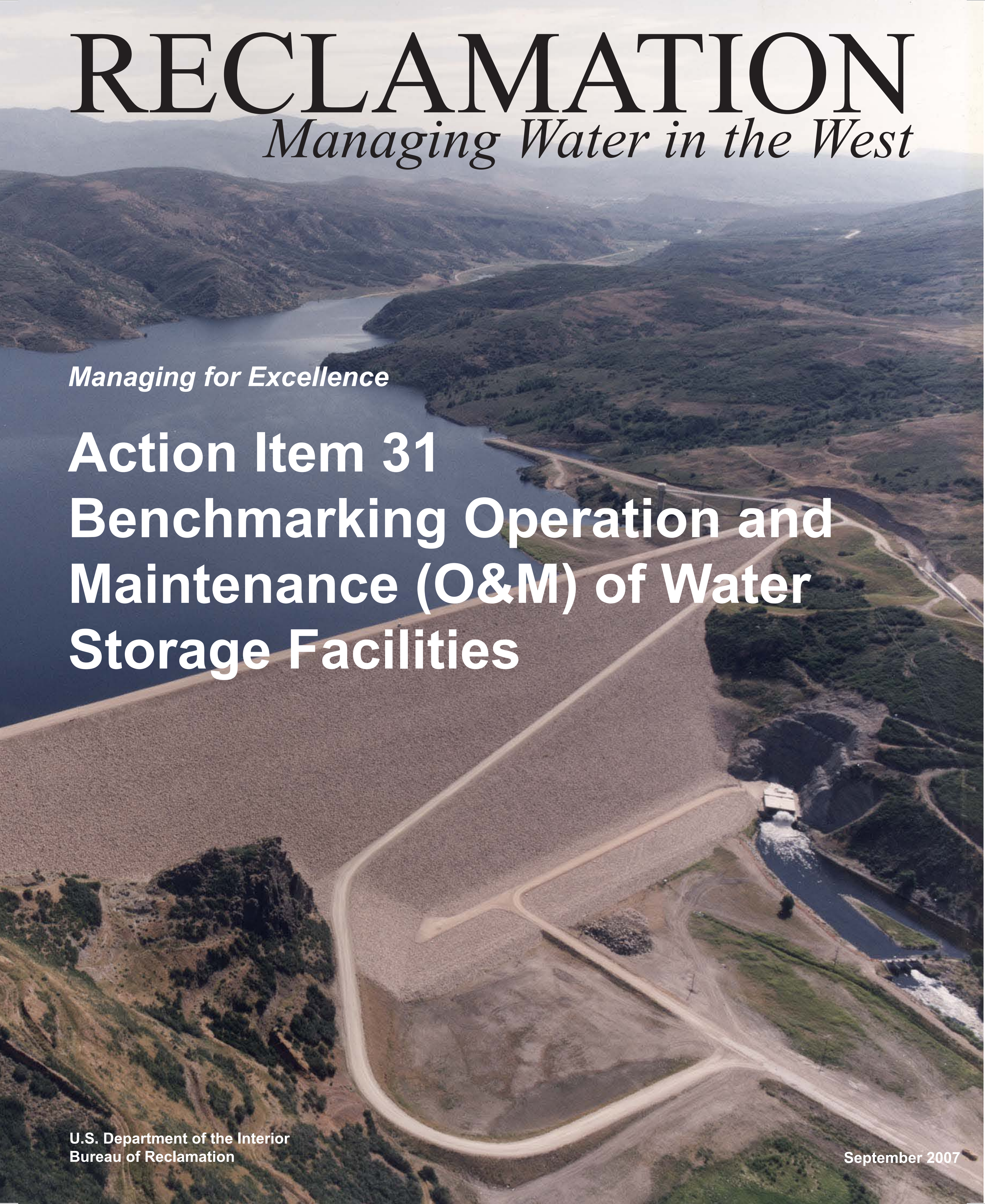

RECLAMATION

Managing Water in the West

Managing for Excellence

Action Item 31
Benchmarking Operation and Maintenance (O&M) of Water Storage Facilities

U.S. Department of the Interior
Bureau of Reclamation

September 2007

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Managing for Excellence

Action Item 31
Benchmarking Operation and Maintenance (O&M) of Water Storage Facilities

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

September 2007

Executive Summary

Background

The Bureau of Reclamation (Reclamation) requested the National Academy of Sciences' National Research Council (NRC) to review Reclamation's organization, business practices, culture, and capabilities for managing construction and infrastructure in the 21st century. As a result, the NRC published a report, *Managing Construction and Infrastructure in the 21st Century, Bureau of Reclamation*. Reclamation's *Managing for Excellence (M4E) Action Plan* was initiated to address the recommendations provided by the National Academy of Sciences' NRC report.

Reclamation's Action Plan identified 8 functional areas that included a total of 41 action items. Within the "asset sustainment" functional area, specific action items were identified to help improve the efficiency and effectiveness with which Reclamation's assets are managed.

Team 31 (the Team) was tasked with completing action item 31, which involves benchmarking the operation and maintenance (O&M) of water storage and distribution facilities in a manner modeled after the existing power benchmarking program, starting with a pilot program.

Scope

A pilot program was developed in accordance with the action item to determine the feasibility of water O&M benchmarking. Although the action item referred to "distribution facilities," the Team determined that including conveyance and distribution facilities in this benchmarking effort would not improve Reclamation's efficient management of O&M activities because the majority of these facilities are operated and maintained by others (transferred works). As a result, the Team decided that the scope should focus on the O&M of multipurpose water storage dams. Figure S-1 shows the refinement of the scope for this benchmarking effort.

A primary reason for focusing on multipurpose reserved works water storage dams was the availability of comparable O&M cost information. Another reason was that the entities responsible for a portion of O&M costs would likely be interested in the identification and implementation of potential cost saving practices.

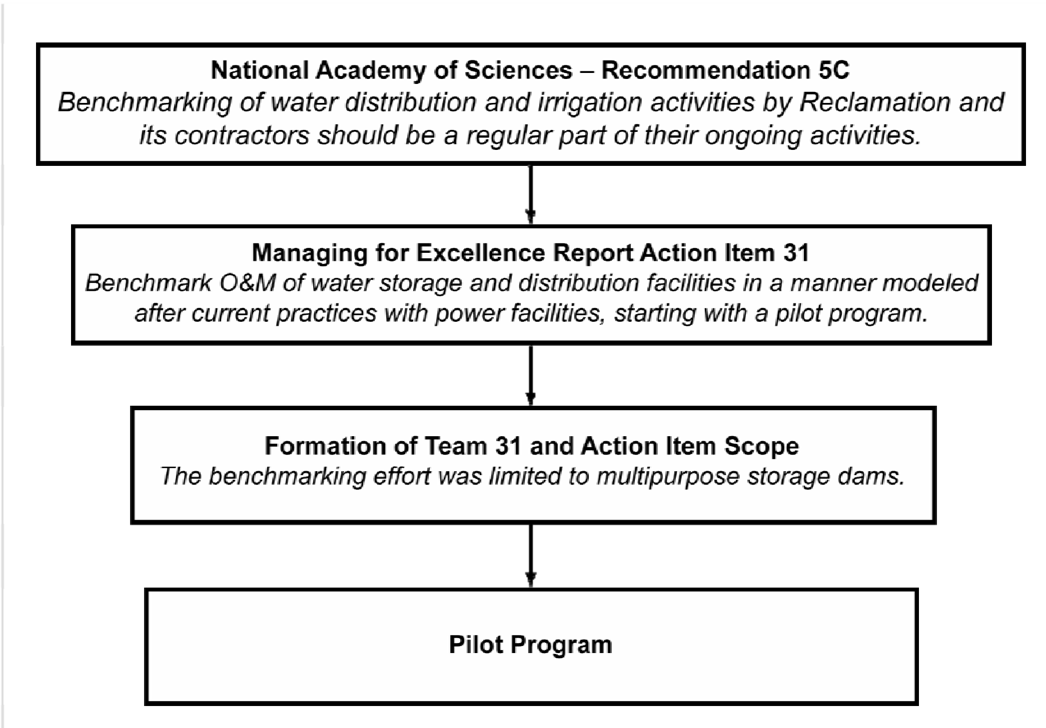

Figure S-1. Progression and refinement of scope.

The Team proposed this scope to Reclamation's Executive Sponsor and to stakeholders that attended the initial stakeholders meeting. There was concurrence, and the Team proceeded with the effort.

What is Benchmarking?

The power benchmarking study defined benchmarking as "a continuous formal process of measuring, understanding, and adapting industry best practices that lead to superior performance."

Benchmarking can also be defined as an analytical process that compares data, resulting from common practices, between or among entities within like peer groups to determine areas for potential improvement and to identify best practices. As can be seen from these definitions, benchmarking is more than just a comparison of costs.

The benefits of using the benchmarking process are:

- Industry-accepted benchmarks and performance metrics are identified.
- Partnerships with industry leaders are developed.
- Industry best practices are identified.
- Methods for improving performance are recommended.
- Credibility is developed or improved with the customer.

Water O&M Benchmarking vs. Power Benchmarking

In modeling water O&M benchmarking after power benchmarking, the Team compared the two industries and the standards within the industries. Table S-1 shows a comparison of power and water O&M benchmarking and the challenges that are inherent with them.

Table S-1. Comparison of Power and Water O&M Benchmarking

Benchmarking component	Availability of data in power benchmarking	Availability of data in water O&M benchmarking
Existing industry performance metrics	Yes. NERC performance metrics.	No.
Industry-defined cost accounting structures	Yes. FERC cost codes.	No.
Comparable external cost data	Yes. EIA, EUCG, and others.	No.
Performance reliability metrics	Yes. Calculations on operational statistics predefined by industry, such as forced outage factor, reliability factor, availability factor, and others.	No.
Industry-wide defined facility categories (peer groupings)	Yes.	No.

Notes: NERC = North American Electric Reliability Corporation, EUCG = Electric Utility Cost Group, FERC = Federal Energy Regulatory Commission, EIA = Energy Information Administration

Planning the Pilot Program

Realizing that it was not possible to include Reclamation's entire inventory of multipurpose storage dams in the pilot program, the Team identified a subset of comparable dams for which a pilot program could be performed. Table S-2 summarizes the screening criteria used to determine the facilities included in the pilot program. Figure S-2 depicts the facility selection process.

Table S-2. Pilot Program Screening Criteria

Component	Included in pilot program	Excluded from pilot program
Facility type	Multipurpose storage dams	Conveyance and distribution facilities
Dam type	Embankment	Concrete, composite/other
Dam function	No hydropower	Dams with hydropower facilities
Dam construction date	Built after 1945	Built before 1945
Dam operation	On-stream storage	Off-stream storage without spillway

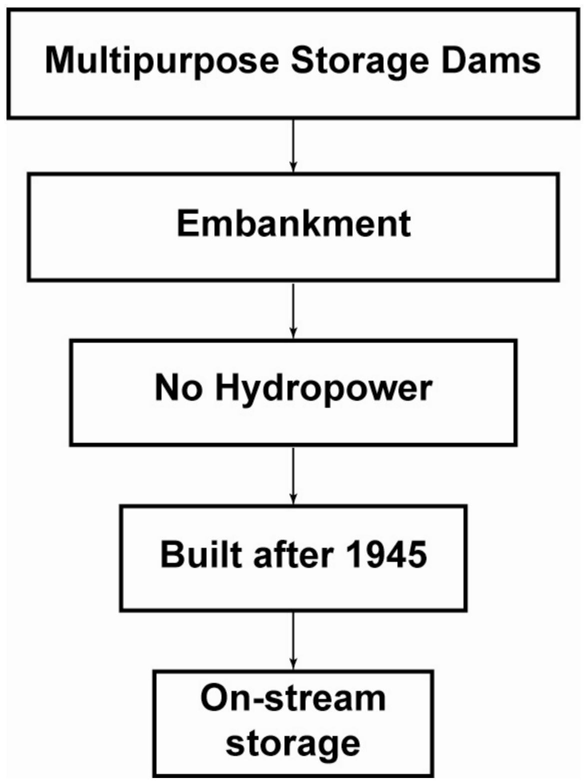

Figure S-2. Facility selection process.

The Team identified 34 dams that met the criteria of the pilot program and for which cost data were available; 23 of them are reserved works and 11 of them are operated and maintained by non-Reclamation entities (third parties). Facility characteristics for each of the 23 reserved works dams are shown in table S-3. To ensure anonymity, the 11 third-party dams are not identified. The purpose of the last column in Table S-3 is to indicate the relative operation and maintenance costs paid by the water users for each dam in the pilot program.

Table S-3. Characteristics of Dams Included in Pilot Program

Name of Dam	Region	Age (yrs)	Structural Height, ft	Crest Length, ft	Embankment Volume, yd^3	Reservoir Capacity, acre-ft*	Complexity Number	% of allocable O&M Costs Paid by Water Users
Bonny Dam	GP	55	158	9,200	8,853,000	170,160	34	23.7
Bradbury Dam	MP	53	278.9	3,350	6,700,000	205,000	37	100.0
Cedar Bluff Dam	GP	55	202	12,560	8,490,000	376,950	45	1.5
Whiskeytown Dam	MP	43	281.5	4,000	4,540,000	241,000	23	51.7
Dickinson Dam	GP	56	64.6	2,980	340,000	10,169	12	0.0
Enders Dam	GP	55	134	2,603	1,950,000	74,520	34	11.1
Glen Elder Dam	GP	37	142	15,275	10,030,000	963,775	51	0.4
Heart Butte Dam	GP	57	142	1,850	1,140,000	223,646	16	9.8
Heron Dam	UC	35	275	1,220	3,031,121	401,317	21	83.0
Jamestown Dam	GP	52	110	1,418	963,000	221,000	11	0.0
Keyhole Dam	GP	54	168	3,420	1,335,000	334,200	12	13.8
Lovewell Dam	GP	49	93	8,500	3,000,000	92,150	25	1.0
Medicine Creek Dam	GP	57	165	5,665	2,730,000	88,420	22	5.6
Norton Dam	GP	42	130.5	6,450	3,740,000	134,738	29	3.3
Prosser Creek Dam	MP	43	163.1	1,830	1,800,000	27,800	28	0.0
Red Willow Dam	GP	44	126	3,159	2,991,000	86,627	18	2.0
Ririe Dam	PN	29	253	1,070	2,676,000	100,500	32	21.1
Ruedi Dam	GP	38	321.9	1,042	3,745,200	102,373	18	55.3
Shadehill Dam	GP	55	145	12,843	3,500,000	357,382	11	0.0
Sugar Loaf Dam	GP	38	162	2,020	1,833,700	129,398	17	52.5
Tiber Dam	GP	50	211	3,839	11,740,000	1,368,157	50	4.6
Trenton Dam	GP	53	144	8,600	8,130,000	2,462,910	37	5.0
Webster Dam	GP	50	154	10,720	8,145,000	260,740	41	1.3
Average		**47.8**	**175**	**5,375**	**4,408,827**	**366,649**	**27.1**	**19.4**

[1]The majority of the dams are in the Great Plains Region due to screening criteria used.

Data Collection, Sources, and Validation

Once the pilot program facilities were selected, the Team decided how best to compare these facilities. In reviewing what the Team understood to be concerns of the stakeholders, and drawing upon what the power stakeholders identified to be important performance indicators in the power benchmarking effort, the Team identified the following relevant performance indicators for this effort:

- Costs
- Staffing
- Reliability

Data were collected for each of these indicators on a fiscal year (FY) basis, from FY 2001 through FY 2005. Physical and operational characteristics of each facility were also collected because they most likely have a direct relationship to O&M cost.

Costs

The term "O&M costs" can have a wide variety of meanings within Reclamation and with other Federal and non-Federal entities. For benchmarking purposes, it is extremely important that this term be fully defined and understood so that O&M costs can be consistently compared between or among dams.

The Team collected costs for the 34 dams that fit the criteria of the pilot program. Because the same cost accounting procedures are used within Reclamation for the 23 reserved works dams, the Team was confident that the data were comparable and comprehensive.

However, in reviewing data for the 11 third-party dams, the Team could not conclusively determine whether the third-party costs captured the same O&M-related costs as Reclamation's cost accounting procedures. Therefore, there was limited confidence in the comparability of the third-party data. Due to these factors, and the fact that data would yield suspect comparisons, the 11 third-party dams were eliminated, resulting in 23 reserved works dams for the pilot program.

Cost data were collected from Reclamation's cost accounting reports and verified. Costs were collected by activity and budget object class in order to obtain recurring O&M costs (A40), nonrecurring O&M costs (A50), direct O&M costs, and indirect O&M costs. Project O&M costs were consistently collected at a certain point in the costing process (termed "allocable O&M") prior to undergoing any allocation procedures for reimbursability.

Staffing

Annual staff hours for each facility were collected from Reclamation's Financial Information Reporting System (FIRS) and verified by financial staff. Staff hours were converted to full-time equivalents (FTEs) by dividing the annual total hours by 1,800 hours.

Performance Reliability

Without any common, industry-accepted performance metrics to measure reliability, the Team explored the use of the facility reliability rating (FRR), which was developed by Reclamation in 2003. The FRR was developed for use as an "outcome-oriented" performance measure for the Government Performance and Results Act (GPRA) under the Department of the Interior's Strategic Plan. As such, the FRR was intended to provide a general indication of Reclamation's effectiveness in ensuring the reliability of its facilities to store and deliver water.

FRR scores were collected from Reclamation's related regional and dam safety databases, which document and maintain these scores.

The Team recognized that only a small part of the FRR scoring reflects the project O&M activities/costs that are targeted for comparison purposes under this benchmarking effort (i.e., allocable O&M).

Facility Characteristics

Facility characteristics that were collected include the following:

- Age
- Structural height
- Crest length
- Embankment volume
- Reservoir capacity

The Team was concerned that individual facility characteristics were inadequate to unitize the O&M costs at a particular dam. As a result, the Team developed a method to integrate the physical and operational characteristics of a dam that affect O&M costs into a single number termed the "complexity number" (CN). A CN was calculated for each facility.

The Team also explored the use of water storage and release data for these dams. However, because of extreme fluctuations in these data during the 5-year timeframe selected, no further effort was made to include these characteristics in the pilot program.

Table S-3 summarizes these physical characteristics and CNs for each facility in the pilot program. In addition to the facility characteristics, a column was added to table S-3 to show how much of the allocable O&M costs used in this benchmarking effort are actually reimbursed by the water users; the average was less than 20 percent.

Data Analysis

Initially, the Team analyzed a number of potential metrics. Because costs were considered to be one of the essential performance indicators for this program, costs were compared with many dam characteristics. Statistical analyses were performed to determine if meaningful relationships existed between cost data and other facility characteristics. Where high correlations existed, a unitized benchmark was established. By these criteria, there were two cost metric benchmarks (cost per embankment volume and cost per CN) confirmed for unitizing. None of the staffing metrics were determined to be adequate for unitizing.

Further analysis was performed in order to identify benchmarks based on percent of indirect allocable O&M costs, aggregate (nonunitized) staffing, and FRR. These data were correlated with the cost data that had been correlated. A negative correlation with FRR was nonintuitive and supported the suspicions that FRR was not a good measure of reliability for this benchmarking effort; therefore, it was not used. Both aggregate staffing and percent indirect of allocable O&M costs had no correlation with either metric and, therefore, were considered independent, complementary benchmarks to the two unitized benchmarks.

Prime Benchmarks

The analyses produced the following four prime benchmarks:

- O&M costs per 1,000 cubic yards of embankment material
- O&M costs per CN
- Percent indirect of allocable O&M costs
- Number of full-time equivalents

Benchmarking Results

The four prime benchmarks were applied to the 23 Reclamation facilities and yielded the results found in table S-4. Figures S-3 through S-6 show the comparisons for each benchmark for the 23 Reclamation facilities.

Table S-4. Benchmarking Results

Prime benchmarks	Group high	Group low	Reclamation median
O&M costs per 1,000 cubic yards of embankment material	$347.00	$27.96	$62.92
O&M costs per CN	$16,218	$4,035	$8,207
Percent indirect of allocable O&M costs	45.1%	15.6%	21.8%
Number of FTEs	3.59	0.58	1.33

Caution should be taken in drawing conclusions or making comparisons among facilities based on the data presented in table S-4 and the following figures because none of these benchmarks alone fully explain the performance of a facility. For example, when viewing costs per cubic yard of embankment volume, Dickinson Dam appears to be an outlier facility. But the same dam, when viewed in the cost versus CN benchmark, falls near the median.

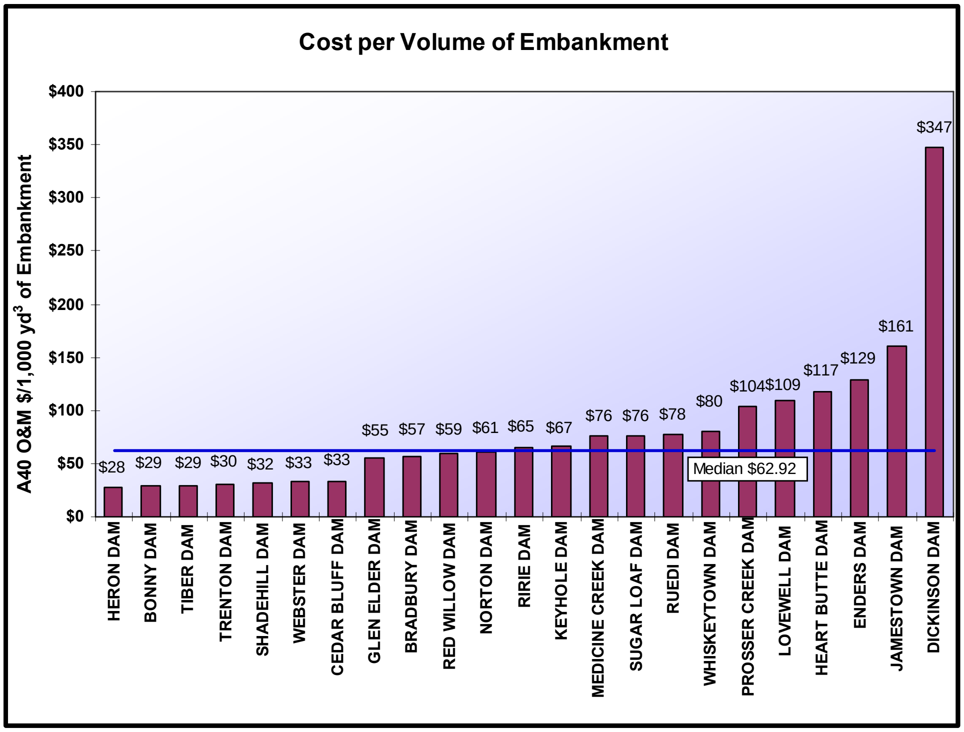

Figure S-3. Cost per volume of embankment.

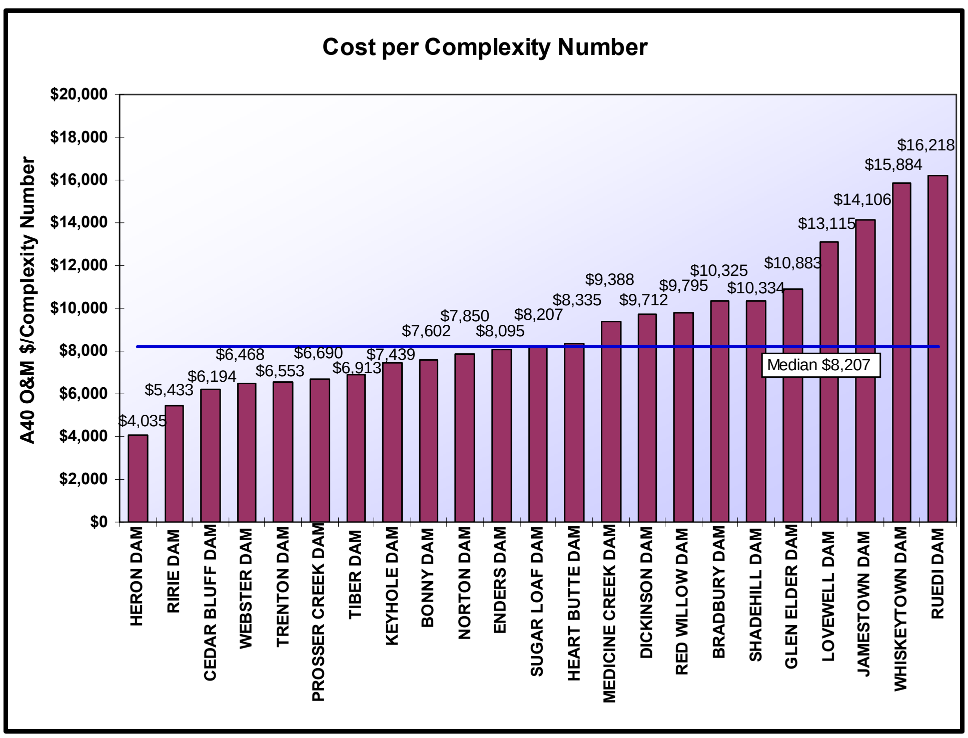

Figure S-4. Cost per complexity number.

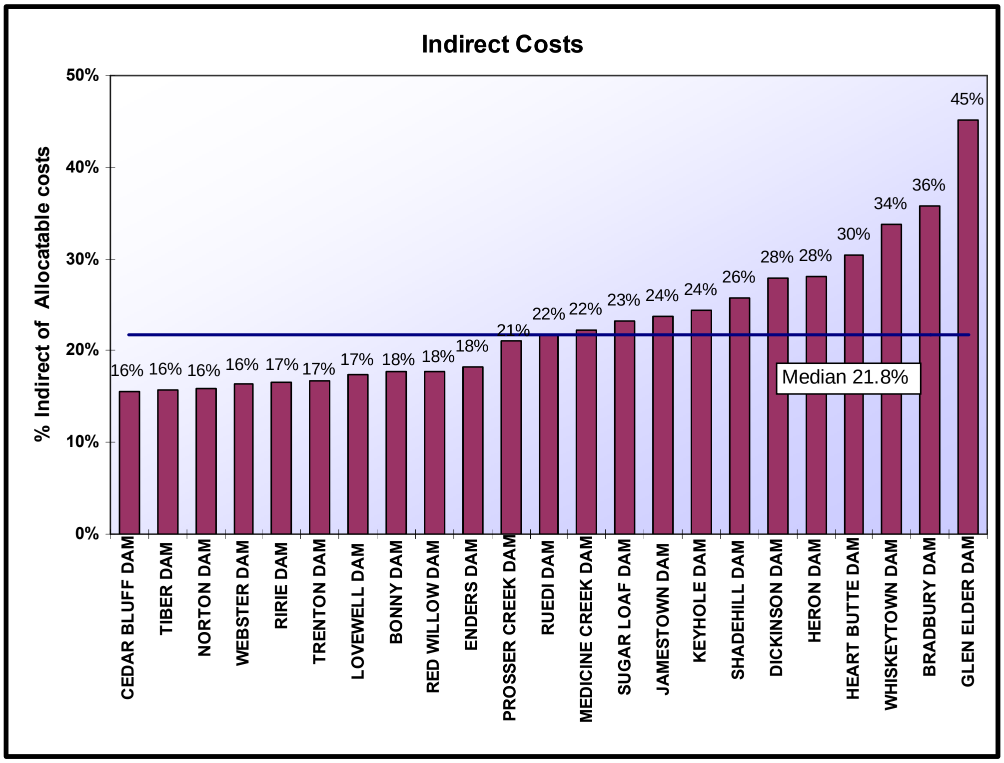

Figure S-5. Percent indirect of allocable O&M costs.

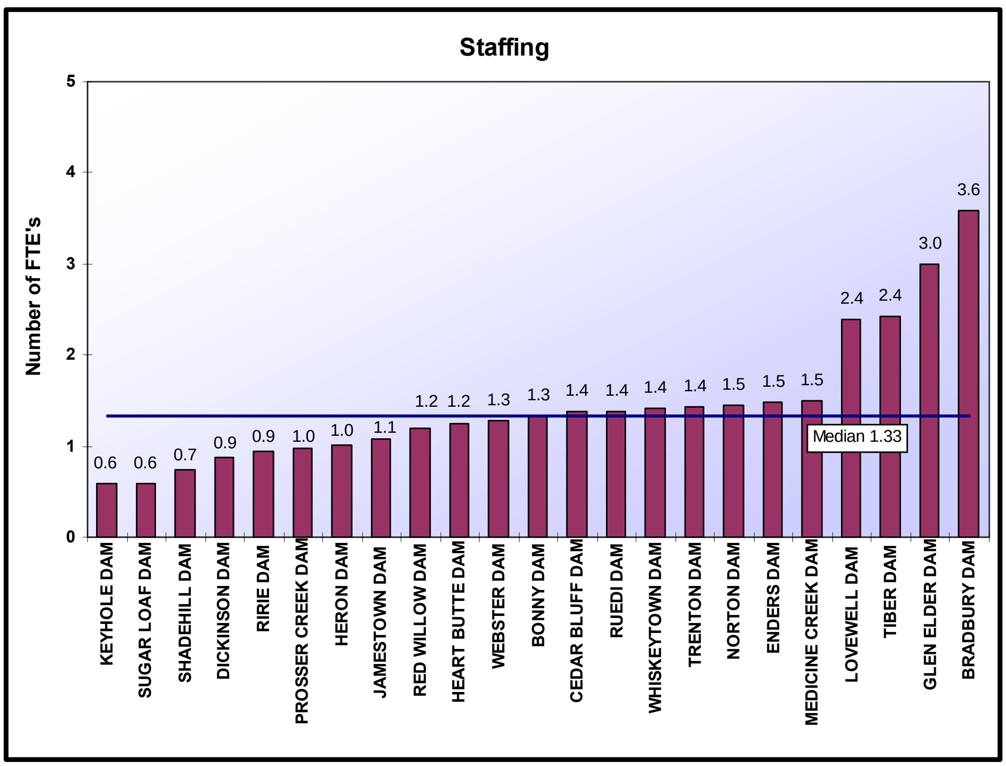

Figure S-6. Full-time equivalents.

Gap Analysis

A gap analysis was not performed because a full complement of benchmarks could not be developed. The Team was able to develop cost-related benchmarks. However, no performance or reliability based benchmarks were achievable. Specifically, there is presently no means of objectively measuring the relative quality of O&M at each dam. The Team agreed that performing a gap analysis without considering this factor would result in incomplete and, thus, inaccurate results or conclusions based solely on costs. In other words, without performing a gap analysis, best practices and best performers could not be identified.

Conclusions

1. Benchmarking hydropower facilities is relatively simplistic and straightforward compared to benchmarking water storage and distribution facilities. The main reasons for this conclusion are:

- Hydropower facilities primarily serve a single purpose.
- Common O&M practices exist among hydropower facilities.
- All power utilities use industry-defined cost accounting codes.
- The power industry has established reliability performance metrics.

Benchmarking water storage and distribution facilities does not offer any of these advantages.

2. Even though some benchmarks were developed, true, disciplined O&M benchmarking of water facilities may not be feasible. The Team developed cost-related benchmarks; however, no performance or reliability based benchmarks were identified. Specifically, there is presently no means of objectively measuring the relative quality of O&M at each dam. Further evaluation would be needed to attempt to develop a related metric that reflects the quality of O&M performance and/or the relative condition of the facility to support any future efforts to compare costs or O&M activities to achieve best practices.

The Team agreed that a gap analysis performed without considering this metric would result in incomplete and, thus, inaccurate results. Without a gap analysis, best practices and best performers could not be identified, which is ultimately the objective of any benchmarking effort. In lieu of benchmarking, the Team explored other possible ways to achieve improved best practices.

3. Reclamation will not realize a significant benefit by benchmarking water conveyance and distribution facilities. Non-Federal entities are responsible for the O&M (and O&M funding) of the vast majority of Reclamation's water conveyance and distribution facilities. Benchmarking these facilities will require a significant and dedicated effort by involved entities.

4. There is no industry-wide accounting system for obtaining consistent and comparable cost data associated with the O&M of water storage and distribution facilities. The Team was unable to use available data from entities outside of Reclamation due to lack of standardized cost accounting structures. The development of standardized structures would be necessary for any future benchmarking effort.

Because of a relatively consistent application of Reclamation's cost accounting system, the Team was fairly confident of the comparability of "allocable O&M" cost data associated with reserved works facilities included in this benchmarking pilot program.

5. There are many factors that must be considered in comparing water facilities and the related O&M costs of these facilities. Failure to do so jeopardizes statistical significance and results in nonmeaningful comparisons. Some of the variability is due to factors such as:

- Size
- Geographical location/environment/climate
- Remoteness of a facility
- Construction material
- Age
- Project purpose(s)
- Quality of O&M
- Complexity
- How RAX items are addressed as costs
- Inflow/fill/storage history (operations)

6. The complexity number is a credible method of determining the relative complexity of embankment storage dams. The complexity of a facility, reflecting the extent and frequency of O&M activities, must be factored into any future efforts directed toward improved best practices.

7. Some of the tools used in the pilot program are specific to embankment storage dams. Adaptation of these tools (e.g., CN form, prime benchmarks, etc.) may be required to enable comparisons of other storage dam types, a larger data set of embankment storage dams, or water conveyance and distribution facilities.

8. The pilot program identified four prime benchmarks. These benchmarks were:

- O&M costs per cubic yard of embankment material
- O&M costs per CN
- Percent indirect of allocable O&M costs
- Number of full-time equivalents

Missing from these benchmarks is a reliability benchmark which is critical to a full complement of benchmarks necessary for true, disciplined benchmarking.

Recommendations

The Team developed a total of seven recommendations. The first three recommendations pertain directly to O&M benchmarking. Realizing that true, disciplined water O&M benchmarking is not feasible, the Team explored other methods that Reclamation could utilize to identify and share best practices. As a result, the Team made four additional recommendations that address possible ways to improve O&M practices throughout Reclamation by comparing O&M costs and practices among similar facilities both within and outside of Reclamation.

1. Reclamation should not pursue internal O&M benchmarking among Reclamation's reserved works storage dams. Using lessons learned from this pilot program, Reclamation should not pursue internal O&M benchmarking among Reclamation's reserved works storage dams because of significant uncertainty in the viability of success and the high costs associated with further effort. In comparison with power benchmarking, the Team anticipates that development of water O&M benchmarking will be very expensive, and it will not realize similar benefits, primarily because this is because there are no existing means or metrics (i.e., industry standards) to objectively measure the reliability or quality of O&M for water storage dams. Development of a necessary reliability metric (if possible to develop) would require significant time and resources.

2. Reclamation should not pursue water O&M benchmarking with entities outside of Reclamation. In addition to reasons stated in Recommendation 1, Reclamation should not pursue water O&M benchmarking with entities outside of Reclamation principally because industry-defined cost accounting structures do not exist. The development and implementation of such accounting structures would require a significant commitment of resources by both Reclamation and industry.

