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III.F. Summary of Effects

This section discusses the potential for impacts on streams, slope processes, and covered species posed by implementing the management commitments required by the IFP.

The area of influence of the IFP on fisheries and aquatic resources includes surface waters in the Clearwater and Salmon River basins in Idaho (the IFP area). IFP area boundaries are shown in Figure I.B-1 in Section I, Description of the Proposed Action – The Idaho Forestry Program. At a broad scale, all surface waters and habitat for the covered species or other threatened or endangered species that may occur in the IFP area could potentially be affected directly or indirectly by implementing the IFP.

Potential impacts on fisheries and aquatic resources in the IFP area include changes in habitat conditions that could subsequently benefit or adversely affect the covered species, and other aquatic resources. Sediment, water temperature, habitat complexity as affected by large woody debris, and habitat connectivity as affected by road culverts and fish passage barriers are key habitat factors addressed by the IFP. Clean stream gravels are important for salmonid spawning success and in the production of aquatic invertebrates as a food source for fish. Cold water is important to all salmonids, which are relatively sensitive to warm waters. Complex habitat with undercut banks, pools, and other features provides cover and an array of desirable habitat features for fish. Stream corridor connectivity is important to salmonid movement and migration (Rieman and McIntyre 1993; MBTSG 1998). The following discussion summarizes the likelihood of impacts to these four key habitat factors and on measures for mitigating or avoiding potential impacts to them.

Whether an actual improvement in habitat will occur, or whether degradation of habitat will be reduced, depends on site-specific conditions at the time conservation measures are applied. For example, the current IFPA rules may be adequate to conserve covered species in certain watersheds that are not currently degraded. In severely impacted watersheds, even the most conservative prescriptive measures governing forestry actions may or may not be sufficient to improve native fish habitat to fully natural conditions.

The IFP includes rigorous adaptive management requirements designed to provide further assurances that the IFP conservation goals will be achieved. These commitments allow the Services to work with the State of Idaho to develop and implement additional measures using IFP monitoring data or other information if initial measures are found to be inadequate to conserve covered species. Administration and implementation requirements provide additional conservation benefits to covered species. This process of implementing specific conservation commitments immediately, coupled with the opportunity to monitor, evaluate, and adapt management in the future, helps ensure that the IFP will provide adequate

conservation of covered species over the 30-year life of the IFP. Current FPA rules provide some of these benefits, but to a lesser degree. Habitat conditions and the covered species will also potentially benefit from a "changed circumstances" commitment. Changed circumstances require preparation and implementation of a site-specific plan if a large or intense landslide, wildfire, or flood occurs in the IFP area that adversely affects covered species.

Effects on Erosion and Sediment Delivery

During the 30-year life of the IFP, new roads will be constructed with potential to deliver sediment to streams. However, the IFP requires conservation measures designed to reduce erosion and sediment delivery from new roads, road abandonment and closure, and rehabilitation of existing road systems. As a result, net sediment delivery from road systems from lands enrolled to the IFP is expected to decrease.

In general, logging roads have been identified as a major contributing factor to elevated stream sediment levels (Packer 1967; MBTSG 1998), and the effects of roads cannot always be completely controlled (Packer 1967; FEMAT 1993; Furniss et al. 1991). However, several road design features can reduce erosion potential, including limiting grade steepness and employing appropriate criteria in designing cross-drain spacing (Furniss et al. 1991). IFP commitments for new construction and existing roads would minimize erosion potential to a considerable degree as compared to current conditions. Although the absolute quantity of sediment reduction throughout the IFP area is unknown, and it cannot be determined if recovery of all covered species will occur in all watersheds within enrolled lands, habitat conditions are generally expected to improve as a result of decreased sediment delivery. IFP commitments also require evaluation of the magnitude of the change over time to ensure it is sufficient to maintain and contribute to restoring suitable habitat conditions.

Sediment delivery is expected to decline annually upon implementation of the IFP. Watersheds that are currently developed provide the greatest opportunity to reduce sediment delivery from existing roads, reducing the level of existing impacts to covered species more than in watersheds where there are fewer miles of forest roads. Sediment budgeting conducted as part of this assessment indicates that implementation of IFP road drainage conservation measures alone will reduce total sediment delivery on enrolled lands by approximately 27 percent. During the 30-year life of the IFP, the combined effects of IFP conservation measures associated with upgrading old roads, constructing new roads, and treating hot spots are estimated to deliver substantially less sediment to IFP area streams than would occur under the current IFPA rules. This positive effect will be accomplished despite potential increases in road density.

