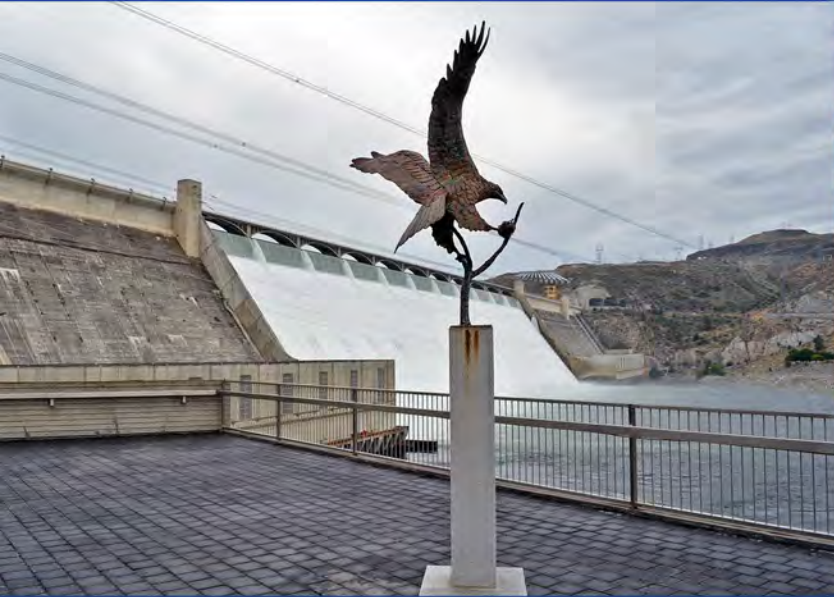


RECLAMATION

Managing Water in the West



Infrastructure Investment Strategy



U.S. Department of the Interior
Bureau of Reclamation
Denver, Colorado

May 2015

Mission Statements

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

The Bureau of Reclamation manages, develops, and protects water and related resources in an environmentally and economically sound manner in the interest of the American public.

Photographs on cover:

Top Left: Grand Coulee Dam, Columbia Basin Project, Pacific Northwest Region

Top Right: Echo Dam, Weber River Project, Upper Colorado Region

Bottom Left: All-American Canal, Boulder Canyon Project, Lower Colorado Region

Bottom Right: Shasta Dam, Central Valley Project, Mid-Pacific Region

Infrastructure Investment Strategy



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Acronyms and Abbreviations

BRC	Budget Review Committee
CARMA	Capital Asset and Resource Management Application
CI	Condition Index
CRV	Current Replacement Value
D&S	Directive and Standard
DEC	Design, Estimating, and Construction
Department	U.S. Department of the Interior
DM	Deferred Maintenance
DSO	Dam Safety Office
EO	Executive Order
FBMS	Financial and Business Management System
FCI	Facility Condition Index
FO&M	Facilities Operations and Maintenance
FRPP	Federal Real Property Profile
FRR	Facility Reliability Rating
FY	Fiscal Year (October 1 – September 30)
MR&R	Major Rehabilitation and Replacement
O&M	Operations and Maintenance
OM&R	Operations, Maintenance, and Repair
OMB	Office of Management and Budget
RD	Regional Director
RM	Reclamation Manual
RLT	Reclamation Leadership Team
SOD	Safety of Dams
SSLE	Security, Safety, and Law Enforcement
XM	Extraordinary Maintenance

Chapter 1

Introduction

Reclamation's mission is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Established in 1902, Reclamation is best known for the dams, power plants, pipelines, and canals constructed in the 17 Western states. These water and power projects led to homesteading and promoted the economic and social development of the West.

Reclamation is the steward of approximately 69 percent, by value, of all real property assets (buildings and structures constructed by the Department of the Interior). Reclamation's water resource infrastructure assets have a current estimated total replacement value of \$99 billion. In FY 2013, the delivery of water, power, and other benefits from Reclamation's projects provided \$65 billion in positive economic impact and supported more than 403,000 jobs. From dams and irrigation facilities to hydropower generation and distribution, Reclamation's assets are a vital part of the Nation's economy, safety, and security.

Many of Reclamation's oldest buildings and structures endure, functioning beyond their initial design lives. Reclamation has worked in partnership with many non-Federal operating entities to provide reliable service across the West, delivering water and power to meet multiple demands and changing public needs and interests. Reclamation and its partners achieved this record of reliability through preventive maintenance programs and substantial investment in major repairs and replacement activities. Continued investments by Reclamation and its water and power partners will further extend the serviceability of existing reserved and transferred works.

Looking ahead, it is clear that asset management practices must evolve to meet the challenges of maintaining infrastructure that continues to age even as additional demands are placed on it. Reclamation developed the strategy presented in this document to improve the data used to support and inform asset management decisions, while addressing a range of emerging issues: the demands of a growing population in the West; new design standards; employee safety improvements; regulatory requirements and operational needs; the effects of a changing climate and associated hydrologic conditions; and new opportunities for improvements in yield, efficiency, and reliability.

To better understand the issues and opportunities regarding future infrastructure investments, Reclamation established an internal team with broad representation and experience to assess these issues and identify the best path forward. This team reviewed and evaluated Reclamation's current processes and practices; identified related strengths and weaknesses; and provided recommendations for improvements. The recommended improvements selected either for implementation or for further analysis and discussion are described in detail in Chapter 4.

The action items in Chapter 4 focus on the following areas:

- Improved data collection, analysis, and reporting
- Categorizing potential investments according to relative importance and urgency
- Collaboration with water and power customers

As a result of this effort, Reclamation developed an Infrastructure Investment Strategy (Strategy) for addressing these related items on a sustainable basis. The success of Reclamation's strategy will depend on many factors, but must build on the effectiveness of existing asset management practices. Recognizing the importance of reliable and informative asset management data to support that evolution, the strategy includes measures to improve Reclamation's processes for gathering asset data and assembling the information in meaningful and useful formats.

For the past six years, Reclamation has been collecting and analyzing data on Major Rehabilitation and Replacement (MR&R) activities as part of its annual asset management planning and reporting processes. The data is a snapshot estimate of the major non-recurring facility maintenance activities that support the continued safe, dependable, and reliable delivery of authorized project benefits. This estimate of MR&R activities has been used in various reports, testimonies, and responses to inquiries. Congressional oversight committees have expressed increased interest in the MR&R activities conducted at Reclamation facilities, both transferred and reserved, including estimates of the funding required to address those activities, safety ratings, and categorizations of the importance of addressing each activity. Moreover, the issues associated with infrastructure investments have been of increasing interest to many of Reclamation's water and power partners and other stakeholders.

In addition, improvements to Reclamation's data collection and reporting processes are necessary because Reclamation's maintenance programs have developed different approaches for determining the amount and priority of funding necessary to support expenditures by Reclamation on reserved works. Reclamation's project staffs also employ different approaches to the oversight of maintenance, including extraordinary maintenance, on transferred works. As a result, it is challenging to combine the information from these various processes in a single document that clearly communicates the basis of Reclamation's maintenance funding requests to Congress, water and power partners, and other stakeholders.

Reclamation's Strategy is intended to meet the challenges presented by the need to balance new and competing demands on the Nation's water and power infrastructure. Implementing the Strategy will improve on Reclamation's approach to identifying, prioritizing, and funding asset investments. The plan presents Reclamation's vision for future infrastructure investments, outlines the criteria Reclamation will use for categorizing investments, and presents a blueprint for implementation.

Reclamation will continue to engage its water and power customers and other interests to assure that infrastructure investment decisions are made in an efficient and transparent manner. Reclamation will also continue to engage other Federal agencies and stakeholders to gain their insight and to seek input regarding opportunities to refine its MR&R data collection and related processes for infrastructure investments.

Chapter 2

Current Asset Management Practices

For more than 100 years, Reclamation has been committed to the proper maintenance of both reserved and transferred works. Reserved works are those facilities for which Reclamation holds title and has retained the operation and maintenance responsibility. Transferred works are facilities that Reclamation also constructed and owns, but that a non-Federal operating partner, generally the benefitting water district, has contractual responsibility to operate and maintain. Transferred works can include dams, delivery and distribution canals and laterals, power facilities, pumping plants, drains, and other associated facilities. The useful life of many Reclamation facilities has been extended well beyond their initial design life. This is the result of both effective preventive maintenance programs and investments by Reclamation and its managing partners in implementing facility rehabilitation and upgrades.

Reclamation uses deliberative investment decision processes grounded in the specialized knowledge of Reclamation staff at its regional, field, and area offices and of Reclamation's water and power partners. As a result, the process reflects important differences among projects and programs.

One of the challenges arising from the evolution of project-specific or region-specific practices has been the use of different definitions for common terminology. The Strategy will establish standard definitions for some widely used terms to support greater consistency across Reclamation and with the Department. Adopting common definitions of other terms, however, will require additional coordination and discussion will be needed to understand the scope of word usage and the implications of making changes.