3. Reclamation should not pursue benchmarking of water conveyance and distribution facilities. In addition to reasons stated in Recommendations 1 and 2, Reclamation should not pursue benchmarking of water conveyance and distribution facilities because non-Federal entities are responsible for the O&M and O&M funding of the vast majority of these facilities.

4. Reclamation should consider redefining and expanding its standardized cost accounting system at reserved works dams so that detailed, consistent, and comparable cost data for various types O&M activities can be obtained and tracked. To identify "best practices" or to make meaningful comparisons of costs between facilities, detailed data for O&M activities are necessary. Reclamation has cost accounting structures that track labor, supplies and materials, and major repairs at a "facility" level, but does not track costs by specific type of O&M activity in any real level of detail. If costs for specific O&M activities (e.g., vegetation control, concrete repair, etc.) were tracked, annual costs associated with these activities could be compared among facilities. In addition, implementing this recommendation could provide a straightforward means of presenting cost data that would serve to improve transparency and accountability to Reclamation's customers. However, it should be noted that expanding the existing cost system could take up to two years and that meaningful cost comparisons and identification of "best practices" may not be possible until after five years of data collection.

5. Reclamation should consider developing a means to measure the relative level of effectiveness of specific O&M activities (quality of O&M) to enable activity-based cost comparisons among reserved works dams, identification of best practices, and long-term tracking of O&M program efficiency. As explained previously, successful water O&M benchmarking requires some objective means or metric to measure the reliability or quality of O&M at a facility level. Such a means or metric is not currently available on an industry-wide basis. O&M costs alone do not provide sufficient information to benchmark or to perform a comprehensive comparison of facility O&M costs. However, if cost data for specific O&M activities are made available through a redefined cost accounting system (as recommended above), the Team also recommends development of "a measurement of the relative level of effectiveness" of specific O&M activities to perform activity-based cost comparisons among facilities. Ideally, an objective scoring type approach is preferred, in which the effectiveness of each applicable O&M activity (e.g., success of vegetation control measures, condition of protective coatings, etc.) is evaluated. These scores can be useful to Reclamation managers in identifying potential areas of improvement. However, the full benefit would be realized when the scores are coupled with activity-specific costs to identify "best practices" and track O&M program efficiency. As a result, it could provide a straightforward means of justifying past and future O&M expenditures, as well as improving transparency and accountability, to our customers.

6. Reclamation should consider routinely collecting, publishing, and distributing O&M cost data for reserved works storage dams. In addition to providing the "transparency" desired by Reclamation's customers, publishing and distributing this cost data, both on a "total O&M" basis and by "specific O&M activity," could permit comparisons among facilities and invite discussion and analysis among those performing the O&M, thus generating improved O&M practices. Such cost data should be grouped by "like" facilities for comparison purposes, such as "embankment dams without power plants." Further, appropriate "unitizing" should be identified to normalize the variations in the facilities and make them more comparable, such as the cost/unit volume of embankment and cost/complexity number, which worked well for comparing embankment dams. Publishing the data within Reclamation's existing Water O&M Bulletin or on a suitable Web site should be considered.

7. Reclamation should explore additional forums to share best practices regarding the operation and maintenance (O&M) of storage dams. One opportunity to achieve this objective would be to develop a "best practices" workshop similar in content to the Water Management Workshop, but focused specifically on the O&M of reserved works storage dams; primary participants would be Reclamation O&M field personnel, managers, and field reviewers/examiners. In addition to many of the same Water Management Workshop sessions, this workshop would also include sessions on the O&M of storage dams, as well as cost and effectiveness comparisons resulting from cost data collected on specific O&M activities. Other opportunities for "best practice" sharing could be provided through regular Facility Review Workshops; cross-regional or customer participation in facility reviews and the sharing of best practices in Reclamation's Water O&M Bulletins.

Abbreviations and Acronyms

AAR	alkali-aggregate reaction
BOC	budget object class
BOR730	Bureau of Reclamation Cost File Summary Report
C&D	conveyance and distribution
CFR	Comprehensive Facility Review
CN	complexity number
EIA	Energy Information Administration
EUCG	Electric Utility Cost Group
FCI	Facility Condition Index
FERC	Federal Energy Regulatory Commission
FIRS	Financial Information Reporting System
FRR	facility reliability rating
ft^3	cubic feet
FTE	full-time equivalents
FY	fiscal year
GPRA	Government Performance and Results Act
M&I	municipal and industrial
M4E	Managing for Excellence
NERC	North American Electric Reliability Corporation
NRC	National Research Council
OMB	Office of Management and Budget
O&M	operation and maintenance
PFR	Periodic Facility Review
RAX	replacements, additions, and extraordinary maintenance
Reclamation	Bureau of Reclamation
Team	Team 31

Definitions

A40 – Activity level code related to recurring facility O&M within Reclamation's programmatic budget structure.

A50 – Activity level code related to facility maintenance and rehabilitation within Reclamation's programmatic budget structure.

Allocable O&M – The accounting of O&M costs for a facility, prior to undergoing allocation procedures for reimbursement by project purposes, used in this benchmarking pilot program.

Baseline – Data or basic information gathered before a program/activity/analysis begins and used later to provide a comparison for assessing impacts.

Benchmark – An adopted standard by which processes or products are compared.

Benchmarking –An analytical process that compares data (resulting from common practices) from one entity to like information from a peer entity or group to determine areas for potential improvement and to identify best practices.

BOR730 – The Cost File Summary Report is a Reclamation-wide accounting report that is designed to report accounting activity by region and project on a monthly, fiscal year, and cumulative total-to-date basis (from date of inception of the project). The report provides further breakdown by project activities as identified by one of many of Reclamation's authorized cost accounts.

Complexity number – A number between 0 and 100 that is calculated based on the physical and operational parameters of a dam that affect O&M costs. The complexity number was developed by M4E Team 31 for use as a performance metric.

Customer – An individual, entity, or organization that receives products or services (from Reclamation) through a contractual arrangement.

Direct costs – Labor, material, and equipment costs directly associated with the operations of projects and facilities.

Facility reliability rating – A number between 0 and 100 used to indicate the reliability of Reclamation's high- and significant-hazard dams and associated facilities based on factors that affect the overall performance, O&M, safety, and security of the facility.

Gap analysis – A comparison of entities in a benchmarking program that is used to identify the performance or operational differences between processes that are successful and processes that are not.

Indirect costs – Management and administrative costs that are pooled for distribution towards projects and project facilities.

Performance metric – A standard quantifiable measure of information or data that is intended for use in assessing performance and/or improvement in a particular area.

Reserved works – An individual facility/structure or a system of facilities/structures for which O&M responsibility has been retained (reserved) by Reclamation for O&M responsibility, or where Reclamation has contracted the O&M without formally transferring the O&M responsibility.

Stakeholder – An individual, entity, or organization that is directly or indirectly impacted by, or has a vested interest in, the business processes (i.e., delivery of products or services) performed by Reclamation.

Third party – An entity with available facility/cost data because of a Reclamation contractual relationship.

Transferred works – An individual facility/structure or a system of facilities/structures for which O&M responsibility has been formally transferred (via a contract or agreement) from Reclamation to a non-Federal entity for O&M responsibility.

Unitized costs – Costs which are divided by some characteristic of that cost for comparison purposes.

Water user – An entity or organization that contractually receives Reclamation project water.

Frequently Asked Questions

1. What is benchmarking?

Benchmarking is a continuous formal process of measuring, understanding, and adapting industry best practices that lead to superior performance.

2. What are the benefits of doing a benchmarking study?

- Industry-accepted benchmarks and performance metrics are identified
- Partnerships with industry leaders are developed
- Industry best practices are identified
- Methods for improving performance are recommended
- Credibility with the customer tends to be developed or improved

3. What did you benchmark in this study? How many facilities were benchmarked?

The Team benchmarked a total of 23 Reclamation reserved works embankment storage dams and attempted to benchmark 11 external or third-party storage dams.

4. Why didn't you benchmark conveyance and distribution systems?

Significant customer involvement would be required to gather consistent and usable data. Given the short time frame of this effort, the Team did not feel that the data would be comparable, adequately verified, and detailed enough to be useful.

5. Why weren't all water storage dams benchmarked?

The Managing for Excellence report asked that a pilot program be done. The pilot program was scoped to meet available resources, schedules, and data availability.

6. The Managing for Excellence report suggested modeling after the power benchmarking effort. What makes water O&M benchmarking so different?

In power benchmarking, the following data/tools existed at the onset of the benchmarking effort:

- Existing, widely-accepted industry metrics
- Industry-defined cost accounting structures

- Comparable external cost data
- Performance reliability metrics
- Industry-defined facility categories

In water O&M benchmarking, these types of data were not available.

7. How well is Reclamation doing?

The question cannot be answered at this time because this benchmarking effort purposely focused on a select number of comparable facilities under a pilot program. It is not possible to draw a conclusion as to how Reclamation is doing based upon results of the pilot program, specifically due to the lack of a reliability benchmark. As a result, best performers and best practices could not be identified.

8. Have there been any other benchmarking efforts conducted in this arena?

After an intensive literature search, the Team found no other studies that benchmarked water storage facilities.

9. Why isn't there a full complement of performance metrics?

Data are limited, and many of the metrics analyzed in this study were not sufficiently statistically significant for comparison with other facilities.

10. Were data readily available?

No good measure of performance reliability was available. Cost data were available for Reclamation facilities, and a few (11) external or third-party facilities were identified as having available data. The available cost data for these 11 facilities was identified as being questionable for comparison purposes.

11. Is there enough cost and performance data consistency, both internal and external, to successfully conduct future studies?

No. Consistency and comparability are significant issues that will need to be addressed. An enormous effort would be necessary to acquire consistent O&M cost data for future benchmarking efforts to be successful.

12. If the data were so hard to obtain, how do we know it was comparable and accurate?

A high level of confidence was obtained through cross-checking and validation of data associated with the facilities included in the pilot program.

13. Was this report peer reviewed?

Yes. The report had 14 internal peer reviewers and 4 external peer reviewers, including a contractor. Peer reviewers are listed in appendix L.

14. Does the Team recommend further benchmarking studies be conducted? If so, why?

Reclamation should not pursue water O&M benchmarking because of significant uncertainty in the viability of success and the high costs associated with further effort.

15. Was a gap analysis performed?

A gap analysis was not performed because a full complement of benchmarks could not be developed.

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I. Introduction

National Research Council Report

The National Research Council (NRC) published a study report entitled, *Managing Construction and Infrastructure in the 21st Century, Bureau of Reclamation.* Within that report, Finding 5c described the need to benchmark the operation and maintenance (O&M) costs associated with water distribution systems to "help improve the efficiency of Reclamation's water management and distribution activities as well as those of the water contractors responsible for transferred works." The report recommended that "Benchmarking of water distribution and irrigation activities by Reclamation and its contractors should be a regular part of their ongoing activities" (Recommendation 5c).

Managing for Excellence Action Item

Reclamation's Action Plan identified 8 functional areas which included a total of 41 action items. Within the "asset sustainment" functional area, specific action items were identified to help improve the efficiency and effectiveness with which Reclamation's assets are managed.

Team 31 (the Team), was tasked with completing action item 31:

> *Benchmark O&M of water storage and distribution facilities in a manner modeled after current practices with power facilities, starting with a pilot program.*

Team Formation

The Team initially was comprised of three regional office employees and three employees from offices located in Denver. Four Team members have extensive O&M experience. The other two members have extensive experience with Reclamation's Power Benchmarking Program. One member was responsible for creating Reclamation's Power Benchmarking Program.

In addition to the initial Team members, two more Reclamation employees and one contractor were utilized after the initial meetings. One expert from Denver's finance office was integrated into the Team to assist in deciphering cost data. A report writer was integrated into the Team at a relatively early stage. The contractor has considerable experience in power benchmarking and has investigated water benchmarking in the past. The timeline from first Team meeting to first draft completion was 7 months.

This report has gone through an extensive peer review. A list of the team members and peer reviewers can be found in appendix L. The peer reviewers provided expertise in water O&M, benchmarking, finance, and/or statistical analysis. Three external reviewers were chosen based on their interest in the study and their expertise.

Scope

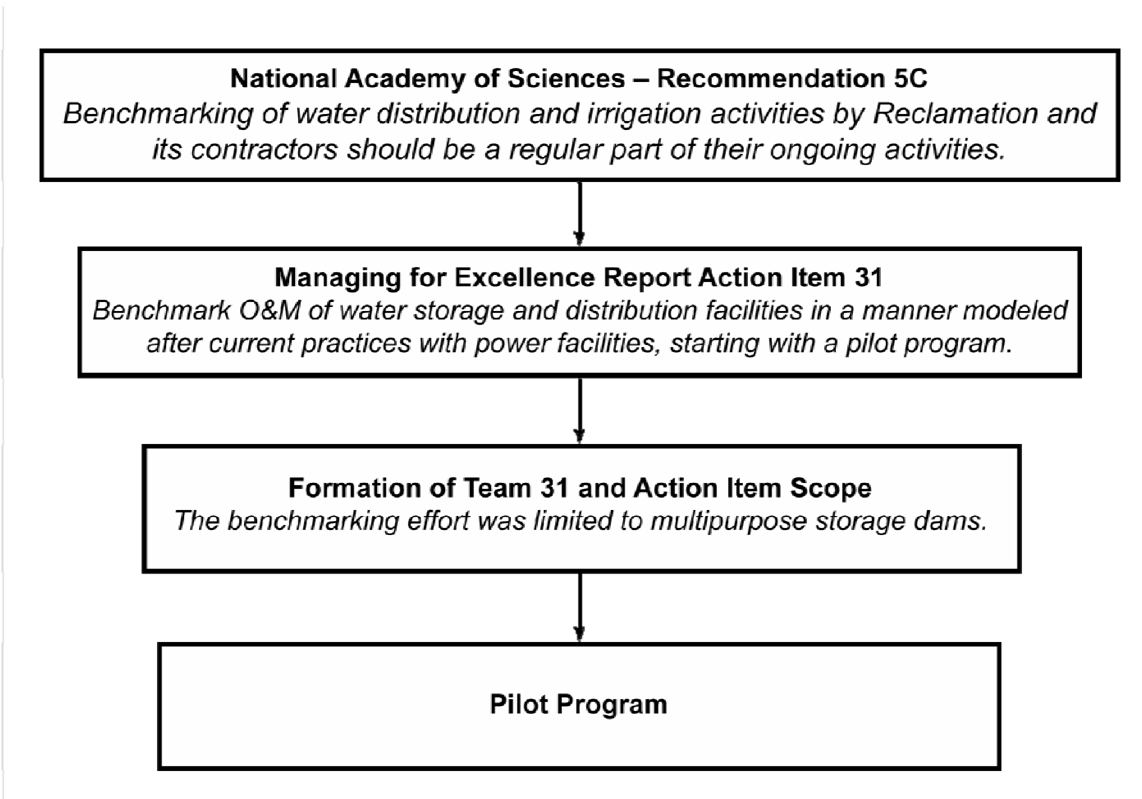

Figure 1. Progression and refinement of scope.

In accordance with the action item and to determine the feasibility of water O&M benchmarking, a pilot program was developed. Although the NRC report referred to “distribution facilities,” the Team concluded that including conveyance and distribution facilities in this benchmarking study did not improve Reclamation’s efficient management of water O&M activities because the majority of these facilities are operated and maintained by others (transferred works). The Team determined that the scope should focus on the O&M of multipurpose water storage dams. As a result, the scope for this benchmarking effort was refined as shown in figure 1.

A primary reason for focusing on multipurpose reserved works water storage dams was the availability of comparable O&M cost information for these facilities. Another reason was that the entities that are responsible for a portion of O&M costs would likely be interested in the identification and implementation of potential cost saving practices.

The Team proposed this scope to Reclamation's Executive Sponsor and to stakeholders that attended the initial stakeholders meeting. There was concurrence, and the Team proceeded accordingly with the effort.

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II. Benchmarking Background

Reclamation Benchmarking History

Over the past decade, Reclamation has developed and put in place an extensive benchmarking effort for its hydropower generation facilities. The development of the power benchmarking program was an extremely resource-intensive activity because it required gathering data related to power O&M performance metrics and comparing the data obtained from the private hydropower industry, as well as other governmental agencies involved with hydropower generation, both in the United States and other countries. Because of the acceptance and use of common performance metrics throughout the hydropower industry and standardized methodologies for accounting of power-related costs, these benchmarking efforts have been generally well received by the participants. This success has led the participating agencies to explore the differences reflected by the data to improve the effectiveness and efficiency of power O&M practices.

Conversely, past benchmarking efforts on the O&M of water storage and distribution facilities have usually been limited to finite O&M activities and related cost information. Performance metrics related to these facilities are not universally recognized. Therefore, such metrics are extremely limited in their application. In the late 1990s, Reclamation began an effort to initiate a Water O&M Benchmarking Study. Due to limited interest from potential benchmarking partners during its inception, this study did not materialize. Although the reason for this lack of interest was not conclusive, there were strong indicators that the primary obstacles to making a successful benchmarking study were:

- A lack of understanding of benchmarking practices
- The questionable comparability of common facilities
- A lack of cost data
- A lack of metrics
- The unknown benefits that could be derived

What is Benchmarking?

To provide a context for understanding the efforts of The Team and the challenges faced in the benchmarking effort, this section will provide a general description of benchmarking methodology.

Definition

As defined in the power benchmarking study, **benchmarking is a continuous formal process of measuring, understanding, and adapting industry best practices that lead to superior performance.** Benchmarking can also be defined as an analytical process that compares data, resulting from common practices, between or among entities within like peer groups to determine areas for potential improvement and to identify best practices. As can be seen from these definitions, benchmarking is more than just a comparison of costs. The benefits of using the benchmarking process are:

- Industry-accepted benchmarks and performance metrics are identified.
- Partnerships with industry leaders are developed.
- Industry best practices are identified.
- Methods for improving performance are recommended.
- Credibility with the customer tends to be developed or improved.

Ideally, benchmarking is repeated over multiple years, so that progress can be effectively monitored.

There are two general categories in benchmarking: internal and competitive. Internal benchmarking is a self-assessment of current practices. Competitive benchmarking is comparison of strategies, processes, and practices of one organization to those of other organizations.

The Four-Step Process

One generally accepted approach to benchmarking is a model that includes the following four steps:

1. Planning the benchmarking study
2. Collecting data
3. Analyzing data and applying metrics
4. Identifying areas for improvement

The Team adhered to these steps in this water O&M benchmarking effort. The four-step process is shown in figure 2.

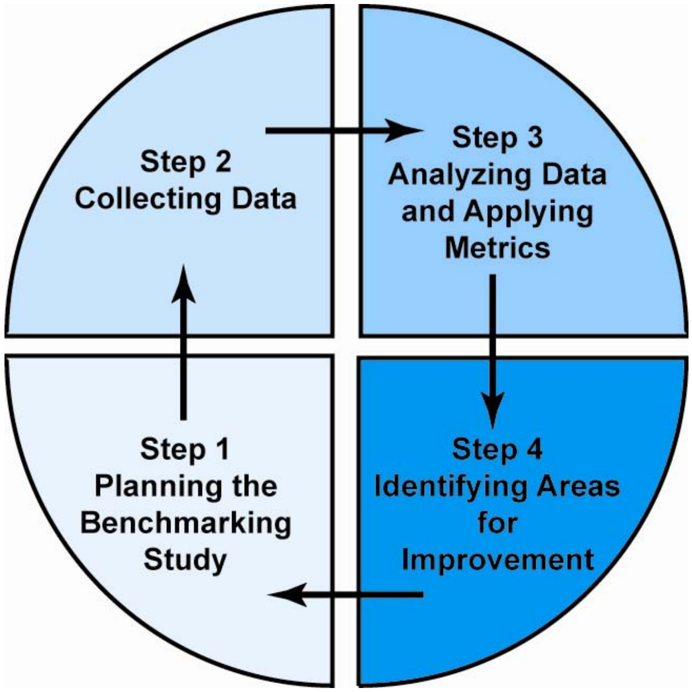

Figure 2. Four-step process.

Step 1: Planning the Benchmarking Study

To plan any benchmarking study, general benchmarking topics must be identified, benchmarking partners must be identified, and performance metrics must be determined.

When developing performance metrics, it is generally advisable to use 'SMART' metrics:

Specific
Measurable
Actionable
Relevant
Timely

Typical areas covered by metrics are the cost of doing business, performance of work processes, accountability to customers, and related employee or resource use. When developing metrics, it is important to identify outputs, determine customer needs, understand key goals, and compare/filter/align metrics with those for the higher level processes they are a part of. Finally, once metrics have been identified, it is important to ask the questions:

- Do the metrics make sense?
- How do they compare with any existing metrics?

- Do they form a complete set?
- Do they reinforce good performance?
- Are the metric data available, and are the descriptive statistics on these data significant for creating unitized benchmarks?

Step 2: Collecting Data

In order to collect the data, the Team must first determine the data collection methodology and then obtain and validate the data. Validation ensures that the data are consistent and accurate.

Questions that must be answered with your data collection methodology include:

- How often will you collect data?
- Who will you benchmark against?
- Who will obtain the information and how?
- Is the topic easily understood, or does it require explanation?
- What will you share with participants?

Step 3: Analyzing Data

To analyze the data, the data must be unitized, performance metrics must be compared, a gap analysis must be performed, and best practices must be documented. Unitizing the data ensures that valid comparisons are being made among the participating organizations – or that an 'apples to apples' comparison is being made.

A gap analysis is essential to all benchmarking studies. A gap analysis is performed by identifying significant differences in the performance (for competitive benchmarking) and/or the performance parameters within your own business (for internal benchmarking). The gap analysis results are used to identify best business practices that can be widely applied.

Step 4: Adapting and Improving

The final step of benchmarking includes communicating findings, identifying action items and goals, and implementing and establishing a process whereby action items are implemented and monitored and benchmarks are recalibrated when necessary.

The Team was educated on the above methodology.

Benefits and Potential Pitfalls of Benchmarking

Benefits

The benefits of using the benchmarking process are:

- Industry-accepted benchmarks and performance metrics are identified.
- Partnerships with industry leaders are developed.
- Industry best practices are identified.
- Methods for improving performance are recommended.
- Credibility with the customer tends to be developed or improved.

Potential Pitfalls

There are many potential pitfalls to be avoided in any benchmarking study. These pitfalls include:

- Confusing benchmarking with participating in a survey.
- Assuming that there are pre-existing benchmarks to be found.
- Undertaking a study too large and complex to be manageable.
- Confusing benchmarking with research.
- Picking an industry that is too intangible and difficult to measure
- Not researching benchmarking partners thoroughly.
- Not having a code of ethics and contract with partners.

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III. Planning the Water O&M Benchmarking Pilot Program

Literature Search

To gain a perspective on any other water O&M benchmarking studies conducted in the past, the Team requested that Reclamation's Denver Office library perform an extensive literature search using various search engines which access a number of reference databases. The librarian performed this search using various combinations of the following words:

- Water
- O&M
- Benchmarking
- Performance
- Dams
- Operations and maintenance
- Comparison

Although many records were identified in this search, none of the records proved to be useful for the Team's efforts.

The Team also identified references for tools that currently exist for benchmarking water delivery. The performance metrics contained in these tools did not have data supplied from the industry, nor had they undergone any analysis to determine the validity for comparing 'like' facilities. In addition, because the Team had decided that the scope of the pilot program would not include conveyance and distribution, these benchmarks were not expanded upon.

Comparing Water O&M to Power Benchmarking

Comparisons

The Team reviewed the established and successful power benchmarking program, which began in 1995, to familiarize itself with the benchmarking methodology (using an industry the Team has general knowledge of) and to begin formulating a process to benchmark water O&M that is modeled upon power benchmarking.

In modeling water O&M benchmarking upon power benchmarking, the Team compared the two industries and the standards within the industries.

Table 1 shows a comparison of power and water O&M benchmarking and the challenges inherent with them.

Table 1. Comparison of Power and Water O&M Benchmarking

Benchmarking component	Availability of data in power benchmarking	Availability of data in water benchmarking
Existing industry performance metrics	Yes. NERC performance metrics.	No.
Industry-defined cost accounting structures	Yes. FERC cost codes.	No.
External cost data	Yes. EIA, EUCG, and others.	No.
Performance reliability metrics	Yes. Calculations on operational statistics already predefined by industry, such as forced outage factor, reliability factor, availability factor, and others.	No.
Industry-wide defined facility categories (peer groupings)	Yes. Industry categories for facilities are predefined.	No.

NERC = North American Electric Reliability Corporation, EUCG = Electric Utility Cost Group, FERC Federal Energy Regulatory Commission, EIA = Energy Information Administration

Power benchmarking continues to be an annual effort for Reclamation. The yearly publication of *Reclamation's Power Performance Databook* documents the data associated with seven prime benchmarks at each of Reclamation's hydropower facilities. Benchmarking hydropower facilities has a number of advantages over benchmarking water storage and distribution facilities. Among these advantages are:

- Existing widely-accepted industry benchmarks
- Industry-defined cost accounting structures
- External cost data
- Reliability measures
- Comparable facilities

Industry Benchmarks

In the hydropower industry, different venues for benchmarking already existed when Reclamation began its benchmarking effort. Among these venues were Haddon-Jackson and Associates, a for-profit benchmarking agency, and the Electric Utility Cost Group (EUCG). EUCG is a Canadian electric group in which the participating organizations contribute work and money to produce a database containing performance metrics of the participant companies.

An aggressive benchmarking effort was undertaken to compare Reclamation's hydropower facilities, both internally and with similar external facilities. In this benchmarking effort, six workgroups "purged" every conceivable benchmark possible and arrived at approximately 500 benchmarks through a brainstorming process. The 500 benchmarks were eventually narrowed down to the prime 7 benchmarks.

Customer involvement drove the effort to identify performance metrics. Stakeholders were surveyed about what they viewed to be important: cost, availability of the generating units, forced outages, and staffing. Reclamation hired Haddon-Jackson to benchmark a few of its large hydropower facilities. Thus, not only do benchmarks and benchmarking partners exist in the hydropower industry, but some Reclamation facilities have been benchmarked for a number of years.

An irrigation data comparison study was found at the International Water Management Institute's Web site under *Tools and Resources*. The Team reviewed the benchmarks identified by this organization and concluded that because almost all of Reclamation's distribution facilities are transferred works, these measures were not applicable to the Team's O&M benchmarking effort, as described in section V of this report. No other existing benchmarks or benchmarking venues were found for water storage facilities.

Financial/Cost Accounting Standards

Because cost seems to be a major concern of most of Reclamation's customers and most industries in general, cost benchmarks are usually among the most high-profile benchmarks. Every utility in the energy industry, including the hydropower industry, must use codes defined by the Federal Energy Regulatory Commission (FERC) in its accounting structures. These codes are:

- 535 through 539 for operations
- 540 through 545 for maintenance

For example, table 2 contains the description and explanation that accompanies FERC's 535 accounting code, defined as operation supervision and engineering.

Clearly, there is more-than-adequate definition to classify different types of costs related to O&M of hydropower facilities. Additionally, when the hydropower benchmarking effort began, the Energy Information Administration (EIA) collected and published cost data for all electric utilities in the United States according to the FERC accounting codes.

A similar accounting standard does not exist for the costs associated with the O&M of water storage and distribution facilities. This is true even within Reclamation because a number of different entities are responsible for the O&M of Reclamation's facilities.

Because of the lack of industry-defined accounting standards, there are many inconsistencies in accounting for O&M of the water facilities. The lack of guidance and the inconsistencies make internal benchmarking complex and external benchmarking even more complex.

Table 2. FERC 535 Accounting Code

535 Operation supervision and engineering.
A. For Major utilities, this account shall include the cost of labor and expenses incurred in the general supervision and direction of the operation of hydraulic power generating stations. Direct supervision of specific activities, such as hydraulic operation, generator operation, etc., shall be charged to the appropriate account (See operating expense instruction 1.)
B. For Nonmajor utilities, this account shall include the cost of supervision and labor in the operation of hydraulic power generating stations.
ITEMS (NONMAJOR ONLY)
Hydraulic Labor:
1. Supervising hydraulic operation.
2. Removing debris and ice from trash racks, reservoirs and waterways.
3. Patrolling reservoirs and waterways.
4. Operating intakes, spillways, sluiceways and outlet works.
5. Operating bubbler, heater or other deicing systems.
6. Ice and log jam work.
7. Operating navigation facilities.
8. Operations relating to conservation of game, fish, forests, etc.
9. Insect control activities.
Electric Labor:
10. Supervising electric production.
11. Operating prime movers, generators and auxiliary equipment.
12. Operating generator cooling system.
13. Operating lubrication and oil control systems, including oil purification
14. Operating switchboards, switchgear and electric control and protection equipment.
15. Keeping plant log and records and preparing reports on plant operations.
16. Testing, checking and adjusting meters, gauges, and other instruments, relays, controls and other equipment in the plant.
17. Cleaning plant equipment when not incidental to maintenance work.
18. Repacking glands.
Miscellaneous Labor:
19. General clerical and stenographic work.
20. Guarding and patrolling plant and yard.
21. Building service.
22. Care of grounds, including snow removal, cutting grass, etc.
23. Snow removal from roads and bridges.
24. Miscellaneous labor.

Performance Reliability Measures

The performance reliability standards for the electric industry are generally accepted as the definitions given by the North American Electric Reliability Corporation (NERC). Among these reliability standards are:

- Forced outage factor
- Availability factor
- Scheduled outage factor

All of these standards are associated with exact calculations and are weighted by the size of each facility. Reclamation routinely calculates these factors on its power facilities and integrates them heavily in its current benchmarking activities.

Industry-accepted reliability standards for the performance of water storage and conveyance/distribution facilities do not currently exist. It should be recognized that Reclamation has developed Facility Reliability Rating (FRR) systems specifically for its water storage dams and associated (water-related) facilities to evaluate various criteria (operation/maintenance/management activities) to obtain a descriptive indicator of "good/fair/poor" for each facility. However, much of the FRR scoring is reflective of ensuring a desired level of reliability of Reclamation's water facilities. The FRR system is also somewhat subjective in areas and does <u>not</u> directly reflect the reliability of a facility based on specific onsite O&M activities (such as availability or outage factors used in the power industry).

The potential use of the FRR as a performance reliability indicator in this water O&M benchmarking effort is explained in more detail in section IV of this report.

Comparable Facilities

Hydropower generating plants/stations come in many different capacities. Reclamation alone owns units ranging in capacity from 350 kilowatts to 805 megawatts. Aside from generating unit capacity, however, there is very little difference in the O&M of hydropower facilities. For example, each turbine, generator, exciter, and other component of the power train has an associated regular maintenance schedule. Therefore, when benchmarking hydropower facilities, the facilities are differentiated solely on the basis of total generating plant/station capacity.

Another reason the powerplants are readily comparable is that they all serve primarily the same purpose: to generate hydropower. Water storage and conveyance and distribution facilities serve at least three purposes:

- Store water (storage dams)
- Convey water (main canals, pumping plants, diversion dams)
- Distribute water (lateral and drain systems)

The water storage and distribution industry again is at a different disadvantage in that it consists of a wide variety of facilities, which serve various purposes. These differences are discussed in detail later in this report.

Therefore, it was apparent to the Team that the action plan to “benchmark in a manner modeled after current practices with power facilities” was not of sufficient basis for defining a viable water benchmarking approach.

Determining Pilot Program Facility Group

The Team needed to define a group of facilities for which a pilot water O&M benchmarking program could be performed comprehensively in a relatively short timeframe. The Team began this pilot program definition by exploring Reclamation’s current water storage and conveyance distribution facility inventory.

Reclamation Water-Related Facility Inventory

In determining the scope of this water O&M benchmarking effort, the Team initially observed a significant difference in how the various types of Reclamation water facilities are operated and maintained. There is a wide variety of water-related facilities, and, for the purposes of this effort, the facilities can be divided into two categories:

- Storage dams
- Conveyance and distribution facilities

Depending on a number of factors, the O&M of these facilities is performed either by Reclamation staff or contracted with a non-Federal entity (reserved works), or the O&M responsibility has been formally transferred via a contract or agreement to a local operating entity (transferred works). For the vast majority of the transferred works, the cost of O&M is borne by the operating entity. In either case, Reclamation holds title to these facilities, and, as such, maintains an oversight role aimed at ensuring service reliability and protecting the Federal investment and public safety. (See appendix B for a listing of reserved and transferred works for water-related facilities.)

Table 3 summarizes the Reclamation inventory of transferred and reserved works in these two categories. Figure 3 shows a breakdown of Reclamation transferred and reserved works for water-related facilities.

Table 3. Inventory of Reclamation Water-Related Facilities

Facility type	Reserved	Transferred	Total	Percent reserved	Percent transferred
Storage dams	102	143	245	42%	58%
Conveyance and distribution (C&D) facilities	39	266	305	13%	87%
Total	141	409	550	26%	74%

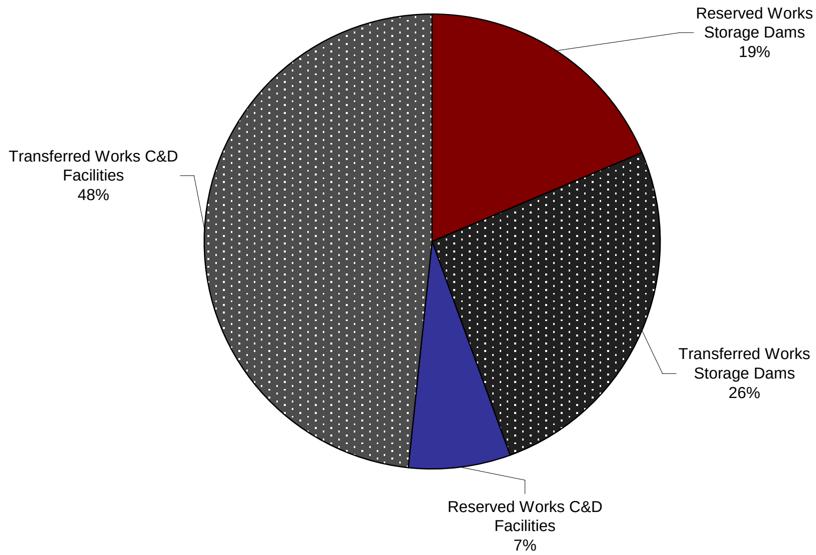

Figure 3. Breakdown of Reclamation's transferred and reserved works water-related facilities.

