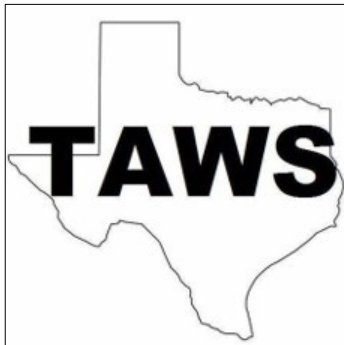




# NRCS Watershed Rehabilitation and Planning – A Consultant's Perspective

J Ryan Collins, P.E. / April 4, 2024



Build Better. Together.

# History of the NRCS Watershed Program

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- Early soil conservation efforts were spearheaded by Dr. Hugh Hammond Bennett, who authored a highly influential circular "Soil Erosion: A National Menace" in April 1928. Dr. Bennett was the first Chief of SCS.
- Soil Conservation Act (PL 74-46), enacted in 1935 created the Soil Conservation Service (SCS), now the Natural Resources Conservation Service (NRCS).
- Flood Control Acts of 1936 (PL 74-738) and 1944 (PL 78-534)
  - Authorized NRCS to work on first watershed projects.
- The Agricultural Appropriations Act of 1953 (PL 83-156) authorized additional watershed projects (Pilot).



Dr. Hugh Bennett (Left), the "father of Soil Conservation" Source: [https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/about/history/?cid=nrcs143\\_021392](https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/about/history/?cid=nrcs143_021392)