Responsibility for the operation and maintenance of Reclamation's reserved works and oversight of transferred works resides at the field level in the respective area offices under the direction of the five Regional Directors (see Figure 1 for a map of the Reclamation regions). Policy and technical support is provided by offices principally located in Denver. Over time, the maintenance programs and practices for determining the amount and priority of funding to support expenditures by Reclamation on its reserved works have developed differently, reflecting the unique characteristics of the projects and facilities.

There are also different levels of oversight of the maintenance, including extraordinary maintenance, on transferred works across the many Reclamation projects. These differences are often the result of varying provisions in authorizing legislation and individual contracts, as well as the nature of the facilities at each project. Maintenance practices can range from preventive to reactive, depending on the level of engineering expertise and financial resources available to the operating entity. Issues of affordability often influence maintenance practices and decisions made to direct investments toward one action over another. As a result, the differing approaches toward maintenance, including decision-making and prioritization of funding for MR&R, are practices that have been developed over time to accommodate the features of each authorized project and investment area.

2.1 Asset Inventory

Executive Order (EO) 13327, “Federal Real Property Asset Management,” issued in February 2004, required executive branch departments and agencies to undertake actions to improve their real property asset management. EO 13327 also required the General Services Administration to establish the Federal Real Property Profile (FRPP), which serves as the Federal government’s inventory of all real property under the custody or control of executive branch agencies.

As of December 12, 2014, Reclamation reported 4,000 assets to the FRPP, which represent Reclamation’s inventory at the major constructed asset level. Reclamation classifies each major asset as either a building or a structure and all installed equipment and related components are included as part of the major asset. The table below summarizes, by region, the number of Reclamation assets. As shown in Table 1, approximately two-thirds of all assets are transferred works. Reclamation’s 10 direct- leases are not included in the total count of Reclamation facilities, bringing the number in the table to 3,990.

Table 1. Reclamation Federal Real Property Profile Summary for FY 2014

Reserved Works						
Region	PN	MP	LC	UC	GP	Total
Buildings	170	94	91	110	246	711
Structures	126	62	182	66	155	591
Total Number of Reserved Works	296	156	273	176	401	1,302
Reserved Works as a Percentage of Regional Facilities	30%	29%	47%	22%	37%	33%

Transferred Works						
Region	PN	MP	LC	UC	GP	Total
Buildings	354	251	138	182	227	1,152
Structures	340	131	170	434	461	1,536
Total Number of Transferred Works	694	382	308	616	688	2,688
Transferred Works as a Percentage of Regional Facilities	70%	71%	53%	78%	63%	67%

Reclamation Regional office abbreviations and boundaries

PN: Pacific Northwest Region
 MP: Mid Pacific Region
 LC: Lower Colorado Region
 UC: Upper Colorado Region
 GP: Great Plains Region



Figure 1. Map of Reclamation Region

2.2 Major Rehabilitation and Replacement

Reclamation defines MR&R as the extraordinary maintenance activities that are separate and distinct from the routine maintenance items typically addressed through a facility’s annual operation and maintenance (O&M) program. The MR&R database is a list of MR&R activities that also includes dam safety modification work and reported deferred maintenance¹ (DM).

Reclamation prepares the database to identify its projected MR&R activities over a five year period, without regard to the funding source (appropriated or non-appropriated). While the area and regional offices apply locally relevant factors to determine which MR&R activities should be included in Reclamation’s 5-year list, the consolidated database does not reflect any particular prioritization of the listed activities.

Throughout the Strategy, the terms “Replacements, Additions, and Extraordinary Maintenance (RAX) and Extraordinary Maintenance (XM) are used interchangeably when discussing maintenance activities at reserved and transferred works, regardless of the source of funding.

¹ For the purposes of Reclamation’s Infrastructure Strategy, the term Deferred Maintenance (DM) includes activities currently defined by the Federal Accounting Standards Advisory Board (FASAB) as Deferred Maintenance and Repairs (DM&R).

The data provides a snapshot estimate of anticipated investments to maintain both reserved and transferred works. Since 2008, the annual five-year MR&R estimate has ranged from about \$2.5 billion to \$3.2 billion. In 2014, the updated estimate was approximately \$2.9 billion.

2.3 Infrastructure Investment Areas

Reclamation works in partnership with non-Federal entities to fund MR&R activities at Reclamation facilities, using both appropriated and non-appropriated sources. The processes for identification, prioritization, and funding of MR&R activities have been shaped by important differences in the types of partnerships, sources of funding, project authorizations, cost allocations, and agreements with operating entities, many of which are driven by legislative direction from Congress in statute enacted over the span of Reclamation’s 113 year history. Reflecting those differences, Reclamation groups MR&R items into four general investment areas: Dam Safety, Power, Reserved Works, and Transferred Works.

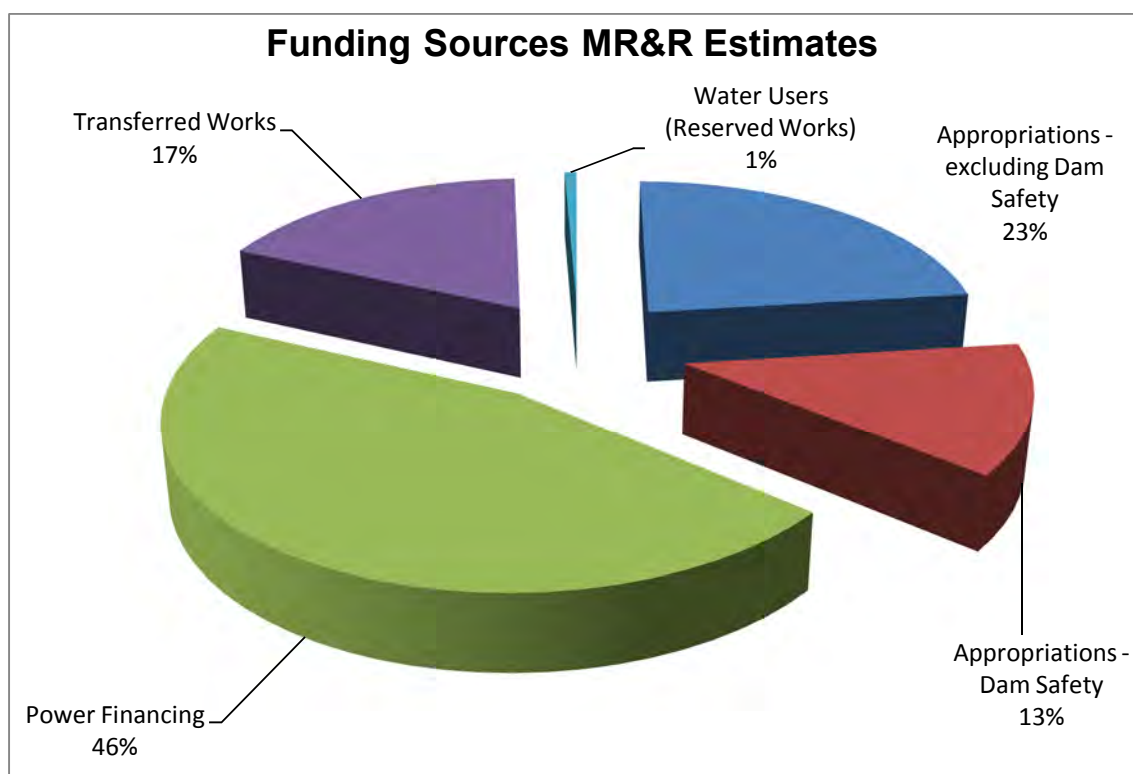


Figure 2. 5-Year MR&R Estimate for the Period 2015-2019 Grouped by Funding Source.

Regarding the different sources of funding in particular, the funding of MR&R activities in each of the four investment areas relies on a different mix of appropriated and non-appropriated sources. Reclamation directs a substantial portion of its annual appropriations toward addressing the MR&R activities at water and power reserved works and a lesser amount toward the Federal share of completing maintenance on transferred works. A smaller proportion of Federal appropriations funds dam safety modifications. The use of appropriations for dam safety modifications is prioritized separately from other categories of MR&R. Reclamation may occasionally consider using appropriations to assist operating entities to fund the non-Federal share of costs through extended repayment terms. Reclamation will also consider addressing certain activities at power facilities that the operating entity might not include in its budget.

The distribution of funding among the sources and the total MR&R estimate will vary, as identified MR&R activities and planned accomplishments change. To provide a sense of the relative amounts of appropriated and non-appropriated funding directed toward infrastructure investments in Reclamation-owned assets, the chart in Figure 2 groups the estimated cost of MR&R for the period 2015 through 2019 according to funding source. Reclamation's analysis of the MR&R data indicates that 36 percent of the \$2.9 billion in estimated MR&R activities is identified for funding from Federal appropriations. This appropriation percentage consists of 23 percent for MR&R activities other than for Dam Safety and 13 percent specifically for Dam Safety modifications. Consequently, it should be noted that the remaining 64 percent of anticipated MR&R is identified for funding through sources other than Reclamation appropriations ("off-budget" sources such as power financing, direct funding, and contributions by water users on both reserved and transferred works). There is significant participation in asset planning and management by project beneficiaries in each of the investment areas; however, the level of their involvement increases with higher levels of non-appropriated funding.