Hot spot treatment of high-risk sediment problems on roads (such as large gullies, failed culverts, unstable fills, and other poorly designed road segments) will also contribute to cleaner water during the

30-year period. Harr and Nichols (1993) found that treating hot spot roads (pulling back sidecast, reshaping roads and landings, re-establishing natural drainage patterns, and retiring road segments) significantly reduced the amount of sediment entering adjacent streams during storms. Although the precise degree of sediment reduction due to hot spot treatment is largely not quantifiable because of factors such as variability of slope gradient, soil conditions, and local slope morphology, hot spots can be a major source of sediment delivery to streams. Conservation measures designed to reduce sediment delivery from these hot spot areas would generally contribute significantly to reducing sediment delivered to salmonid habitat.

The IFP requires identification of legacy road system and other hot spots, and implementation of site-specific action plans to remedy them. This commitment will result in more rapid improvement in aquatic conditions and reduction of future sediment delivery to streams than afforded by current IFPA rules. The exact nature and number of hot spots will remain unknown until IFP inspections are completed, but the benefits of hot spot treatments will be greatest in watersheds with large amounts of roads adjacent to streams or where mass wasting hazards are highest (Harr and Nichols 1993). Treating hot spots aggressively on existing roads will decrease sediment delivery in the early years of the IFP. Treatment of hot spots that are not associated with roads, but where active erosion is occurring, will provide additional benefits.

The IFP will apply enhanced practices to all roads built on enrolled lands. Since new roads necessarily involve disturbance of previously vegetated areas, new road construction generally has the greatest potential of any forest management activity to produce sediment delivery to streams, with the risk being greatest for the first few years following construction (WFPB 1997).

The IFP requires road inspection, analysis of road sediment delivery processes, and procedures for reporting to the Services. Current IFPA regulations require regular road maintenance. Under the IFP, roads that have been constructed or upgraded with enhanced practices will be reinspected periodically, and any maintenance necessary to ensure their effectiveness is required. This commitment will enhance the current IFPA rules and further reduce sediment delivery to streams.

IFP riparian management commitments, described below, will also beneficially affect fish bearing and non-fish bearing streams in the IFP area by further reducing sediment delivery. Many of the riparian commitments include provisions for restricting tree harvest or excluding equipment operation within SPZs. For example, riparian management commitments prevent harvest in some areas, greatly restrict harvest in remaining areas, and prohibit equipment operation except where specific, low-impact conditions are met.

Effects on Water Temperature

The IFP contains a number of riparian management commitments designed to control water temperature supplementary to existing IFPA and other regulations. These commitments are expected to increase riparian and stream canopy cover and may produce cooler water temperatures than presently occur or that would occur under current IFPA rules. Further improvements (cooling) of water temperature associated with increased bank stability and reduced sediment beneficial effects on stream channel morphology (e.g., channel narrowing) may also occur.

The changes in canopy cover through the 30-year life of the IFP will be similar to what would occur under the current IFPA rules. However, under the IFP, where harvest does occur, more trees, canopy cover and shade will be retained near streams. Moreover, fewer stands adjacent to streams will be harvested because many stands will not achieve the IFP minimum stand density requirements. Canopy cover is expected to increase in most stands because they are now young or lightly stocked and will not be harvested during the 30-year period. Overall, canopy closure will be higher at the end of the 30-year period than at present. If adequate increases in canopy cover are not achieved - or the magnitude of the trend of decreasing water temperatures must be greater - the IFP commits to modify management practices. Adaptive management commitments under the IFP allow the Services to revisit the adequacy of riparian buffer prescriptions implemented in riparian areas early during the life of IFP implementation so that if inadequacies are detected, management adaptations can be made before additional streamside riparian stands are harvested.

Effects on Habitat Complexity

Habitat complexity in IFP area streams as affected by LWD loading, bank stability, RPZ protection, canopy cover, and sediment loading is expected to increase, because IFP commitments will leave more trees standing near streams. LWD is a critical component of native salmonid habitat, because it helps maintain natural stream function by contributing to sediment control, cover, channel complexity, ability of the stream to process organic matter, presence of prey species, and channel stability (MBTSG 1998; Kondolf 1996).

Under the IFP, tree harvest would be limited or precluded throughout RPZs, and trees retained in RPZs would be concentrated in areas most likely to contribute to aquatic habitat. Compared to the current IFPA rules, the IFP will add no-harvest zones, extend management restrictions farther away from streams, and require retention of additional large trees (greater than 8 inches in diameter). Because of the IFP management approach, total LWD contribution to many streams will equal or approach the amount produced by unmanaged stands. Riparian stand simulations of LWD recruitment indicate that the

changes in instream LWD loading within enrolled lands that will occur with implementation of the IFP will increase, and will be similar to what would occur if no harvest were to occur at all. LWD loading is expected to increase in most stream segments even where adjacent to IFP harvest units. Moreover, many – perhaps most – riparian stands will not be harvested during the 30-year period. Nevertheless, if adequate increases in LWD loading are not achieved in the IFP area and within certain watersheds of key importance, the IFP commits to adapt management to ensure LWD increases.

