21. Water Source Development Consistent with Water Quality Protection (PRACTICE: 2-21)

a. Objective: To supply water for road construction, reconstruction and maintenance, fire protection, and other management activities, while maintaining existing water quality and water quantity necessary for protecting downstream beneficial uses, including fisheries and aquatic habitat.

b. Explanation: Water source development is needed to supply water for road construction, reconstruction and maintenance, dust control, and fire control. Problems may arise when cofferdams or water holes are built in streams. Protection of exposed surfaces of water holes or other improvements is necessary to prevent streambanks from eroding, and ultimately discharging sediment back into the waterway. Contaminants from water drafting equipment,

In addition to erosion of water source developments, degradation of water quality can occur at the water source approach, through introduction of sediment and contaminants into waterways as a result of access and equipment filling operations. Water drafting can alter water quality, water yield, runoff regimes, natural channel geomorphic processes, and fish and wildlife habitats.

Water sources designed for permanent installation, such as piped diversions to off-site storage, are preferred over temporary, short term use developments.

c. Implementation: Critical to the effectiveness of this practice is the coordination of engineering representatives, hydrologists, fishery biologists, and permit and sale administrators. Locate existing developments, or proposed streams, and evaluate for feasibility of use, determine scope and scale of environmental risks, selection of techniques to utilize to mitigate disturbance to water quality and streamflow, and compare with the economics of development and use. Projects incorporate a list of BMP's to implement, with Line Officer signature and date. Erosion control plan includes measures to protect water quality and streamflow at and downstream from water source development and/or use sites.

Every site is unique, and requires techniques customized to the site for the BMP to be most effective. Techniques include, but are not limited to:

- Water supply sources are located and developed with the intent of permanency whenever possible. Convenience by developing additional water sources is weighed against degree of degradation of water quality from that development.
- Materials that minimize sediment disturbance and contamination, in the development, use, and removal of improvements are utilized.
- Disturbance of adjacent vegetation is minimized to the extent possible, with intent to encourage vegetation recovery after source development and/or use.
- Earth fill for impoundment construction has protective surface materials, such as plastic liner or filter cloth for temporary sources, and sandbags with clean sand and gravels, or more permanent methods for long term use of water source developments.

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Comment [WW1]: You have to maintain sufficient streamflow so fish and other aquatic life is not adversely impacted. This is especially true for listed salmonids and other listed species that could be affected by reductions in streamflow during summer and fall low-flow conditions.

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Comment [WW2]: Missing end of sentence…

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Comment [WW3]: So, are the following techniques supposed to qualify as BMPs? Or are the BMP standards and specifications found elsewhere?

- Natural stream flow is maintained while diversion is being constructed, for aquatic life protection.
- Screens of appropriate size opening are installed to prevent mature and juvenile organisms from entering [pump] intakes.
- Conveyances are designed and constructed to carry intended flows, without collapse or failure.
- Releases from developed water source into natural stream flow are controlled to prevent sediment discharge and erosion at the re-entry point.
- Access approaches are located as close to perpendicular as possible to prevent stream bank excavation.
- Access approaches are stabilized with appropriate materials, dependent on expected life and use frequency of the developed water source.
- Equipment accessing water sources is free of contaminants.
- BMP Implementation may be incorporated as a pay item in contracts.
- Erosion Control Plan is developed jointly with engineers, hydrologists, and fish biologists. It is included in all work and activities, and implementation of the plan is ensured by COR, ER, Permit or Sale Administrator, crew supervisor, and project manager, depending on type of project.
- Existing water source developments that are to be restored follow the same techniques as for new development.
- Use of commercial water sources is encouraged.

Water source development associated with roads follows FP-03 Edition of Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03), Section 209 – Structure Excavation and Backfill.

BMP Implementation is considered as a pay item in contracts, rather than incidental to construction and maintenance. For all projects, contract and otherwise, BMP implementation is evaluated with multi-disciplinary team, and with Line Officer, to understand practices that were successful as well as to learn from those that were less than successful and to make improvements for future implementation.

Comment [WW4]: One related technique is missing: water quantity and maintenance of stream flows. Water drafting needs to consider and maintain minimum the streamflow needed to maintain aquatic habitat and beneficial uses (especially for fish, but also for other aquatic organisms) at the extraction site and in the downstream channel. This will affect the size of the stream that can be used for drafting and the rate of water extraction at the drafting point. This is a critical biological element related to water drafting impacts.

Comment [WW5]: Access routes should either be hard surfaced (to reduce erosion and fine sediment production) or they should be closed and treated for erosion control prior to the beginning of the rainy season.

Comment [WW6]: Again, BMP effectiveness monitoring also needs to be included.