturbance</u>						
<u>Juvenile Harvest</u>						
<u>Bull Trout Subpopulation Characteristics & Habitat Integration:</u>						
<u>Subpopulation Size</u>						
<u>Growth and Survival</u>						
<u>Life History Diversity, Isolation</u>						
<u>Persistence & Genetic Integrity</u>						
<u>Integration of Species and Habitat Conditions</u>						

¹Indicators of high, moderate, or low habitat condition.

² For the purposes of this checklist, "restore" means to change the function of an indicator for the better, or that the rate of restoration rate is increased.

³ For the purposes of this checklist, "maintain" means that the function of an indicator will not be degraded and that the natural rate of restoration for this indicator will not be retarded.

⁴ For the purposes of this checklist, "degrade" means to change the function of an indicator for the worse, or that the natural rate of restoration for this indicator is retarded. In some cases, a low environmental baseline indicator maybe further worsened, and this should be noted.