Improvements in habitat complexity under the IFP may also occur due to reduced sediment delivery. Potential effects of reductions in sediment delivery under the IFP include increased pool depth and frequency, increased hiding spaces among larger substrate, and improved deep-water over-winter cover (MBTSG 1998).

Effects on Habitat Connectivity

Connectivity has been identified as a significant factor affecting bull trout and other salmonids. Isolation of sub-populations resulting from a lack of connectivity can subject both the sub-population and other populations to greater risks of extinction (Rieman and McIntyre 1993; Lee et al. 1997). Historically, habitat connectivity for covered species was variable because of natural, random events such as landslides. However, these disruptions in connectivity occurred over time scales large enough, and were infrequent enough across the landscape, that covered species could re-colonize areas that became disconnected. As a result of past management impacts, habitat connectivity has been disrupted more frequently and more rapidly than what naturally occurred on unmanaged landscapes, resulting in threats to covered species.

Habitat connectivity and fish passage will be improved under the IFP by finding passage barriers at road culverts and either replacing them or modifying them to restore fish passage. Habitat connectivity will be restored as completely as possible for a managed landscape condition and will exceed the rate and degree of connectivity restoration that would occur under current IFPA rules.

Other Potential Water Quality Effects

Influences of IFP management commitments on water quality parameters (nutrient loading, contaminant loading, dissolved oxygen levels, and sediment loading from silvicultural and commercial forestry sources other than roads), water quantity, soils, vegetation resources, or covered species habitat, will be similar to those that would occur under the current IFPA rules, with some additional reduction of risk because of IFP commitments. These parameters are not expected to be adversely affected by implementing the IFP, and at the least, produce more beneficial effects than the current IFPA rules.

Adaptive Management

The IFP adaptive management strategy relies on implementation, monitoring, evaluation, and management response. Effectiveness monitoring information will be gathered in a series of studies. This information will be evaluated against the IFP conservation goals and specific habitat objectives and metrics to determine when mandatory management responses are required. For example, the conservation goal for sediment is to provide suitable instream substrate conditions for covered species, and a specific habitat objective is to reduce sediment delivery from roads. One of the IFP effectiveness monitoring studies would measure actual sediment reduction achieved. If sediment delivery does not decrease, then enrollees and the Services would determine the cause for (in this case) excessive sediment. Road prescriptions would then be revised as necessary to better meet the conservation goal.

Adaptive management commitments for the IFP are summarized in Table I.I-1 of Section I, Description of the Proposed Action – The Idaho Forestry Program. These commitments provide for monitoring and studies designed to increase certainty that the IFP is adequately achieving conservation goals. Management responses are required if pre-defined and quantifiable levels of effect ("triggers") are detected. In addition, a process is specified whereby monitoring data or other new scientific information could be used to set triggers that are more appropriate. This feature would reduce uncertainty with respect to triggers that were chosen at the outset of the IFP as better scientific information becomes available. Should management not be adapted, or triggers not reset adequately, the Services and the State of Idaho have options for relinquishing, suspending, or revoking the IFP. The intent of including such flexibility in adaptive management commitments is to ensure that the combined effect of IFP commitments is adequate to meet the IFP's conservation goals.

While the suite of specific IFP conservation measures is expected to create improved habitat conditions for covered species, there is some uncertainty associated with the adequacy of sediment reduction and riparian buffer commitments for the conservation needs of all covered species. The Services could agree to provide ESA assurances despite this level of uncertainty, as long as the Services have sufficient opportunity to continually re-evaluate those uncertainties under a flexible approach to adaptive management. The IFP requires the State of Idaho and the Services to revisit the adequacy of these commitments every 5 years throughout the 30-year life of the IFP. A different approach to conservation planning might be to require such high levels of conservation commitments from enrollees up front in the IFP that there is very little uncertainty whether conservation goals would be met. Such an approach would reduce the need to rely on adaptive management to ensure successful conservation. However, this alternative would not allow the State of Idaho and other potential enrollees to fulfill their business goals.