Reserved Works MR&R

Reclamation retains responsibility for operating, maintaining, and performing MR&R activities at reserved works facilities (typically multi-purpose facilities) and regularly conducts Review of Operation and Maintenance (RO&M) Program field examinations (i.e., condition assessments) to verify the condition of these facilities and to ensure that O&M is being performed at an acceptable level. O&M deficiencies, as well as some MR&R items, are documented in reports and related recommendations.

Project beneficiaries are responsible for funding the portion of operations, maintenance, and repair (OM&R) costs, including MR&R costs,² that are allocated to irrigation, power, and municipal and industrial water. This requires Reclamation to consider the ability of the beneficiaries to fund their share of these investments. For most reserved works, the funds are generally provided to Reclamation by the beneficiaries via various funding mechanisms in advance for the reimbursable components of the facility OM&R costs. However, multi-purpose projects may have non-reimbursable benefits that include flood control, recreation, and fish and wildlife. Reclamation is responsible for funding the portion of the OM&R costs allocated to non-reimbursable purposes and must request appropriations to fund that portion of the MR&R activities associated with them. As a result, both appropriated and non-appropriated funding sources support Reclamation's maintenance, including MR&R, of reserved works. The prioritization of appropriated funding requests for MR&R activities at reserved works is integrated with Reclamation's processes for requesting annual appropriations, as described in Section 2.5.

² Non-Federal entities typically enter into O&M contracts that also include replacement and other MR&R costs (OM&R) associated with Reclamation facilities.



Grand Coulee Dam, Columbia Basin Project, Pacific Northwest Region.

Transferred Works MR&R

After the construction of an authorized project is completed, Reclamation is responsible to ensure that OM&R is carried out in a manner that assures all authorized project purposes are met in a sustainable and reliable manner, and that facilities are adequately maintained to protect the Federal investment. Project authorization, repayment contracts, and other factors may have a bearing on how project OM&R is accomplished. For roughly two-thirds of its projects, Reclamation has entered into formal agreements or contracts with non-Federal entities to perform the OM&R on facilities constructed and owned by Reclamation, commonly referred to as transferred works. A majority of transferred works are single-purpose irrigation project facilities. The project beneficiary performing the day-to-day O&M is accountable to Reclamation for proper performance of facility maintenance.

Similar to reserved works facilities, Reclamation also regularly conducts RO&M Program field examinations (i.e., condition assessments) to verify the condition of transferred facilities and to ensure that the non-Federal entity conducts O&M of the project facilities in an acceptable manner. Deficiencies are identified and categorized, and corrective actions are documented as formal recommendations in an examination report. These recommendations are then monitored and tracked until completed. Many of the recommendations are preventive actions intended to avoid facility breakdowns or more costly future extraordinary maintenance.



East Park Dam, Northern California Area Office, Mid-Pacific Region.

The work necessary to perform O&M and any related MR&R activities is funded by the responsible operating entity in accordance with current project cost allocations. For single-purpose irrigation project facilities, these costs are funded entirely by the project beneficiaries. Funding is typically obtained through OM&R assessments by the operating entity on individual users based on the related amount of acreage irrigated or the water used per acre or from other funds available to the operating entity. Additional funding is normally available in a reserve fund established by the operating entity for use in emergencies or for extraordinary maintenance. Where sufficient funding is unavailable to the operating entity to fund significant MR&R items, the operating entity may seek private financing or, in limited circumstances, an extended repayment contract through Reclamation.

Since the funding for OM&R of transferred works is typically the responsibility of non-Federal operating entities, much of the prioritization of activities is made by these entities. Reclamation provides input on this prioritization through its oversight processes, particularly through the RO&M field examinations and related recommendations.



Stony Gorge Dam, Northern California Area Office, Mid-Pacific Region.

In the instances of multipurpose transferred works, Reclamation provides funding for the allocated share of costs assigned to the non-reimbursable purposes, such as flood control, recreation, and fish and wildlife. Reclamation reviews the OM&R activities reported by the operating entity on an annual basis, as part of the budget submitted by the entity, and provides input to the priorities, as appropriate.

Power Facilities

The funding for MR&R power activities at Reclamation's power facilities is derived from three sources: a mix of appropriations and contributions from power customers, use of revolving funds, and direct funding by Bonneville Power Administration (BPA), the Federal power marketing agency in the Pacific Northwest of the United States. The manner in which each of these sources is managed differs depending on the specific project authorizations and implementing agreements with the power customers. Under each facility's applicable funding arrangement, Reclamation develops a separate initial ranked list of MR&R power activities that ensure the safe, dependable, and reliable power production. A brief description of the various power funding arrangements follows.



500kV Switchyard, Columbia Basin Project, Pacific Northwest Region.

Power Activities funded with Appropriations and Contributions

The financing arrangements for the power facilities that rely on a mix of appropriations and contributions are governed by agreements involving Reclamation, the Federal power marketing administration responsible for determining power rates, which recover the portion of Reclamation's costs allocated to power, and the power entities that provide contributions. The terms and conditions of the agreements vary depending on the power customers, Federal power marketing administration, and Reclamation projects involved.

The customers under each agreement review Reclamation's initial list of MR&R activities and decide which activities they will fund to best serve their collective needs. The activities that are not funded or partially funded are then included for consideration in Reclamation's request for Federal appropriations.



Flatiron Powerplant, Eastern Colorado Area Office, Great Plains Region.

Power Activities Funded with Revolving Funds

Reclamation is able to use power receipts or revolving funds set up by specific project authorizations to finance MR&R power activities at specific project facilities (i.e., Boulder Canyon Project and the Colorado River Storage Project). The amount of financing is limited by how much power is sold and the other designated costs financed by the receipts. Reclamation's initial list of activities is discussed with the power customers for review and comment. As with financing from contributions, appropriations are not requested for those activities supported by revolving funds.



Glen Canyon Dam, Colorado River Storage Project, Upper Colorado Region.



Grand Coulee Dam, Columbia Basin Project, Pacific Northwest Region.

Power Activities Directly Funded by BPA

Pursuant to specific statutory authority, Reclamation's MR&R power activities in the Pacific Northwest can be funded directly by BPA at its sole discretion. BPA reviews Reclamation's initial list of MR&R activities and works with Reclamation to collectively determine which specific activities BPA will directly fund. The activities that are not funded or are partially funded can be considered in Reclamation's request for Federal appropriations.

Safety of Dams

The Dam Safety Program maintains a separate process for identifying MR&R items specific to maintaining the safety of Reclamation dam structures. Unlike the other three investment areas described in this report, dam safety activities are usually fully funded with Federal appropriations. However, once dam safety modifications are made to a dam, project beneficiaries reimburse a portion of these costs through separate repayment contracts.



Echo Dam Safety of Dams Modification, Weber Basin Project, Upper Colorado Region.

The priority for initiating actions to address dam safety items depends on a relative assessment of risks throughout Reclamation's dam inventory and in part on available resources. The intent is to make the greatest long-term reduction in risk achievable on a programmatic basis, while at the same time assuring that no dam presents an unreasonable risk in the short term.

Qualitative screening of potential failure modes at dam structures allows Reclamation to focus limited resources on performing more detailed quantitative estimates for the potential failure modes that are likely to dominate the risk. Reclamation adopted a Dam Safety Priority Rating (DSPR) system to help prioritize actions. The categorization of a dam is dynamic, changing as project characteristics are modified and as more refined information becomes available.

The DSPR system (and associated subcategories) forms the initial basis for ranking, after which priorities may be adjusted for other reasons. Other factors include the confidence in the risk estimates, the number of potential failure modes driving the risk, the type of loading condition(s) driving the risk, and the costs of additional actions to reduce or better define the risks. In some instances, work at a facility is delayed so that higher priority work can be accomplished.

2.4 Investment Models

The funding arrangements for the four investment areas reflect a range of investment decision-making models. In cases where significant risk and consequences are concerned, such as in the Dam Safety Program, decision and budgetary processes require a greater degree of standardization in the assessment of needs at Reclamation facilities. Consequently, the process for decision-making depends on quantifiable criteria and must be documented in detail.

For other MR&R activities, where local knowledge of specific project issues can inform decisions more efficiently, the budgetary processes are more decentralized. Reclamation relies less on the application of uniform criteria that might not adequately capture relevant aspects of an identified activity. Many MR&R investment decisions require the informed deliberation of managers and technical professionals familiar with the unique issues and circumstances affecting a facility, often in close collaboration with water and power customers.

In particular, Reclamation uses formal agreements and contracts to transfer OM&R performance, funding responsibilities, or both, to beneficiaries of water and power facilities. This allows such work to be prioritized and performed by those who benefit most from ensuring the reliability of the systems being maintained. Reclamation still retains title to these facilities and ensures the public interest is protected through periodic condition assessments and other inspections of the facilities.