Approximately 58 percent of Reclamation's major storage dams are classified as transferred works, which reflects that these dams are typically single-purpose irrigation dams and no Federal appropriations are contributed for O&M. The remaining 42 percent (98 dams) are classified as reserved works and are multipurpose facilities. It should be noted that, generally due to the multipurpose nature of these reserved works dams, some of the O&M costs are considered nonreimbursable and funded through Federal appropriations, while the remainder of the O&M costs are reimbursable by project authorization and law, such as irrigation, municipal and industrial (M&I), and power. In other words, the water users typically are responsible for a designated percentage of the O&M costs on these reserved works storage dams.

In contrast to the storage dams, the vast majority (87 percent) of the conveyance and distribution facilities within Reclamation is classified as transferred works and receive little or no Federal appropriations for the O&M of these facilities. (Federal appropriations are not provided for single-purpose irrigation facilities.) Essentially all of the O&M funding for these conveyance and distribution facilities is the responsibility of the associated water user operating entities.

Facility Screening

Given the breakdown of the inventory for which Reclamation is responsible for O&M, the Team proceeded to develop an appropriate pilot program. In collaboration with the Team's benchmarking consultant, who has had extensive experience with power benchmarking, the Team realized the great amount of time and resources necessary to acquire external partners and related data for a pilot benchmarking program. The Team further envisioned that by successfully applying the methodology to a pilot program, the possible benefits and advantages derived could be identified and used to encourage participation by external partners in future benchmarking efforts.

Facility Type

The vast majority of the conveyance and distribution features are transferred works, and, in most cases, Reclamation does not have easy access to related O&M cost data. It is also unlikely that the cost data that could be collected, accounted for, and reported by these operating entities would be comparable to that obtained on the relatively small number of reserved works facilities of this type. Therefore, the Team determined that such conveyance and distribution systems should not be included in the scope of this pilot program.

The Team also surmised that one of the primary driving issues for this activity is the amount of O&M costs associated with reserved works multipurpose storage dams, a portion of which irrigation and M&I beneficiaries are required to reimburse. Clearly, the stakeholders in these reserved works storage dams have an interest in the related O&M costs for which they are responsible and for ensuring that these costs are reasonable. In addition, a larger set of O&M cost data is available from these reserved works storage dams (approximately 100 possible dams) and would permit data analysis from which conclusions could be drawn. In addition, as described previously, the availability of consistent and comparable cost data, in terms of accounting and reporting (on reserved works facilities), is a significant advantage in any benchmarking effort.

Given this understanding of the above-described types of water-related facilities (storage dams versus conveyance and distribution facilities) and the O&M responsibilities (reserved versus transferred works), the Team determined the scope of this benchmarking effort would be limited to multipurpose storage dams.

Dam Type

Development of the pilot program continued with the Team's understanding of the benchmarking methodology and the need to use as large a data set as possible to support evaluation and comparison of facility-specific performance metrics. On the basis of the Team's collective knowledge of storage dams within and outside of Reclamation, it was fully understood and evident that the O&M activities and related costs vary considerably based on dam type. In general, there are three basic types of dams: (1) concrete, (2) embankment, and (3) composite/other (combination of concrete and embankment features). Table 4 details Reclamation's dam inventory by dam type and O&M responsibility (reserved versus transferred). Figure 4 illustrates the entire breakdown of Reclamation dams by dam type, and figure 5 illustrates the breakdown of dams by both dam type and O&M responsibility.

Table 4. Reclamation's Summary Inventory of Storage Dams by Type

Facility type	Reserved	Transferred	Total	Percent reserved	Percent transferred
Embankment	68	116	184	37%	63%
Concrete	23	18	41	56%	44%
Composite/Other	11	9	20	55%	45%
Total	102	143	245	42%	58%

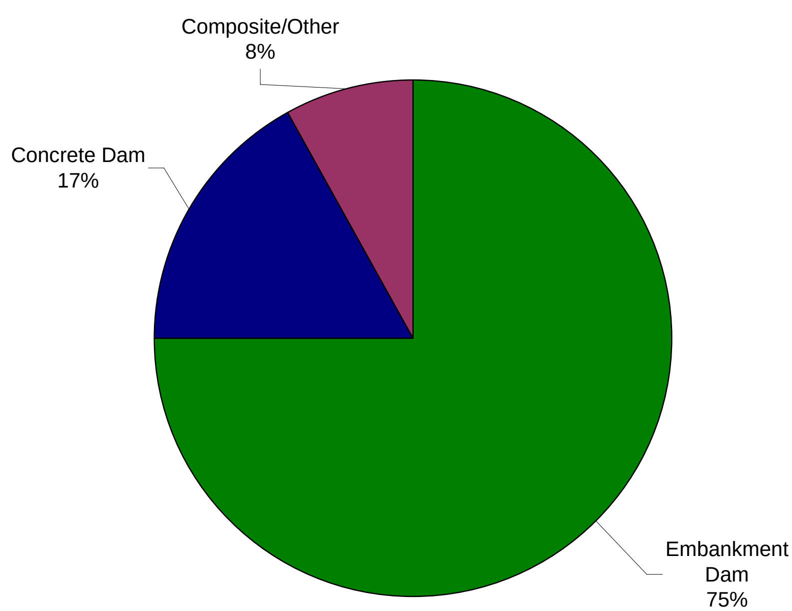

Figure 4. Breakdown of Reclamation storage dams by dam type.

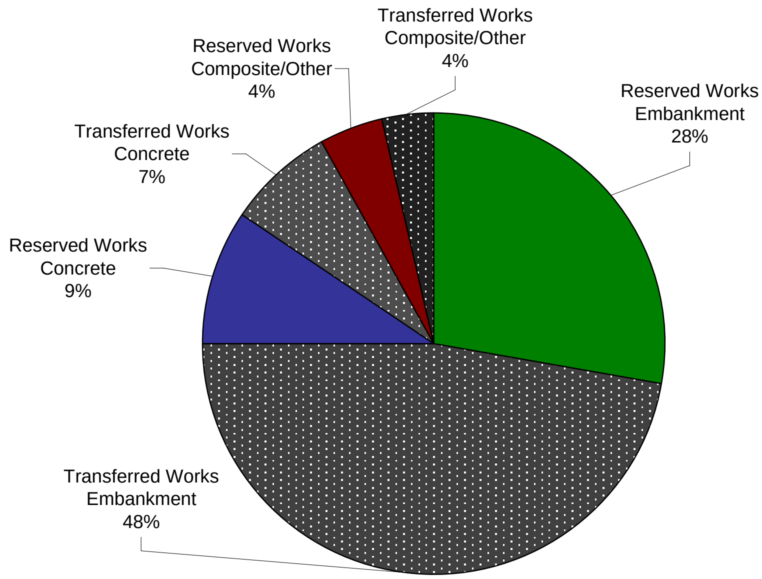

Figure 5. Breakdown of Reclamation dams by dam type and O&M responsibility.

After reviewing the information in table 4 and Reclamation's current inventory of storage dams, the Team concluded that the embankment dam type was the most common and, thus, provided the largest possible data set to draw from.

Dam Function

At dams with hydropower plants, some facility features and related O&M activities benefit both the dam and the powerplant. For the purposes of this pilot program, the Team did not want to make the benchmarking process more cumbersome by trying to separate these costs. Therefore, the Team excluded dams for which costs associated with an appurtenant hydropowerplant could not be easily isolated from the dam O&M costs.

Dam Construction Date

Another attribute the Team believed could greatly affect O&M costs is the age of the facility; O&M costs of older dams are typically higher than those of newer dams. The Team decided to exclude dams built prior to 1945, primarily because the use of air entrainment and other concrete admixtures became widely used in Reclamation dams about this time. The use of air entrainment greatly reduces the amount of freeze-thaw damage in concrete and the associated ongoing preventive maintenance and repair costs. This is also about the time that construction practices began mitigating for the effects of alkali-aggregate reaction (AAR). Although perhaps not obvious, this factor is significant for embankment dams because of the concrete associated with the dams' outlet works and spillway features.

Dam Operation

The Team also determined that storage dams can vary considerably in complexity, depending on whether or not they are "offstream" storage. Offstream storage dams are typically filled exclusively through a feeder canal, with only limited natural stream runoff. Often, the runoff area does not warrant the construction of a spillway as part of the dam. The absence of any type of spillway structure can significantly reduce the O&M costs for a particular dam. Therefore, offstream storage dams without spillways were generally excluded in the pilot program.

Table 5 summarizes the screening criteria used to determine the type of facility included in the pilot program. Figure 6 depicts the facility selection process.

Table 5. Pilot Program Screening Criteria

Component	Included in pilot program	Excluded from pilot program
Facility type	Multipurpose storage dams	Conveyance, and distribution facilities
Dam type	Embankment	Concrete, composite/other
Dam function	Multipurpose, no hydropower	Dams with hydropower facilities
Dam construction date	Built after 1945	Built before 1945
Dam operation	On-stream storage	Off-stream storage without spillway (generally)

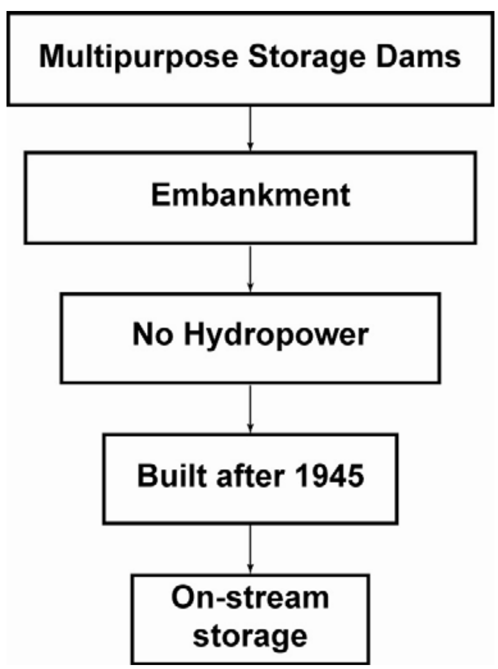

Figure 6. Facility selection process.

Final Facilities in Pilot Program

The Team identified 34 dams that met the criteria of the pilot program and for which cost data were available, 23 of which are reserved works and 11 of which are operated and maintained by non-Reclamation entities (third parties). Facility characteristics for each of the 23 reserved works dams are shown in table 6, which appears later in this report. To ensure anonymity, the 11 third-party dams are not identified. (As will be explained later, these 11 dams were chosen not only because they met the screening criteria but primarily because related O&M cost data were readily available to Reclamation.)

Figure 7 shows Bureau of Reclamation's regions, area office boundaries, and the locations of the 23 dams included in the pilot program.

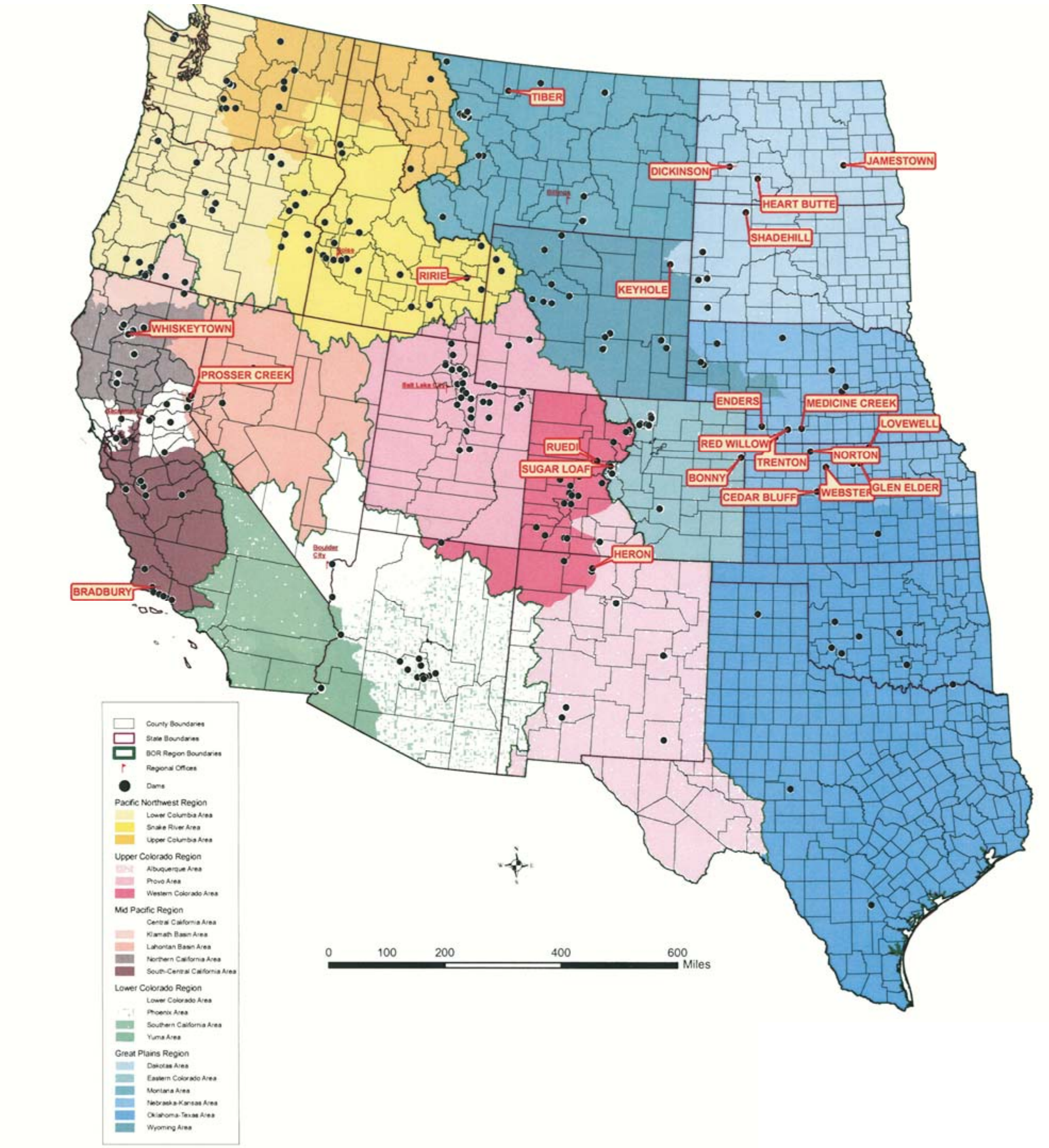

Figure 7. Bureau of Reclamation regions, area office boundaries, and locations of the 23 reserved works dams in the pilot program.

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IV. Data Collection and Analysis

Following selection of the pilot program facilities, the Team proceeded to determine how best to compare the facilities. In reviewing what the Team understood to be concerns of the stakeholders, and drawing upon what the power stakeholders identified to be important performance indicators in the power benchmarking activities, the Team identified the following relevant performance indicators for this effort:

- Costs
- Staffing
- Reliability

The Team recognized that these indicators may not be comparable on a raw data comparison basis. Therefore, facility characteristics and facility operational data were collected and analyzed with respect to unitizing the data.

Data were collected for each performance indicator for each facility in the pilot program, as described in this section. Each Team member was essentially responsible for collecting data for the pilot program facilities in his/her respective region(s). Following data collection and verification, the data were subjected to an extensive process of analysis and correlation methodology.

Data Collection, Sources and Verification

The Team collected data for each facility in the pilot program. All of the data subject to yearly variation were collected on an annual basis over the time period fiscal year (FY) 2001 through FY 2005 and are graphically represented in appendix A for each of the dams in the pilot program. A description of the data collected, along with a brief description of the sources, are described below.

Costs

The term "O&M costs" can have a wide variety of meanings within Reclamation and with other Federal and non-Federal entities. For benchmarking purposes, it is extremely important that this term be fully defined and understood in order to be able to compare O&M costs of one dam to another in a consistent manner. Therefore, before attempting to compare O&M activities among the multipurpose storage dams in the pilot program, the types of activities and costs included as O&M are defined in the following pages.

O&M Activities

The O&M activities that must be accomplished at a Reclamation storage dam are typically determined by the dam’s construction type, its related attributes and characteristics, its geographical location, and, to a certain degree, its use in storing and delivering water. As such, no “corporate” set of O&M standards applies to each and every Reclamation storage dam. There are operating documents (Designers Operating Criteria and Standing Operating Procedures), as well as supplemental manufacturer’s instructions for particular pieces of equipment, that help provide guidance on preventive maintenance for each particular dam. These documents, along with sound judgment, experience, and training of responsible personnel, largely determine the degree and level of O&M activities necessary at each dam, as well as their frequency.

In addition, since 1948, Reclamation has conducted facility reviews of its storage dams, generally on a 3-year frequency. These reviews are intended to instill a preventive maintenance philosophy, to monitor the O&M condition of these dams, to identify O&M deficiencies that have been corrected, and to recommend sound and acceptable O&M procedures. Through these reviews, a certain level of consistency in the O&M is to be implemented at all Reclamation dams. However, there are still differences in the quality or effectiveness of activities across the dams. This is a very important point to understand when analyzing and comparing the relative costs for O&M activities among storage dams.

Examples of items occurring in both the operation activities category and the maintenance activities category are located in appendix C. It should be noted that not all of these activities occur at every dam. Additionally, depending on a particular office’s involvement in an activity, some of these project O&M activities, by Reclamation policy, are nonreimbursable in the accounting of O&M costs, which are described later in this section.

Reclamation’s accounting system provides standard outputs for certain designated types of expenditures at the storage dams and is summarized in Reclamation’s BOR 730 reports. Appendix H provides an example of one of these reports.

Defining O&M Costs

For most Reclamation projects, water users are responsible for two distinct costs:

- Construction repayment costs (based on terms of applicable repayment contract(s) and related project authorization(s))

- O&M costs (based on applicable project O&M allocations)

Repayment construction costs are the costs of constructing a project to provide new or additional benefits (i.e., costs of facilities to provide for additional irrigated acres) and are repaid over time. In most all cases, O&M costs are paid annually in advance of water delivery and are applied toward the O&M of existing facilities to ensure that project benefits will continue for the planned life of the project. Repayment and O&M costs are generally not combined as a single amount in either contracts or the accounting records. This explanation is provided to clarify that construction repayments are separate from the O&M costs and, thus, are excluded from this water O&M benchmarking effort and pilot program.

For the purposes of this pilot program, an illustration of Reclamation cost accounting is provided in appendix F. Figure 8 presents a simplified representative version of the illustration in appendix F.

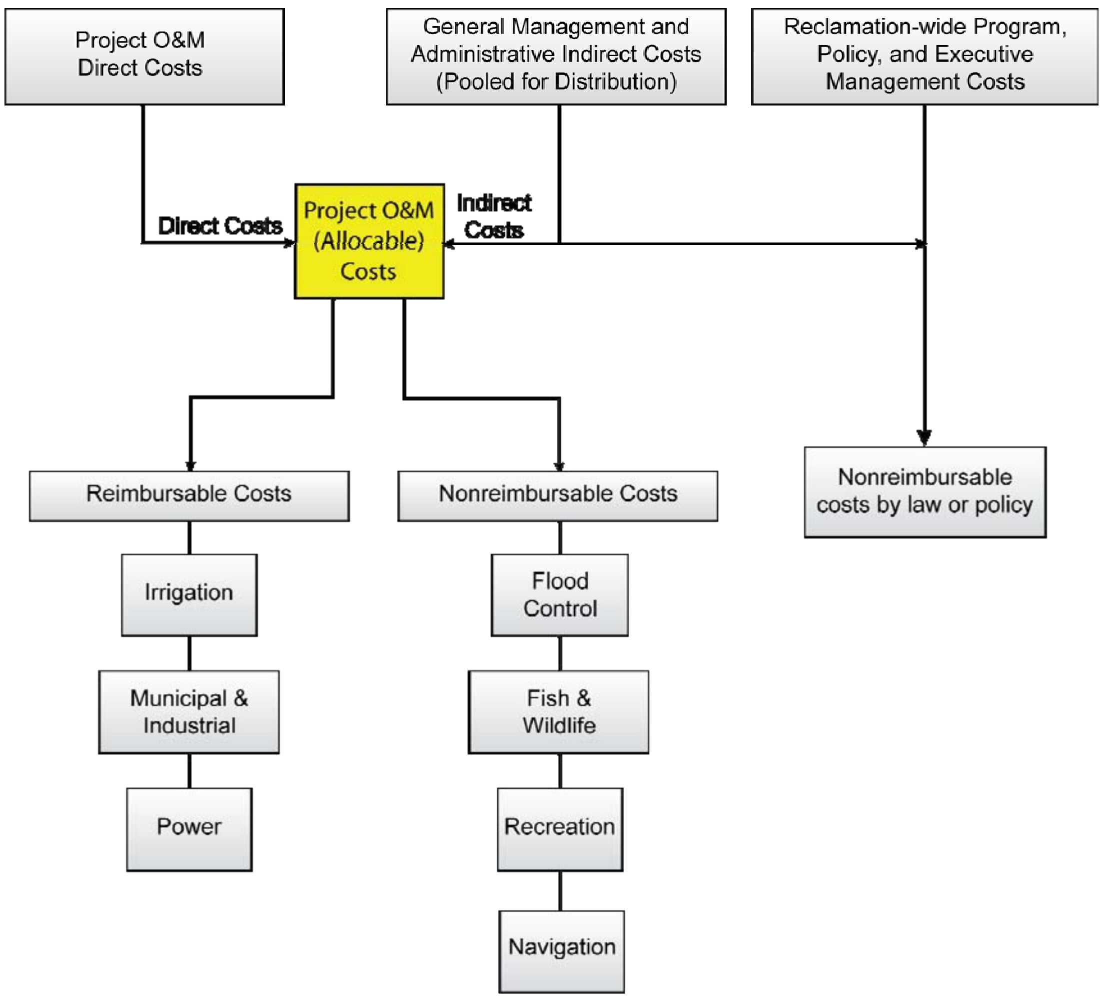

Figure 8. Cost accounting for Reclamation facilities.

As shown at the top of figure 8, there are three sources of where/how costs are incurred.

Project Direct Costs. These are generally direct O&M costs for direct labor, direct materials, contracted services and equipment, etc.

General Management and Administrative Indirect Costs. These are indirect costs which are pooled and distributed among projects and among the dams within each project.

Reclamation-Wide Programs and Policy and Executive Management Costs. These are costs for activities that have been designated to be nonreimbursable by Reclamation law or policy and, therefore, excluded as project-specific O&M costs and not pooled for distribution among projects.

As shown on figure 8, total project O&M costs (direct costs and indirect costs) are allocated between reimbursable and nonreimbursable project purposes. Those O&M costs allocated to reimbursable purposes (irrigation, M&I, and power) are paid for by water (irrigation and M&I) and power users. Each project allocation is different, based on the specific benefits derived from that project, and there is a wide range of the percentage of reimbursement of O&M costs by waters users, as shown in the last column in table 6. For example, if the allocated project purposes for a dam are flood control (40 percent), irrigation (50 percent), and M&I (10 percent), then a total of 60 percent of the project O&M costs would be allocated to water users (irrigation and M&I entities) for their responsibility to reimburse. The remaining 40 percent (for flood control purposes) would be the responsibility of the Federal Government (Reclamation). Within Reclamation, O&M cost allocation processes and procedures are detailed and complex. This example is provided merely to illustrate how project O&M costs are allocated between reimbursable and nonreimbursable functions of a project. For purposes of this benchmarking effort and pilot program, the total project O&M costs (allocable O&M costs), as highlighted in figure 8, were used for the comparative analysis, regardless of whether costs were allocated to reimbursable or nonreimbursable purposes.

Obtaining O&M Cost Data from Reclamation's Accounting System

In obtaining O&M cost data, Reclamation's finance personnel used the accounting system described in this section. The data collection effort for the pilot program included the research and analysis of selected cost data and related information from Reclamation's accounting system for 23 reserved works storage dams throughout Reclamation for the period FY 2001 through FY 2005. To determine the allocable costs shown in figure 8, A40 and A50 costs were obtained and subsequently divided into direct and indirect costs.

The obtained O&M cost data generally consisted of costs incurred for each dam under the A40 activity of the programmatic budget structure (appendix I), which typically are normal or routine O&M expenses. A50 activity costs are typically those associated with extraordinary maintenance items (usually referred to as RAX items– replacements, additions, and extraordinary maintenance). In a given year, A50 can fluctuate considerably. For the purposes of benchmarking comparisons in the pilot program, the O&M costs include only those captured under the A40 activity and cost authorities.

To separate direct costs from indirect costs, data were obtained from Reclamation's accounting system according to budget object class (BOC), as described in appendix G. Direct costs are costs that can be specifically and readily identified to a product or service relating to the activities of a project, or that can be specifically and readily identified with two or more project activities through a reasonable and economical feasible allocation. An example of a direct cost is a mechanic who is working on a spillway gate. The mechanic's time, tools, and supplies are all direct costs of that dam's spillway gate, which are identified in the accounting system by the appropriate BOC for that type of expense. For example:

- BOC 1100 – Labor
- BOC 2610 – Supplies

Indirect costs are costs that are jointly or commonly used to provide a product or service for two or more project activities but are not specifically identifiable with any one activity in an economically feasible way or through a reasonable allocation. These costs are also identified in the accounting system with the appropriate BOC. For example:

- BOC 8126 – Regional Office Indirect Cost
- BOC 8128 – Office Indirect Cost

Appendix G, "Budget Object Class Listing," provides a list of the codes used to identify the various expenses in the accounting records. These BOCs are in accordance with the Office of Management and Budget (OMB) Circular A-11 guidelines, "Preparation and Submission of Budget Estimates."

The Team collected costs for all 34 dams that fit the criteria of the pilot program. Because the same cost accounting procedures are used for the 23 reserved works dams, the Team had a good confidence level that the data were comparable and comprehensive. However, in reviewing data for the 11 third-party dams, the Team was not able to conclusively determine whether the third-party costs captured the same O&M-related costs as Reclamation's cost accounting procedures. Therefore, there was limited confidence in the comparability of the third party data. Because of these factors, the 11 third-party dams were eliminated from the pilot program.

Staffing

Annual staff hours for each facility were collected from Reclamation's Financial Information Reporting System (FIRS) and verified by financial staff. Staff hours were converted into full-time equivalents (FTEs) by dividing the annual total hours by 1,800 hours.

Appendix J provides a sample of the reports obtained from the FIRS system.

Performance Reliability

Without any common industry-accepted performance metrics to measure reliability, the Team explored the use of the FRR, a rating developed by Reclamation in 2003. The FRR was developed for use as an "outcome-oriented" performance measure for the Government Performance and Results Act (GPRA) and under the Department of the Interior's Strategic Plan. As such, the FRR was intended to provide a general indication of the effectiveness of Reclamation in ensuring the reliability of its facilities to store and deliver water. The FRR was also intended to replace the Facility Condition Index (FCI) as the performance metric to measure the condition of Reclamation's water-related facilities. The FCI is a metric that simply indicates the general condition of replaceable units of property, such as buildings and other simple structures that do not have a service delivery or reliability component.

Appendix E provides a sample FRR form for a storage dam. The FRR form was designed to evaluate a number of management and O&M activities that support the overall reliability performance/condition of a dam. As such, most of the FRR scoring is attributable to the evaluation of Reclamation's activities in the management or oversight of the dam (site inspections, operating procedures/documents, training of operators, dam safety, operations monitoring, etc.), rather than specific onsite O&M activities. As a result, little of the FRR scoring reflects project O&M activities/costs pertinent to this benchmarking effort; therefore, the Team determined that the FRR, in its current use, would not be an acceptable performance reliability metric. As discussed later in this report, a performance reliability metric would need to be developed for water-related facilities to support the success of any future efforts directed toward improved best practices.

O&M costs alone do not provide sufficient information to benchmark or to perform a comprehensive comparison of facility O&M costs. For instance, low O&M costs may be the result of efficient O&M practices or conversely, the result of inadequate facility maintenance. High O&M costs may be an accurate reflection of a complex facility or the result of extravagant spending. Only by considering the relative quality or effectiveness of O&M can a true comparison of facility O&M costs be made. However, the development of a composite score for the relative quality of O&M at each facility would be problematic because of the wide variation of features and O&M requirements associated with water storage and distribution facilities.

Facility Characteristics and Operational Data

To unitize the cost data, the age and four physical characteristics related to the size of the dam for each dam in the pilot program were collected through available project data information for each facility:

- Age
- Structural height
- Crest length
- Embankment volume
- Reservoir capacity

The Team was concerned that individual facility characteristics may not be adequate to unitize the O&M costs at a particular dam. As a result, the Team developed a method to integrate physical and operational characteristics of a dam that affect the O&M costs into a single number, termed the "complexity number" (CN).

Complexity Number

The CN is based on a scoring system that evaluates a variety of features or factors at a dam that tend to greatly influence the extent and frequency of certain O&M activities and, therefore, the incurred O&M costs. Appendix D shows the form created by the Team that was used to determine the relative complexity of each (embankment) dam. A higher CN score indicates a more complex facility. Note that the form includes a breakdown in scoring (weighting) for the CN as follows:

- Dam features/factors (20%)
- Number of spillway gates (30%)
- Number of outlet works gates (30%)
- Other features and factors (20%)

Although not considered to be a perfect system, the Team determined that the CN adequately reflected the relative complexity of the dams included in the pilot program. As discussed later in this report, the CN scoring system should be further reviewed and refined if it is proposed for use in any future facility comparison analyses.

Table 6 summarizes the physical characteristics and CNs for each of the 23 dams in the pilot program. The purpose of the last column in Table 6 is to indicate the relative O&M costs paid by the water user for each dam in the pilot program.

Table 6. Characteristics of Dams Included in Pilot Program

Name of Dam	Region	Age (yrs)	Structural Height, ft	Crest Length, ft	Embankment Volume, yd^3	Reservoir Capacity, acre-ft*	Complexity Number	% of O&M Costs Paid by Water Users
Bonny Dam	GP	55	158	9,200	8,853,000	170,160	34	23.7
Bradbury Dam	MP	53	278.9	3,350	6,700,000	205,000	37	100.0
Cedar Bluff Dam	GP	55	202	12,560	8,490,000	376,950	45	1.5
Whiskeytown Dam	MP	43	281.5	4,000	4,540,000	241,000	23	51.7
Dickinson Dam	GP	56	64.6	2,980	340,000	10,169	12	0.0
Enders Dam	GP	55	134	2,603	1,950,000	74,520	34	11.1
Glen Elder Dam	GP	37	142	15,275	10,030,000	963,775	51	0.4
Heart Butte Dam	GP	57	142	1,850	1,140,000	223,646	16	9.8
Heron Dam	UC	35	275	1,220	3,031,121	401,317	21	83.0
Jamestown Dam	GP	52	110	1,418	963,000	221,000	11	0.0
Keyhole Dam	GP	54	168	3,420	1,335,000	334,200	12	13.8
Lovewell Dam	GP	49	93	8,500	3,000,000	92,150	25	1.0
Medicine Creek Dam	GP	57	165	5,665	2,730,000	88,420	22	5.6
Norton Dam	GP	42	130.5	6,450	3,740,000	134,738	29	3.3
Prosser Creek Dam	MP	43	163.1	1,830	1,800,000	27,800	28	0.0
Red Willow Dam	GP	44	126	3,159	2,991,000	86,627	18	2.0
Ririe Dam	PN	29	253	1,070	2,676,000	100,500	32	21.1
Ruedi Dam	GP	38	321.9	1,042	3,745,200	102,373	18	55.3
Shadehill Dam	GP	55	145	12,843	3,500,000	357,382	11	0.0
Sugar Loaf Dam	GP	38	162	2,020	1,833,700	129,398	17	52.5
Tiber Dam	GP	50	211	3,839	11,740,000	1,368,157	50	4.6
Trenton Dam	GP	53	144	8,600	8,130,000	2,462,910	37	5.0
Webster Dam	GP	50	154	10,720	8,145,000	260,740	41	1.3
Average		**47.8**	**175**	**5,375**	**4,408,827**	**366,649**	**27.1**	**19.4**

The Team also explored the use of various operational data to unitize O&M costs. However, because of the extreme fluctuation in water release and storage data for these pilot program dams during the selected timeframe, the Team was unable to validate the use of any related unitized cost data.

Data Analysis

Prior to determining the benchmarks for this pilot program, many dam performance metrics were evaluated for correlations both to unitize the data and to determine the level of comparability. Realizing that the three desirable areas for comparison were cost, staffing, and reliability, the Team performed an extensive analysis of the data.

With respect to cost, the Team expected that the data could be unitized on some characteristic with respect to the size of the facility. Facility size was quantified using the four physical characteristics listed in the "Facility Characteristics and Operational Data" section. The Team determined that data with a significant correlation could be successfully unitized. The Team also determined that a desirable benchmark was the percentage of the O&M costs at a facility that were determined to be indirect costs.

The Team also expected that it would be possible to unitize staffing data on some parameter of facility size. Additionally, the Team surmised that some measure of staffing would be necessary for the pilot program, whether or not it was a unitized benchmark.

With respect to performance reliability, even though the FRR was determined to be an inappropriate metric (as discussed previously), the Team was interested in whether or not the unitized FRR scoring would have a positive correlation with O&M costs.

The Team tested these assumptions and determined benchmarks using the data analysis described in this section.

Unitizing the Cost and Staffing Data

The Team began by analyzing many potential metrics. Because costs were considered to be essential parameters for this program, the costs were compared with many dam characteristics. Statistical analyses were performed to determine if meaningful relationships existed between the cost data and other parameters. In theory, where correlations are shown to exist, a unitized benchmark would then be established.

The fundamental concern was that some of the variation in costs is attributable to performance of O&M, but much of the variation comes merely from the fact that each of the facilities has a different size and/or complexity. To provide a meaningful cost benchmark, the Team needed to unitize the cost data to remove the differences based upon size or complexity alone. Once these differences were removed through unitizing, the remaining cost comparisons would then be largely attributable to differences in performance.

Correlations were computed among cost and facility characteristics. For all cost metrics, a 5-year representative value was adopted, defined as the average of reported annual data among FY 2001-2005. The same correlations were performed for staffing. The following correlations were tested to find parameters suitable for unitizing the cost and staffing data, the following data were correlated for all the facilities in the pilot program:

- Costs and staffing per acre-foot of capacity
- Costs and staffing per cubic yard of embankment material
- Costs and staffing per foot of structural height
- Costs and staffing per foot of crest length
- Costs and staffing per year of age
- Costs and staffing per complexity number

In many of the cost metrics used, costs were compared with a physical characteristic of the dam in an attempt to normalize the data with respect to many different variables. All of the costs used in these cost metrics were those categorized as A40 (routine O&M) under Reclamation's programmatic budget structure, as this was determined to eliminate highly variable extraordinary maintenance and replacement (A50) costs for a more equal comparison.