Summary of Benefits

Overall, habitat conditions for bull trout, steelhead, and salmon in IFP area streams will improve to a greater extent under the IFP than under the current IFPA rules. Implementing IFP mitigation measures is expected to result in reduced sediment delivery, increased connectivity, increased LWD loading, and higher average canopy closure after 30 years than under the current IFPA rules. The changed circumstances commitment would further aid habitat and covered species if impacted by large landslides, fires, or floods. The magnitude of change expected under the IFP would be greater than that expected for current IFPA rules as a result of the more comprehensive IFP commitments.

Other aquatic species possibly present in the IFP area will also be positively affected by changes in habitat conditions under the IFP. These species include native and non-native salmonids, aquatic invertebrates, and non-native fish. Salmonids in the IFP area generally have similar habitat requirements. Therefore, to the extent that the IFP benefits bull trout, salmon, and steelhead, it will also generally benefit other aquatic species.

Certainty of IFP riparian conservation commitment effectiveness may be somewhat less than provided by several other aquatic conservation plans approved by the Services because the number of trees left close to streams may be less in some circumstances. The reasons for developing the IFP approach to aquatic species conservation and riparian prescriptions include:

- Less than 4 percent of the Salmon River basin is state or private timberland that is eligible for enrollment to the IFP. Basin-wide, the percentage of state and private forestlands in the Clearwater River basin is also small (20 percent), although some sub-basins and watersheds contain substantial areas of state and private lands. Nevertheless, most riparian stands existing within these state and private lands have been harvested historically and/or are young; simulation of riparian stand conditions through the 30-year life of the IFP demonstrates that most of these stands within RPZs will remain off limits to harvest.
- Only 23 percent of state streamside forests would initially be candidates for harvest under the IFP, minimizing any potential negative effects if conservation benefits of riparian prescriptions are found to be inadequate.
- The IFP requires significant additional conservation measures for road upgrades beyond those required by other approved aquatic conservation plans.

- The IFP provides significant adaptive management flexibility to accommodate increased uncertainty associated with these less conservative riparian prescriptions and other commitments.

In addition to the current IFPA rules, the IFP will increase certainty that conservation is achieved through effective implementation and administration of required management measures. Administration and implementation commitments ensure IFP success by reporting performance metrics, providing third party audits of practices, and training personnel and contractors regarding required IFP conservation practices. Moreover, the actual success of the IFP and need for additional mitigation will be evaluated through a series of implementation and effectiveness monitoring efforts for all categories of conservation commitments. Administration and implementation commitments are substantial and describe the processes and schedules for reporting monitoring results to the Services.

For road impacts, IFP conservation commitments are expected to reduce total road surface erosion by 27 percent over the 30-year IFP. This reduction in total sediment loading from roads occurs because less sediment will be produced from both new and existing roads than would occur if the IFP were not implemented, reversing an increasing trend of sediment loading to a decreasing trend.

Only 23 percent of IDL riparian buffer areas are expected to be initial candidates for partial-cut harvest throughout the IFP area under the IFP. An additional 28 percent of riparian buffer areas are expected to become candidates for partial-cut harvest in the IFP area over the 30-year period of the IFP. Impacts within RPZs will be minimized by increased buffer width, additional leave-tree requirements, and other commitments required by the IFP. Moreover, the preponderance (approximately 50 percent) of riparian areas on state and private enrolled lands will provide additional conservation benefits because they would not meet the IFP minimum leave-tree requirements and would remain unharvested through the life of the IFP.

Implementation of prescriptions and all covered activities associated with the IFP will not create additional unavoidable adverse impacts on fisheries and aquatic resources in IFP area watersheds compared to existing conditions. Cumulative effects of continued timber harvest, road system management, and other activities on aquatic habitat with implementation of IFP management commitments in the IFP area are not entirely certain, because many uncontrolled factors may influence habitat quality, and variable conditions exist across the IFP area. It is anticipated that implementation of the IFP will improve aquatic habitat characteristics and positively affect covered species populations throughout the IFP area. However, cumulative effects in areas of mixed ownership could be driven by activities on lands not owned or managed by the State of Idaho or private landowner enrollees, or by

lands that are not forested - the majority of all lands in all sub-basins of the Salmon River and many Clearwater River sub-basins. Nevertheless, potential improvement in bull trout, salmon, and steelhead habitat quality would certainly exceed any improvement that may occur under current IFPA rules; a positive trend of gradually improving aquatic habitat conditions is expected over the 30-year IFP period. This improving trend will result from the combined positive influences of low risk habitat management strategies for salmonids, the predominance of Federal lands in the IFP area, and the benefits to bull trout, salmon, and steelhead habitat resulting from implementation of IFP requirements on state and enrolled private lands.