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# Rehabilitation Plan Submittal -Frequently Asked Questions

## Should state staff review plans prior to submittal to the NWMC?

Yes. Prior to sending plans to the National Water Management Center (NWMC) states are reminded that the National Watershed Program Manual (NWPM), Section 502.11 (A) requires state staff review:

*An internal interdisciplinary review of plans must be conducted by appropriate NRCS State staff to ensure that the problems identified, alternatives considered, preferred alternative, and effects are adequately described, and the plan has been developed in accordance with national policy.*

The NWMC has prepared a Watershed Plan Review Checklist as an aid for State staff reviews.

## How should multiple plans be timed for review?

If several plans are being developed within a state at the same time, it is recommended that only one plan at a time is submitted to the NWMC for review. This will avoid repeated errors and comments on subsequent plans, assist the NWMC with balancing its workload, and improve NRCS efficiencies at all levels by not having the same comments and disposition of those comments on subsequent plans.

## What and where is the current policy language and guidance for watershed agreements?

States are required to use the most recent Watershed Agreement language contained in the current NWPM, Section 506.30. The language therein has been reviewed by the Office of General Counsel (OGC). In addition, it is recommended that states visit:

[http://www.usda.gov/wps/portal/usda/usdahome?navtype=RT&parentnavid=HOME&navid=NON\\_DISCRIMINATION](http://www.usda.gov/wps/portal/usda/usdahome?navtype=RT&parentnavid=HOME&navid=NON_DISCRIMINATION) for most current Civil Rights statement.

## What vertical datum should elevations be referenced in a plan?

The use of the elevation suffix Mean Sea Level (MSL) is confusing and discouraged as it can now refer to one of two vertical datum, the National Geodetic Vertical Datum of 1929 (NGVD29) or the North American Vertical Datum of 1988 (NAVD88). NRCS-assisted dams likely referred to the NGVD29 datum for original planning and design, even though the suffix “feet-MSL” was used, while modern surveys of the dam likely reference the new NAVD88 datum. Also, most if not all of FEMA’s Flood Insurance Rate Maps (FIRMs) now reference the NAVD88 vertical datum. It is recommended to reference all elevations to the NAVD88 datum. Mixing datum in a plan is confusing and forces the reader to make conversions to compare between for example, as-built elevations and proposed elevations. Any elevations in tables that were converted to NAVD88 should be footnoted accordingly. All elevations within narrative sections of the plan should include the suffix “\_\_\_\_feet-NAVD88” to eliminate any confusion.

The National Geodetic Survey tool VERTCON will convert between the datum given the latitude and longitude of a dam site:

[http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert\\_con.pr1](http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.pr1)

## Is the sponsor required to obtain additional land rights upstream of the dam?

The NRCS policy addressing upstream land rights (development rights, flowage easements) for rehabilitation is stated in sections 504.3(C) (1) (iii) and 505.36 (G) of the NWPM. For watershed rehabilitation projects, the minimum land rights area upstream of the dam must be for all areas below the elevation of the top of the dam, unless the plan allows a lower elevation (not lower than the elevation of the 100-year, 24-hour storm or auxiliary spillway elevation, whichever is higher).

If the selected land rights elevation is lower than the top of the dam, then policy requires that a rationale be discussed in the plan (not in the Agreement) for the **selected** elevation. The rationale should be based on planning principals where alternatives are formulated and evaluated using risk, economic, and environmental criteria. The cost of obtaining land rights for a range of flood recurrence levels could be compared to the potential costs of risk-adjusted damages for the respective recurrence intervals as shown in the following table for a dam with a 100-year evaluated life:

**Risk-Adjusted Damage Costs versus Land rights Acquisition Costs (present-value basis)**

Annual Flood Rec./Freq.	Max Reservoir Elev., ft-NAVD88	Estimated Flood Damages (future developed)	Life-time % chance of Occurrence *	Risk-Adjusted Damage Costs	Landrights Acquisition Cost
100-yr / 0.01	882.2	\$ 1M	63.4 %	\$634 K	> 300K
200-yr / 0.005	885.2	\$ 1.5M	39.4 %	\$591 K	> 350K
500-yr / 0.002	888.2	\$ 2.0M	18.1 %	\$362 K	< 375k
1000-yr / 0.001	891.2	\$ 3.0M	9.5 %	\$285 K	< 400k

\*  $J = 1 - (1-p)^n$  where J is the risk of occurrence over the life of a project, p is the annual exceedance probability, and n is the number of trials or years of life.

From the table it can be seen that the cost of acquiring land rights at the 500-year flood event begin to exceed the risk-adjusted damage costs. Thus acquiring land rights to the 500-year flood elevation rather than the top-of-dam elevation could be rationalized.

Also, if the selected land rights elevation is lower than the top of the dam, then policy requires a provision in the watershed agreement **describing** the potential risk and liability that the sponsors and landowners may be assuming.