# History of the NRCS Watershed Program

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

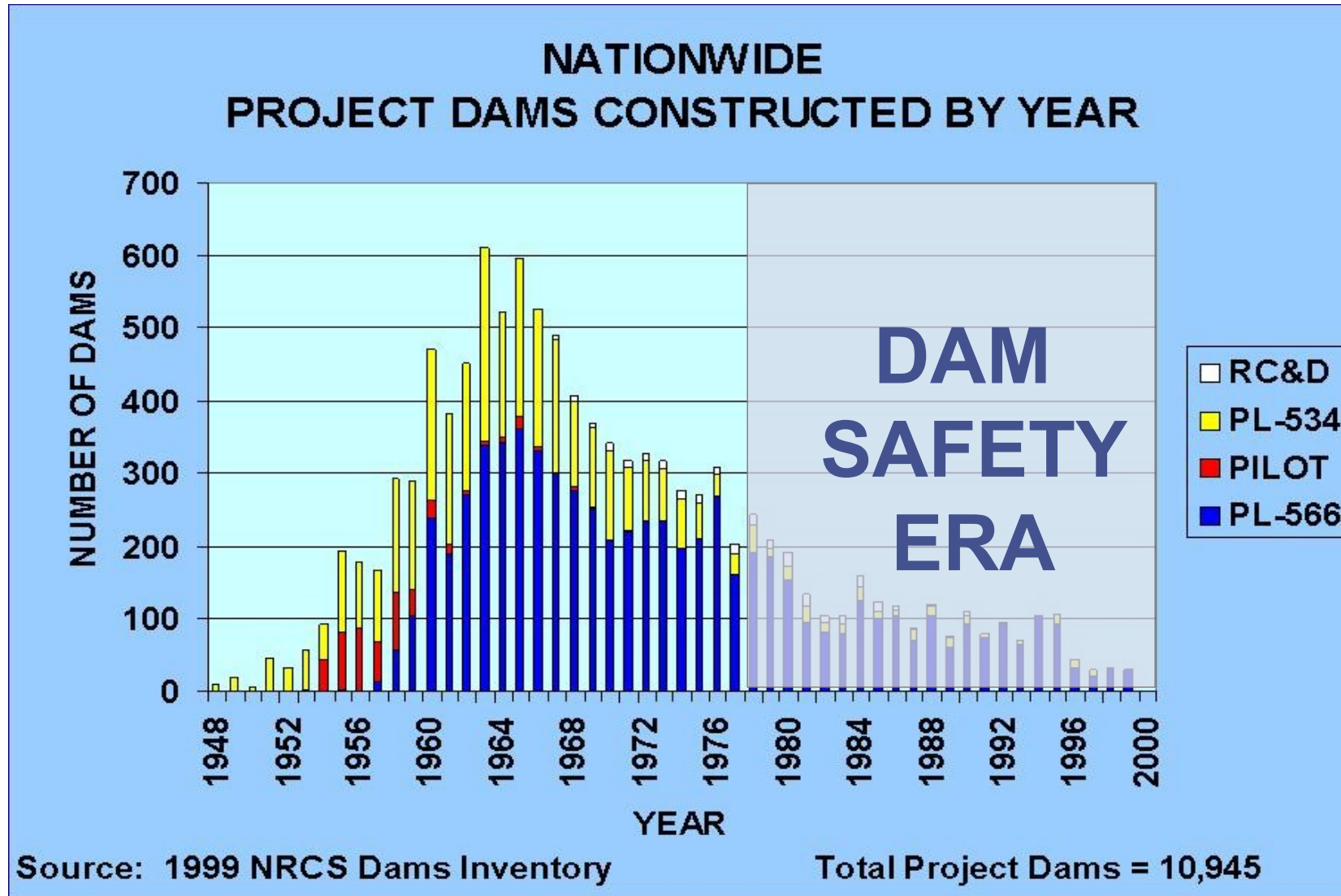


Hearthstone Lake Dam located in Augusta County, Virginia

- During the 1950's, the Watershed Protection and Flood Prevention Act (Public Law 83-566) was developed and adopted by Congress
- This act provided authority for financial and technical assistance for planning and implementation of watershed projects.
- Resource Conservation and Development (RC&D) Program, authorized under PL 87-703 (1962)
- Small Watershed Rehabilitation Amendments of 2000 (Section 313, Public Law 106-472).
- Amends PL 83-566 to add authority for rehabilitation
- More than 11,800 flood control dams have been constructed in the U.S. under these programs since 1948 (PL-534, Pilot, PL-566, RC&D).