2.5 Overview of Current Capital Planning and Investment Decisions and Budgeting Practices

On an annual basis, Reclamation engages in a multi-step process to identify and prioritize MR&R-type activities, and then formulates a budget to request appropriations for the MR&R work scheduled to be completed in the budget year. Reclamation's deliberate, ground-up approach begins with input from the area and field offices and reflects subsequent decisions made at each organizational level of the agency. While investment decisions ultimately rest with Reclamation's Commissioner, the budget development process described below ensures that the agency's request for Federal appropriations reflects priorities informed by local and regional knowledge.

Reclamation's area and field office managers have the primary responsibility for decision-making on MR&R activities. Each of the 26 area office managers reports to one of the five Reclamation regional directors who, in turn, reports to the Deputy Commissioner for Operations. In addition, the Commissioner consults with several advisory bodies for assistance in making final infrastructure investment decisions:

- The Budget Review Committee (BRC): The BRC is comprised of leadership representing different areas of Reclamation and is chaired by a Reclamation Director, a responsibility that is annually rotated through Reclamation regions and directorates. This committee extensively reviews all budget proposals from all offices of Reclamation, and develops for consideration by the Commissioner, the overall budget profile for Reclamation. This includes resource allocations for both asset management and capital improvements.
- The Reclamation Leadership Team (RLT): The RLT comprises all Reclamation senior executives. The RLT deliberates agency-wide topics and advises the Commissioner on policy-level activities, including the recommendations of the BRC. Decisions of the Commissioner are communicated back to the organization through members of the RLT.
- The Facilities O&M (FO&M) Team: The FO&M Team, comprised of representatives of all regions and operations-related directorates, serves as a forum to address Reclamation-wide OM&R-related priorities, issues, activities, policies and budget formulation, and to facilitate program accomplishment. The FO&M Team's responsibilities include reviewing and making recommendations to the Director, Policy and Administration, and the Deputy Commissioner for Operations on:
 - Deferred Maintenance
 - Asset management
 - Condition assessments/field review activities.
 - MR&R activities (including Extraordinary Maintenance items).
 - Facility security, Life Safety Code, Universal Accessibility, employee safety, and public safety.
 - Maintenance management practices and systems.
 - Implementing facility O&M-related policies and directives & standards.
 - Congressional, Office of Management and Budget, and stakeholder questions.

As described in Table 2 and shown in Figure 3, decisions are made at four points:

Table 2. Decision Points in the Current Process for Identifying, Prioritizing, Budgeting, and Completing MR&R activities

Decision Point	Decision Maker	Description
DP 1	Field or Area Office Manager	MR&R needs identified for regional budgeting considerations.
DP 2	Regional Director SSLE Director	Priorities applied to MR&R activities and budget requests developed.
DP 3	Commissioner (with RLT and BRC input)	Reclamation priorities applied and Reclamation's budget request developed.
DP 4	Director, Program and Budget	Following congressional authorization of Reclamation's budget, activity funding is adjusted, if needed, in the year of execution to address changing circumstances.

Figure 3 further illustrates Reclamation's current process for identifying, prioritizing, budgeting, and completing MR&R activities, particularly those which are required to be funded partially or entirely by Federal appropriations.

Decision Point 1 – Developing the MR&R Database

Currently, each region and Security, Safety, and Law Enforcement (SSLE) consult several sources of information to determine the infrastructure investments to be included on Reclamation's list of MR&R activities for the five-year reporting period. At a minimum, the area offices identify extraordinary maintenance and DM at Reclamation's reserved works facilities identified for funding or accomplishment in the upcoming five-year timeframe. In addition to the MR&R activities at reserved works facilities, area and regional office staff, in collaboration with water and power operating entities determine if any planned extraordinary maintenance activities at transferred works are appropriate to be included in the MR&R database. The Dam Safety Office, an office within SSLE, provides a listing of all safety of dams (SOD) modifications that are planned in the 5-year timeframe. Supporting data for each identified MR&R activity typically includes the cost estimate, source of funding, investment area, project location, and other related information. The level of effort in developing cost estimates and other supporting data for individual MR&R activities can vary across Reclamation, as can the comprehensiveness of each region's consolidated list of activities submitted for inclusion in the MR&R database.

Current Reclamation Infrastructure Planning and Investment Process

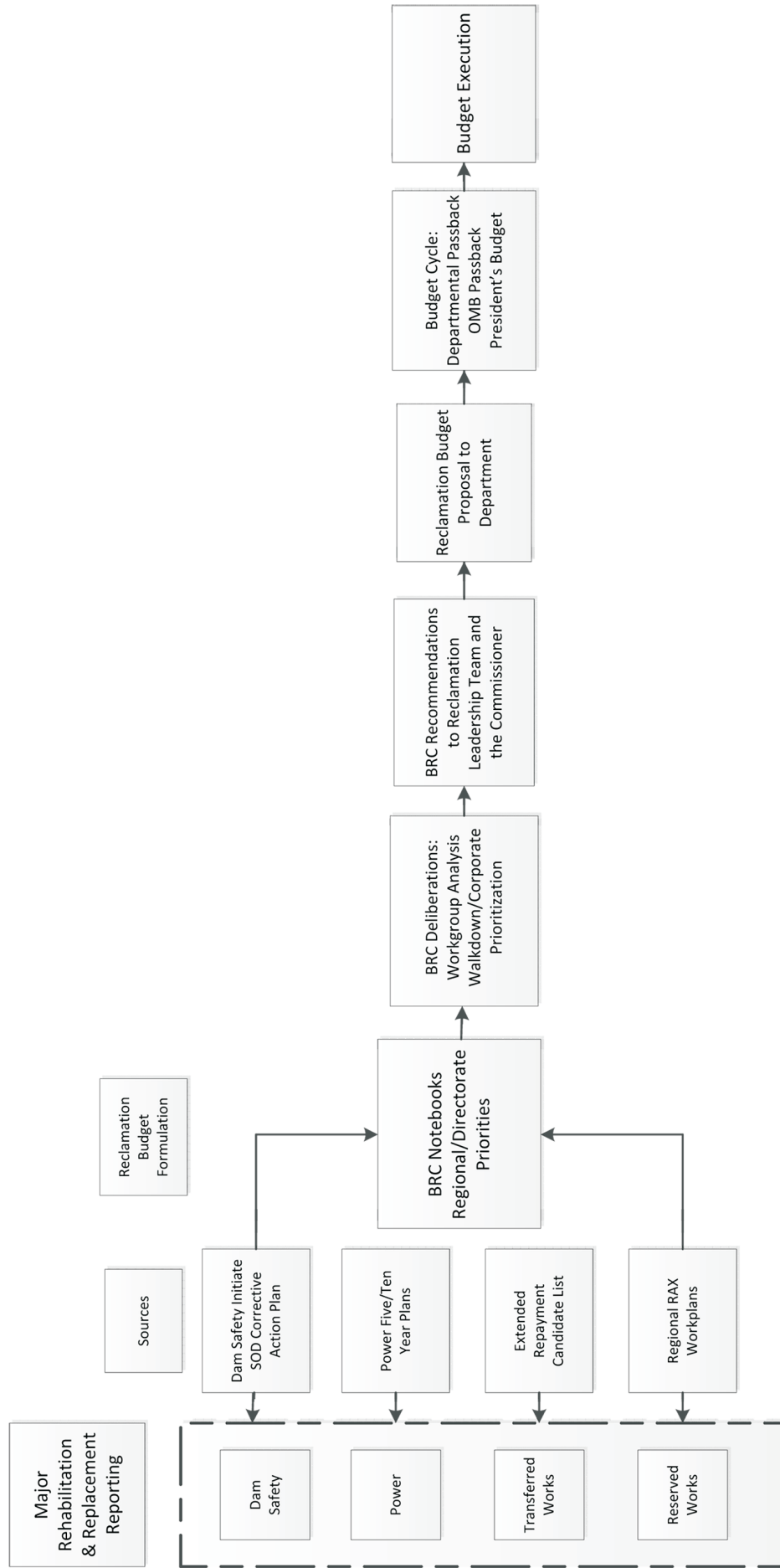


Figure 3. Current Reclamation Infrastructure Planning and Investment Process.



Minidoka Dam Spillway, Minidoka Project, Pacific Northwest Region.

Decision Point 2 – Prioritizing MR&R Work for the Budget Year

Area office managers determine which of the activities in the 5-year MR&R database require annual appropriations for the Federal share of the work proposed in the current budget year and, to a limited extent, for the beneficiaries' share to be recovered through repayment over time. Budget requests from the area and field offices are then submitted to the responsible Regional Director for consideration. All regions use a risk-informed approach to prioritize their MR&R activities, but there is variability and discretion across regions and area offices in determining which of the identified activities are included in the Regional Director's budget request for Federal appropriations. The regional budget request reflects regional priorities, criteria specific to each investment area (Power, Reserved Works, and Transferred Works), and other factors such as stakeholder involvement, acquisition timeframes, availability and timing of funding, availability of technical resources, and operational concerns. Funding for Dam Safety is requested by the SSLE Director.