Having a "statistically significant" sample correlation does not guarantee that one correlating variable will explain a majority or significant fraction of the variations in the other variable. The opposite can be true for larger sample sizes because it is easier for a sample correlation to be statistically significant in the context of larger samples as opposed to small samples (Haan 1977). If there is interest in estimating what percentage of one variable's variations can be explained by another, a reasonable approximation is the square of the correlation coefficient between the two variables. To determine if these hypotheses were accurate, sets of performance metrics were analyzed.

Table 7 shows A40 5-year average cost correlations with respect to the facility characteristics listed above. Table 8 shows A40, 5-year average staffing correlations with respect to the facility characteristics listed above.

Tables 7 and 8 provide information on whether the sample correlations are statistically significant. Scatter diagrams for the information in tables 7 and 8 are included in appendix K. This information is listed as a "p" value associated with each correlation, which is the probability expressed as percent confidence that one can judge the sample correlation as not "statistically significant." Ideally, this percentage value would be small (e.g., 5 or less), suggesting the sample correlation could be a good approximation of the true unknown population, at least in terms of sign. For readers interested in the details behind identifying "p" values, a sample correlation is "statistically significant" if there is a high percent of confidence that the true unknown population correlation is not actually zero or the sign opposite that of the sample correlation (negative rather than positive correlation, or vice versa). Given this hypothesis, the test proceeds with formulation of a test statistic dependent on the sample size and the computed sample correlation, assumptions about a statistical distribution underlying the test statistic, and a user-chosen level of confidence for accepting the hypothesis (Haan, 1977). The Team used the guideline that the unitizing basis for the data should explain approximately one-half or more of the variation, or the correlation coefficient, r, should be approximately equal to 0.7.

Table 7. Correlation Analysis, 5-Year Average A40 Costs vs. Key Facility Characteristics

Facility characteristic	Correlation with A40 costs * (5-year representative costs) †	
	r ‡	P (%) §
Age	0.13	56
Structural height	0.21	34
Crest length	0.46	3
Embankment volume	0.70	0
Reservoir capacity	0.28	20
Complexity number	0.74	0

* A40 costs are routine O&M costs

† 5-year representative costs are defined as the average of reported annual costs from 2001-2005 as available (up to 5 reporting years).

‡ r is the correlation coefficient.

§ p is the probability (expressed as percentage, and rounded to nearest unit) that the computed correlation coefficient could actually be zero or the opposite sign, and depends on the computed correlation value and sample size.

Table 8. A40 5-Year Staffing Correlations for Facility Characteristics

Facility characteristic	Correlation with A40 staff hours * (5-year representative costs) †	
	r ‡	P (%) §
Age	0.17	47
Structural height	-0.09	72
Crest length	0.15	53
Embankment volume	0.29	22
Reservoir capacity	0.11	65
Complexity number	0.54	1

* A40 staff hours are the routine O&M staff time reported by Reclamation and external facilities.

† 5-year representative costs are defined as the average of reported annual costs from 2001-2005 as available (up to 5 reporting years).

‡ r is the correlation coefficient.

§ p is the probability (expressed as percentage and rounded to nearest unit) that the computed correlation coefficient could actually be zero or the opposite sign, and depends on the computed correlation value and sample size.

Table 7 indicates that A40 O&M costs have statistically significant correlation with complexity number and embankment volume. Further, examination of complexity number content (appendix D) reveals several factors that appear to be "volume-related." Overall, embankment volume and complexity number explain similar variations within A40 O&M costs.

From the examination of tables 7 and 8, and the guidance above, the following conclusions can be made:

- Two correlations in table 7 are greater than or equal to 0.7, and both have a p value less than 5, indicating that both of these facility characteristics are acceptable for creating a unitized cost benchmark, namely:

- 5-year average A40 costs per embankment volume
- 5-year average A40 costs per complexity number

- No correlations in table 8 are greater than or equal to 0.7, suggesting that there are no facility characteristics that should be used to create a normalized staffing benchmark.

Analyzing Additional Benchmarks

Further analysis was performed to identify benchmarks based on percent indirect of allocable O&M costs, nonunitized staffing, and FRR. These data were correlated with the two established unitized cost benchmarks.

Table 9 shows the correlations between the unitized benchmarks and the three remaining parameters: staffing, FRR, and percent indirect of allocable O&M costs.

Table 9. Correlations Between the Unitized Benchmarks and Staffing, FRR, and Percent Indirect of Allocable O&M Costs

Potential additional metric	Correlation with A40 costs per complexity * (5-year representative costs)		Correlation with A40 costs per volume † (5-year representative costs)	
	r ‡	P (%) §	r ‡	p (%) §
Facility reliability rating	-0.28	20	-0.13	57
A40 staff hours	-0.13	59	-0.06	79
Percent indirect of allocable O&M costs	0.21	33	0.20	36

* Defined as facility's A40 5-year representative value divided by its complexity number.
† Defined as facility's A40 5-year representative value divided by its embankment volume.
‡ r is the correlation coefficient.
§ p is the probability (expressed as percentage and rounded to nearest unit) that the computed correlation coefficient could actually be zero or the opposite sign, and depends on the computed correlation value and sample size.

Table 9 shows several notable results in which statistically significant correlations were not found. For example, unitized A40 O&M costs do not correlate significantly with percent indirect of allocable O&M costs. This result might suggest that cost metrics describing A40 O&M costs and percent indirect of allocable O&M costs might be *complementary* in a benchmarking context, explaining two aspects of facility O&M measured by costs.

A negative, nonintuitive relationship is implied by the sample to indicate that reduced O&M spending leads to better "reliability." This negative relationship demonstrates the fact that the FRR score is not a suitable measure of the reliability of the facility O&M. On the basis of the above analysis, which supports the Team's understanding of the FRR, the Team decided not to use it as an indicator for reliability. It should be noted, however, that a reliability indicator is necessary to determine the appropriateness of the costs at each facility. For example, if one facility is spending more on O&M on a unitized basis than another, it is helpful to have a complementary reliability benchmark to determine whether the facility spending more money is performing better and, therefore, the additional cost is justified. FRR is not the correct metric for this, as indicated by the analysis and the fact that it does not reflect the O&M costs used in this benchmarking effort and pilot program. Any future cost comparison/best practices effort should explore and/or develop a performance reliability metric for this purpose.

For the reasons cited earlier, the Team determined that the following two benchmarks, in addition to the two previously described unitized benchmarks, were appropriate for the pilot program:

- Number of FTEs
- Percent indirect of allocable O&M costs

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V. Prime Benchmarks

Following the analysis, the prime benchmarks determined for the pilot program were:

- O&M costs per cubic yard of embankment material
- O&M costs per CN
- Percent indirect of project (allocable O&M) costs
- Number of full-time equivalents

These metrics are described in detail in this section.

O&M Costs Per Cubic Yard of Embankment

Description: This benchmark is one of the two unitized cost benchmarks. This benchmark is a completely objective unitized cost measure. The costs used for unitizing with embankment volume are recurring O&M costs, also known as A40 costs. For comparison, these costs are averaged over a 5-year period.

Significance/Value: This benchmark monitors the cost of operating and maintaining the dam on a regular basis, independent of extraordinary maintenance or replacements. This benchmark indicates how efficiently a dam is being operated and maintained compared to other dams on a unitized basis.

Period of Data: FY 2001 – 2005

Unit of Measure: Dollars per cubic yard of embankment

Equation: $$\frac{\text{Project (allocable O\&M) costs}}{\text{Embankment volume (yd}^3\text{)}}$$

Data Sources: Reclamation’s schedule 730 reports and project data

Data Verification: Cost data were verified by comparing costs received from Denver Office personnel to costs provided by regional personnel.

Graph Explanation: The graph shown in section VI compares all facilities within the group benchmarked in the pilot program. All embankment dams built after 1945 were considered to be one class. The unitizing of the data accounts for variation in size.

Costs per Complexity Number

Description: This benchmark is one of the two unitized cost benchmarks. This benchmark is more subjective than the other unitized cost measure. The costs used for unitizing with CN are recurring O&M costs, also known as A40 costs. For comparison, these costs are averaged over a 5-year period. The CN was derived by the Team in an effort to quantify the overall O&M complexity of any given dam. The Team created the CN form (appendix D) and used it in an attempt to normalize each facility in terms of its complexity.

Significance/Value: This benchmark monitors the cost of operating and maintaining the dam on a regular basis, independent of extraordinary maintenance or replacement costs. This benchmark is an indication of how efficiently a dam is being operated and maintained compared to other dams on a unitized basis.

Period of Data: FY 2001 – 2005

Unit of Measure: Dollars per complexity number

Equation: $\dfrac{\text{Project (allocable O\&M) costs}}{\text{Complexity number}}$

Data Sources: Reclamation’s schedule 730 reports, project data, facility-specific Standing Operating Procedures, and O&M reports

Data Verification: O&M personnel knowledgeable of the facilities calculated the CN.

Graph Explanation: The graph shown in section VI compares all facilities within the group benchmarked in the pilot program. All embankment dams built after 1945 were considered to be one class. The unitizing of the data accounts for variation in size.

Percent Indirect of Allocable O&M Costs

Description: This benchmark is one of the two aggregate benchmarks. This is a third cost benchmark, complementary to the other two, as described in the data analysis section of this report.

Significance/Value: This benchmark monitors the percent of indirect costs at a given facility. This benchmark is an indication of how much money is being spent and charged as management and administrative costs pooled for distribution, which are not directly related to the O&M activities performed at the dam site.

Period of Data: FY 2001 – 2005

Unit of Measure: Percentage

Equation: $$\frac{\text{Average indirect project (allocable O\&M) costs}}{\text{Total project (allocable O\&M) costs}}$$

Data Sources: Reclamation's schedule 730 reports. Budget object class codes identify indirect costs in the 730.

Data Verification: Cost data were verified by comparing costs received from Denver Office personnel to costs provided by regional personnel.

Graph Explanation: The graph shown in section VI compares all facilities within the group benchmarked in the pilot program. All embankment dams built after 1945 were considered to be one class.

Full-Time Equivalents

Description: This benchmark is one of the two aggregate benchmarks. This is the only noncost benchmark, even though it could be argued that cost is intrinsic to the nature of staffing.

Significance/Value: This benchmark monitors the staffing level at a given facility. This benchmark is an indication of how many staff are involved with the O&M activities at each facility.

Period of Data: FY 2001 – 2005

Unit of Measure: Unitless

Equation: $$\frac{\text{Average total hours charged to a facility}}{1800}$$

Data Sources: Reclamation's FIRS database. This database contains data for all employee charges throughout Reclamation.

Data Verification: Reclamation's financial staff verified staff hours collected.

Graph Explanation: The graph shown in section VI compares all facilities within the group benchmarked in the pilot program. All embankment dams built after 1945 were considered to be one class.

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VI. Benchmarking Results

The four prime benchmarks were applied to the 23 Reclamation dams in the pilot program and yielded the results found in table 10. Trend graphs of the prime benchmarks for each of the individual dams are presented within the facility description pages in appendix A. Figures 9 through 12 graphically compare the prime benchmarks for all the dams in this pilot program.

Table 10. Benchmarking Results

Prime benchmarks	Group high	Group low	Group median
O&M costs per 1,000 cubic yards of embankment material	$347.00	$27.96	$62.92
O&M costs per CN	$16,218	$4,035	$8,207
Percent indirect of allocable O&M costs	45.1%	15.6%	21.8%
Number of FTEs	3.59	0.58	1.33

Caution should be taken in drawing conclusions or making comparisons among the facilities based on the data presented in table 10 and the following figures because none of these benchmarks alone fully explain the performance of a facility. For example, when viewing costs per cubic yard of embankment volume (figure 9), Dickinson Dam appears to be an “outlier.” But the same dam, when viewing the cost per CN benchmark (figure 10), falls near the median.

It should also be noted that the results show variation among some of the dams, but not more than is typically observed in most cost-based benchmarking efforts.

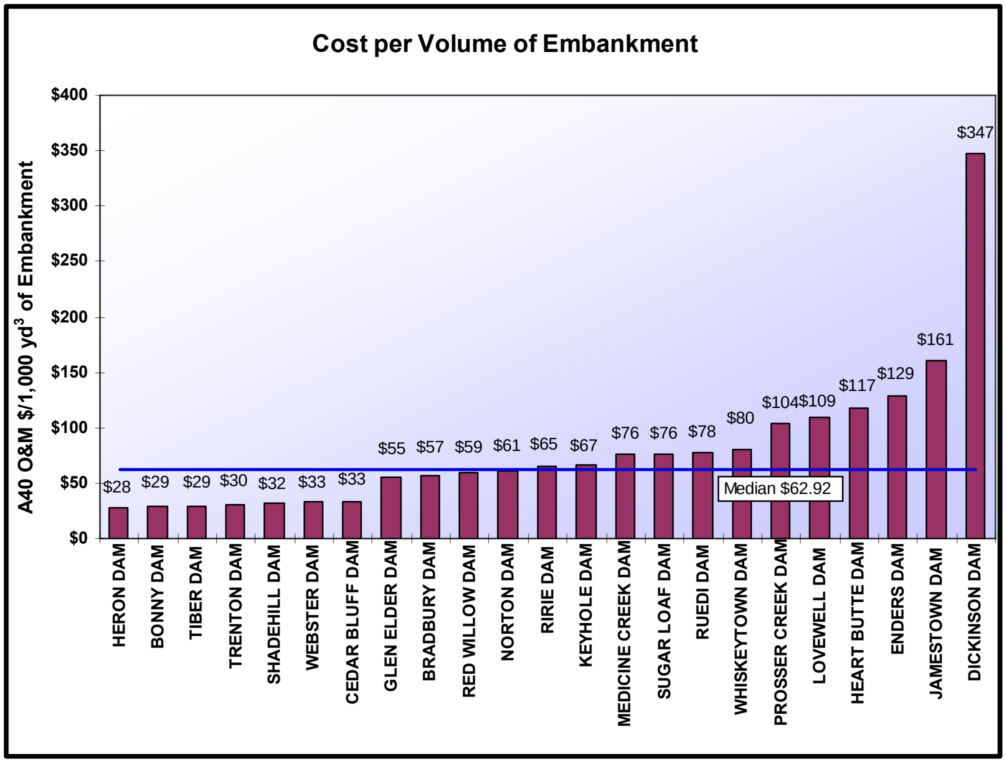


Figure 9. Cost per volume of embankment.

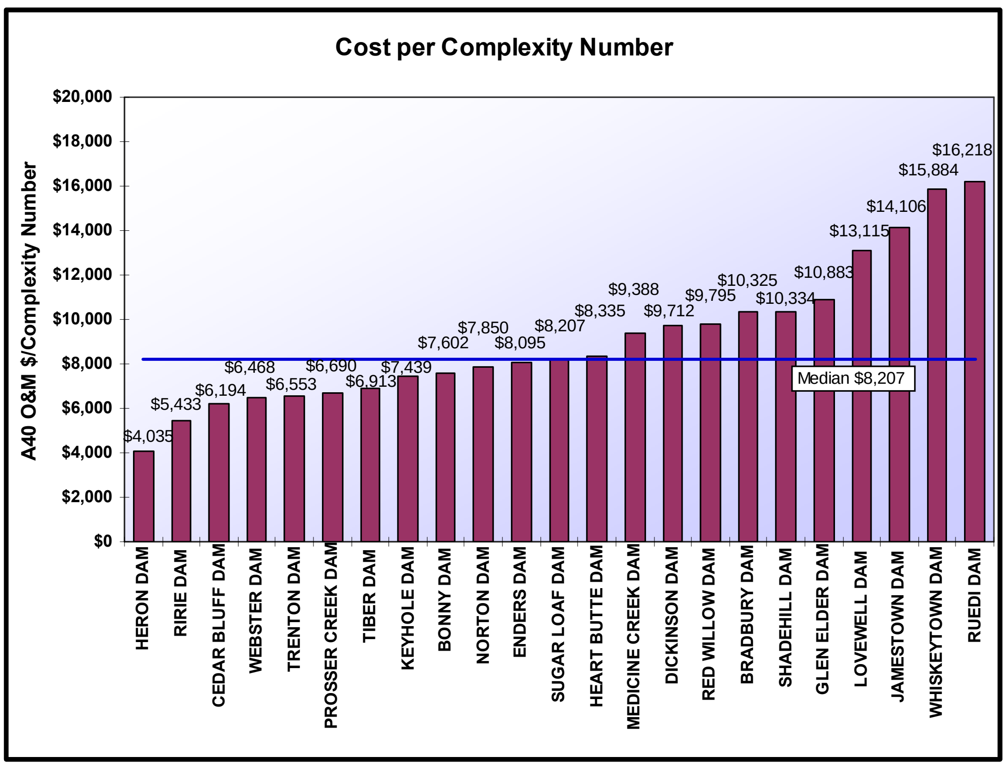


Figure 10. Cost per complexity number.

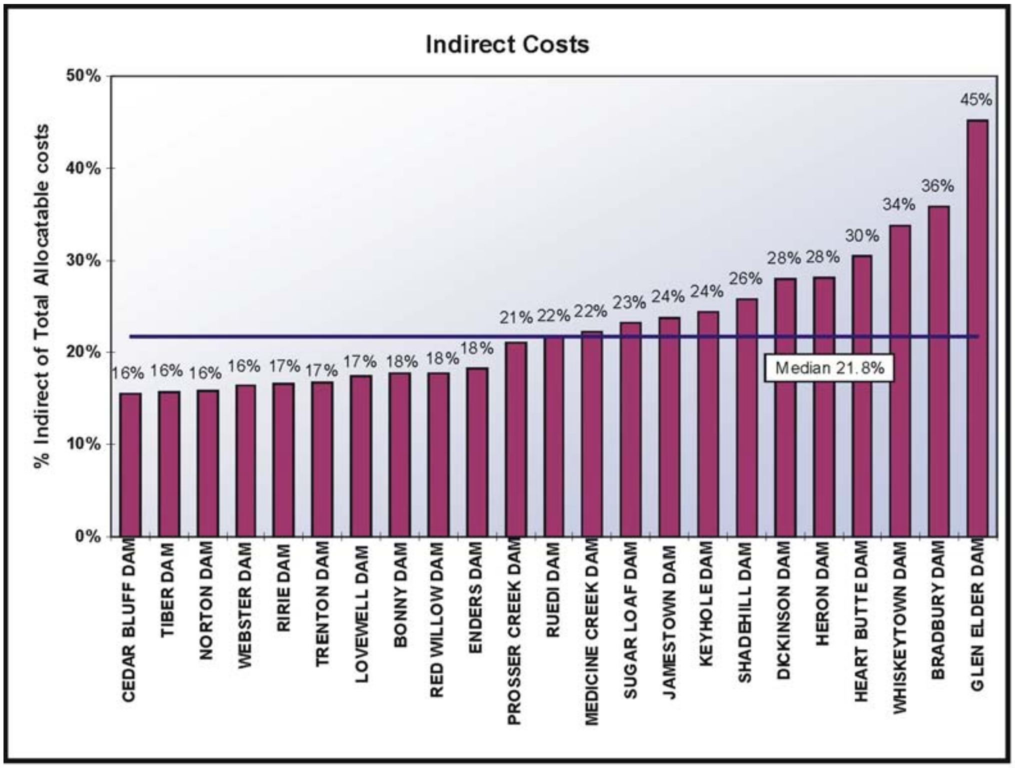


Figure 11. Percent indirect of allocable O&M costs.

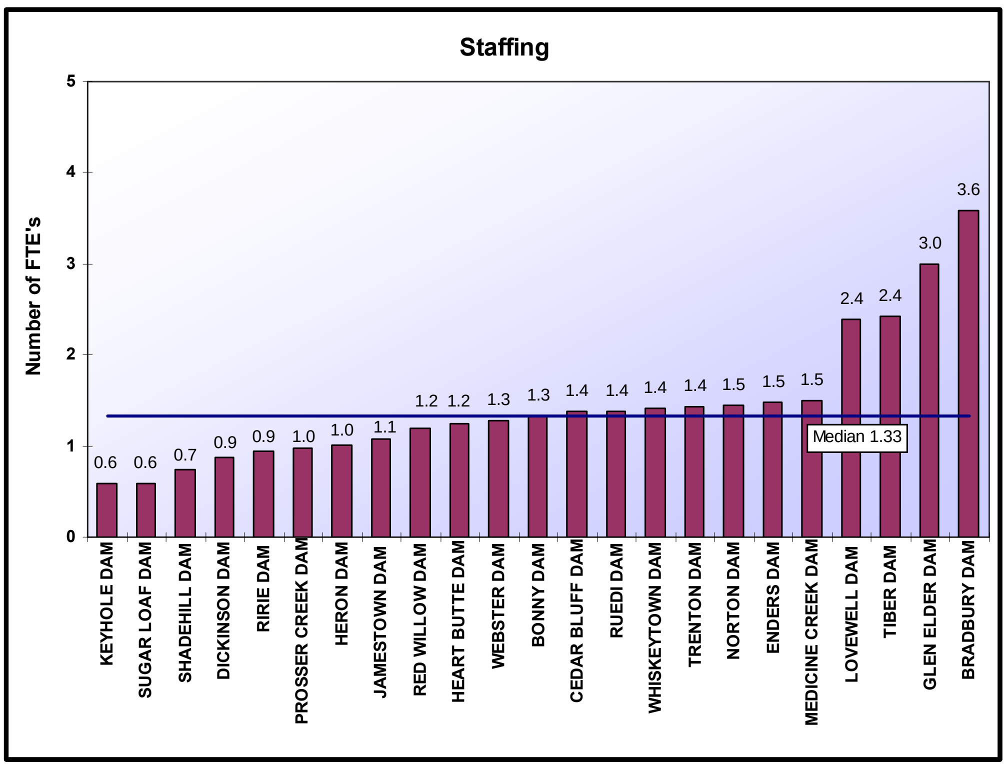


Figure 12. Full-time equivalents.

Reclamation Performance

Gap Analysis

A gap analysis was not performed because a full complement of benchmarks could not be developed. The Team was able to develop cost-related benchmarks; however, no performance- or reliability-based benchmarks were identified. Specifically, there is presently no means of objectively measuring the relative quality of O&M at each dam. The Team agreed that performing a gap analysis without considering this factor would be incomplete and, thus, would provide inaccurate results.

Without a gap analysis, best practices and best performers could not be identified.

Although a gap analysis was not performed, the Team discussed possible factors, aside from the relative quality of O&M, which could at least partially explain variations from the median benchmark values. These factors include:

- Complex and/or aging equipment that requires a high level of routine maintenance
- Personnel present at the dam and/or remoteness of dam location entailing relatively long travel times
- Long-term monitoring and/or repeated repair of concrete features that exhibit AAR or other deficiencies
- Costs associated with how RAX-type work is accounted for (some dams capitalize certain costs where others may expense these costs)
- The CN scoring methodology may not incorporate all factors contributing to O&M costs at a facility, or the weightings in the CN calculation may not reflect the true O&M efforts
- Errors in determining the number of FTEs utilized at each dam
- Errors in employee time charges

Without a reliability or quality of O&M metric, there is no means of determining whether or not a less expensive facility is being properly maintained.

Best Practices

Due to the difficulty in applying traditional benchmarking methodology to water storage and distribution facilities, the Team looked for other methods Reclamation could utilize to identify and share best practices. Four possible ways were identified for consideration, and they are discussed below.

1. Consider redefining and expanding Reclamation's standardized cost accounting system at reserved works dams so that detailed, consistent, and comparable cost data for various types of O&M activities can be obtained and tracked.

While discussing the results of the pilot program, the Team realized that comparing costs on an activity level, rather than the sum of O&M costs associated with each facility, would be less problematic and would provide the information needed to improve O&M efficiency. To identify "best practices" or to make meaningful comparisons of costs, detailed data for O&M activities are necessary. Reclamation has cost accounting structures that track labor, supplies and materials, and major repairs but do not track costs by specific type of O&M activity in any real level of detail.

Therefore, Reclamation should consider redefining its internal cost accounting structures/definitions to isolate the costs associated with specific O&M activities such as vegetation control, concrete repair, painting, instrumentation data collection, and equipment exercising and testing to name a few. Doing this would provide a means by which annual costs associated with common O&M activities can be compared among facilities.

The Team believes that this action could take up to 2 years and that meaningful cost comparisons and identification of "best practices" could be obtained following 5 years of data collection. In addition, some of the activity-based costs could be used by Reclamation managers to track costs for which they are responsible and provide a straightforward means of presenting cost data that would serve to improve transparency and accountability to our customers. Other costs could be unitized and used for activity-based cost comparisons among other facilities.

2. Consider the development of a means to measure the relative level of effectiveness of specific O&M activities to enable activity-based cost comparisons among reserved works facilities, identification of best practices, and long-term tracking of O&M program efficiency.

Perhaps the foremost obstacle in performing water O&M benchmarking, and making meaningful comparisons between facilities, was the lack of an industry-wide or Reclamation-wide means of measuring the relative quality of the O&M practices employed at each facility. The Team realized that O&M costs alone do not provide sufficient information to benchmark or to perform a comprehensive comparison of facility O&M costs. For instance, low O&M costs may be the result of efficient O&M practices or, conversely, the result of inadequate facility maintenance. High O&M costs may be an accurate reflection of a complex facility or the result of extravagant spending. Only by considering the relative quality or effectiveness of O&M can a true comparison of facility O&M costs be made.

The Team recognized that development of a composite score for the relative quality of O&M at each facility would be problematic due to the wide variation of features and O&M requirements associated with water storage and distribution facilities. Measurement of the relative level of effectiveness of specific O&M activities, however, would be much more manageable and would provide the information necessary to perform activity-based cost comparisons among facilities.

Therefore, consideration should be given to the development of a means to measure the relative level of effectiveness of O&M activities that are common to a wide array of reserved works facilities (i.e., vegetation control, maintenance of protective coatings). The Team discussed a scoring type approach whereby the effectiveness of each applicable O&M activity (i.e., success of vegetation control measures, condition of protective coatings) is evaluated. Ideally, the scores would be objectively rather than subjectively measured. Strict score definitions for each O&M activity will likely be necessary to accomplish this.

The relative level of effectiveness scores could be immediately useful to area office managers and regional directors in identifying potential areas of improvement. However, the full benefit of this action may not be realized until the results are used to compare activity-specific costs to identify “best practices” and track O&M program efficiency. This could also serve to provide a straightforward means of justifying past and future O&M expenditures and improving transparency and accountability to our customers.

3. Consider the routine collection, publication, and distribution of O&M cost data for reserved works storage dams.

In addition to providing the “transparency” desired by our customers, publication and distribution of cost data, both on a “total facility O&M” basis and by “specific O&M activity,” would permit comparisons among facilities and invite discussion and analysis among those performing the O&M, thus generating improved O&M practices.

This action would require that the cost data be grouped by “like” facility for comparison, such as the “embankment dams without powerplants,” chosen by the benchmarking team. Further, it would be necessary to identify appropriate “unitizing” to normalize the variations in the facilities and make them more comparable. The Team found that cost/unit volume of embankment and cost/complexity number worked well for comparing embankment dams. Much more research and experimentation could be done on this aspect, especially for other types of dams and other facilities.

Reclamation's existing *Water O&M Bulletin* may be a useful vehicle for the cost data publication, or it could be located on a suitable Web site.

4. Explore additional opportunities to share best practices regarding the operation and maintenance (O&M) of storage dams.

Currently, Reclamation annually holds the Water Management Workshop to share best practices among water users and Reclamation personnel regarding the O&M of water conveyance and distribution facilities/systems. With the focus on water conveyance and distribution facilities, sharing of best practices is directed primarily to water user field personnel regarding these particular facilities. Only a limited number of Reclamation O&M staff currently attend this workshop.

Relative to water storage dams, there is a need to share best practices among those personnel involved with the O&M of these facilities. One opportunity to achieve this sharing would be to develop a "best practices" workshop that is similar in content to the Water Management Workshop, but focused specifically towards the O&M of water storage dams. In addition to many of the same sessions currently included in the Water Management Workshop, this workshop would also include sessions specific to the O&M of storage dams. The initial emphasis of such a workshop would be towards "reserved works" storage dams, with the primary participants being Reclamation O&M field personnel, managers, and field reviewers/examiners. This initial workshop could also be used as a forum to discuss the desired consistency in cost accounting related to O&M activities and to analyze/evaluate data and resulting variances in O&M activity costs. As cost accounting procedures are shared and more fully implemented outside of Reclamation, future workshops could be expanded to include transferred works storage dams and non-Reclamation dams.

Another opportunity for best practice sharing on the O&M of storage dams is to provide additional emphasis on this issue relative to the facility reviews routinely conducted on these dams. Best practices could be more pointedly shared and discussed at the Facility Review Workshop, which is held by Reclamation every 2 years for Reclamation staff that routinely lead or participate in dam examinations/reviews. Additionally, it may be beneficial for examiners to participate in reviews conducted for dams outside of their jurisdiction such that they are exposed to a wider range of O&M practices.

As referred to in item 3 above, the *Water O&M Bulletin*, published and distributed on a quarterly basis, can serve as another forum to share best practices on the O&M activities related to water storage dams. As information and data are obtained on the costs and effectiveness related to various O&M activities, the *Water O&M Bulletin* should be utilized in the sharing and distribution of best practices.

Potential for Further Use

The Team believes that the best opportunity for improved best practices lies with Reclamation's reserved works storage dams. However, the use of redefined cost accounting structures/definitions and the proposed O&M effectiveness measures could eventually be adopted by our transferred works operating entities and perhaps other Federal and non-Federal dam owners (i.e., the U.S. Army Corps of Engineers, public utility organizations, etc.). This would enable expanded cost comparisons of O&M activities and a broader pool of facilities from which to identify and, thus, implement best practices.

VII. Conclusions and Recommendations

Conclusions

1. The benchmarking of hydropower facilities is relatively simplistic and straightforward as compared to benchmarking of water storage and distribution facilities. The main reasons for this conclusion are:

- Hydropower facilities primarily serve a single purpose.
- Common O&M practices exist among hydropower facilities.
- All power utilities use industry-defined cost accounting codes.
- The power industry has established reliability performance metrics.

The benchmarking of water storage and distribution facilities does not offer any of these advantages.

2. Even though benchmarks were developed, O&M benchmarking of water facilities may not be feasible. The Team developed cost-related benchmarks; however, no performance or reliability based benchmarks were identified. Specifically, there is presently no means of objectively measuring the relative quality of O&M at each dam. Further evaluation is needed to attempt to develop a metric that reflects the quality of O&M performance and/or the relative condition of the facility to support any future water O&M benchmarking effort.

The Team agreed that a gap analysis performed without considering this metric would be incomplete and, thus, provide inaccurate results. Without a gap analysis, best practices and best performers could not be identified.

3. Reclamation will not realize a significant benefit by benchmarking water conveyance and distribution facilities. Non-Federal entities are responsible for O&M (and O&M funding) of the vast majority of Reclamation's water conveyance and distribution facilities. Benchmarking these facilities will require a significant and dedicated effort by involved entities.

4. There is no industry-wide accounting system for obtaining consistent and comparable cost data associated with the O&M of water storage and distribution facilities. The Team was unable to use data from entities outside of Reclamation because of a lack of standardized cost accounting procedures.

Because of a relatively consistent application of Reclamation's cost accounting system, the Team was fairly confident in the comparability of "allocable O&M" cost data associated with reserved works facilities included in this benchmarking pilot program.

5. There are many factors that must be considered in comparing water facilities and the related O&M costs of these facilities. Failure to do so jeopardizes statistical significance and results in nonmeaningful comparisons. Some of the variability is due to factors such as:

- Size
- Geographical location/environment/climate
- Remoteness of a facility
- Construction material
- Age
- Project purpose(s)
- Quality of O&M
- Complexity
- How RAX items are addressed as costs
- Inflow/fill/storage history (operations)

6. The complexity number is a credible method of determining the relative complexity of embankment storage dams. The complexity of a facility, reflecting the extent and frequency of O&M activities, must be factored into any future efforts directed toward improved best practices.

7. Some of the tools used in the pilot program are specific to embankment storage dams. Adaptation of these tools (e.g., CN form, prime benchmarks, etc.) may be required to enable comparisons of other storage dam types, a larger data set of embankment storage dams, or water-conveyance and distribution facilities.

8. The pilot program resulted in the identification of four prime benchmarks. These benchmarks were:

- O&M costs per cubic yard of embankment material
- O&M costs per CN
- Percent indirect of allocable O&M costs
- Number of full-time equivalents

Missing from these benchmarks is a reliability benchmark which is critical to a full complement of benchmarks necessary for true, disciplined benchmarking.

Recommendations

1. Reclamation should not pursue internal O&M benchmarking among Reclamation's reserved works storage dams. Using lessons learned from this pilot program, Reclamation should not pursue internal O&M benchmarking among Reclamation's reserved works storage dams because of significant uncertainty in the viability of success and the high costs associated with further effort. In comparison with power benchmarking, the Team anticipates that water O&M benchmarking will be very expensive and it will not realize similar benefits, primarily because there are no existing means or metrics (i.e., industry standards) to objectively measure the reliability or quality of O&M for water storage dams.

2. Reclamation should not pursue water O&M benchmarking with entities outside of Reclamation. In addition to reasons stated in Recommendation 1, Reclamation should not pursue water O&M benchmarking with entities outside of Reclamation principally because industry-defined cost accounting structures do not exist.

3. Reclamation should not pursue benchmarking of water conveyance and distribution facilities. In addition to reasons stated in Recommendations 1 and 2, Reclamation should not pursue benchmarking of water conveyance and distribution facilities because non-Federal entities are responsible for O&M and O&M funding of the vast majority of these facilities.

However, the Team recognized that one of the primary objectives of investigating water O&M benchmarking was to improve O&M practices throughout Reclamation by comparing O&M costs and practices among similar facilities both internal and external to Reclamation. Due to the difficulty in applying traditional benchmarking methodology to water facilities and related O&M activities, the Team identified the following methods by which Reclamation could improve its O&M practices.

4. Reclamation should consider redefining and expanding its standardized cost accounting system at reserved works dams so that detailed, consistent, and comparable cost data for various types O&M activities can be obtained and tracked. To identify "best practices" or to make meaningful comparisons of costs between facilities, detailed data for O&M activities are necessary. Reclamation has cost accounting structures that track labor, supplies and materials, and major repairs at a "facility" level, but do not track costs by specific type of O&M activity in any real level of detail. If the annual costs for specific O&M activities (e.g., vegetation control, concrete repair, etc.) can be tracked, cost comparisons can be made among facilities that have these same O&M activities. In addition, implementing this recommendation could provide a straightforward means of presenting cost data that would serve to improve transparency and accountability to Reclamation's customers. However, it should be noted that expanding the existing cost system could take up to two years and that meaningful cost comparisons and identification of "best practices" may not be possible until after five years of data collection.