# History of the NRCS Watershed Program

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

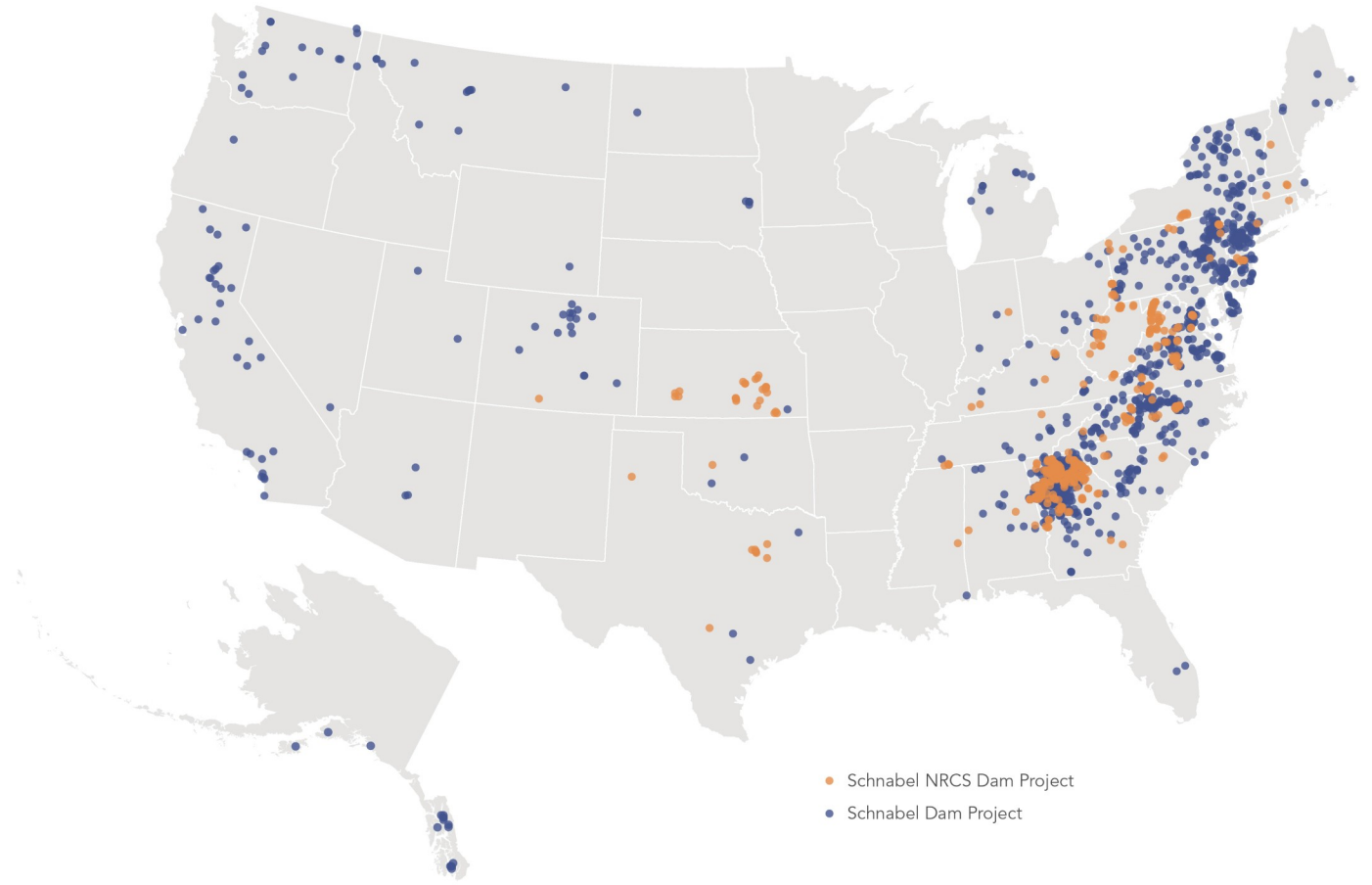


In total, NRCS has been responsible for the construction of nearly 12,000 project dams since 1948.

# Schnabel's Project Experience

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- Schnabel personnel have provided engineering services for over 400 NRCS dams across the country since 1994.
- Schnabel Engineering NRCS Project Experience:
  - Dam Inspections
  - Dam Assessment Reports
  - Planning Studies
  - Supplemental Watershed Plan-Environmental Documents
  - Repair Designs
  - Rehabilitation Design



# Watershed Planning - Steps

## *NRCS Dam Rehabilitation – A Consultant's Perspective*



<https://www.blogs.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/cta/>

# Watershed Planning - Team

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

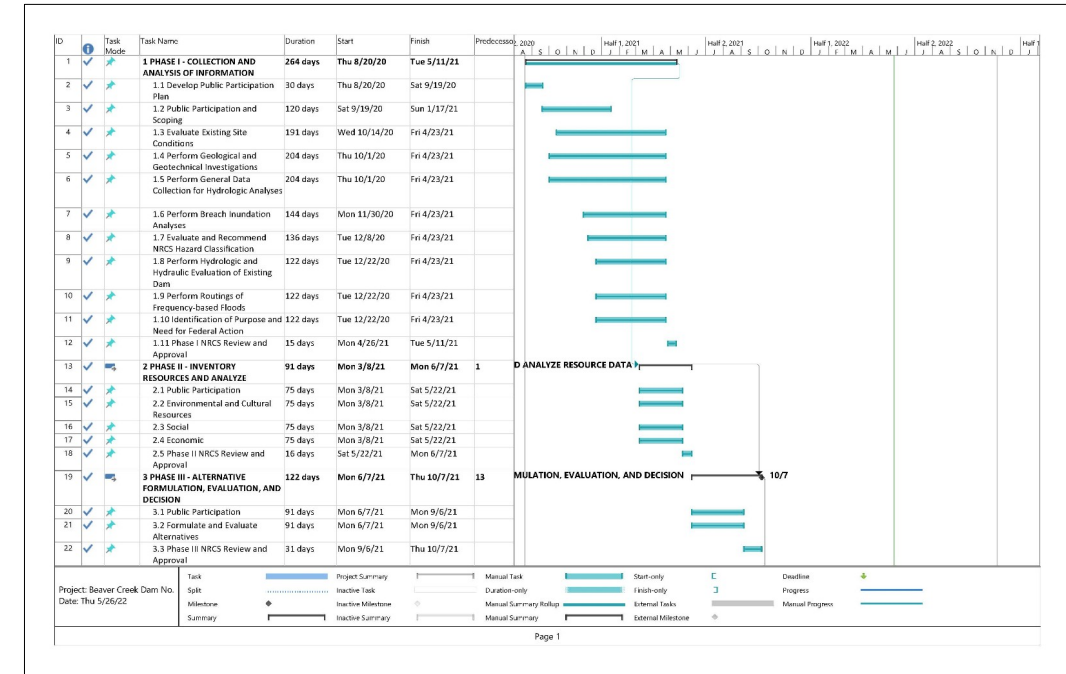
- The development of a watershed plan or supplemental watershed plan requires a multi-disciplined team including:
  - Engineers
  - Geologists
  - Environmental Consultants and Ecologists
  - Cultural Resource Specialists and Archaeologists
  - Economists
  - Sub-contractors and sub-consultants such as
    - Surveyors, drillers, laboratories, divers,
    - CCTV inspectors, specialty contractors, etc.