Folsom Dam Auxiliary Spillway Control Structure, Central Valley Project, Mid-Pacific Region.

Decision Point 3 – Development of Reclamation Budget Requests

The information submitted by the Regional Directors to the BRC in their respective budget notebooks reflects regional priorities rolled up from the area and field offices. The Commissioner’s Office budget request (which includes the SOD funding request) and the regional budget requests are then provided to the BRC. Often, the BRC requests specific types of analyses from the Operation, Maintenance, and Replacement (OM&R) Workgroup (same membership as the FO&M Team plus budget officers from each Regional Office and the Commissioner’s Office). Using those analyses and their own review, the BRC deliberates over the budget requests and develops a proposed Reclamation budget for consideration by the RLT and Reclamation’s Commissioner.

The BRC considers regional priorities for MR&R funding on a Reclamation-wide basis, but does not apply formal metrics to compare one MR&R activity or investment area relative to another. The BRC instead relies on the narrative justifications for MR&R activities provided for each activity in the five regional BRC notebooks, input and analysis provided by the OM&R work group, direct discussion with each region of its overall budget submittals and priorities, and the knowledge, collective experience, and judgment of individual BRC members.

The BRC presents its recommendations to the RLT and the Commissioner. The larger and more significant line items in the overall budget proposal are discussed and the Commissioner’s budget proposal is developed. The Commissioner then discusses this proposed budget with the Assistant Secretary for Water and Science before submitting Reclamation’s final budget proposal to the Department. Based on its role in this process, the RLT serves as Reclamation’s Asset Investment Review Board for purposes of considering infrastructure investment activities.

Decision Point 4 – Funding Changes in the Year of Execution

Budget proposals are prepared up to three years in advance of when Reclamation expects the work will be performed. In most cases, work accomplished in the year of execution ties closely to the work identified in the budget request. However, emergencies, new information, changes to the schedule, and other factors sometimes impact priorities and create the need to re-direct funding from an MR&R activity identified in the budget proposal to another MR&R activity in the year of budget execution. Reclamation's Program and Budget Office reviews and approves fund transfer requests to re-direct the funding. The funds transfer approval includes documentation of the factors supporting the decision. Funds transfers are made throughout the fiscal year for the various reasons cited above. Funds transfers are also made at the end of a fiscal year to ensure that obligations of appropriations support the timely completion of construction and maintenance activities.

Chapter 3

Supporting Infrastructure Investments through Better Information and Refined Processes

Reclamation values the knowledge and experience of its professional field and regional O&M and resource managers. Reflecting the diverse nature of Reclamation programs and processes and the agency's decentralized structure, the current BRC process for developing requests for Federal appropriations begins at the local level. The process allows each office to plan for future MR&R activities given their own unique challenges, while addressing Reclamation's overall funding priorities within anticipated available appropriations.

During the BRC process, each region and program is assigned a budget target to address the various activities anticipated for the budget year. Reclamation's leadership uses the internal BRC process to incorporate each region's budget into the overall funding request and on the prioritization of activities across all regions and programs. The advantage of this approach is flexibility and responsiveness. A disadvantage is that it makes it more difficult to articulate how budget requests reflect agency-wide priorities. In the absence of uniform criteria for assessing the importance and urgency of MR&R activities consistently, Reclamation often has difficulty describing why the activities for which it is seeking appropriations are its highest priority activities. In particular, as decisions are made at the Reclamation-wide level in response to BRC deliberations, considerations by the Commissioner, and passback results, additional information and data could efficiently facilitate comparisons and potential options for decision making.

A process of criteria-based assessment and categorization of MR&R items could create a more easily understood basis for the justification of funding decisions. By employing uniform criteria and standardized processes for categorizing MR&R activities, Reclamation will be able to make an increasingly robust case for appropriations requests in a budget-constrained environment. If the criteria and processes adequately reflect Reclamation's institutional culture and its values, as established through law, regulations, and policy, then the use of criteria will support informed and efficient exercise of discretion and more consistent documentation of the rationale for local, regional, and corporate budget decisions.

Chapter 4

Infrastructure Investment Strategy

Much of the future success of Reclamation's Strategy will rest on the professional judgment of on-site managers, who will need access to human, financial, and information resources. As an important first step in reaching the goals of this Strategy, Reclamation will support the efforts of local managers by improving the quality of the information collected and displayed in the MR&R database. Improvements to the MR&R database will help local asset managers communicate the basis for requesting funding for identified needs to Reclamation's leadership and stakeholders.

The Strategy is intended to apply to both reserved and transferred works. There are recommendations that will require process details that can only be developed or fine-tuned during implementation. It is Reclamation's intent to develop those process details during implementation by focusing first on reserved works, while concurrently coordinating the Strategy with transferred works entities and stakeholders. The detail and fine-tuning Reclamation develops for reserved works will facilitate the development of process details for transferred works. Likewise, the input derived from coordination with the transferred works entities and stakeholders may be incorporated into the process details for reserved works. The final product will, therefore, be a strategy to address MR&R activities at both reserved and transferred works.

4.1 Action Items for Implementation

As described in Chapter 2, Reclamation regularly collects information on its assets, including the number and current replacement value (CRV) of its buildings and structures, the general condition of the assets, and the estimated level of infrastructure investment that adequately supports facility safety and reliability. Data collection and reporting processes have been developed over time, in response to different requirements and to meet a wide range of purposes. The use of MR&R data over the last few years has provided the basis for explaining the comprehensive scope of investments in Reclamation's assets. Therefore, Reclamation will continue to rely on the MR&R database as the foundation for future data collection and reporting processes.

By critically evaluating the separate processes currently in use to collect and report asset management data, Reclamation identified potential ways to consolidate its efforts. Developing a comprehensive asset data collection process will enable Reclamation to standardize and track the information it gathers to meet multiple reporting requirements and to support more effective identification and categorization of MR&R items.

Three complementary goals for information gathering and reporting stem from the need for improved, comprehensive data to support Reclamation's infrastructure planning effort:

- Create an MR&R database that is sufficiently consistent in the granularity and quality of its data that similar activities can be compared and categorized.
- Focus on the use of quantifiable data to facilitate the comparisons of objective measures and to adequately support qualitative judgments.
- Base the categorization of activities in the MR&R database primarily on a risk-based approach that can be further adapted to meet the requirements of each of the investment areas.

4.1.1 Asset Inventory and Data Management

Reclamation accounts for the number and CRV of its buildings and structures through the annual updating and reporting of data within the Federal Real Property Profile (FRPP). A five-year projection of investments are identified and updated annually in the MR&R database and then reported as repair items in the FRPP.

Reclamation examined its processes for identifying assets and asset components, updating the CRV of each asset, and applying various metrics to evaluate and report on the condition of assets. The first objective of Reclamation's strategic plan for infrastructure investments is to develop a comprehensive, single source of meaningful information on the broad range of investment and management activities at Reclamation facilities. The three implementation actions related to this objective will result in an improved, standard Reclamation-wide method for identifying assets, reporting investment activities, and assigning CRVs.

Action Item 1: Establish a standard Reclamation-wide method for identifying assets.

Currently, asset identification in the FRPP is not consistent across the inventory, nor does it align with maintenance planning or with budgeting activities and processes at the facility level. The FRPP inventory is based on financial system entries. Each asset is included in the FRPP based on when its construction was completed and the asset placed into service. In some cases, assets were identified by subdividing a project into its major features or components. In other cases, a single major constructed asset was identified. For example, a canal can be identified as multiple assets (i.e., broken out into sections of canal) or identified as a single asset. Inconsistencies in asset delineation contribute to the difficulty of meaningful comparisons or evaluations for decision-making purposes across Reclamation's inventory. The various ways these assets are delineated also lead to a non-uniform presentation of asset value (CRV) and condition (Condition Index, CI, and Facility Condition Index, FCI).

Reclamation will evaluate whether realignment and standardization of the current identification of assets in the asset inventory will provide additional benefits for the purposes of asset management. Any adjustments to the manner in which assets are delineated should produce additional utility to Reclamation, beneficiaries, and operating entities for purposes of MR&R planning, funding, and tracking.

Action Item 2: Establish the thresholds for reporting identified MR&R activities at \$100,000 for structures and \$20,000 for buildings. Reclamation evaluated the MR&R data collected over the past few years and determined that the number of activities reported could be reduced by as much as 33 percent and still account for almost 99 percent of the total value of the identified MR&R items. By raising the threshold for reporting on MR&R activities, Reclamation will increase the usefulness of the data it collects and reports, and it will also reduce the workload required to collect information on numerous relatively low-value activities. Reclamation will apply the thresholds in a manner consistent with the definition of XM provided by Congress in P.L. 111-11³. MR&R activities will be reported when the estimated cost exceeds the applicable dollar threshold or 10 percent of the annual O&M budget for the project facility.