5. Reclamation should consider developing a means to measure the relative level of effectiveness of specific O&M activities (quality of O&M) to enable activity-based cost comparisons among reserved works dams, identification of best practices, and long-term tracking of O&M program efficiency. As explained previously, successful water O&M benchmarking requires some objective means or metric to measure the reliability or quality of O&M at a facility level. Such a means or metric is not currently available on an industry-wide basis. O&M costs alone do not provide sufficient information to benchmark or to perform a comprehensive comparison of facility O&M costs. However, if cost data for specific O&M activities are made available through a redefined cost accounting system (as recommended above), the Team also recommends development of "a measurement of the relative level of effectiveness" of specific O&M activities to perform activity-based cost comparisons among facilities. Ideally, an objective scoring type approach is preferred, in which the effectiveness of each applicable O&M activity (i.e., success of vegetation control measures, condition of protective coatings, etc.) is evaluated. These scores can be useful to Reclamation managers in identifying potential areas of improvement. However, the full benefit would be realized when the scores are coupled with activity-specific costs to identify "best practices" and track O&M program efficiency. As a result, it could provide a straightforward means of justifying past and future O&M expenditures, as well as improving transparency and accountability, to our customers.

6. Reclamation should consider routinely collecting, publishing, and distributing O&M cost data for reserved works storage dams. In addition to providing the "transparency" desired by Reclamation's customers, publishing and distributing this cost data, both on a "total O&M" basis and by "specific O&M activity," could permit comparisons among facilities and invite discussion and analysis among those performing the O&M, thus generating improved O&M practices. Such cost data should be grouped by "like" facilities for comparison purposes such as "embankment dams without power plants." Further, appropriate "unitizing" should be identified to normalize the variations in the facilities and make them more comparable, such as the cost/unit volume of embankment and cost/complexity number, which worked well for comparing embankment dams. Publishing the data within Reclamation's existing Water O&M Bulletin or on a suitable Web site should be considered.

7. Reclamation should explore additional forums to share best practices regarding the operation and maintenance (O&M) of storage dams. One opportunity to achieve this objective would be to develop a "best practices" workshop similar in content to the Water Management Workshop, but focused specifically towards the O&M of reserved works storage dams; primary participants would be Reclamation O&M field personnel, managers, and field reviewers/examiners. In addition to many of the same Water Management Workshop sessions, this workshop would also include sessions specific to the O&M of storage dams, as well as cost and effectiveness comparisons resulting from cost data collected on specific O&M activities. Other opportunities for "best practice" sharing could be provided through regular Facility Review Workshops, cross-regional or customer participation in facility reviews, and the sharing of best practices in Reclamation's Water O&M Bulletins.

Appendix A
Reclamation Dams Benchmarked

Appendix A
Dams Benchmarked

Bonny Dam

(Bonny Reservoir)

Original construction completed: 1951 by Bureau of Reclamation (56 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: South Fork of Republican River, approximately 24 miles north of Burlington, Colorado

Type: homogeneous earthfill

Structural height: 158 feet

Dam crest length: 9200 feet

Dam crest elevation: 3742 feet

Dam embankment volume: 8,853,000 ft^3

Active reservoir capacity: 168,026 acre feet at top of exclusive flood control elevation 3710 feet

Authorized benefits: flood control, recreation, (limited) irrigation for lands administered by State of Colorado, Division of Wildlife

Spillway description: uncontrolled 121.5 foot-wide ogee crest at elevation 3710 feet with capacity 73,300 ft^3/s at reservoir water surface elevation 3736.2 ft; a concrete-lined sluiceway passes beneath the concrete crest and contains a 16.5- by 10.75-foot fixed-wheel gate (sluiceway gate installed to regulate reservoir water surface to elevation 3682.2 feet – the gate is a partial control of the sluiceway)

Outlet works description: located in left dam abutment; consists of intake structure with trash racks; a 4-foot, 8-inch-diameter upstream conduit; a gate chamber with 4-foot-square emergency high-pressure slide gate; an 8-foot, 2-inch horseshoe-shaped downstream conduit and five buildings (Conduit Access, Old River Outlet, Hale Ditch Valve, the Hale Ditch Outlet, and the New River Outlet); capacity 160 ft^3/s

Other features associated with dam: supervisory control and data acquisition (SCADA) system, gate chamber ventilation system, outlet works sump pump, outlet works emergency standby generator, control house and spillway generator

Complexity Number: 34

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office (facility located in eastern Colorado)

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

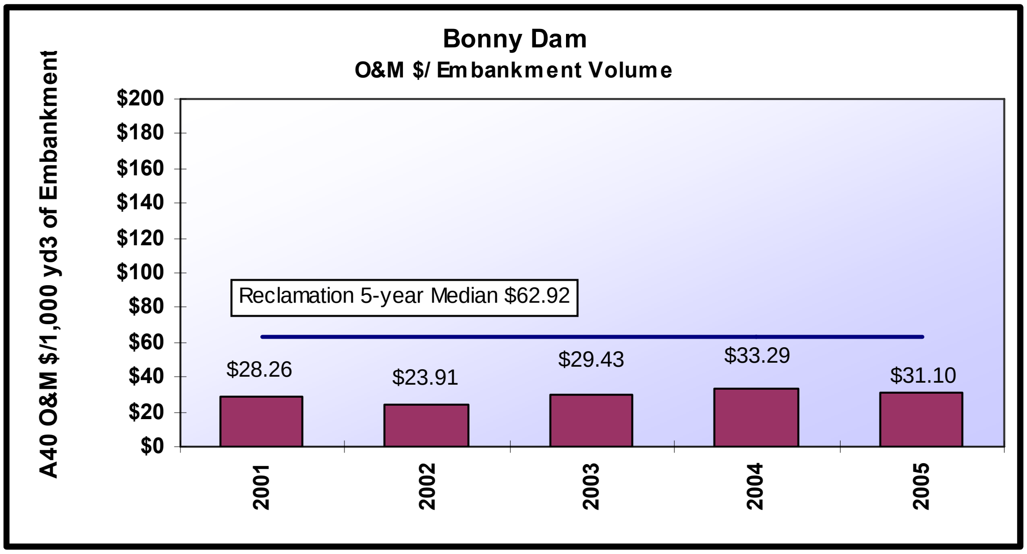
Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

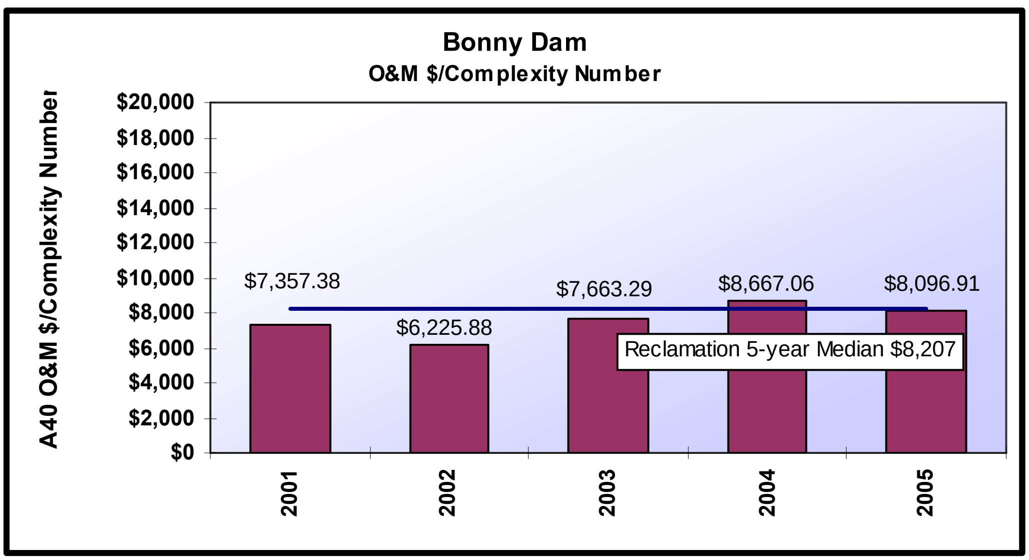
Bonny Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$250,151	$250,151	21.0%	34,125	7,113
2002	$211,680	$211,680	20.0%	24,914	4,635
2003	$260,552	$260,552	16.2%	21,201	4,423
2004	$319,158	$294,680	16.8%	16,868	3,638
2005	$369,131	$275,295	14.3%	13,147	3,709
Median	**$260,552**	**$260,552**	**17.7%**		

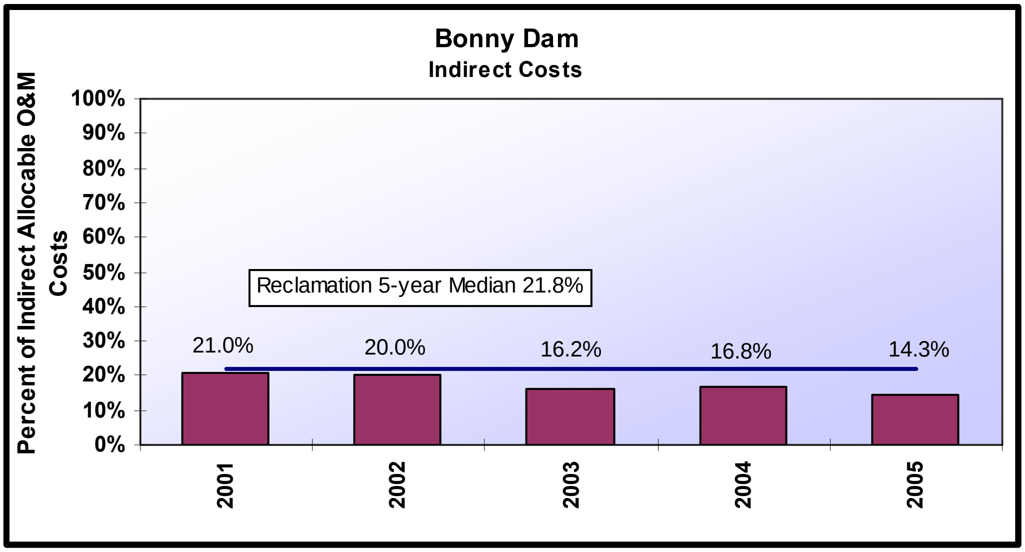
Benchmarking Analysis

Bonny Dam Benchmark Summary			
Benchmark	**Bonny Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 29.43	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 7,663.29	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	16.83%	21.8%	15.61%
Full Time Equivalents	1.31	1.33	0.58

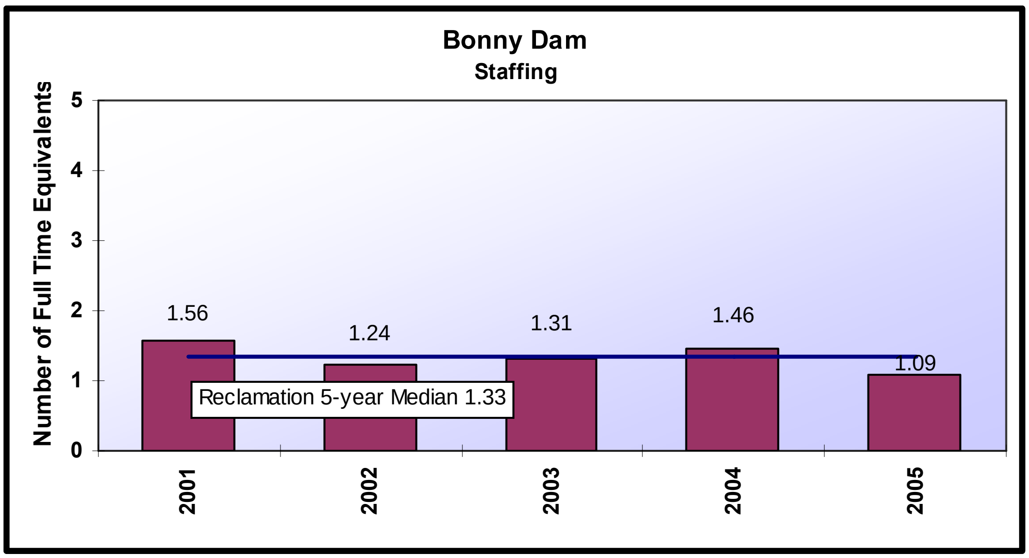
Cost Benchmarks







Staffing Benchmark



Bradbury Dam

(Lake Cachuma)

Original construction completed: 1953 by Bureau of Reclamation (54 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Santa Ynez River, approximately 25 miles northwest of Santa Barbara, California

Type: earthfill

Structural height: 279 feet

Dam crest length: 3,350 feet

Dam crest elevation: 766 feet

Dam embankment volume: 6,700,000 ft^3

Active reservoir capacity: 190,400 acre-feet at top of joint use elevation 750.0 feet

Authorized benefits: municipal and industrial, irrigation

Spillway description: on left abutment of the dam; consists of a concrete overflow crest, four 50-feet wide by 30-feet high radial gates, a concrete-lined spillway chute, and a stilling basin. The elevation of the spillway sill is 720 feet. It is designed to pass flood flows from the upstream drainage basin and has a design capacity of 159,500 ft^3/s

Outlet works description: a 7-foot-diameter horseshoe tunnel located in the left abutment of the dam. The original design capacity of the outlet works is 350 ft^3/s at normal water surface elevation 750 feet. Other features associated with the dam: The Tecolote Tunnel delivers reservoir water through the mountains to the Santa Barbara area, with the reservoir receiving water pumped through its outlet works to be stored for downstream communities.

Complexity Number: 37

Owner: Bureau of Reclamation

Jurisdiction: Mid-Pacific Region, South Central California Area Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by SCCAO

Supervisory/remote control: all operations are performed locally; reservoir water surface elevation and other data are monitored remotely via the Hydromet system.

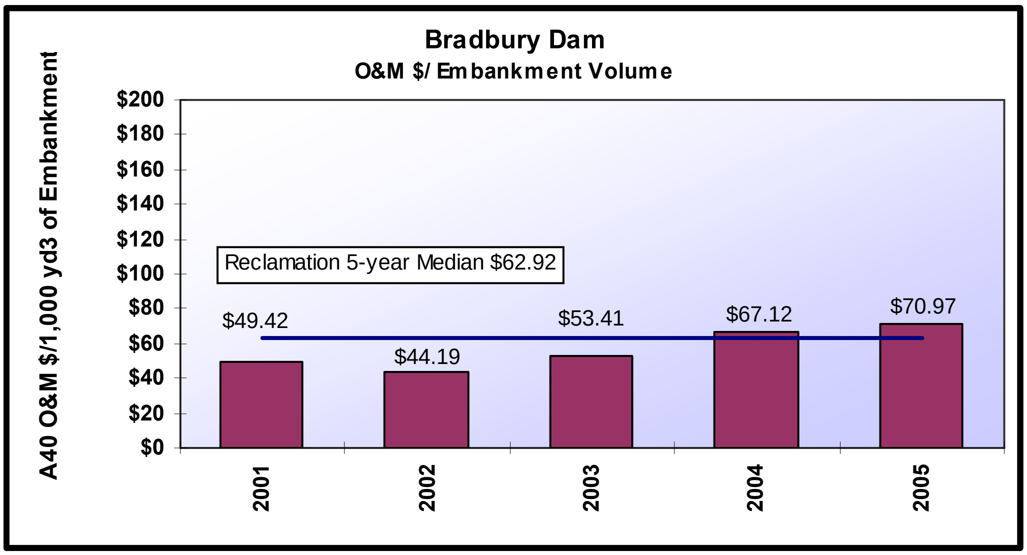
Other features associated with the dam: The Tecolote Tunnel delivers reservoir water through the mountains to the Santa Barbara area, with the reservoir receiving water pumped through its outlet works to be stored for downstream communities

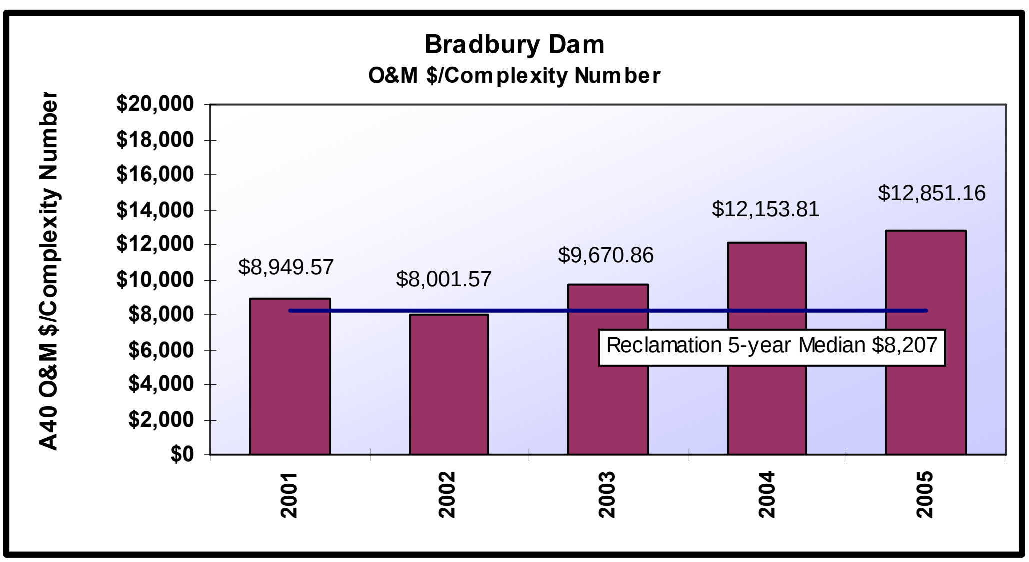
Bradbury Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$331,134	$331,134	44.0%	197,089	144,139
2002	$355,875	$296,058	36.3%	173,308	45,284
2003	$357,822	$357,822	39.4%	130,784	33,864
2004	$454,562	$449,691	35.9%	115,342	48,700
2005	$776,055	$475,493	23.7%	197,649	292,875
Median	**$357,822**	**$357,822**	**35.9%**		

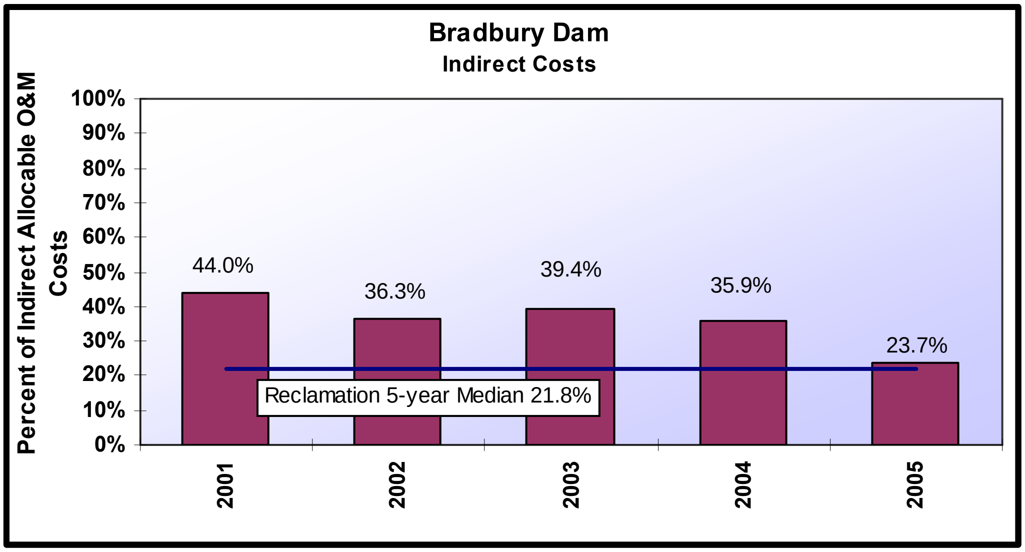
Benchmarking Analysis

Bradbury Dam Benchmark Summary			
Benchmark	Bradbury Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 53.41	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 9,670.86	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	36.31%	21.8%	15.61%
Full Time Equivalents	3.73	1.33	0.58

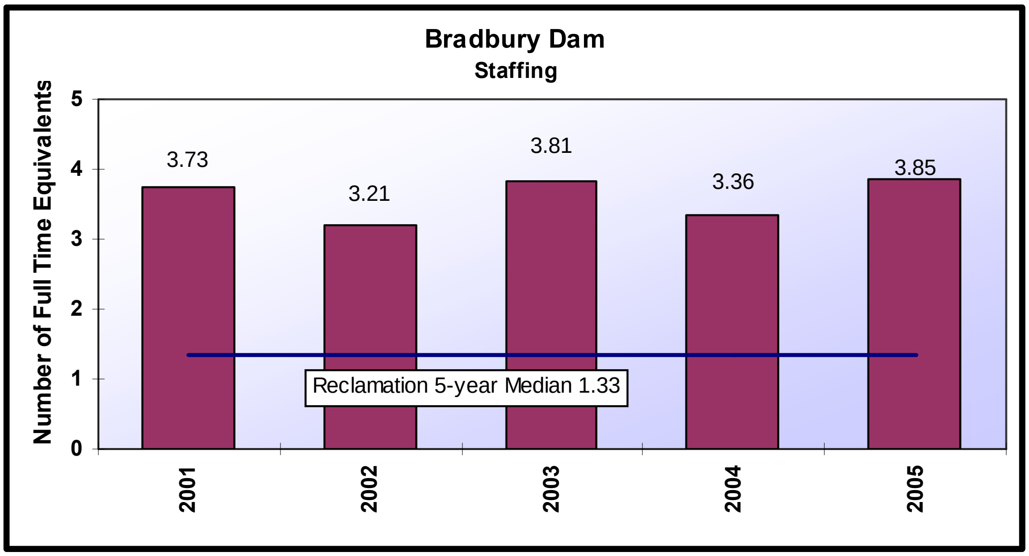
Cost Benchmarks







Staffing Benchmark



Cedar Bluff Dam

(Cedar Bluff Reservoir)

Original construction completed: 1951 by Bureau of Reclamation (56 years old)

Completion date and nature of subsequent modifications: construction of water delivery system to serve lands in Cedar Bluff Irrigation District (1961 to 1963)

Watercourse: Smoky Hill River, approximately 25 miles southwest of Hays, Kansas

Type: zoned earthfill

Structural height: 202 feet

Dam crest length: 12,560 feet

Dam crest elevation: 2198 feet

Dam embankment volume: 8,490,000 ft^3

Active reservoir capacity: 335,768 acre-feet at top of exclusive flood control elevation 2166 feet

Authorized benefits: flood control, municipal uses, recreation, fish and wildlife

Spillway description: on right abutment; consists of an uncontrolled crest with discharge capacity 91,000 ft^3/s at reservoir water surface elevation 2192 feet; flow also available from a sluiceway controlled by one 14-foot, 6-inch by 9-foot, 7-inch radial gate and eight 5-foot-square sluice gates

Outlet works description: within the river channel section of embankment; consists of a trashracked drop inlet, a 10-foot-diameter horseshoe-shaped downstream conduit containing a 66-inch-diameter steel pipe, a control house containing a bifurcation to a 4-foot by 5-foot regulating gate, a chute, and a stilling basin to the river, and another 4-foot by 5-foot regulation gate, which discharges to the Cedar Bluff Canal via a 106-inch-diameter, 464-foot-long conduit; discharge capacity 800 ft^3/s at reservoir water surface elevation 2166 ft

Other features associated with dam: SCADA system; gate chamber ventilation system, outlet works sump pump, residence and shop emergency standby generator, spillway generator, spillway access building, and gallery ventilation

An 18-inch-diameter wedge valve controls flows to a nearby goose habitat, which replaced the previous fish hatchery

Complexity Number: 45

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

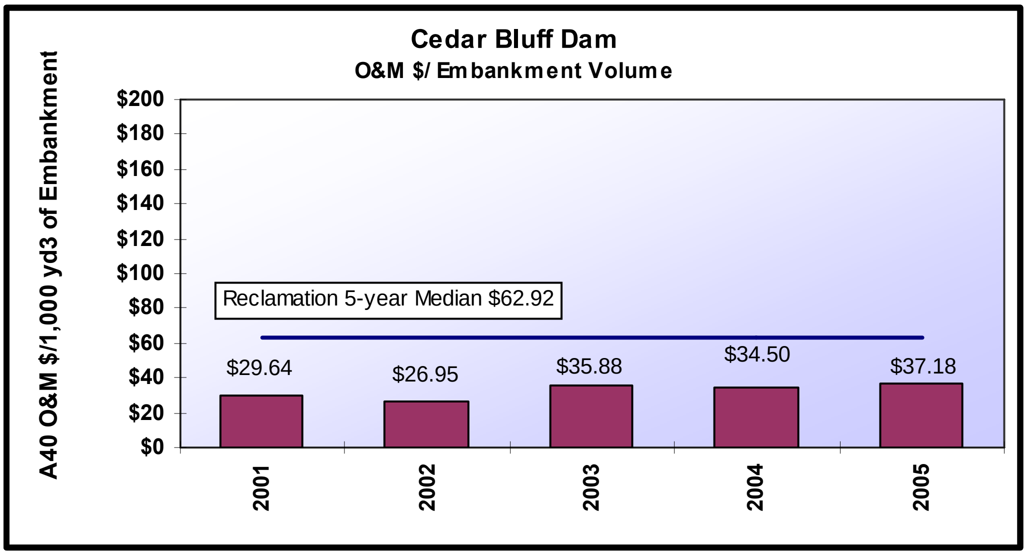
Cedar Bluff Dam Statistics by Fiscal Year

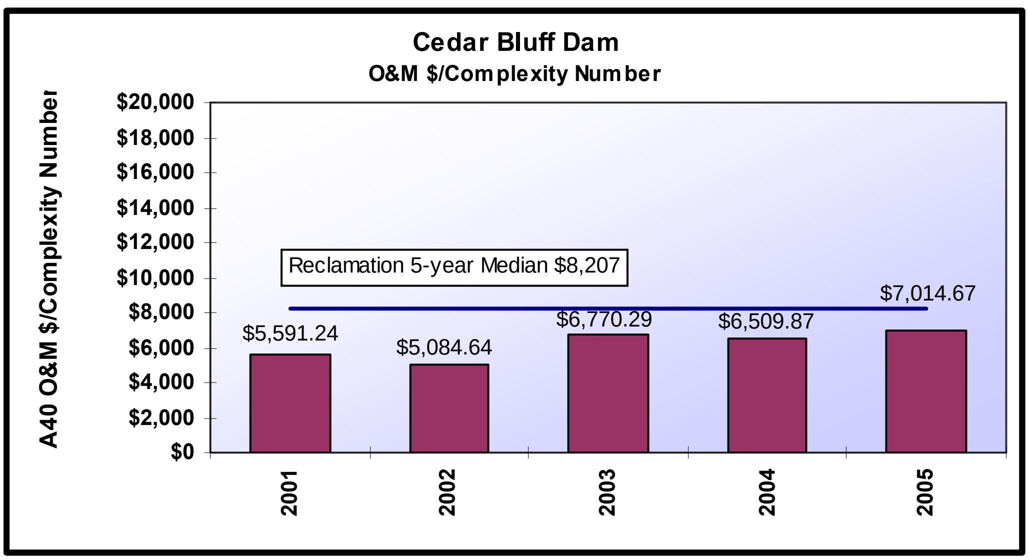
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$251,606	$251,606	17.5%	187,918	223
2002	$228,809	$228,809	19.0%	186,052	1,545
2003	$304,663	$304,663	15.5%	150,757	3
2004	$292,944	$292,944	13.1%	130,225	-
2005	$315,660	$315,660	12.8%	120,067	3
Median	**$292,944**	**$292,944**	**15.6%**		

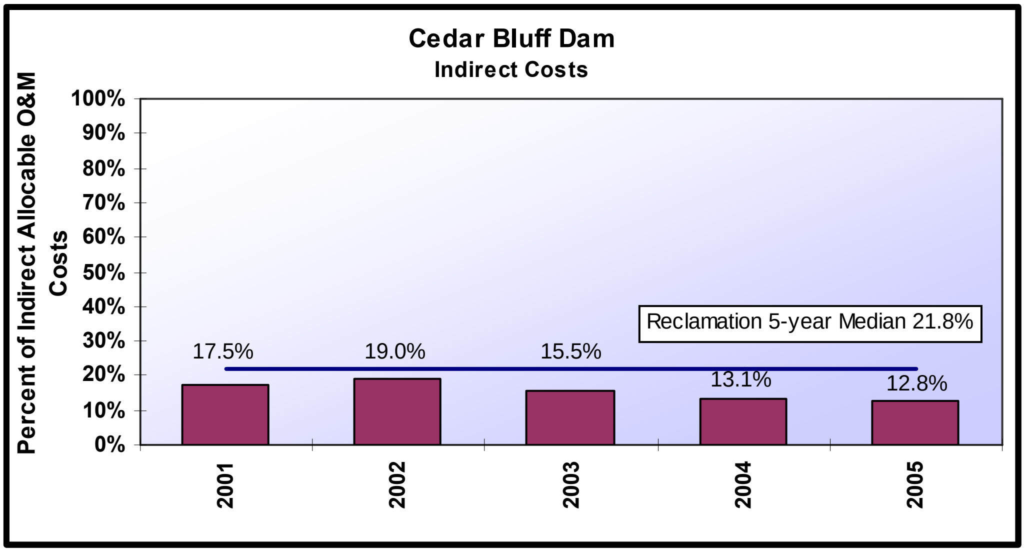
Benchmarking Analysis

Cedar Bluff Dam Benchmark Summary			
Benchmark	Cedar Bluff Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 34.50	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 6,509.87	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	15.54%	21.8%	15.61%
Full Time Equivalents	1.45	1.33	0.58

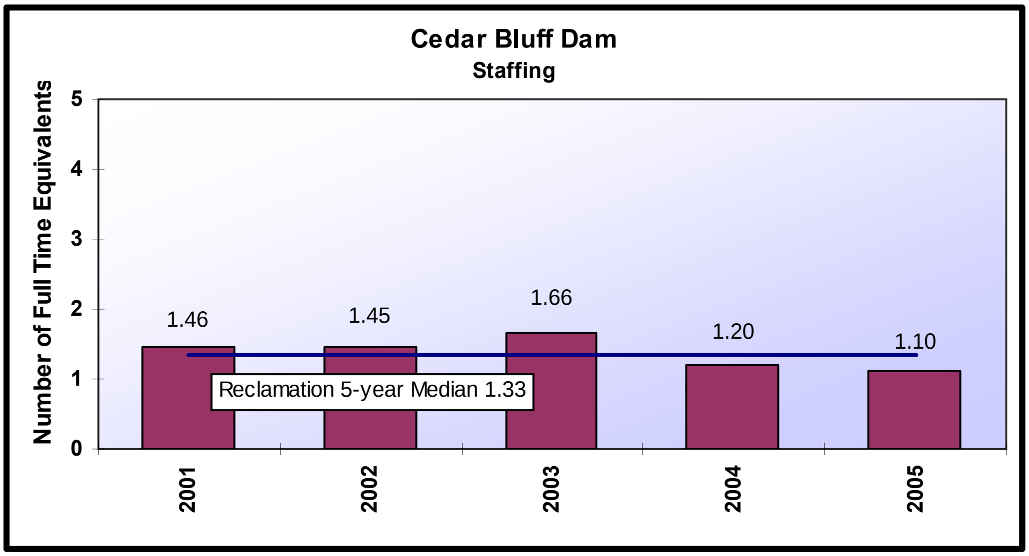
Cost Benchmarks







Staffing Benchmark



Clair Hill Whiskeytown Dam

(Whiskeytown Lake Reservoir)

Original construction completed: 1963 by Bureau of Reclamation (44 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Clear Creek, approximately 9 miles west of Redding, California

Type: zoned earthfill

Structural height: Main dam - 282 feet; dike 1 – 30 feet; dike 2 – 75 feet

Dam crest length: 4,000 feet – (main dam - 2,250 feet; dike 1 - 750 feet; dike 2 - 1,050 feet)

Dam crest elevation: 1228 feet

Dam embankment volume: 4,540,000 ft^3

Active reservoir capacity: 241,500 acre-feet at top of joint use elevation 1210.0 feet

Authorized benefits: irrigation, flood control, recreation, and power

Spillway description: concrete morning-glory intake and ogee crest at elevation 1210.0 feet, a vertical transition curve, a tunnel, and a flip-bucket energy dissipater; design capacity – 28,650 ft^3/s at maximum water surface elevation 1220.5 feet

Outlet works description: lower and an upper intake structure each with an upstream concrete pressure tunnel leading to a single gate chamber. The pressure tunnel from the lower intake transitions to two conduits within the gate chamber. A 2.75- by 3.75-foot high-pressure guard gate is installed on each conduit. Each conduit then transitions to a steel pipe within a concrete access tunnel. The access tunnel is entered through a control structure which houses a 2.75- by 3.75-foot high-pressure regulating gate on each steel pipe. The pressure tunnel from the upper intake transitions into a conduit within the gate chamber on which a 2.75- by 3.75-foot high-pressure guard gate is installed. It then transitions to a steel pipe, which joins the right steel pipe of the lower level intake. The outlet pipes discharge into a stilling basin. Design capacity of the lower level system is 1,241 ft^3/s, the upper level design capacity is 599 ft^3/s at maximum water surface elevation 1220.5 feet

Other features associated with dam: The city of Redding has a powerplant to the right of the outlet works control structure supplied by penstocks that bifurcate from the steel outlet pipes. Two other bifurcations from the outlet works steel pipes supply water to a water district. The lake provides water via a concrete conduit to a Reclamation Powerplant through an intake structure located 2 miles northeast of the main embankment. At the upstream end of the lake a Reclamation Powerplant discharges water into the lake that is flowing via a 10.7-mile power conduit from Lewiston Lake on the Trinity River. The reservoir also serves as an afterbay for an upstream powerplant. A county road runs along the crest of the embankments leading to public campgrounds and trailheads. The dam and lake are located within a National Recreation Area administered by the National Park Service.