# Watershed Planning - Project Schedule

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- The project schedule is critical – may be tied to funding
- Time must be included to complete the supplemental watershed planning phase. Some considerations include:
  - Time to advertise public meetings and invite agencies for scoping and other meetings.
  - Time for review of work products by NRCS (State and national) and to address those comments.
  - Time for agency/public review and consultation.
  - Any other project deadlines that may or may not be related to the rehabilitation



# Watershed Planning - Public Participation and Scoping

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

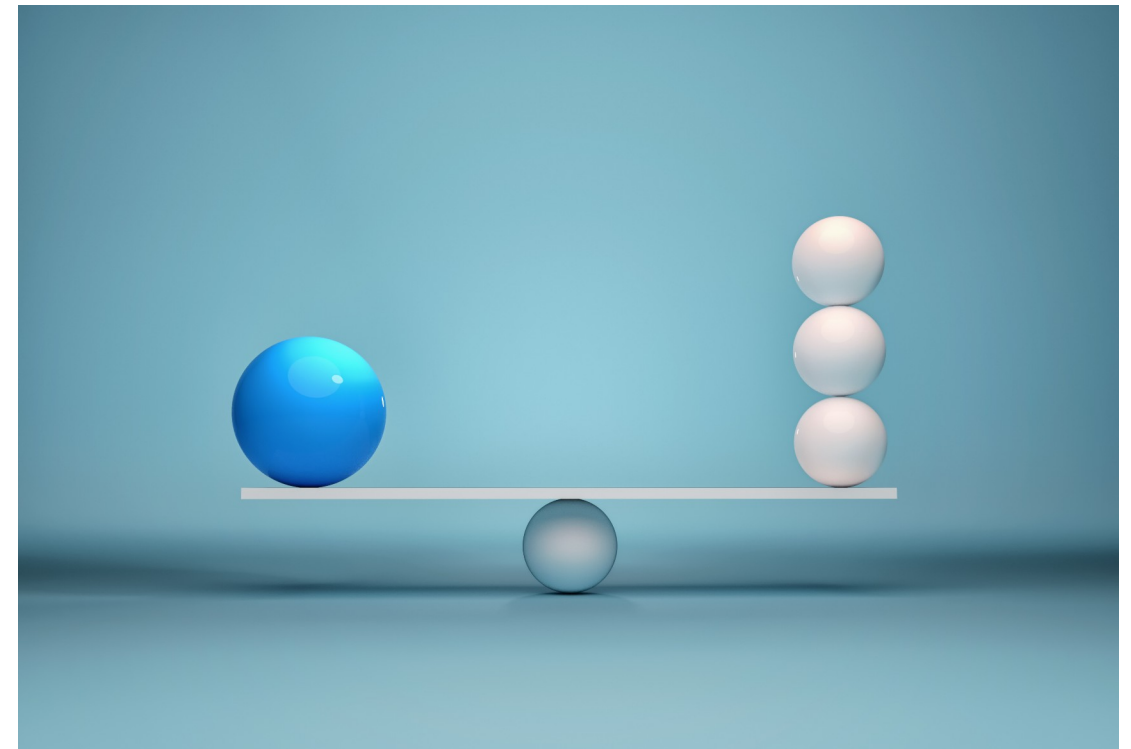


- Public meetings to present the project and identify scoping concerns are required for projects in the Watershed Rehabilitation Program to comply with NEPA.
- Public Meetings for presenting the alternatives and Supplemental Watershed Plan findings and Alternatives are not to be conducted until NWMC comments are addressed and NHQ has performed Programmatic Review of the Plan.