Action Item 3: Establish new procedures for determining the current replacement values of assets. The CRVs reported in the FRPP do not uniformly state the actual cost to replace each of the assets identified. Currently, the CRV is a data element of the FRPP that Reclamation updates annually by indexing the original construction or acquisition cost to approximate the present value of the asset. As a result, the total CRV of Reclamation's asset portfolio potentially understates the true value of assets maintained by Reclamation. Moreover, CRV is used together with the estimated total value of MR&R at a facility to calculate the CI in the FRPP. Reclamation determined that the CI has limited value as a condition metric for structures because the index does not adequately characterize the extent or type of investments made at Reclamation facilities.

The U.S. Army Corps of Engineers (USACE) has a similar asset inventory, which has provided an opportunity for collaboration on the review of CRV calculation methods for buildings and structures. Like USACE, Reclamation will adjust its current practice and begin using square-foot unit values to estimate the CRVs of its buildings. Reclamation will then identify and review other methods for estimating the CRVs of its structures.

4.1.2 Characterizing Projected MR&R Funding

Given the various criteria in use by Reclamation and its partners (as described in Section 2.3), there is a fundamental need for Reclamation to clearly articulate how it manages high priority activities bureau-wide when addressing infrastructure MR&R. The action items presented in this section will allow Reclamation to assign categories of importance to all identified MR&R activities without regard to funding source and in a manner that will add value to the use of such information for related decision-making processes.

Action Item 4: Categorize all MR&R activities based on evaluations of risks and benefits. The objective of developing criteria for the categorization of MR&R activities is to determine the relative importance of the activities identified in the MR&R database. The criteria currently used to prioritize funding within each of the four infrastructure investment areas will be evaluated for commonalities. The result of this evaluation will be used to develop criteria general enough to produce meaningful distinctions of importance across the wide range of activities funded. Moreover, Reclamation will

³ Omnibus Public Lands Management Act of 2009, 123 Stat. 991, 16 USC 1

ensure that the categorization criteria reflect Reclamation's institutional culture and comport with Reclamation's values as established by law, regulation, and policy, including:

- Public safety – Reclamation will continue to prioritize MR&R activities that protect the health, safety, and economic well-being of the public from the direct impacts of natural hazards (e.g., flooding) and from the consequences of infrastructure failure (e.g., the collapse of a canal embankment). Public safety factors include:
 - Imminent risk to human life (Note: Emergency actions are not subject to categorization.)
 - Risks to human health and safety
 - Property damage and significant economic loss
- Complying with Federal statutes (e.g., ESA, Clean Water Act, etc.) – The categorization criteria will recognize the high priority of meeting legal requirements established by Congress and the states.
- Reliable delivery of project benefits – Reclamation will continue to maintain its infrastructure to meet water and power deliveries for all authorized purposes by avoiding forced outages or service interruptions of power generation and maximizing the availability of water.
- Economic efficiency and affordability – Reclamation will prioritize MR&R activities that provide additional benefits for meeting increasing demands. At the same time, recognizing the significant role of partners in financing many of the activities, this criterion will also include other relevant factors, such as price and affordability, the replacement costs of power, increased efficiencies, and reductions in long-term O&M costs.

Reclamation's categorization criteria will include two primary areas of influence that are shared by all investment areas and that reflect the underlying values enumerated above: Risk and Benefits. As further described in Appendix A, Reclamation's assessment of the probability and consequences of failure will build on established models, both internal and external: the risk-informed approaches used by Reclamation field offices to evaluate and prioritize XM activities, the quantified risk analysis system used in the Dam Safety Program, and the risk assessment process (based on both quantitative and qualitative data) used by the power program and its customers to prioritize investments in power facilities.

Non-Federal operating entities fund and complete many MR&R activities at Reclamation-owned facilities. Categorizing all MR&R activities according to risk and benefits without regard to the funding source will therefore enhance Reclamation's coordination with operating entities on the identification and funding of important infrastructure investments.

Action Item 5: Require additional fields in the MR&R database indicating whether formal cost estimates exist, and if so, what level of cost estimate (as articulated in the Reclamation Manual), and what elements are included in the estimate. The cost estimating data provided in the MR&R database do not include some of the source information needed to appropriately characterize Reclamation's level of confidence in both the individual estimates and the total MR&R estimate. Reclamation identified changes to its data collection effort that will address this need.

The primary purposes of Action Item 5 are to improve the overall quality of the data in the MR&R database and to develop a better understanding of the information provided. Several elements are necessary to understand the level and range of the cost estimates supporting the MR&R data:

- Source of the cost estimate. Formal estimates can be prepared using information from a variety of sources, including experience on previous jobs, unit price references (e.g., R.S. Means), material quotes, and Davis-Bacon labor rates.
- The level of the cost estimate (e.g., preliminary, appraisal, feasibility, percent design, pre-validation, etc.).
- Price level of the cost estimate and date prepared.
- Quality assurance processes, quality control reviews, peer reviews, etc., if completed.

Reclamation will implement several changes to collect information that will more reliably characterize the overall estimates of activities contained in the MR&R database. The database will be reformatted to include a column with a check box that would identify if the activity is supported and documented with a defined scope and cost estimate. If not, it is understood that it is a “value” and must be classified as a preliminary cost estimate. For each activity supported by a formal estimate, the reformatted database will also provide an opportunity for respondents to indicate the recognized cost estimates level, as defined in Reclamation Manual Directives and Standards on Cost Estimating. The MR&R database will also be reformatted to include an additional “Yes/No” response column to indicate whether the cost estimate includes all indirect costs to the direct work, such as contract costs, allowances, and non-contract costs.

The guidance that accompanies the annual MR&R data request will state that formal estimates and values in the MR&R database should reflect the costs anticipated at the time the work will be performed. For each activity submitted as part of the MR&R update request, preparers will be required to qualify the cost estimate data entered by including the price level (month and year of the estimate) and the date the estimate was prepared. This information will allow for manual indexing of cost estimates as appropriate.

Providing the information listed above will improve the MR&R database because it will include the supporting detail needed to fully understand what the estimates represent. These refinements will lead to greater consistency in the cost estimates presented in the MR&R database and will help explain the justifiable inconsistencies that arise for two reasons: 1) Estimates prepared for out-year activities tend to be less well developed than estimates for activities to be addressed in the next one to two years, and 2) The confidence in the estimates for large and complex activities is higher than estimates for simpler and smaller activities because large activity cost estimates are typically supported by detailed designs and are independently reviewed.

Action Item 6: Implement a training program on the development and use of cost estimates specific to the MR&R data. Recognizing that some of the action items contained in Sections 4.1.1 and 4.1.2 will require changing institutional practices, Reclamation will likely need to implement training programs for Reclamation staff at all levels (and, upon request, for its water and power partners). The purpose of the training and assistance would be to improve the quality of data submitted, making it more meaningful and useful. Improved consistency in the MR&R cost estimates will result from more robust and defensible designs, concepts, and scopes of work.

The intent of this action item is to provide additional options for training and technical assistance, but is not intended to require changes to existing processes that many water and power partners have in place.

Training will be offered to, but not required of, transferred works operating entities to educate them on Reclamation's cost estimating standards, including classification of the price level and development of indirect cost components, such as allowances and non-contract costs. Reclamation would likely need to institute a train-the-trainer program to help area office staff provide any technical assistance needed by transferred works operating entities.

Action Item 7: Add an entry to the MR&R database for each identified activity indicating with a “Yes/No” response whether the cost estimate has been peer reviewed in accordance with the established business practices of the applicable regional office. The cost estimates developed for the MR&R database are used to provide a total estimated cost of MR&R activities for both reserved and transferred works facilities. As a rule of thumb, improving the quality of the larger contributors or cost drivers in the MR&R database will improve the overall quality of the database. Therefore, Reclamation will encourage technical peer reviews of the estimates of major cost drivers for MR&R activities at both reserved and transferred works facilities.

Each region has a peer review process, as do many of the operating entities responsible for OM&R of transferred works. Applying established peer review processes to MR&R activity cost estimates would improve the quality of the database as a whole. Instituting peer reviews of cost estimates is consistent with the established and successful Design, Cost Estimating, and Construction (DEC) reviews, which are performed on activities larger than \$10 million. Sensitivity will be given to the cost of such a review and the burden it may put on internal budgets as well as our partners' budgets.

4.1.3 Tracking and Reporting MR&R Activities

Reclamation collects MR&R activity data to capture the major infrastructure activities identified for the upcoming 5-year period. In some regions, identifiers are assigned to help track the progress of listed activities; however, actual accomplishment data has not been reported consistently in past years, nor fully analyzed across Reclamation.

Reclamation needs to evaluate existing data and reporting sources across the agency in order to avoid duplication and explore standardization of data collection for efficiency purposes. These areas may include existing work plans at the field offices and annual MR&R update lists. Data sources should be evaluated for streamlining and combining of common information that can be easily accessible and readily available for reporting.