Complexity factor: 23

Owner: Bureau of Reclamation

Jurisdiction: Mid Pacific Region, Northern California Area Office

Operation and maintenance responsibility: Northern California Area Office

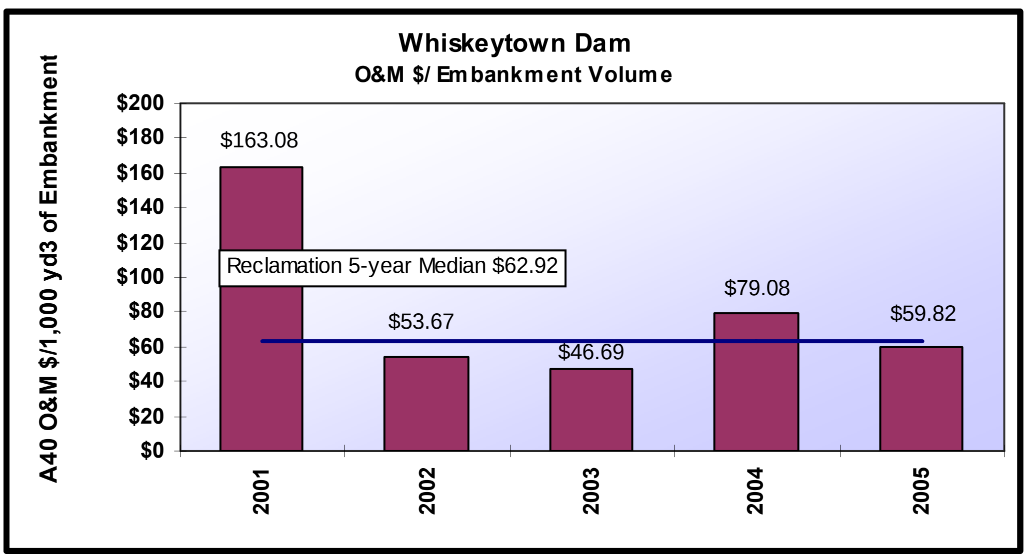
Supervisory/remote control: most operations are performed locally; reservoir water surface elevation, dam releases and some other site data are monitored remotely via two SCADA systems

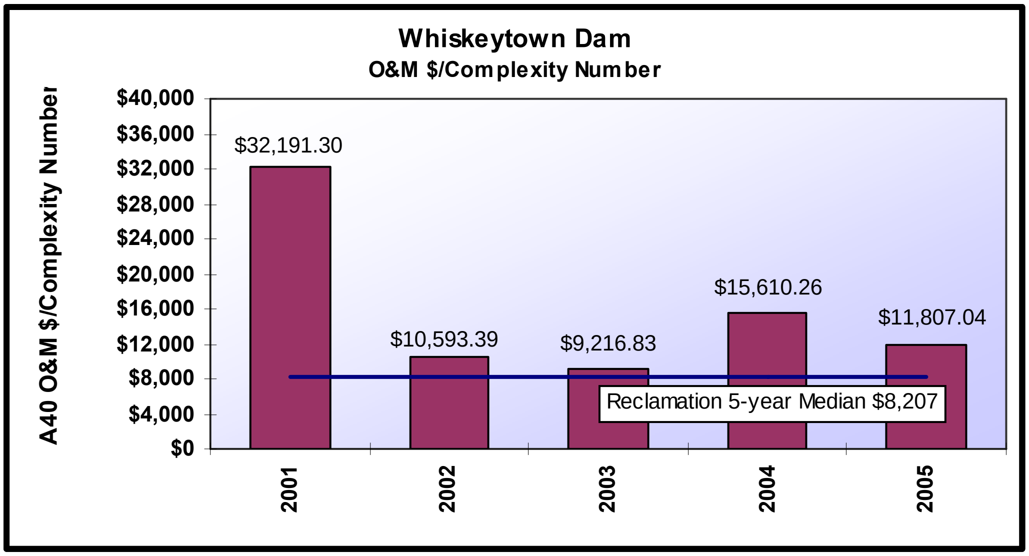
Whiskeytown Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$271,562	$740,400	91.7%	239,207	446,574
2002	$359,036	$243,648	18.4%	240,168	445,340
2003	$211,987	$211,987	24.1%	247,764	627,114
2004	$511,154	$359,036	18.8%	238,727	62,219
2005	$406,219	$271,562	16.2%	241,322	66,491
Median	**$359,036**	**$271,562**	**33.8%**		

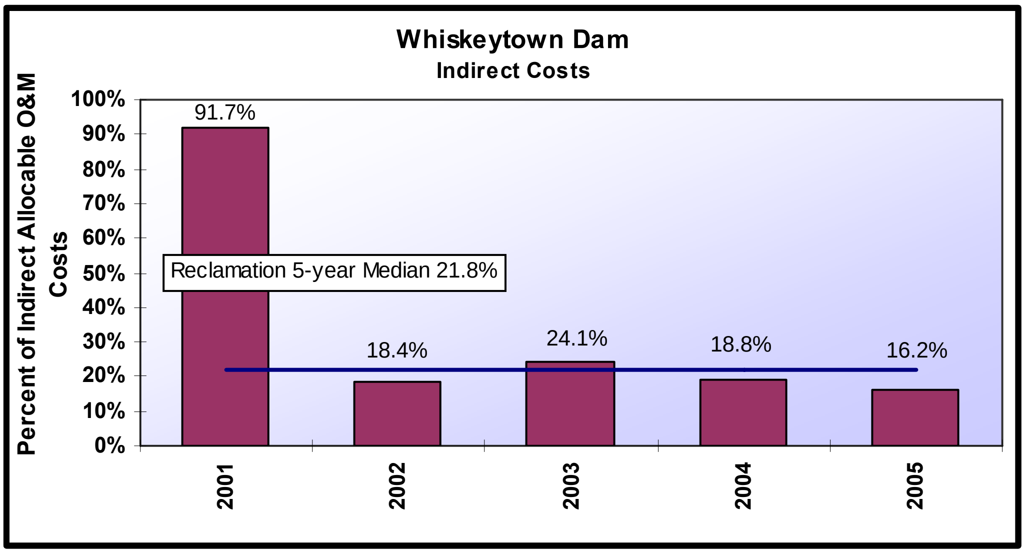
Benchmarking Analysis

Whiskeytown Dam Benchmark Summary			
Benchmark	Whiskeytown Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 59.82	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 11,807.04	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	18.81%	21.8%	15.61%
Full Time Equivalents	0.79	1.33	0.58

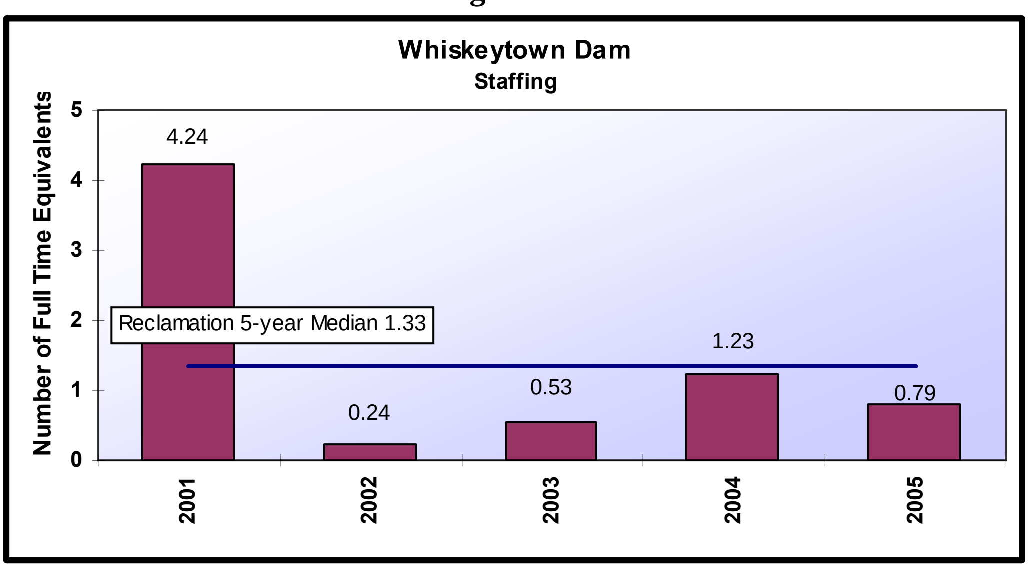
Cost Benchmarks







Staffing Benchmark



Dickinson Dam

(Dickinson Reservoir)

Original construction completed: 1950 by Bureau of Reclamation (57 years old)

Completion date and nature of subsequent modifications: 1982-1983 modifications to address hydrologic deficiencies (raising dam crest elevation 2.5 feet, installing a hinged flap gate (bascule gate) on the spillway crest, and constructing an auxiliary spillway)

Watercourse: Heart River, approximately 1 mile southwest of Dickinson, ND

Type: zoned earthfill

Structural height: 64.6 feet

Dam crest length: 2275 feet (except approximately 200-foot-long portion of dam crest adjacent to the left abutment, which is at the original dam crest elevation 2434 ft)

Dam crest elevation: 2436.6 feet

Dam embankment volume: 340,000 ft^3

Active reservoir capacity: 8156 acre-feet at top of active conservation elevation 2420 feet (service spillway gate top elevation)

Authorized benefits: irrigation storage, flood control, recreation, fish and wildlife (M&I outlets, used for City of Dickinson, are essentially abandoned)

Spillway description: near right dam abutment; includes a 66-foot-long concrete approach apron (converging to 200 feet wide at the crest), and a 200-foot-wide concrete ogee crest, on which is installed a 200-foot-long hinged flap gate (bascule gate); the elevation of the top of the gate leaf in the raised (closed) position is 2420 feet, which is the top of active conservation storage; spillway gate is operated by two hydraulic rams, each attached to a lever arm at the left end of the steel-pipe gate leaf hinge-pin (also known as the torque tube); the ogee crest transitions to a 200-foot-wide, 99-foot-long chute, to a stilling basin with chute blocks; the discharge capacity of the service spillway is 38,770 ft^3/s at reservoir water surface elevation 2430.6 feet

Outlet works description: located at left service spillway wall, consists of 250- to 300-foot-long, 30 inch-diameter steel pipe, which draws from the reservoir into a 4-foot-wide by 3-foot-high opening in the curved portion of the left spillway wall (through a manually-operated 24-inch-square emergency slide gate, which introduced water into a 24 inch-diameter steel pipe that is 61 feet long and has a dry access conduit approximately 6 feet wide by 7 feet high, which extends to the gate chamber; two 24-inch gate valves are installed o the outlet works pipe within the gate chamber; discharge capacity 58 ft^3/s at reservoir water surface elevation 2420 feet

Other features associated with dam: auxiliary spillway located approximately 700 feet from right end of dam, consisting of a 1100 ft-long concrete crest (30 ft-wide concrete, with riprap upstream and concrete apron downstream), leading to grass-lined spillway; discharge capacity of auxiliary spillway is 61,000 ft^3/s at reservoir water surface elevation 2430.6-foot gate vault control (ventilating, heating), ice boom, deicing system, data collection platform, reservoir level sensing and monitoring equipment, security alarm system, gate chamber ventilation system, control house heater, gate jacking/blocking equipment, storage facilities, boat, transfer switch

Complexity Number: 12

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Dakotas Area Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by Dakotas Area Field Office personnel

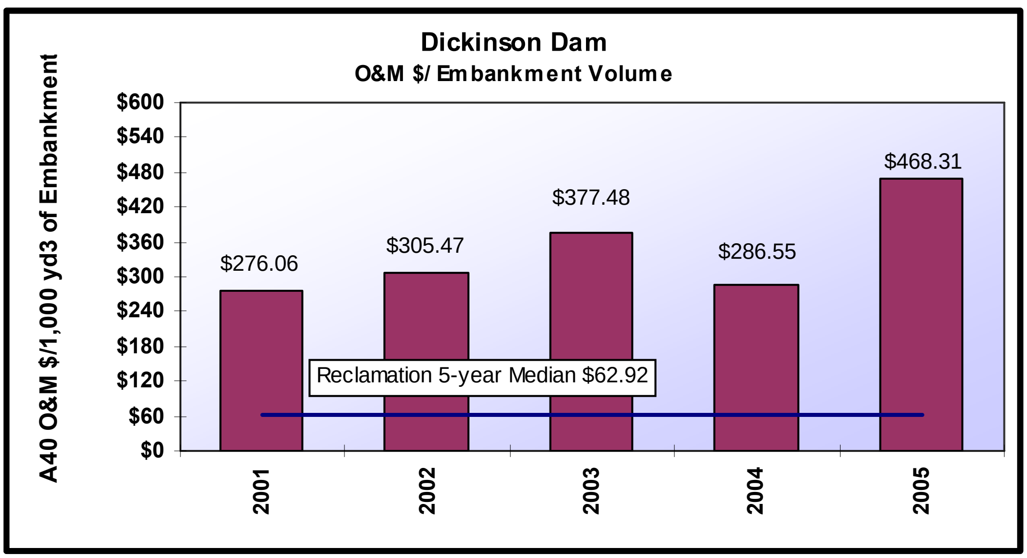
Supervisory/remote control: none

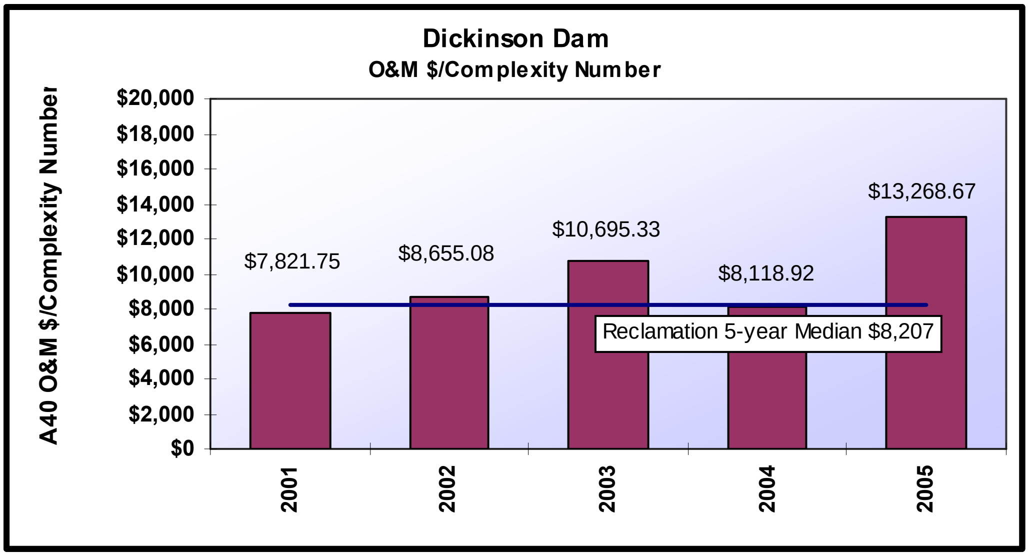
Dickinson Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$93,861	$93,861	30.1%	9,500	24,575
2002	$103,861	$103,861	27.9%	9,335	3,668
2003	$128,344	$128,344	25.4%	9,449	14,906
2004	$97,427	$97,427	28.0%	9,551	19,218
2005	$159,224	$159,224	28.6%	9,285	18,085
Median	**$103,861**	**$103,861**	**28.0%**		

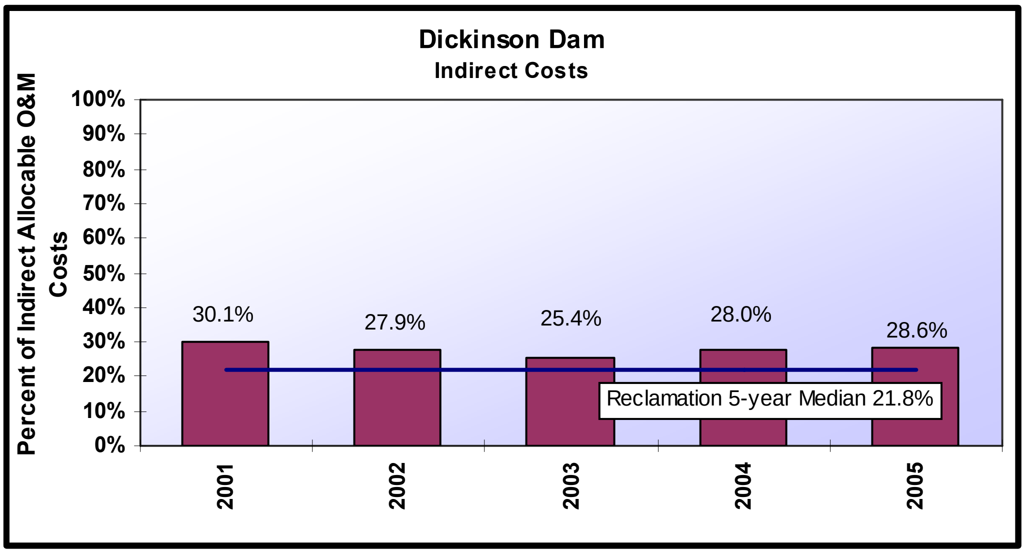
Benchmarking Analysis

Dickinson Dam Benchmark Summary			
Benchmark	**Dickinson Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 305.47	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 8,655.08	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	28.02%	21.8%	15.61%
Full Time Equivalents	0.81	1.33	0.58

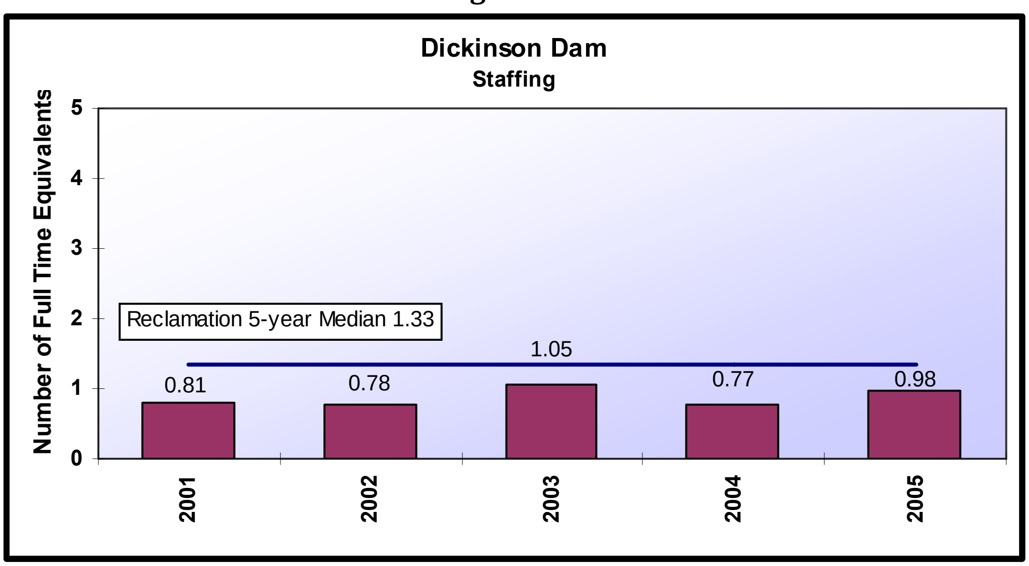
Cost Benchmarks







Staffing Benchmark



Enders Dam

(Enders Reservoir)

Original construction completed: 1951 by Bureau of Reclamation (56 years old)

Completion date and nature of subsequent modifications: 1972 – pump-back system installed at spillway stilling basin to transfer seepage into the stilling basin back to the outlet works pressure pipe within the horseshoe conduit

Watercourse: Frenchman River, approximately 51 miles west of McCook, Nebraska

Type: homogeneous earthfill

Structural height: 134 feet

Dam crest length: 2603 feet

Dam crest elevation: 3137.5 feet

Dam embankment volume: 1,950,000 ft^3

Active reservoir capacity: 64,010 acre ft at top of exclusive flood control elevation 3127 feet

Authorized benefits: irrigation, flood control (incidental recreation, fish and wildlife)

Spillway description: right abutment; consists of six radial gate bays (each controlled by a 50-foot-wide by 30-foot-high radial gate), with a 10-foot-wide uncontrolled bay centered between the gate-controlled bays; the radial gates are operated with electric hoists installed on the gate control deck (upstream of the highway bridge that crosses the spillway); the radial gates open automatically when float switches activate the hoists; the spillway chute is 325 feet long, leading to a 400-foot-wide by 115-foot-long stilling basin; discharge capacity 200,000 ft^3/s at reservoir water surface elevation 3129.5 feet

Outlet works description: river outlet works located to the left of spillway; consists of a vertical trashracked intake structure, a 298-foot-long, 7-foot-diameter concrete conduit (through a 6- by 7.5-ft hydraulically operated emergency slide gate within a concrete gate chamber), a 300-foot-long, 7-foot-diameter steel pressure pipe within a 11.5-foot-diameter concrete conduit and bifurcates to two 60-inch-diameter pressure pipes (each with a 60-inch-diameter hollow-jet regulating valve) approximately 40 feet upstream from the hollow-jet valves; discharge capacity of 1448 ft^3/s at reservoir water surface elevation 3129.5 feet

Other features associated with dam: SCADA system, six radial gates of spillway with highway bridge spanning over (radial gates hoist motors power and control system); a zoned earthfill dike is located 4000 feet north of the dam

Complexity Number: 34

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

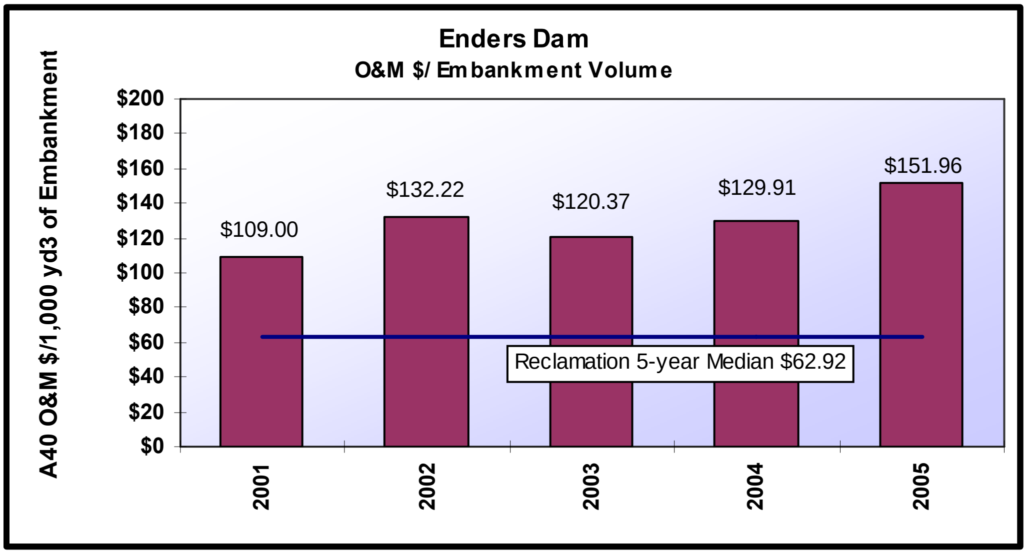
Enders Dam Statistics by Fiscal Year

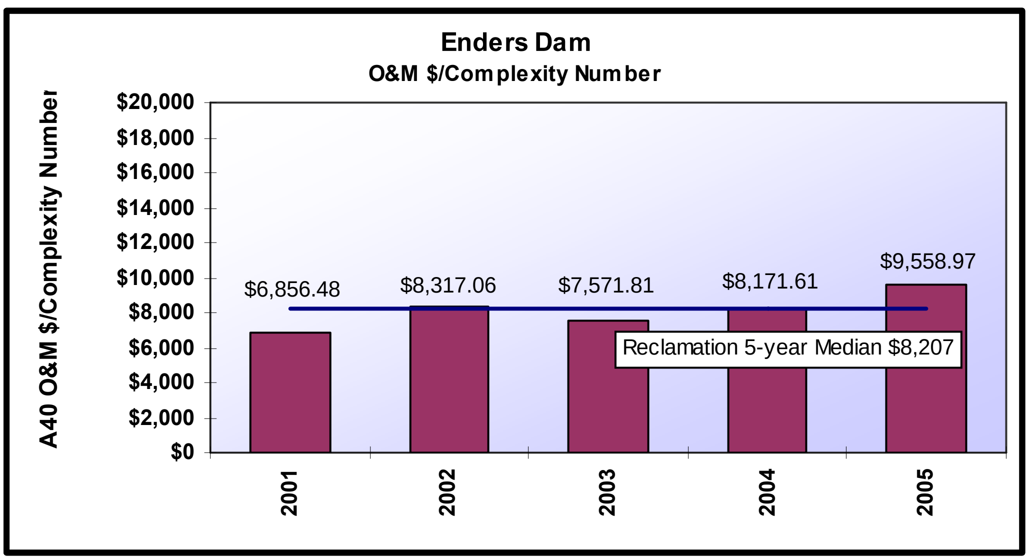
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$228,775	$212,551	17.1%	20,520	9,834
2002	$257,829	$257,829	22.0%	15,148	5,064
2003	$234,726	$234,726	19.3%	13,755	3,350
2004	$257,071	$253,320	19.0%	11,809	2,134
2005	$417,283	$296,328	13.9%	12,981	2,134
Median	**$257,071**	**$253,320**	**18.2%**		

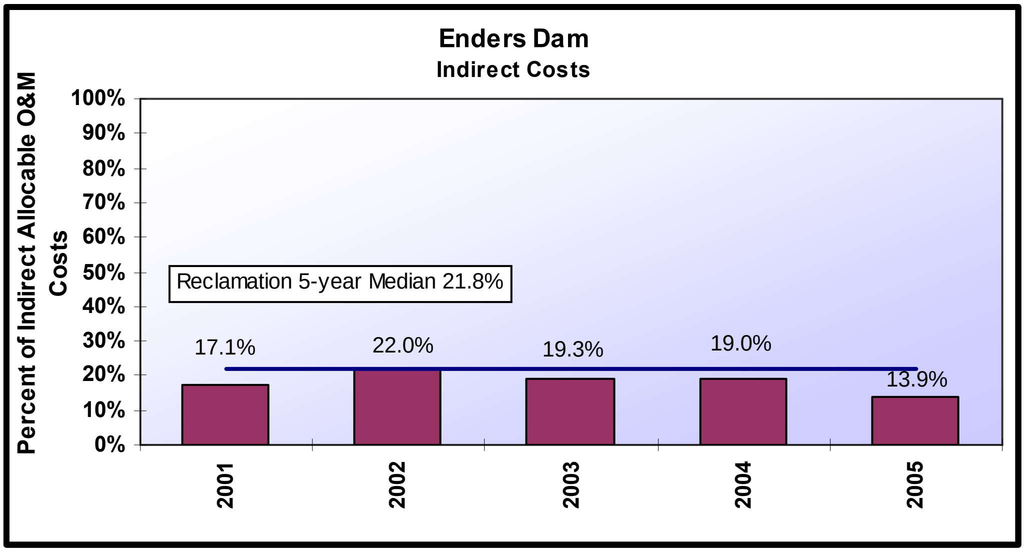
Benchmarking Analysis

Enders Dam Benchmark Summary			
Benchmark	Enders Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 129.91	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 8,171.61	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	18.97%	21.8%	15.61%
Full Time Equivalents	1.50	1.33	0.58

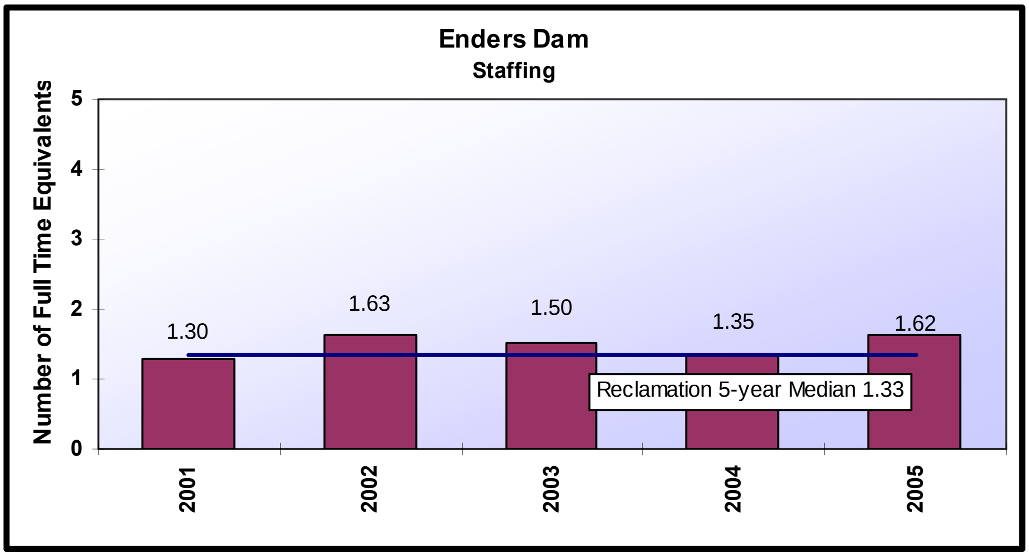
Cost Benchmarks







Staffing Benchmark



Glen Elder Dam

(Waconda Lake)

Original construction completed: 1969 by Bureau of Reclamation (38 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Solomon River, approximately 12 miles west of Beloit, Kansas

Type: zoned earthfill

Structural height: 142 feet

Dam crest length: 15,275 feet

Dam crest elevation: 1500 feet

Dam embankment volume: 10,030,000 ft^3

Active reservoir capacity: 916,171 acre-feet at top of exclusive flood control elevation 1488.3 feet

Authorized benefits: irrigation, municipal uses, flood control, recreation, fish and wildlife

Spillway description: on right abutment; consists of a gated crest with release controlled by twelve 50- by 21.76-foot radial gates, a concrete chute, and a stilling basin and outlet channel; discharge capacity 264,500 ft^3/s at reservoir water surface elevation 1492.9 feet; spillway drainage gallery, spillway ventilation system, spillway service gallery sump pumping units

Outlet works description: on left abutment; consists of trashracked intake structure, a 12.5-foot-diameter steel-lined upstream conduit, a gate chamber and access shaft containing a 9- by 12-foot emergency gate, a 17.5-foot-diameter horseshoe-shaped downstream conduit containing a 12-foot, 3-inch-diameter steel outlet pipe, a control house containing two 6.5- by 8-foot-high pressure regulating slide gates (also two 12-inch jet-flow gates used for low releases), a concrete chute and stilling basin, and an outlet channel; discharge capacity 4000 ft^3/s at reservoir water surface elevation 1455.6 feet

Other features associated with dam: SCADA system; outlet works reservoir level gage, ventilation system, sump pumping unit, building with heating system, auxiliary power plants and standby generators

Cawker City Protective Dike and Downs Protective Dike are located at the north end of the reservoir and enclose the upper reaches of the reservoir.

Cawker City Protective Dike outlet works, used to pump drainage water and lagoon-treated effluent from the town into the reservoir, consists of a trashracked intake structure, a 36-inch-diameter steel-lined conduit, a pump and control house containing two pumps, a 4-foot-square slide gate, a stilling basin, and an outlet channel.

Downs Protective Dike outlet works, used to pump drainage and treated effluent into the reservoir from the town, consists of a trashracked intake structure, an 8-foot-diameter concrete conduit with a 36 inch steel outlet pipe, a stilling basin, and an outlet channel. A separate treated sewage discharge facility is enclosed at the outlet works control structure.

Complexity Number: 51

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator resides at damsite and performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

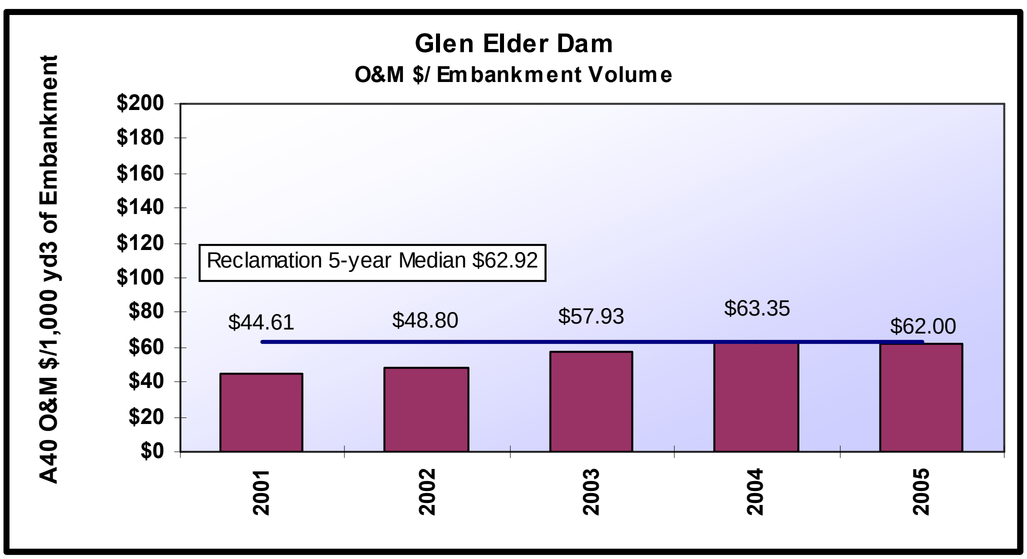
Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction.