# PR&G Process Implementation

## *NRCS Dam Rehabilitation – A Consultant’s Perspective*

- In 2018, the acting chief of NRCS made the decision to adopt the PR&G as required by DR9500-13 as summarized in a decision memorandum signed in April 2018.
- The decision memorandum acknowledges that:
  - *“Integration of the PR&G evaluation process in NRCS analysis and decision-making will necessitate revisions at all levels of the evaluation to decision process.”*
- The PR&G implementation provides improved flexibility when comparing alternatives, in that alternatives are compared using “tradeoffs” which could be either quantified or unquantified information, whereas the P&G process was primarily quantitative.



# Watershed Planning - Typical Scoping Concerns (P&G )

## *NRCS Dam Rehabilitation – A Consultant’s Perspective*

| Typical Scoping Concerns (P&G)    |                                                     |                                                     |                               |                             |
|-----------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------|-----------------------------|
| Economic Considerations           | Air quality                                         | Coral reefs                                         | Cultural resources            | Ecologically critical areas |
| Endangered and threatened species | Environmental justice and civil rights              | Essential fish habitat                              | Fish and wildlife             | Floodplain management       |
| Forest resources                  | Invasive species                                    | Land use                                            | Migratory birds               | Natural areas               |
| Parklands                         | Prime and unique farmland; farmland of significance | Public health and safety                            | Regional water resource plans | Riparian areas              |
| Scenic beauty                     | Scientific resources                                | Sole source aquifers                                | Social issues                 | Soil resources              |
| Water quality                     | Water resources                                     | Waters of the U.S., including special aquatic sites | Wetlands                      | Wild and scenic rivers      |

# Watershed Planning – EcoSystem Services Framework (PR&G)

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

### EcoSystem Services Framework (PR&G)

|                              |                                                                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Provisioning Services</b> | <i>Provisioning services are tangible goods provided for direct human use and consumption, such as food, fiber, water, timber or biomass.</i>                              |
|                              |                                                                                                                                                                            |
| <b>Regulating Services</b>   | <i>Regulating services help maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe.</i>    |
|                              |                                                                                                                                                                            |
| <b>Supporting Services</b>   | <i>Supporting services refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.</i> |
|                              |                                                                                                                                                                            |
| <b>Cultural Services</b>     | <i>Cultural services make the world a place in which people want to live – recreational use, spiritual, aesthetic viewsheds, or tribal values.</i>                         |

# Watershed Planning – EcoSystem Services Framework (PR&G)

|                              | No Action/FWOFI                                                                                                                                                                                                                                        | Alternative 1                                                                                                                                                                                                                                                                    | Alternative 2                                                                                                                                                                                         |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Provisioning Services</b> | <i>Provisioning services are tangible goods provided for direct human use and consumption, such as food, fiber, water, timber or biomass.</i>                                                                                                          |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |
| Food                         | May impact nearby farm.                                                                                                                                                                                                                                | Provides flood protection for nearby dairy farm.                                                                                                                                                                                                                                 | Provides flood protection for nearby dairy farm.                                                                                                                                                      |
| Water                        | Project will fail to meet current community demands, Project will fail to meet future community demands.                                                                                                                                               | Project will provide adequate water supply to community from present demand through 2075.                                                                                                                                                                                        | Project will provide adequate water supply to community at present demand through 2075.                                                                                                               |
| <b>Regulating Services</b>   | <i>Regulating services help maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe.</i>                                                                                |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |
| Flood and Disease Control    | Project remains non-compliant with dam safety standards for high hazard. potential dams, posing additional risk to downstream lives and property. Inadequate water supply may have indirect adverse effects on health and well-being in the community. | Action will result in compliance with dam safety standards for high hazard potential dams. Sponsors will be capable of meeting immediate water supply demands as well as future demands through 2075. Action will remove raw water infrastructure as a hazard of the dam itself. | Action will result in compliance with dam safety standards for high hazard potential dams. Sponsors will be capable of meeting immediate water supply demands as well as future demands through 2075. |
| <b>Supporting Services</b>   | <i>Supporting services refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.</i>                                                                             |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |
| Primary Production           | Non-compliant high hazard potential dam - risk to croplands, raw water supply. Inadequate flood control may impact local dairy farm production.                                                                                                        | Provides flood protection for nearby dairy farm.                                                                                                                                                                                                                                 | Provides flood protection for nearby dairy farm.                                                                                                                                                      |
| <b>Cultural Services</b>     | <i>Cultural services make the world a place in which people want to live – recreational use, spiritual, aesthetic viewsheds, or tribal values.</i>                                                                                                     |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |
| Recreational Experiences     | Flooding in AS could damage existing park space.                                                                                                                                                                                                       | Preserves all existing park space.                                                                                                                                                                                                                                               | Permanent loss of no less than 0.5 acre of park space.                                                                                                                                                |
| Aesthetic Viewsheds          | No change.                                                                                                                                                                                                                                             | Relocation of power pole will improve viewscapes.                                                                                                                                                                                                                                | Loss of an additional 1.0 acre of trees in park area and natural.                                                                                                                                     |