Through the enhanced MR&R effort, Reclamation can capture planned major infrastructure activities in the near term. In addition, identification numbers can be assigned to track the progress of listed activities and report on actual accomplishments consistently. It is recognized that the accomplishment of planned activities is sometimes deferred or delayed to enable the funding of urgent needs that arise, such as dam safety modifications, equipment failures, and changes in the scope of ongoing activities. A consistent tracking system will support better documentation of the progress of activities.

Action Item 8: Produce an Annual Accomplishments Report. An accomplishments report will be prepared annually, similar to Reclamation's Safety of Dams Accountability Report. Reclamation will use the annual report as an opportunity to identify trends in the work that is delayed each year because available budget is reprioritized to address other more critical items. Historical trends could indicate

the extent of Reclamation's deferred maintenance and potential signal the need to request additional appropriations. Similarly, the annual report will address planned accomplishment and actual accomplishment of infrastructure investment activities funded with non-appropriated funds. Further efforts are needed to determine the appropriate data and analyses to be presented in this annual report.

4.2 Action Items for Further Analysis and Discussion

Reclamation identified several actions that could potentially further enhance the agency's ability to effectively manage its assets. Concurrent with its implementation of the action items described in Section 4.1, Reclamation will continue to explore the following proposals through additional analysis and future discussions:

- Improved condition metrics for Reclamation facilities,
- Common use of an automated database to identify MR&R activities and track and report on their accomplishment,
- Better definition of Deferred Maintenance for planning and reporting purposes, and
- Use of improved data from implementation of the action items described in Section 4.1 to inform Reclamation's budget process.

4.2.1 Asset Inventory and Data Management

Action Item 9: Evaluate other condition metrics with potential to more accurately represent the serviceability of structures. Reclamation reports the CI and the FCI as part of the FRPP data provided to the Department, GSA, and OMB. Both the CI and FCI are calculated generally as a ratio of the MR&R estimate to the CRV of each asset as identified in the FRPP. The intent of the indices is to provide an indication of the overall condition as it relates to potential replacement of the asset. While both condition indices provide somewhat useful information on buildings, the metrics are not well-suited to the high-capital cost, high-value structural assets that comprise the majority of Reclamation's portfolio by value. This is because most of Reclamation's major assets are beyond their useful design lives and are not considered replaceable units of property.

In 2004, in an effort to capture a more meaningful representation of the condition of its assets, Reclamation developed the Facility Reliability Rating (FRR). The FRR reflects the reliability and general condition of Reclamation's facilities by accounting for many factors other than MR&R and CRV, such as operations, maintenance, management, and safety. However, the FRR cannot be used in isolation to characterize the condition of an asset in relation to the identified MR&R items at the facility. Additionally, the FRR is not computed for all assets due to the diverse operational requirements of Reclamation's facilities. For example, the HydroAMP model provides another measure of the condition of power facilities. Therefore, Reclamation will explore opportunities to develop condition metrics, in lieu of CI and FCI, that are more meaningful to Reclamation. For example, Reclamation will evaluate the concept of comparing the total cost of MR&R to the annual O&M costs at a facility without regard to reimbursability.

USACE maintains structural assets similar to those in Reclamation's portfolio and has also recognized the limitations of CI and FCI as measures of condition. Like Reclamation, USACE is currently developing methodologies and related metrics that more accurately reflect the condition of their structures. Reclamation will continue to work with USACE to explore other techniques and factors that can be used to objectively evaluate and represent the condition of its structures.

Action Item 10: Consider the benefits of using a central administrative system, such as CARMA or FBMS, to manage infrastructure MR&R data. Reclamation performs the following data calls to collect and report information on its infrastructure:

- MR&R – Collected and reported annually
- Deferred Maintenance – Collected and reported quarterly
- FRPP – Collected and reported annually
- HydroAmp Condition Index Assessments of major powertrain components

There is some overlap and duplication in the information requested because the sources of data are often different and the data is used for different purposes. In addition, there are instances where activity data are required on short notice to respond to additional funding opportunities or other inquiries. The establishment of a centralized system that would contain all of the information required for each of the data requests would result in more consistent reporting and reduce duplication of efforts. A centralized database will be particularly useful when the identification of potential activities is needed with little advance notification and will allow Reclamation to provide a more meaningful response.

Reclamation uses two systems for managing asset maintenance information: CARMA, which is based on the MAXIMO software, and FBMS. Most of Reclamation's assets are managed using CARMA and the balance of the assets is managed utilizing FBMS. Using a comprehensive Maintenance Management Program, such as CARMA or FBMS, could further enhance the consistency of MR&R data, while also providing for improved access to the data for reporting purposes. Expanding the use of CARMA or FBMS could enable faster and more efficient access to stored data. Other Federal agencies, such as USACE, are currently using or are moving toward using MAXIMO for all maintenance planning and management. Using a common system would permit Reclamation to compare its MR&R data with other agencies and evaluate the effectiveness of Reclamation's maintenance program using industry standards and benchmarks for similar asset types. Reclamation will evaluate the potential of both MAXIMO-based CARMA and FBMS to support the effective management of Reclamation's maintenance program.

4.2.2 Tracking and Reporting MR&R Activities

Action Item 11: Develop and consistently apply an interpretation of the definition of Deferred Maintenance. Since the late 1990s, Reclamation has reported the amount of its deferred maintenance (DM) using its interpretation of the definition promulgated by the Federal Accounting Standards Advisory Board (FASAB). While all Federal government agencies use the definition of DM established by FASAB, some agencies interpret the FASAB definition more broadly than Reclamation does. As a result, Reclamation's characterization of its DM varies significantly from that of other agencies with similar asset management responsibilities.

Reporting of DM should be integrated fully with the MR&R data collection and reporting to avoid duplication and confusion. Currently, the Department of the Interior is working on developing guidance to use specific work order types under MAXIMO as a standard method to produce consistent data for reporting DM and repairs. Reclamation's deployment of MAXIMO (called CARMA) is not currently implemented at all facilities and also does not utilize the work order types proposed by the Department. Reclamation will need to reconcile how best to support this reporting requirement.

4.3 Funding MR&R through Non-Appropriated Sources

Action Item 12: Consider the need to expand existing review programs to identify and work with transferred works operating entities on addressing identified MR&R items not funded through appropriations. Reclamation monitors facilities for overall reliability and general condition through periodic evaluations (e.g., facility reviews, examinations, and inspections, etc.). Reclamation reviews and inspects facilities to determine if the facility is meeting an acceptable level of performance and to identify maintenance, repair, and replacement activities. Practices currently in place include the Power Review of Operations and Maintenance Program, the Facility Review Program for High and Significant-Hazard Dams, and the Review of Operation and Maintenance (RO&M) Program for associated facilities (other than high- and significant-hazard dams). Reclamation will consider strategies that leverage these and other review programs to identify and then work with partners to address high-priority MR&R activities at transferred works facilities. Reclamation will also work with operating entities to develop ways to incorporate their documentation of identified MR&R activities into Reclamation's reporting processes in an efficient and transparent manner.

Action Item 13: Explore opportunities to develop new loan and grant programs using existing authorities to the extent possible and new authorities as needed. Reclamation relies on transferred works operating entities to provide data presented in the MR&R database. Larger non-Federal entities often have engineers and maintenance crews on staff and long-term infrastructure investment plans in place; however, smaller entities may not. For the smaller entities, in particular, the MR&R data request may impose additional costs. In order to encourage non-Federal partners to participate and to prioritize O&M activities in a way that aligns with Reclamation's priorities, it is important to consider providing financial incentives in the form of loans and grants. Moreover, many smaller entities could benefit from technical assistance and training from Reclamation, if provided at a low cost or at no cost to the entity. Entities needing assistance could request a grant to contract with or have Reclamation assist with developing plans, designs, and cost estimates. These designs and cost estimates could be used to apply for grants or loans to complete the work.

Action Item 14: Explore streamlining Reclamation's title transfer process to provide greater authority for Reclamation to transfer title without additional legislative action. Reclamation continues to own a large number of buildings and single-purpose conveyance and distribution facilities where routine O&M responsibility has been transferred to the non-Federal entities, and where there are no longer any repayment obligations. These facilities would be good candidates for title transfer to the entities or beneficiaries. While some entities have expressed a willingness to take title to these facilities, the actual process for transferring title, including environmental compliance, analysis, and other compliance requirements, can be a significant financial burden on the beneficiaries and operating entities, and requires specific legislation to authorize. Streamlining this process could generate additional interest on the part of some entities to take title to facilities, especially where there is no longer a broad, compelling public interest that would justify Reclamation retaining title.



Seminole Dam, Kendrick Project, Great Plains Region.