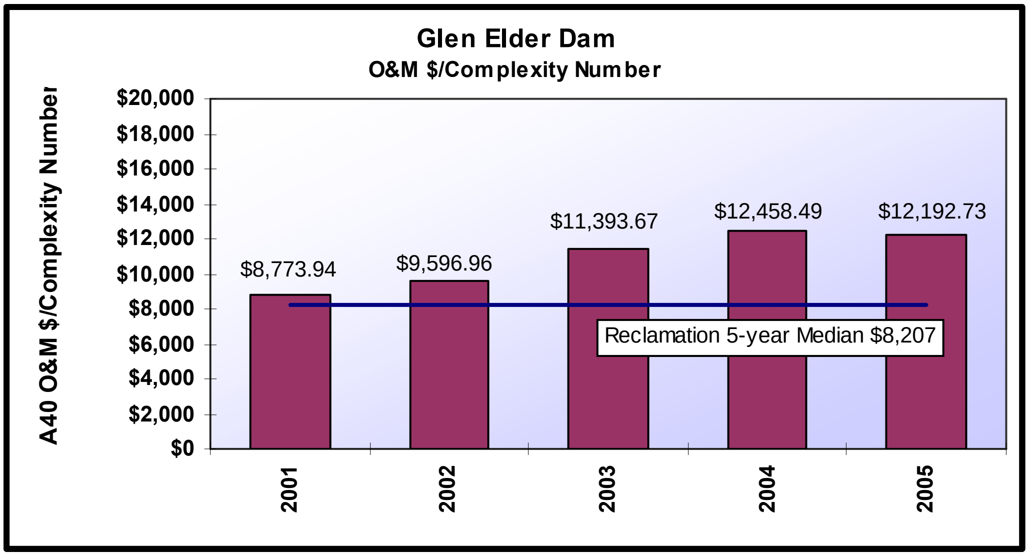
Glen Elder Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$447,471	$447,471	54.1%	270,273	86,551
2002	$690,190	$489,445	35.0%	226,737	60,787
2003	$633,055	$581,077	52.0%	195,816	25,306
2004	$1,191,371	$635,383	31.3%	168,728	21,786
2005	$688,251	$621,829	53.1%	171,129	19,620
Median	**$688,251**	**$581,077**	**45.1%**		

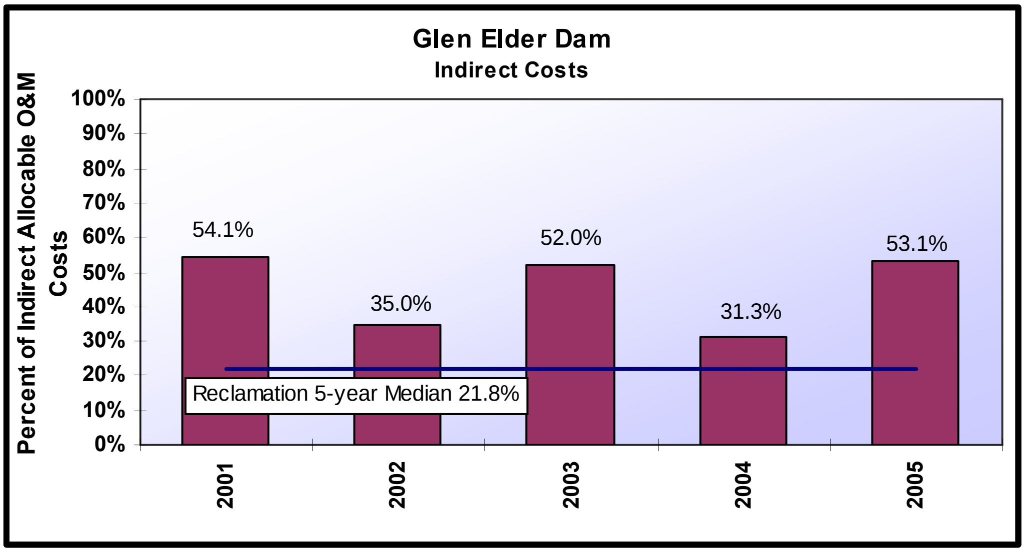
Benchmarking Analysis

Glen Elder Dam Benchmark Summary			
Benchmark	**Glen Elder Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 57.93	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 11,393.67	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	52.05%	21.8%	15.61%
Full Time Equivalents	2.76	1.33	0.58

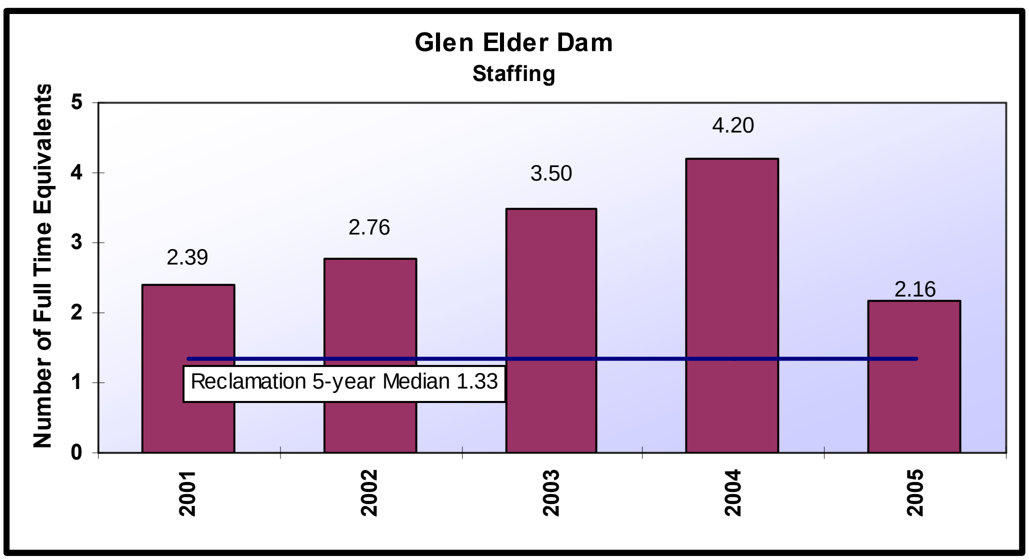
Cost Benchmarks







Staffing Benchmark



Heart Butte Dam

(Lake Tschida)

Original construction completed: 1949 by Bureau of Reclamation (58 years old)

Completion date and nature of subsequent modifications: 1987 – dam safety modification; removal of a low embankment dike (approx. 1.5 miles southwest of dam) and construction of auxiliary spillway at the former dike location

Watercourse: Heart River, approximately 70 miles southwest of Bismarck, ND

Type: zoned earthfill

Structural height: 142 feet

Dam crest length: 1850 feet

Dam crest elevation: 2124 feet

Dam embankment volume: 1,140,000 ft^3

Active reservoir capacity: 208,942 acre-feet at top of exclusive flood control elevation 2094.5 feet

Authorized benefits: irrigation, flood control, incidental water supply, recreation, fish and wildlife

Spillway description: uncontrolled morning-glory type crest structure (27-foot-diameter circular concrete ogee) located near right dam abutment, vertical shaft transitions to a horizontal 14-foot-diameter spillway conduit, to a 75-foot-long chute; capacity 5700 ft^3/s at reservoir water surface elevation 2064.5 feet

Outlet works description: river outlet works located at the service spillway, with a 7.27-foot-diameter bellmouth intake located at the downstream side of the service spillway morning glory hole with trashracked opening, to pressure conduit to gate chamber containing two 4-foot by 5-foot-high pressure gates for emergency and regulating gates (with high pressure hydraulic cylinders and bonnets), to a metal conduit liner, chute, and stilling basin; capacity 700 ft^3/s at reservoir water surface elevation 2030 feet

Auxiliary spillway consists of 2685-foot-long concrete control sill, riprap on upstream and downstream faces, and a grass-lined channel; discharge capacity of 200,600 ft^3/s at reservoir water surface elevation 2119.5 feet

Other features associated with dam: auxiliary spillway, emergency power, distribution panelboards and control boards, motors, lighting system

Complexity Number: 16

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Dakotas Area Office

Operation and maintenance responsibility: dam operator lives at damsite and performs daily O&M; large maintenance tasks are performed by Dakotas Area Office Field personnel

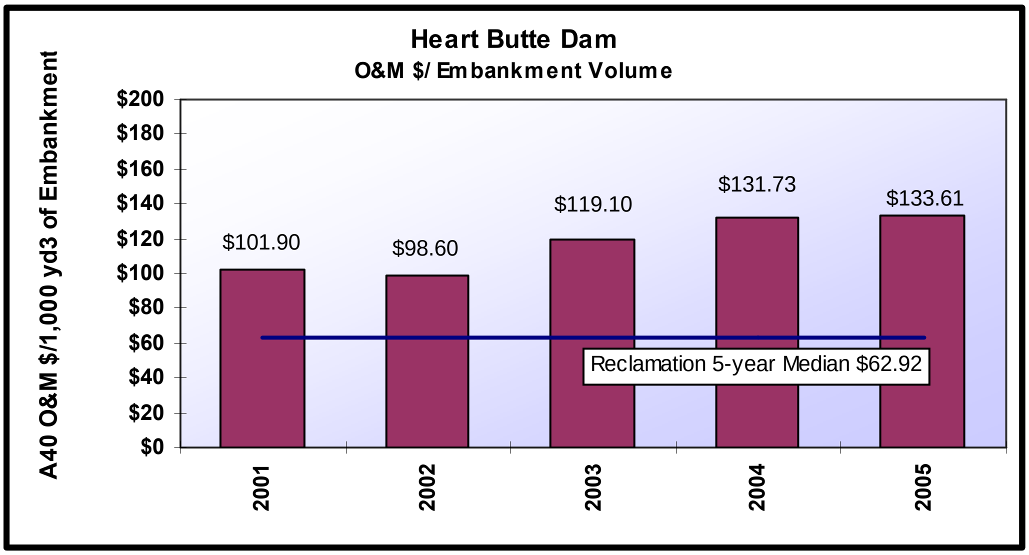
Supervisory/remote control: none

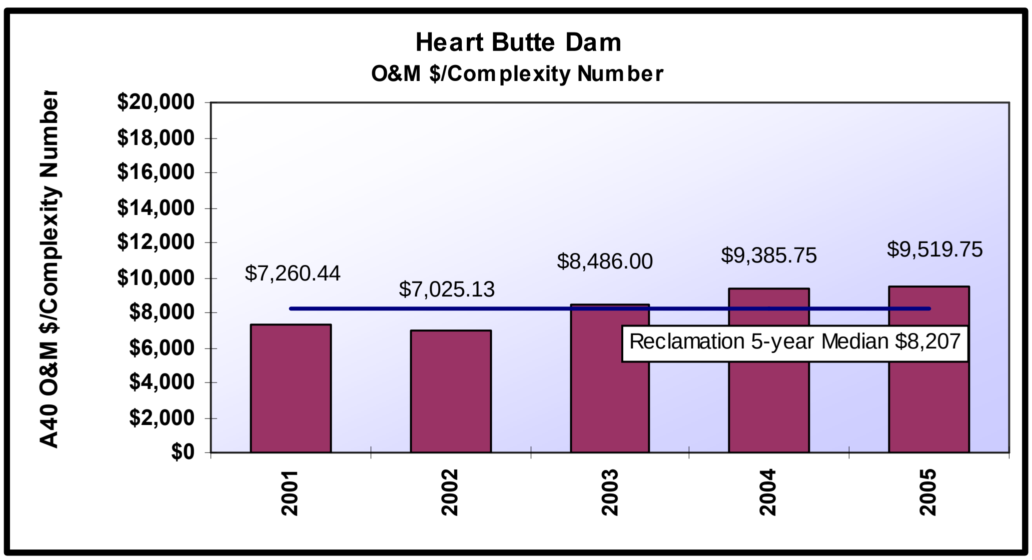
Heart Butte Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$117,952	$116,167	43.3%	73,254	117,615
2002	$117,519	$112,402	32.3%	65,016	25,557
2003	$138,499	$135,776	24.7%	87,807	61,540
2004	$152,600	$150,172	26.2%	82,015	67,124
2005	$154,744	$152,316	25.6%	73,773	34,920
Median	**$138,499**	**$135,776**	**30.4%**		

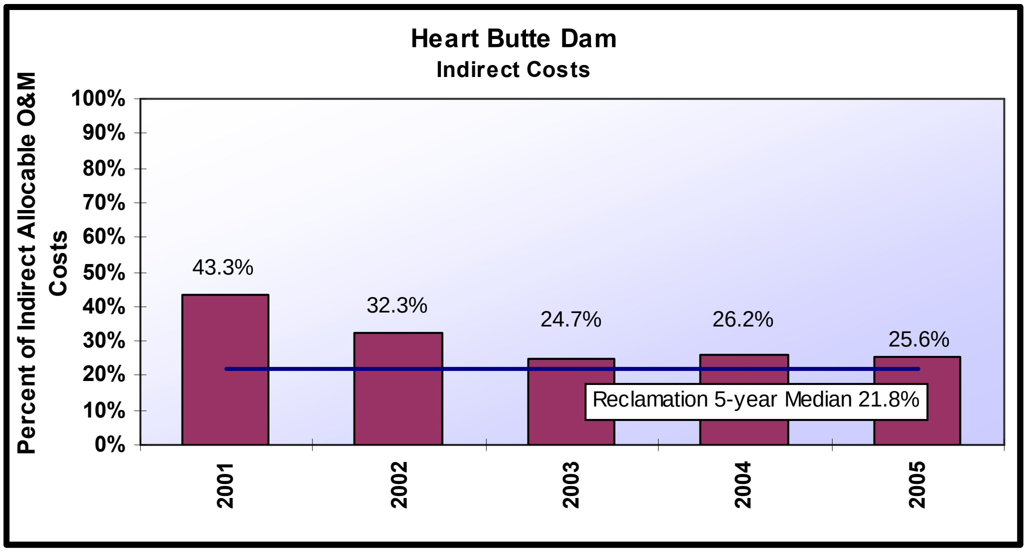
Benchmarking Analysis

Heart Butte Dam Benchmark Summary			
Benchmark	Heart Butte Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 119.10	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 8,486.00	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	26.20%	21.8%	15.61%
Full Time Equivalents	1.14	1.33	0.58

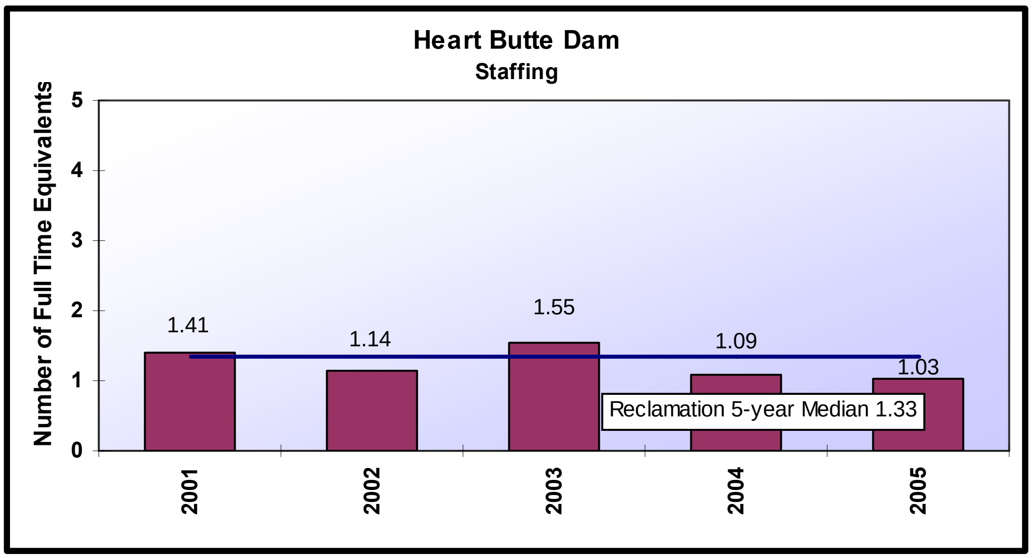
Cost Benchmarks







Staffing Benchmark



Heron Dam

(Heron Reservoir)

Original construction completed: 1971 (36 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: offstream storage reservoir located on Willow Creek just above the confluence of Willow Creek and Rio Chama, approximately 9 miles southwest of Park View, New Mexico

Type: homogeneous earthfill

Structural height: 269 feet

Dam crest length: 1220 feet

Dam crest elevation: 7199.0 feet

Dam embankment volume: 3,031,121 ft^3

Active reservoir capacity: 400,116 acre-feet at top of active conservation elevation 7186.1 feet

Authorized benefits: irrigation, municipal and industrial, fish and wildlife

Spillway description: consists of an inlet channel, a concrete section with a 40-foot-long overflow crest at elevation 7186.1 with a 3-foot-wide by 2-foot-deep slot at the spillway centerline, a concrete discharge chute, and a rock-cut outlet channel; capacity of the spillway is 660 ft3/s at reservoir elevation 7190.8 feet

Outlet works description: a concrete intake structure, a 10-foot-diameter upstream tunnel with a meter flow tube, a gate chamber with two sets of 4- by 6-foot guard and regulating gates, an 11-foot modified horseshoe downstream tunnel, a stilling basin and outlet channel, an adit and shaft for access to the gate chamber, and a shaft house. The capacity of the outlet works gates is limited to 4,160 ft^3/s at reservoir elevation 7190.8 feet to prevent cavitation in the meter flow tube

Other features associated with dam: N/A

Complexity factor: 21

Owner: Bureau of Reclamation

Jurisdiction: Upper Colorado Region, Albuquerque Area Office, Chama Field Office

Operation and maintenance responsibility: dam is visited daily during the diversion season by field office personnel; outside the diversion season, visits to the dam are made at least weekly; there is no resident dam tender.

Supervisory/remote control: guard and regulating gates can be operated manually at the dam, with pushbutton controls, or remotely from the Chama Field Division Office via a remote terminal unit installed in the shaft house.

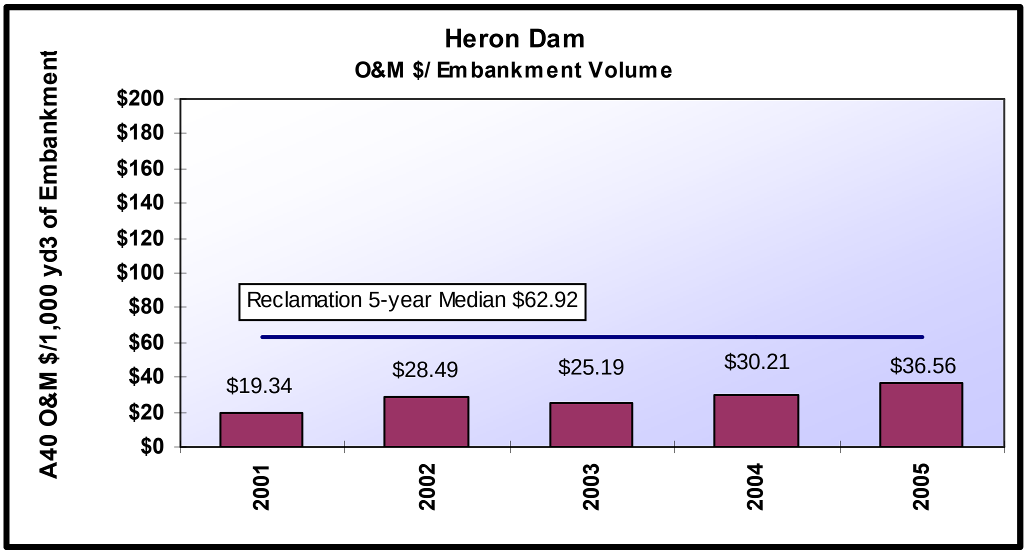
Heron Dam Statistics by Fiscal Year

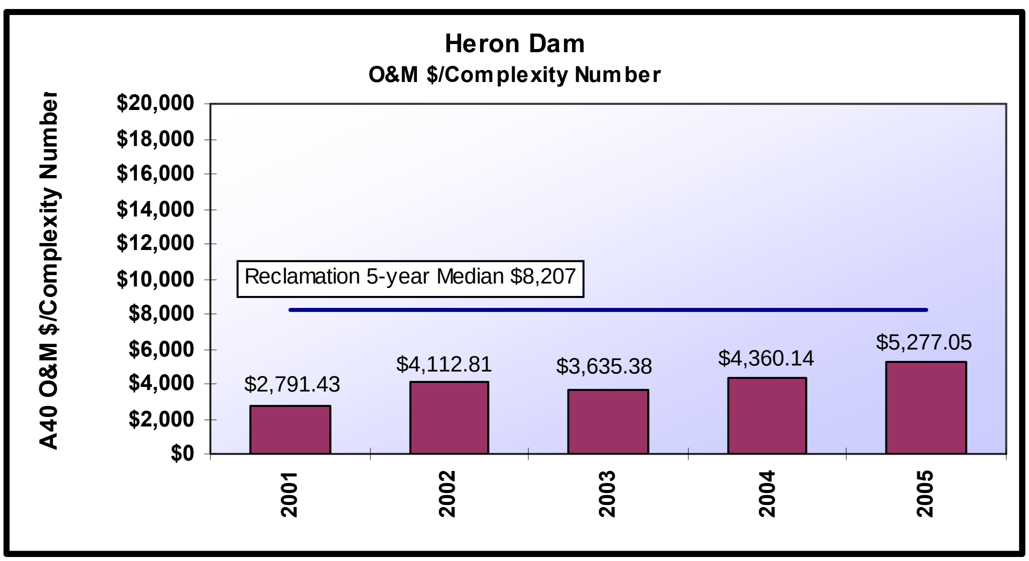
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$242,120	$58,620	20.1%	342,486	68,008
2002	$86,369	$86,369	32.7%	340,222	169,176
2003	$76,343	$76,343	30.2%	198,766	93,103
2004	$91,563	$91,563	27.3%	137,924	105,914
2005	$110,818	$110,818	30.3%	234,082	48,121
Median	**$91,563**	**$86,369**	**28.1%**		

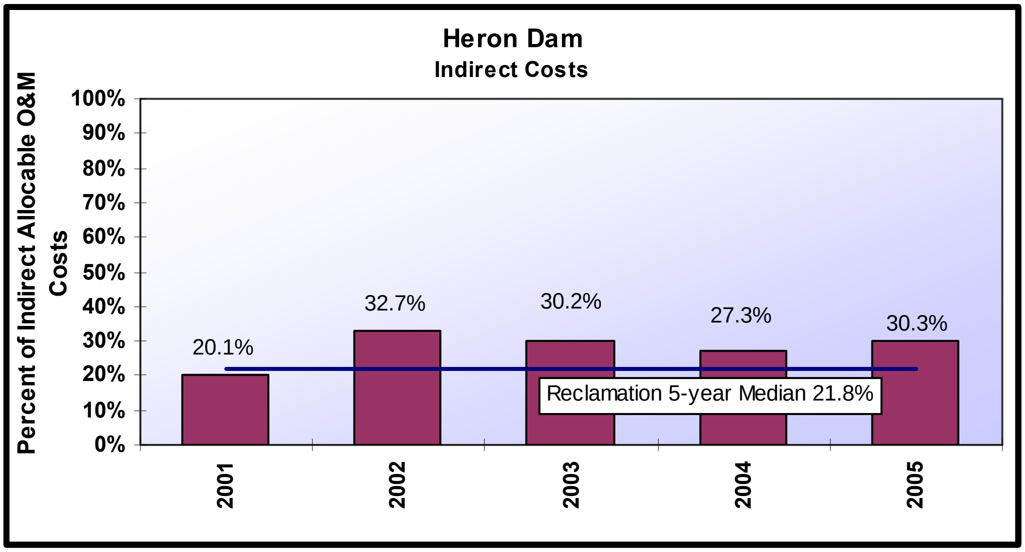
Benchmarking Analysis

Heron Dam Benchmark Summary			
Benchmark	**Heron Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 28.49	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 4,112.81	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	30.23%	21.8%	15.61%
Full Time Equivalents	0.86	1.33	0.58

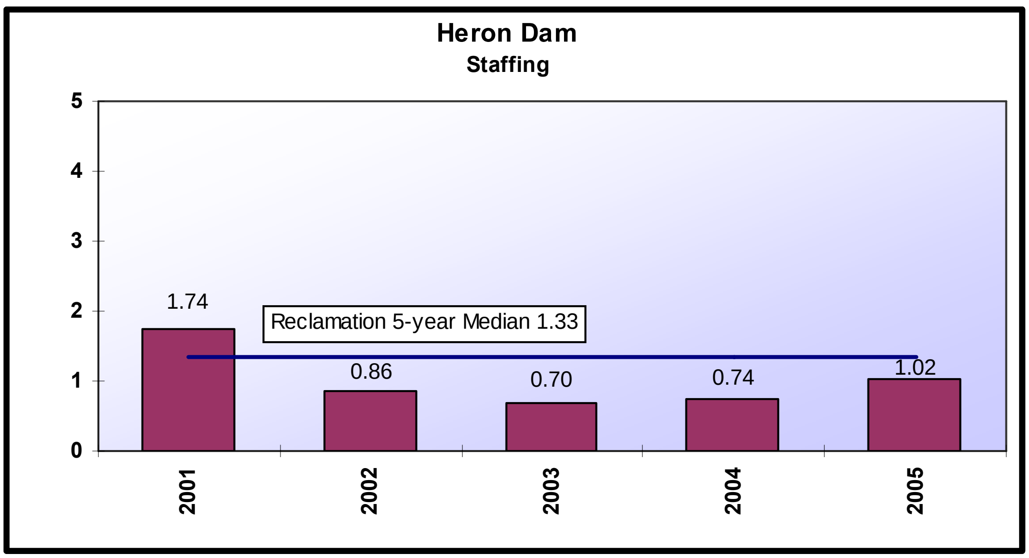
Cost Benchmarks







Staffing Benchmark



Jamestown Dam

(Jamestown Reservoir)

Original construction completed: 1954 by Bureau of Reclamation (53 years old)

Completion date and nature of subsequent modifications: eight relief wells were installed along the downstream toe in 1995

Watercourse: James River, just north of Jamestown, North Dakota

Type: zoned earthfill

Structural height: 110 feet

Dam crest length: 1418 feet

Dam crest elevation: 1471 feet

Dam embankment volume: 963,000 ft^3

Active reservoir capacity: 220,156 acre-feet at top exclusive flood control elevation 1454 feet

Authorized benefits: flood control, irrigation, recreation, fish and wildlife

Spillway description: capacity 2930 ft^3/s at reservoir water surface elevation 1464.5 feet; uncontrolled morning-glory type inlet structure(24-foot, 4-inch-diameter with crest elevation 1454 feet) with 9-foot, 6-inch-diameter concrete conduit (221.25 feet long) through right dam abutment

Outlet works description: capacity 2990 ft^3/s at reservoir water surface elevation 1464.4 ft; high pressure gate-controlled conduit through left dam abutment (292 feet of 9.5-foot-diamter conduit between intake and gate chamber, 151 feet of 13.6-foot-diameter wide horseshoe-shaped conduit extending to stilling basin); 4-foot by 5-foot emergency gate, 4-foot by 5-foot regulating gate

Other features associated with dam: electrical system and equipment, reservoir level sensing and monitoring equipment, security alarm system, gate chamber ventilation system, relief wells, sump pump, control house heater, data collection platform

Complexity Number: 11

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Dakotas Area Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by Dakotas Area Office Field Office personnel

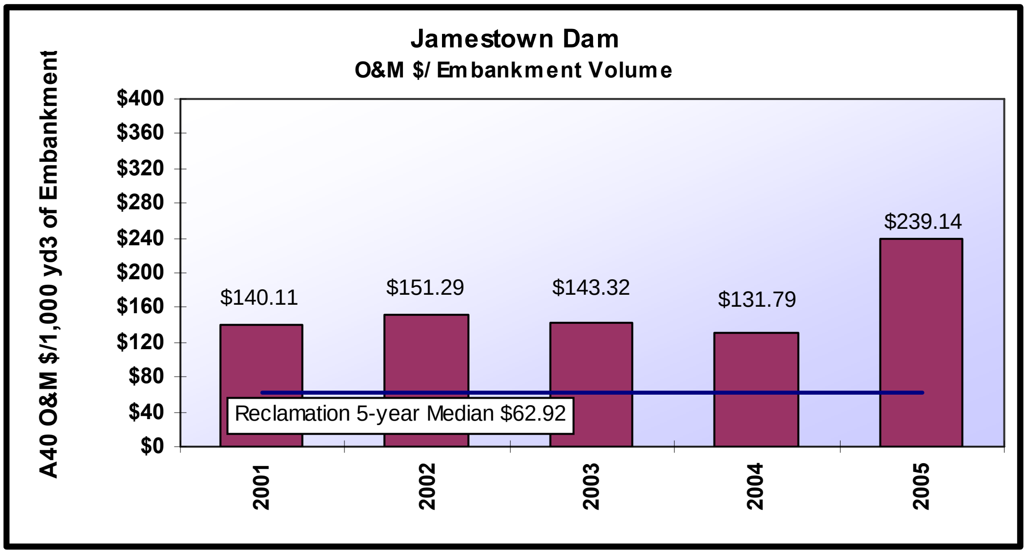
Supervisory/remote control: none

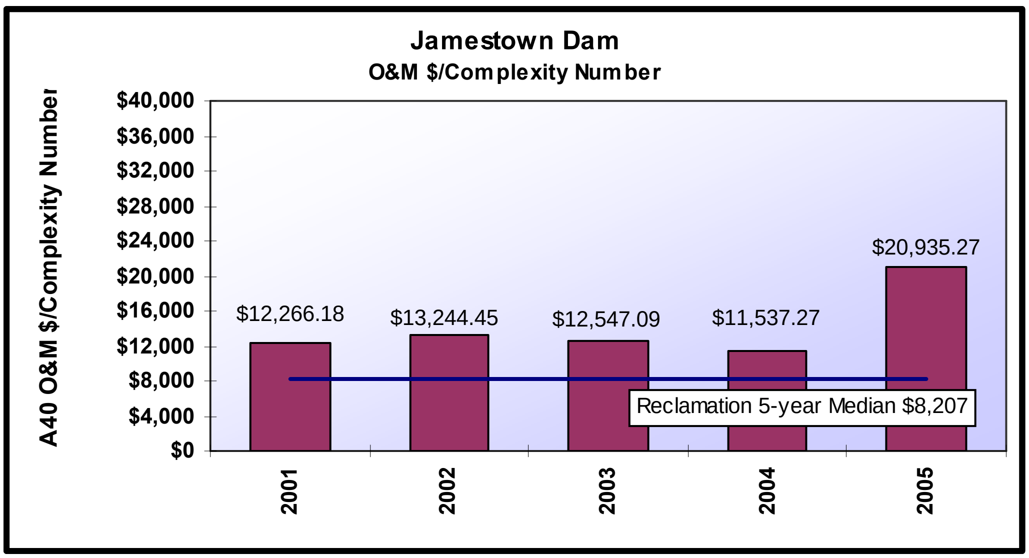
Jamestown Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$135,596	$134,928	22.0%	95,890	203,225
2002	$152,825	$145,689	27.5%	33,644	14,507
2003	$138,018	$138,018	27.4%	35,038	31,542
2004	$128,632	$126,910	29.6%	53,100	95,813
2005	$230,903	$230,288	11.9%	34,611	26,627
Median	**$138,018**	**$138,018**	**23.7%**		

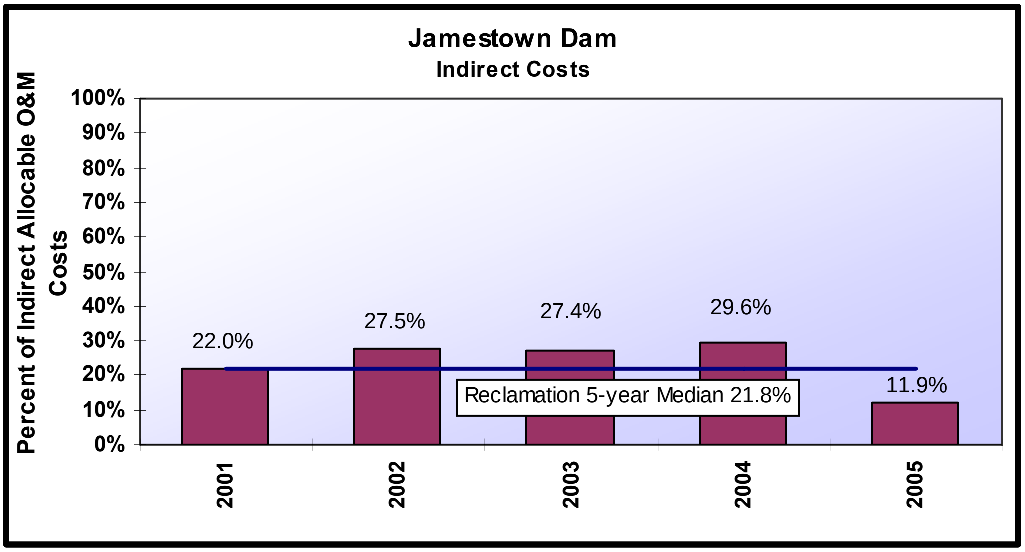
Benchmarking Analysis

Jamestown Dam Benchmark Summary			
Benchmark	Jamestown Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 143.32	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 12,547.09	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	27.38%	21.8%	15.61%
Full Time Equivalents	1.06	1.33	0.58

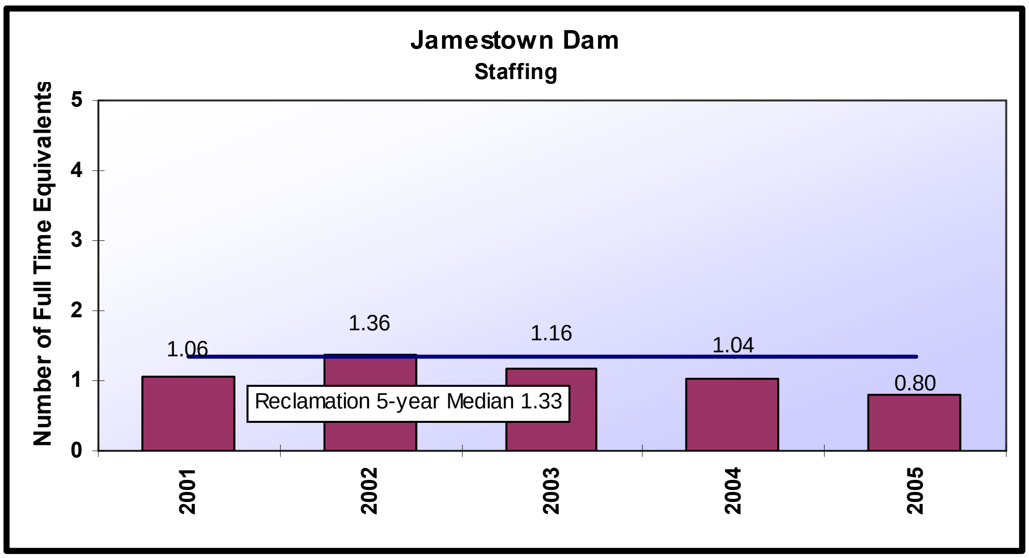
Cost Benchmarks







Staffing Benchmark



Keyhole Dam

(Keyhole Reservoir)

Original construction completed: 1952 by Bureau of Reclamation (55 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Belle Fourche River (offstream), located in northeastern Wyoming

Type: zoned earthfill

Structural height: 168 feet

Dam crest length: 3420 feet

Dam crest elevation: 4134 feet

Dam embankment volume: 1,335,000 ft^3

Active reservoir capacity: 322,542 acre-feet at top of exclusive flood control elevation 4,111.5 ft

Authorized benefits: irrigation, flood control, recreation, fish and wildlife

Spillway description: right dam abutment; consists of a short 70-foot-wide approach channel, concrete wingwalls, a uncontrolled crest (19.25 feet long, elevation 4099.3 feet) with a bridge, a concrete chute and flip bucket with a combined length of 254 feet, and a 40-foot-wide riprap-lined outlet channel to the river; design capacity 10,850 ft^3/s at reservoir water surface elevation 4128.7 feet

Outlet works description: concrete conduit through main dam located on left abutment; consists of a trashracked intake structure with inlet elevation 4051 feet, an upstream horseshoe-shaped tunnel, a gate chamber containing four 3.5-foot-square high-pressure slide gates, a 6-foot-diameter vertical access shaft, a free-flowing downstream horseshoe-shaped tunnel, and an open concrete chute and stilling basin with a riprap-lined outlet channel to the river; capacity 1480 ft^3/s at reservoir water surface elevation 4128.2 feet

Other features associated with dam: reservoir level recording equipment, gate position indicator, gate chamber ventilation system, space heater for control house (hoist house on the dam crest containing gate control equipment)

Complexity Number: 12

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Dakotas Area Office, Rapid City Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by Rapid City Field Office personnel