# Watershed Planning – PR&G Guiding Principles

*NRCS Dam Rehabilitation – A Consultant's Perspective*

- Healthy and Resilient Ecosystems
- Sustainable Economic Development
  - Economic measures
  - Social measures
  - Environmental measures
- Floodplains
- Public Safety
- Environmental Justice
- Watershed Approach

# Watershed Planning – Economic Analyses

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- Develop benefit to cost (B:C) ratios for all alternatives based on comparison with the No-Action (FWOFI) alternative.
- Under PR&G, the Alternatives must be compared using an ecosystem service framework, which includes stakeholder values identified during scoping.
- Comparison of tradeoffs among alternatives shall be accomplished in accordance with policy and guidance as outlined in NWPM, NWPH and DM-9500-13\*.
- The Preferred Alternative will be identified as the reasonable alternative that maximizes the net economic, social, and environmental benefits to society. Identify the Preferred Alternative and other identifications per PR&G for water resource projects.



\*Determine net monetary benefits and benefit:cost ratios for all project alternatives as compared to the Future Without Project condition. The benefit:cost ratio is based on all possible monetized benefits and costs. Any benefits and costs that are difficult to monetize shall use one of the non-market evaluation techniques. If this transparently remains difficult to be monetized, then additional effects may be used as part of the tradeoff analysis in both narrative and display formats.

# No-Action Alternative / Future without Federal Investment

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

**NO-ACTION**

- NRCS released National Instruction in December 2022, which more clearly defined the no-action alternative and how it is to be used when comparing action alternatives (Title 390, Part 303 – Clarification and Instructions for the No-Action Alternative in Supplemental Watershed Rehabilitation Plans).
- This instruction provided vital policy clarification and direction for consultants to prepare Supplemental Watershed Plans under the PL-566 program.
- The instruction also provided technical guidance as to how the impacts of the design storm with breach / without breach should be presented and incorporated into the analyses.

# Example of Alternatives Comparison with No-Action

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- Scenario: I am walking briskly down an aisle in a grocery store and observe another shopper coming down the same aisle in the opposite direction.
- No-Action: Maintain speed and course.
  - Will likely lead to collision with the other shopper.
  - May cause injury to myself, the other shopper or store property.
  - Will likely result in additional injuries to myself resulting from other shopper's annoyance at my inaction.



# Evaluating Consequences and Comparing Alternatives

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- As part of the PR&G and the National Guidance provided by NRCS regarding the No-Action alternative, establishing a baseline of the projected effects of No-Action is critical to provide a meaningful comparison among the action alternatives.
- Schnabel utilized the USACE's "LifeSim" software on a recent project to estimate consequences resulting from a variety of storm conditions for each alternative.
- Structure data from the National Structure Inventory (NSI) were used to estimate (for each flood scenario):
  - Estimated human life loss.
  - Population at Risk (PAR).
  - Economic consequences based on prescribed damage curves for a given structure type.

# Conclusion and Wrap-Up

## *NRCS Dam Rehabilitation – A Consultant's Perspective*

- The development of a Supplemental Watershed Plan can be dynamic, nuanced and requires a great deal of coordination and communication to successfully execute.
- The NRCS has now adopted the PR&G as described in greater detail in DM/DR 9500-013. In short:
  - Focus on the EcoSystem Services as a framework for identifying and evaluating scoping concerns.
  - Alternative comparison must also be conducted with the PR&G Guiding Principles.
  - PR&G allows for qualitative comparison of the alternatives, rather than a strictly quantitative comparison. Quantify tradeoffs when possible.
  - Note: NRCS planning to conduct training for consultants on watershed planning, with a specific focus on PR&G.
- The NRCS has issued National Guidance as to how the No-Action alternative should be developed and used to compare the other action alternatives. Refer to Title 390-303-NI for additional information.



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