## How should the Evaluation Period and Period of Analysis be determined?

NWPH 606.50, Glossary, defines the “evaluation period” and the “period of analysis”. The period of analysis is the time required for installation (implementation) plus the evaluation period (evaluated life). The period of implementation is when installation occurs. The evaluation period is when operation, maintenance, and component replacement occurs. The evaluation period is not to exceed 100 years.

The NRCS policy addressing the evaluation period of a rehabilitation structure is in NWPM 505.35 (B)(1)(iii), and further guidance is contained in Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies (P&G) where the national economic development (NED) alternative is the federal objective. Generally, the evaluation period should be the longest period of time over which any alternative plan would have significant beneficial or adverse effects, but not more than 100 years, P&G, Chapter II, Section 1, subsection 2.1.2(c).

For example, assume that a dam eligible for rehabilitation has 75 years of sediment life remaining. It is not appropriate to assume that the evaluation period is limited to 75 years, as the sediment could be dredged or the sediment pool otherwise enlarged, either during implementation or as a maintenance/replacement cost during the evaluation period. In order to meet P&G and policy, it is recommended to evaluate alternative evaluation periods using increments, such as the 50-year minimum, 75 years, and 100-year maximum. For this example, a 100-year evaluation period alternative would include sediment pool excavation. Then the evaluation period most reasonable for further detailed analysis can be determined. The appropriate period of analysis can then be identified as the evaluation period plus the implementation period. The rationale for selection of the evaluation period and period of analysis should be discussed in Appendix D, "Investigation and Analysis Report", of the Plan.

## Can the term of watershed agreement and O&M agreement default to the minimum of 50 years?

No. The term of Watershed agreements and Operation & Maintenance Agreements should not default to a 50-year period. Codified Rule 7 CFR Part 622, *Watershed Projects*, Subpart B, Section 622.10(2)B states:

*To receive Federal assistance for project installation, sponsors shall commit themselves to use their powers and authority to carry out and maintain the project as planned.*

Recommend that the term of the Watershed Agreement be the same as the period of analysis and the O&M Agreement be the same as the operation life.

## Is a decommissioning alternative required to be considered and should it meet the purpose and need?

Yes and yes. The decommissioning alternative is required and should be formulated to meet the purpose and need of the project. In order to meet the purpose and need, this alternative often involves a combination of breaching, floodproofing, and relocation. If the alternative is "unreasonable" due to exorbitant cost (not just more expensive) or other reasons, it can be described in the "*Alternatives Considered but Eliminated from Detailed Study*" section of the plan with rationale as to why it was eliminated.

## Should impacts to Flood Prevention and Flood Prevention Benefits be evaluated when increasing the capacity of a principal spillway or lowering an auxiliary spillway?

Yes. Dams originally installed by the Small Watershed Program were commonly designed such that the maximum outflow delivered by the principal spillway (PS) would be contained within the banks of the receiving stream during the PS-hydrograph (PSH) event, while the peak reservoir level would be at or near the crest of the auxiliary spillway (AS). The portion of the reservoir, typically between the lowest crest of the PS (normal water surface) and the crest of the AS is termed the retarding pool (TR-60) and also commonly called the flood pool. Downstream flood prevention/protection results from attenuation of the PSH inflow hydrograph by the flow-constricting PS and storage by the flood pool, and is manifest by lower flood profiles downstream of the dam during the low recurrence-interval (high frequency) events, 2-year through the PSH-year, as compared to the flood profiles without the dam in place. Flood damage reduction benefits result from those lower downstream peak discharges and flood profiles.

Under certain rehabilitation scenarios, for example when a dam is upgraded from low or significant hazard class to high hazard class, and the PS capacity is increased, from say a 24-inch-diameter conduit to the required minimum 30-inch-diameter conduit, it could be expected that the peak outflows increase for the lower recurrence-interval events; intervals lower than the original PSH-year. This could have an adverse effect on flood damage reduction benefits since downstream out-of-bank flows may occur more frequently and higher flood elevations may occur for the same recurrence intervals. Impacts may include increased damages to crops, fencing, buildings, road crossing structures, and stream bank stability. The impacts, if any, and the procedures used to evaluate, should be documented in the plan. Additionally, outreach to the public and affected property owners should be documented in the plan.

## Are consultants required to use a multi-disciplinary approach to planning?

Yes. Policy, CEQ regulations, and P&G require an interdisciplinary approach for planning. The disciplines of the planners should be appropriate to the issues identified in the scoping process. At a minimum this will usually involve engineers, geologists, biologists, economists, and cultural resource specialists and could involve technical experts such as ecologists, landscape architects, restoration specialists, and others. A list of preparers must be included in the plan as shown in NWPM Figure 501-D1. NWPM 501.42 describes who should be included, what information is included, and how the *List of Preparers* should be presented.