Chapter 5

Summary of Action Items

	Action Item Number	Page	Action
Phase 1	<i>Items for Implementation</i>		
	1	26	Establish a standard Reclamation-wide method for identifying assets.
	2	27	Establish the thresholds for reporting identified MR&R activities at \$100,000 for structures and \$20,000 for buildings.
	3	27	Establish new procedures for determining the current replacement values of assets.
	4	27	Categorize all MR&R activities based on evaluations of risks and benefits.
	5	28	Require additional fields in the MR&R database indicating whether formal cost estimates exist, and if so, what level of cost estimate (as articulated in Reclamation Manual), and what elements are included in the estimate.
	6	29	Implement a training program on the development and use of cost estimates specific to the MR&R data.
	7	30	Add an entry to the MR&R database for each identified activity indicating with a “Yes/No” response whether the cost estimate has been peer reviewed in accordance with the established business practices of the applicable regional office.
	8	30	Produce an Annual Accomplishments Report.
	<i>Items for Further Analysis and Discussion</i>		
	9	31	Evaluate other condition metrics with potential to more accurately represent the serviceability of structures.
10	32	Consider the benefits of using a central administrative system, such as CARMA or FBMS, to manage infrastructure MR&R data.	
11	32	Develop and consistently apply an interpretation of the definition of Deferred Maintenance.	
Phase 2	<i>Items for Addressing MR&R Activities Funded through Non-Appropriated Sources</i>		
	12	33	Expand existing review programs to identify and work with transferred works operating entities on addressing identified MR&R activities not funded through appropriations.
	13	33	Explore opportunities to develop new loan and grant programs using existing authorities to the extent possible and new authorities, as needed.
	14	33	Explore streamlining Reclamation's title transfer process, including a legislative proposal to provide greater authority for Reclamation to transfer title without additional legislative action.

Chapter 6

Implementation Plan

The implementation of Reclamation's strategy will occur in two phases that may overlap or run concurrently over the next several years.

6.1 Phase 1 Activities

Phase 1 will focus on the improvement of data collected regarding MR&R activities, with a primary emphasis on reserved works. It will include continued work on characterizing the importance and urgency of MR&R activities based on a refined set of categories. Phase 1 activities are intended to improve the quality and use of the MR&R information, while improving the efficiency and effectiveness of the data collection process. This report primarily addresses Phase 1, which will include Action Items 1 through 11.



Folsom Dam, Central California Area Office, Mid-Pacific Region.

6.2 Phase 2 Activities

Phase 2, which includes Action Items 12 through 14, will be directed toward outreach to our water and power partners in order to develop an approach for improving Reclamation's strategy for the MR&R on transferred works. Work in this phase will be focused on developing a better understanding of the variability in the nature of transferred works facilities and the capacity of our partners. It will require the input of operating entities on the scope of the data collected and the ways in which Reclamation's partners might use the data to support effective investment decisions. The outreach effort will also allow for a discussion of additional authority or program support that is needed to address immediate and long term infrastructure investments that will assure safe and reliable facilities into the future. Reclamation is developing a more detailed schedule for the subsequent phases of its infrastructure strategy efforts.

Appendix

Categorization of MR&R activities

As noted in the body of the report, Reclamation's categorization criteria will include two primary areas of influence that are shared by all investment areas: Risk and Benefits. These two factors, risk and benefits, will establish a common basis for assigning a relative ranking of importance (from A to E, with A being the highest) to each of the MR&R activities across investment areas. The risk component will carry more weight than the benefits component. Reclamation recognizes that the factors influencing the relative priority of MR&R activities can differ by investment area. Therefore, as a part of implementing this action item, the categorization of activities will be adapted to reflect the distinct features of each of the four investment areas, while also supporting consistency across Reclamation.

Reclamation's FO&M Team and Area Offices will be engaged in the refinement of the categorization criteria, and will determine how the unique risks and benefits of each investment area (Dam Safety, Power, Reserved Works, and Transferred Works) fit into the overall categorization. Reclamation's assessment of probability and consequences of failure will build on established models, both internal and external: the risk-informed approaches used by Reclamation field offices to evaluate and prioritize XM activities, the quantified risk analysis system used in the Dam Safety Program, and the risk assessment process (based on both quantitative and qualitative data) used by the power program and its customers to prioritize investments in power facilities.

The probability of failure can be characterized in terms of engineering need and the age and condition of facility involved. Consequences can be described in terms of potential impacts to facility and equipment operations; life loss, safety and health impacts; property or resources and environmental damage; as well as impacts in not meeting contractual and legal commitments. As an example of one approach, Reclamation can assess risk using established procedures for assigning a Risk Assessment Code (RAC) to each identified activity. The RAC combines the probability of failure with the consequence of failure and results in a single factor to portray level of risk (see Figure 4). Benefits would be determined principally by evaluating both the investment rating and the mission contribution for each MR&R activity. The investment rating would be determined largely from the operating office or operating entity's justification of the return on investment in the activity, or a similar concept. The mission contribution would be based on the demonstrated and measurable contribution of the completion of the activity's impact to mission delivery.

Reclamation's FO&M Team will further develop the draft criteria and weighting of variables illustrated in Figure 5 to produce the general categorization of activities compiled in the MR&R database. The actual application of the general criteria to each activity in the MR&R database will be done by the regions and SSLE, with review for consistency by the FO&M Team, as needed.

Probability	Risk Assessment Code			
High	3	2	1	1
Likely	4	3	2	1
Occasional	5	4	3	2
Rarely	5	5	4	3
Consequence	Minor	Significant	Critical	Catastrophic

Figure 4. Reclamation's Risk Assessment Code (RAC).

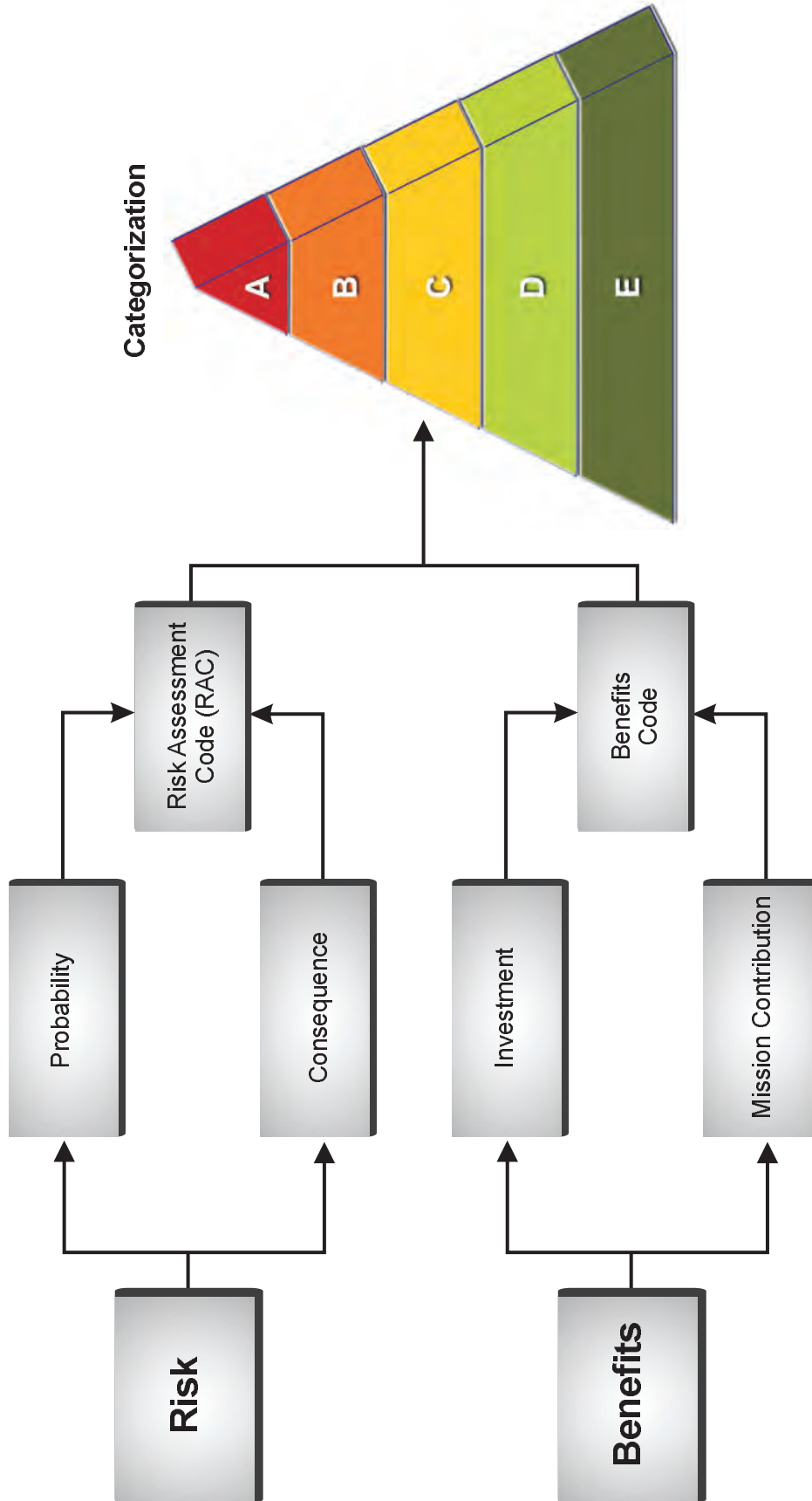


Figure 5. General Categorization Criteria.