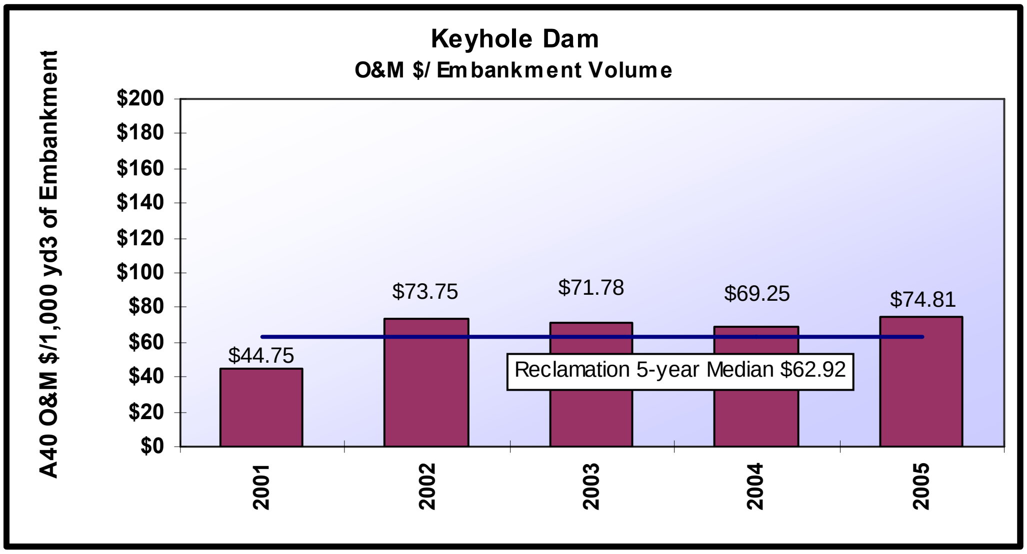
Supervisory/remote control: none

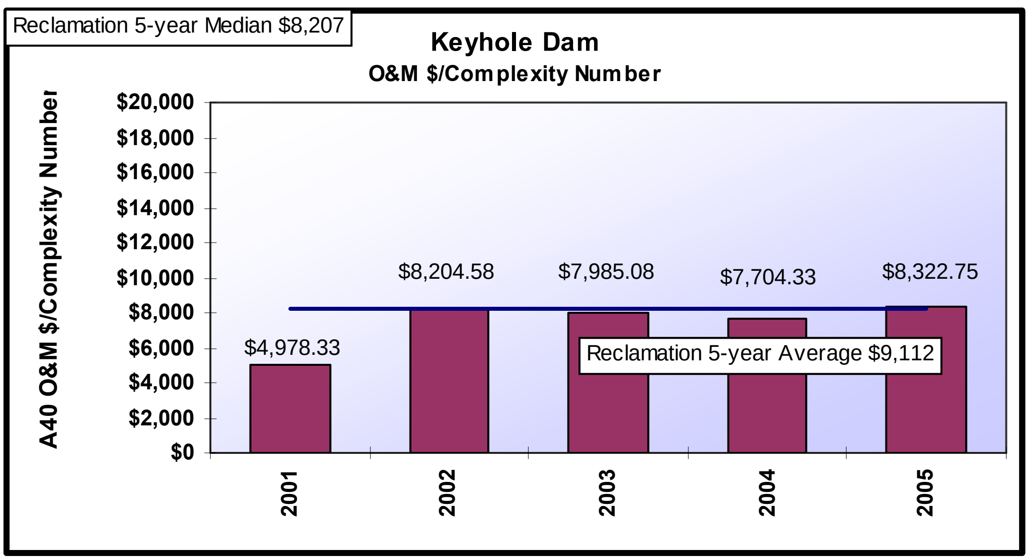
Keyhole Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$59,740	$59,740	22.9%	172,990	3,751
2002	$98,455	$98,455	27.6%	157,814	30,927
2003	$95,821	$95,821	26.0%	136,230	16,469
2004	$92,452	$92,452	22.2%	114,987	11,405
2005	$99,873	$99,873	23.2%	100,530	16,266
Median	**$95,821**	**$95,821**	**24.4%**		

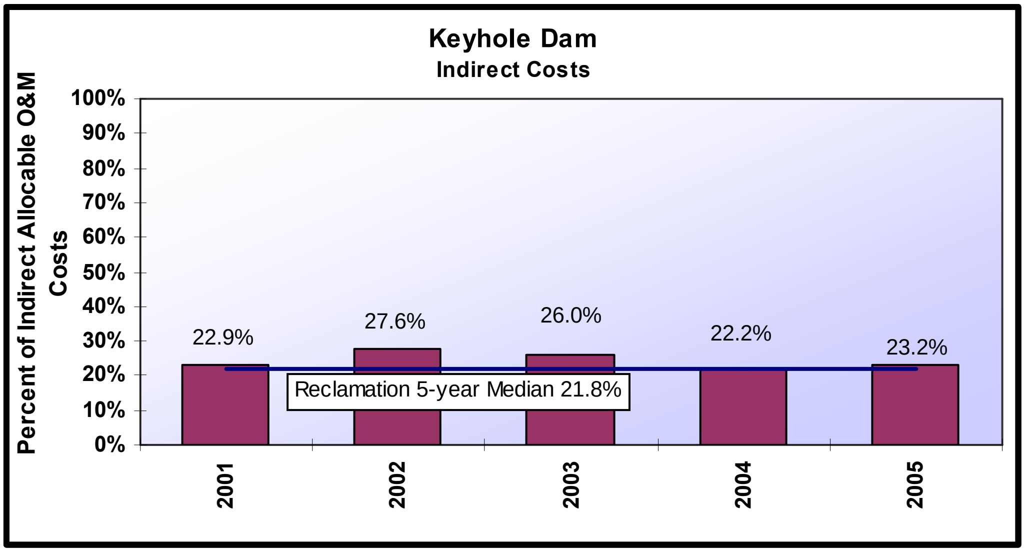
Benchmarking Analysis

Keyhole Dam Benchmark Summary			
Benchmark	Keyhole Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 71.78	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 7,985.08	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	23.17%	21.8%	15.61%
Full Time Equivalents	0.57	1.33	0.58

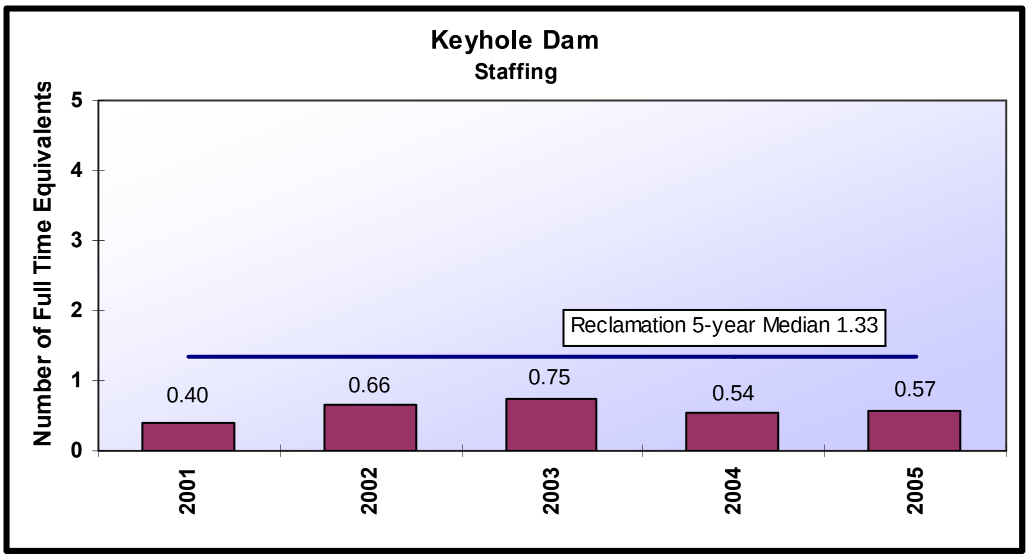
Cost Benchmarks







Staffing Benchmark



Lovewell Dam

(Lovewell Reservoir)

Original construction completed: 1957 by Bureau of Reclamation (50 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: White Rock Creek, approximately 3 miles northwest of Lovewell, Kansas; reservoir stores and regulates water from White Rock Creek and diversions from the Republican River by way of the Courtland Canal

Type: zoned earthfill

Structural height: 93 feet

Dam crest length: 8500 feet

Dam crest elevation: 1616 feet

Dam embankment volume: 3,000,000 ft^3

Active reservoir capacity: 74,487 acre-feet at top of exclusive flood control elevation 1595.3 feet

Authorized benefits: irrigation, flood control, recreation, fish and wildlife

Spillway description: inlet channel, concrete ogee crest, two 25-foot-wide by 20-foot-high radial gates (operated by electric-motor-driven, wire-rope hoists mounted on a platform above the crest), a 268-foot-long concrete-lined chute, and stilling basin (with chute blocks and downstream dentates); gate control float wells, gallery, and control building; discharge capacity 35,000 ft^3/s at reservoir water surface elevation 1610.3 feet

Outlet works description: right abutment; consists of trashracked protected drop inlet intake structure, upstream conduit, access shaft/chamber, downstream conduit, covered chute, wasteway structure, canal outlet check structure (two 9-foot by 10-foot radial gates), and stilling basin chute; discharge capacity 3200 ft^3/s at reservoir water surface elevation 1610.3 feet (but is limited by the stilling basin to 635 ft^3/s)

Other features associated with dam: SCADA system, one diversion dam (six pumping plants, canals, laterals, drains necessary to serve 65,435 irrigable acres); auxiliary power propane engine-driven generator in control building south of spillway deck

Courtland Canal discharges (regulated by six slide gates and one radial gate) into reservoir through reservoir inlet structure near the left abutment of the dike portion of the dam (through a 422-foot-long twin-barrel conduit, each barrel is 6 feet high by 5 feet wide); a 11 foot-wide by 6.5-foot-high top-seal radial gate at the conduit entrance prevents backflow from the reservoir t the canal during periods of high reservoir levels

Complexity Number: 25

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator resides at damsite and performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

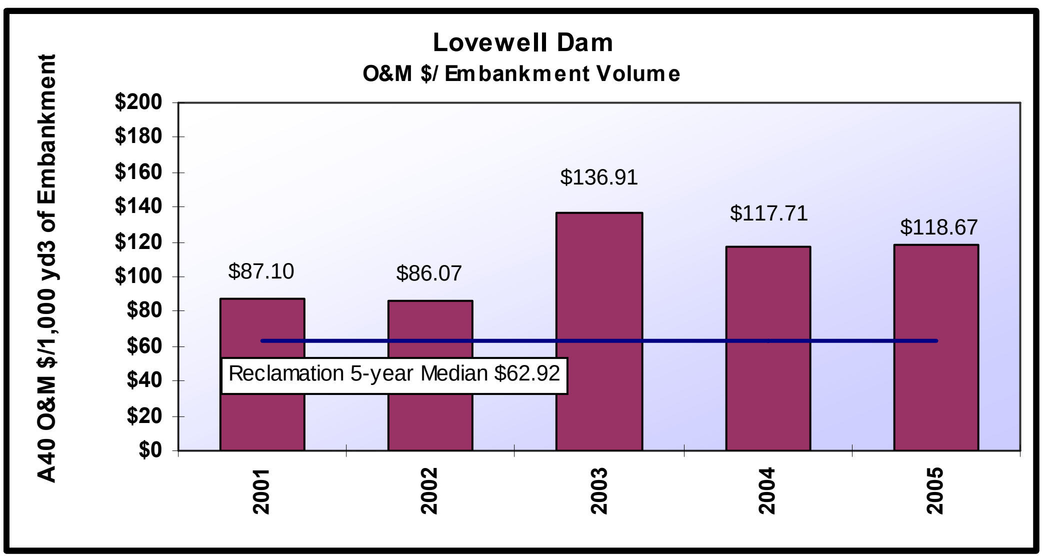
Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

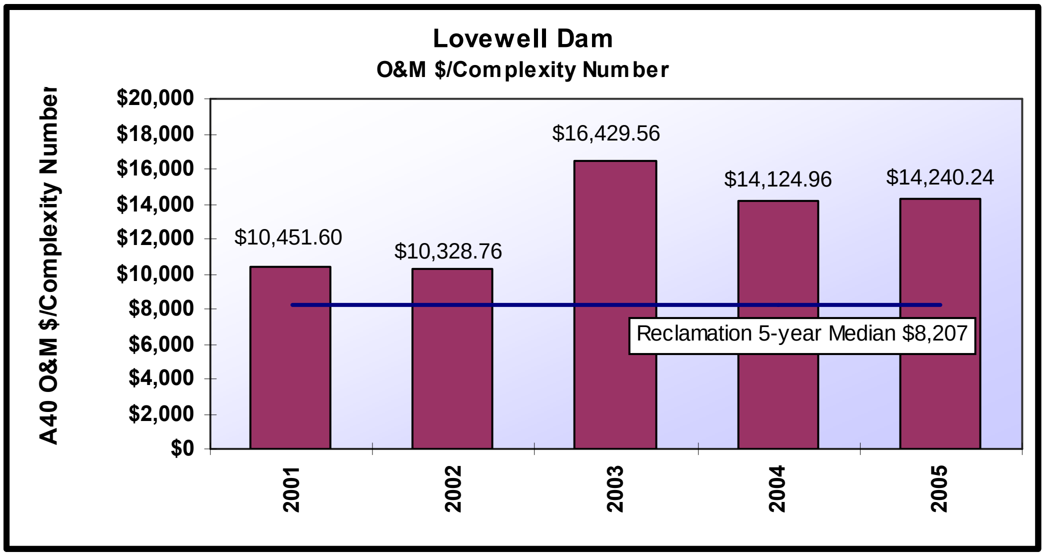
Lovewell Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$286,264	$261,290	20.0%	47,188	56,445
2002	$285,652	$258,219	20.9%	43,606	51,378
2003	$494,455	$410,739	20.7%	48,538	39,077
2004	$816,187	$353,124	14.5%	33,353	35,247
2005	$965,026	$356,006	10.7%	41,060	25,474
Median	**$494,455**	**$353,124**	**17.3%**		

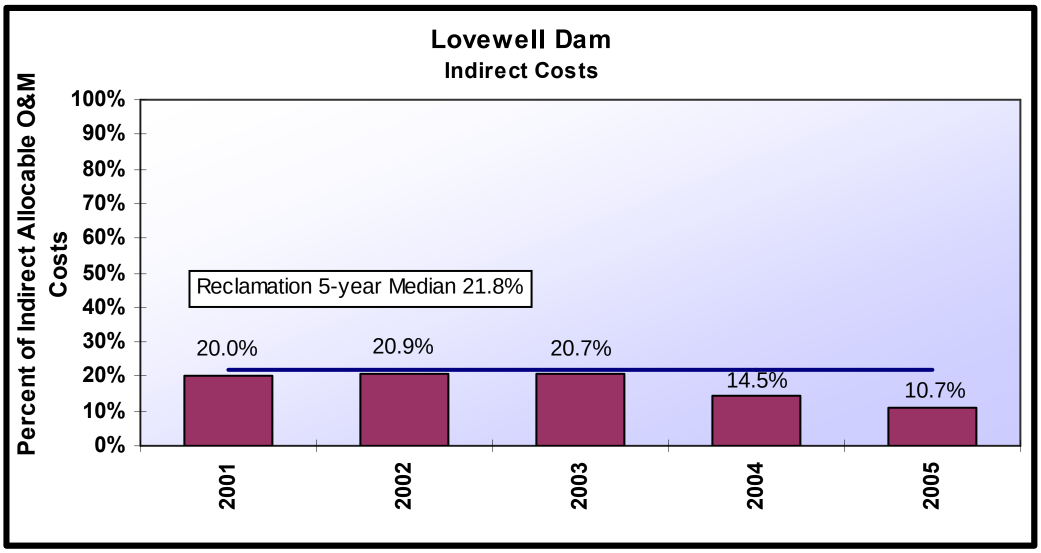
Benchmarking Analysis

Lovewell Dam Benchmark Summary			
Benchmark	Lovewell Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 117.71	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 14,124.96	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	19.98%	21.8%	15.61%
Full Time Equivalents	2.75	1.33	0.58

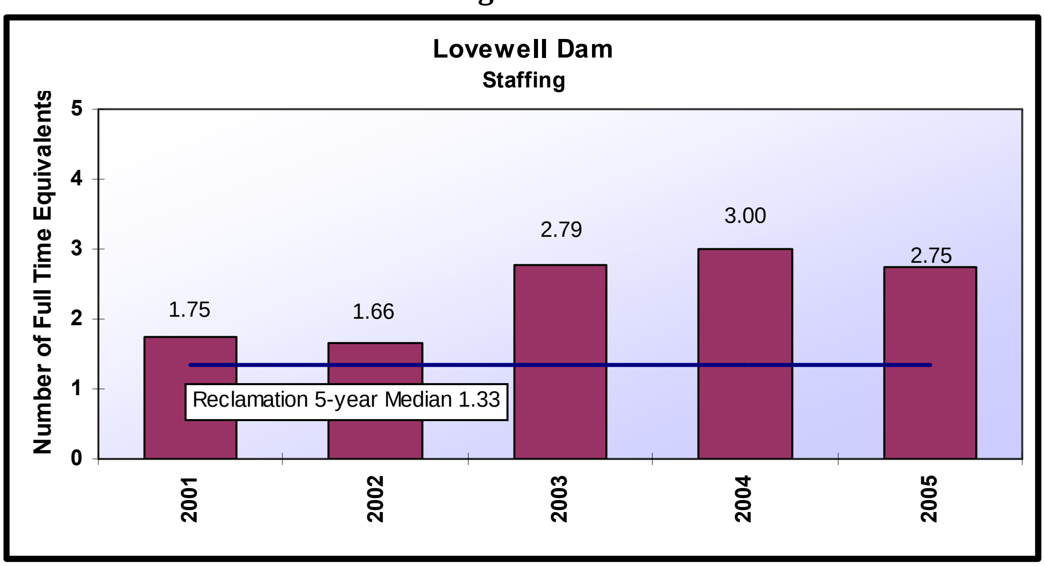
Cost Benchmarks







Staffing Benchmark



Medicine Creek Dam

(Harry Strunk Reservoir)

Original construction completed: 1949 by Bureau of Reclamation (58 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Medicine Creek, about 8 miles northwest of Cambridge, Nebraska

Type: zoned earthfill

Structural height: 165 feet

Dam crest length: 5665 feet

Dam crest elevation: 2415 feet

Dam embankment volume: 2,730,000 ft^3

Active reservoir capacity: 79,561 acre-feet at top of exclusive flood control elevation 2386.2 feet

Authorized benefits: irrigation, flood control, recreation, fish and wildlife

Spillway description: left abutment; consists of an inlet channel, a 200-foot-wide uncontrolled overflow crest, a 13-foot-wide notch in the center that is 20.1 feet lower than the crest on either side, a chute, and a stilling basin; discharge capacity of 97,800 ft^3/s at reservoir water surface elevation 2408.9 feet

Outlet works description: right of the center of dam; consists of a trashracked intake structure, an 8-foot-diameter concrete horseshoe conduit leading to a gate chamber containing a 3.25-foot-square emergency gate, a 44-inch-diameter steel pipe housed in an 8-foot-diameter horseshoe conduit downstream from the gate chamber, a gate control house containing a 3.25-foot-square regulating gate, and a concrete stilling basin. Discharge capacity of 390 ft^3/s at reservoir water surface elevation 2366.1 feet

Other features associated with dam: SCADA system

Complexity Number: 22

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator lives on damsite and performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

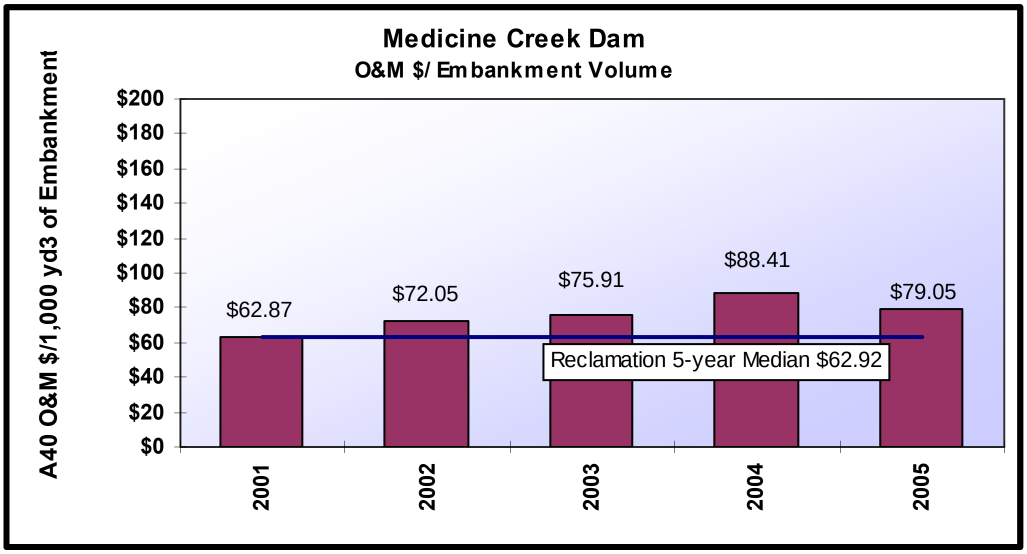
Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

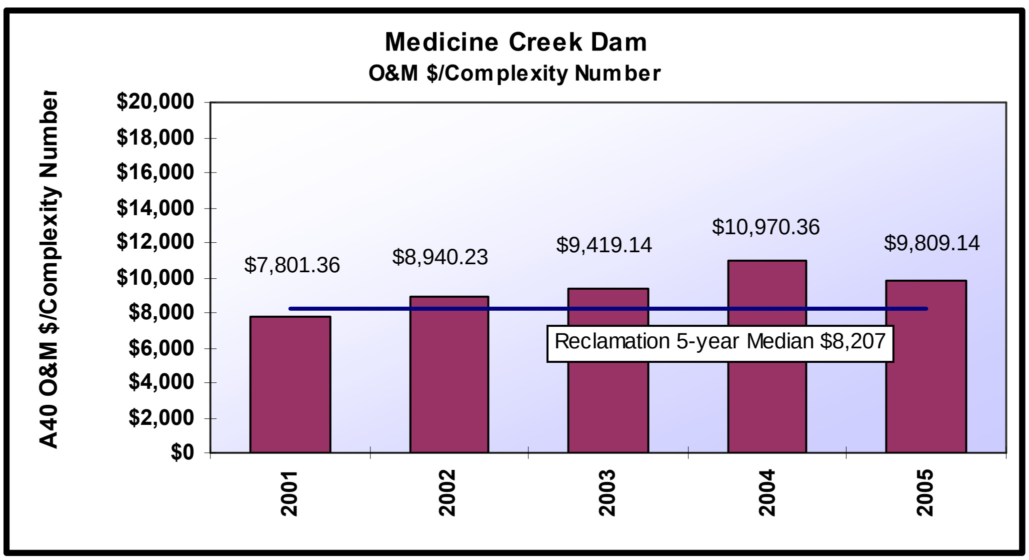
Medicine Creek Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$252,605	$171,630	26.5%	37,657	32,097
2002	$179,750	$196,685	22.9%	36,538	30,686
2003	$207,221	$207,221	22.3%	34,219	22,350
2004	$241,348	$241,348	21.3%	25,758	24,298
2005	$215,801	$215,801	18.3%	36,707	19,724
Median	**$215,801**	**$207,221**	**22.2%**		

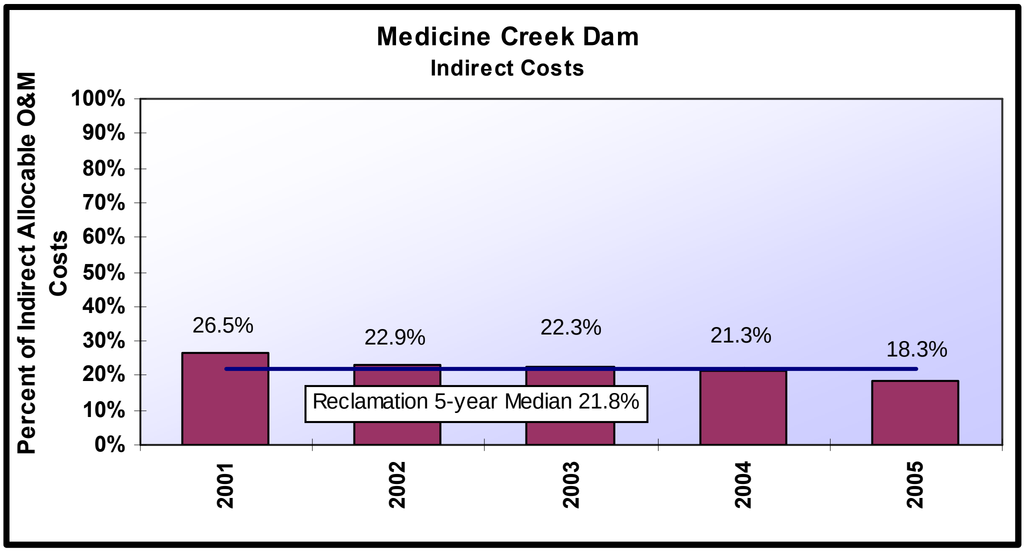
Benchmarking Analysis

Medicine Creek Dam Benchmark Summary			
Benchmark	**Medicine Creek Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 75.91	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 9,419.14	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	22.30%	21.8%	15.61%
Full Time Equivalents	1.49	1.33	0.58

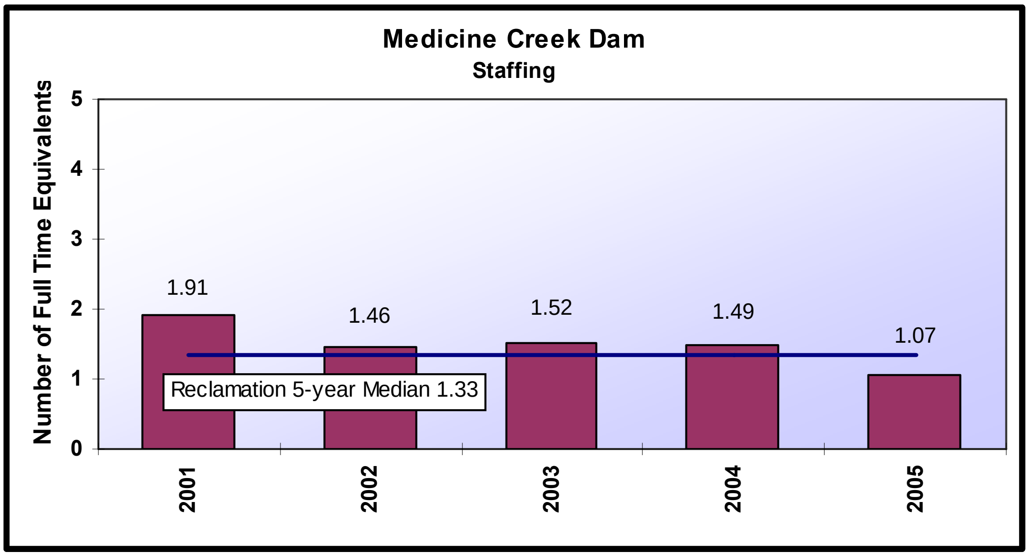
Cost Benchmarks







Staffing Benchmark



Norton Dam

(Keith Sebelius Lake)

Original construction completed: 1964 by Bureau of Reclamation (43 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Prairie Dog Creek, approximately 3 miles southwest of Norton, Kansas

Type: zoned earthfill

Structural height: 130.5 feet

Dam crest length: 6450 feet

Dam crest elevation: 2347 feet

Dam embankment volume: 3,740,000 ft^3

Active reservoir capacity: 129,747 acre-feet at top of exclusive flood control elevation 2331.4 feet

Authorized benefits: irrigation, municipal water, recreation, fish and wildlife

Spillway description: right abutment; consists of a gated crest, a concrete chute, and a stilling basin (releases controlled by three 30- by 26.35-foot radial gates; discharge capacity of 96,000 ft^3/s capacity at reservoir water surface elevation 2341 feet

Outlet works description: near left abutment; consists of a trashracked drop intake, a 204-foot-long, 48-inch-diameter steel-lined upstream conduit; and emergency gate chamber containing a 2-foot, 9-inch-square emergency gate; a 216-foot-long, 7-foot, 6-inch-diameter horseshoe-shaped conduit containing a 38-inch-diameter steel carrier pipe, to a control house containing a 2-foot, 9-inch-square regulating gate, a chute and stilling basin, and discharge channel; discharge capacity of 330 ft^3/s capacity at reservoir water surface elevation 2341 feet

Other features associated with dam: SCADA system, 16 inch-diameter steel bypass pipe branches off from upstream conduit near the gate chamber (to provide M&I water to city of Norton)

Complexity Number: 29

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

Supervisory/remote control: yes; programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

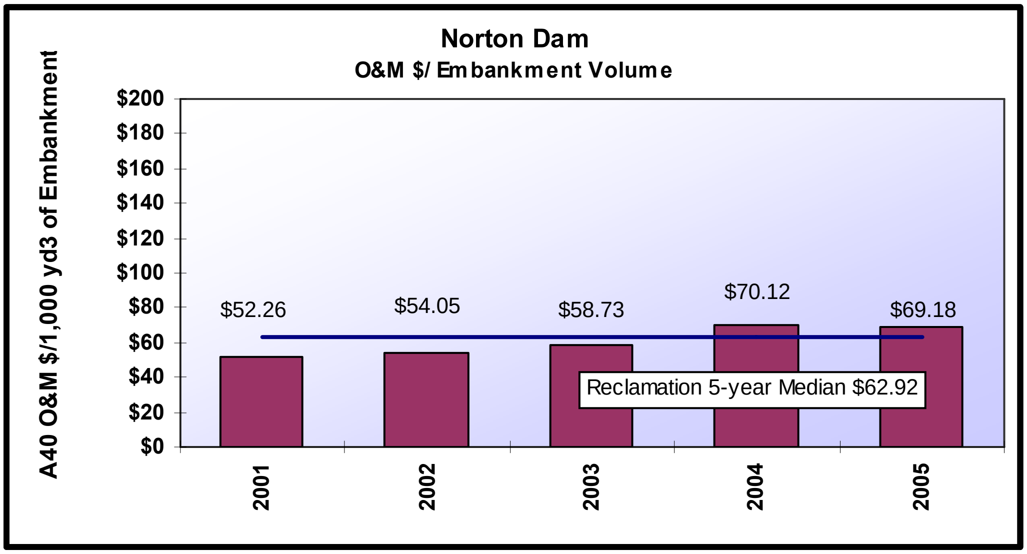
Norton Dam Statistics by Fiscal Year

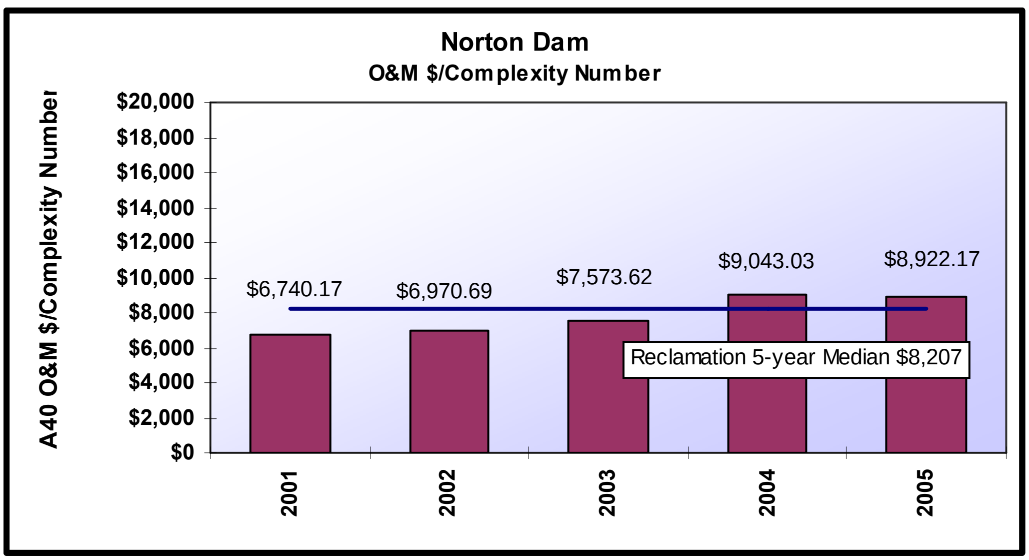
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$195,465	$195,465	18.7%	27,022	5,296
2002	$225,305	$202,150	22.1%	15,766	5,869
2003	$812,490	$219,635	9.0%	14,899	4,801
2004	$405,800	$262,248	14.8%	9,440	929
2005	$548,803	$258,743	14.4%	9,342	794
Median	**$405,800**	**$219,635**	**15.8%**		

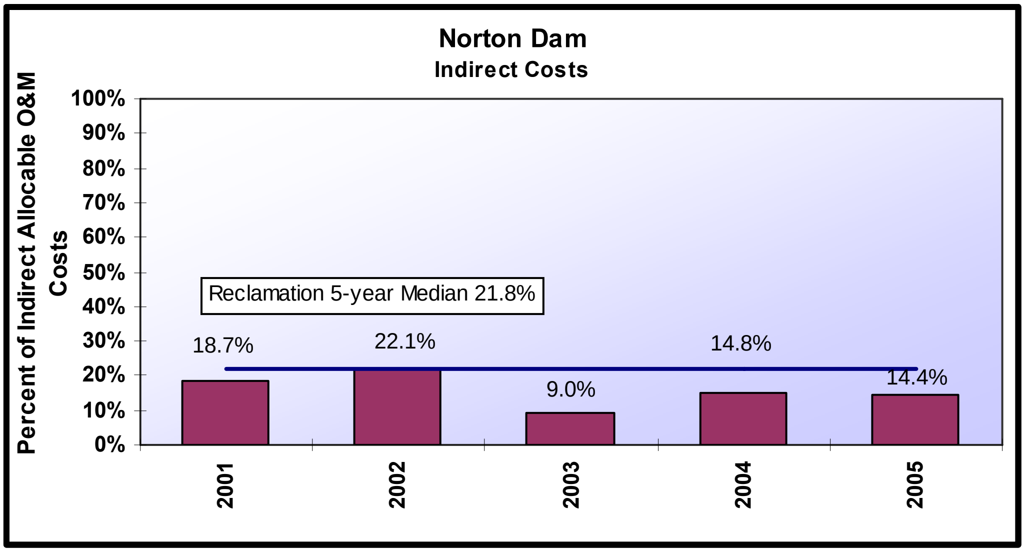
Benchmarking Analysis

Norton Dam Benchmark Summary			
Benchmark	Norton Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 58.73	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 7,573.62	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	14.80%	21.8%	15.61%
Full Time Equivalents	1.39	1.33	0.58

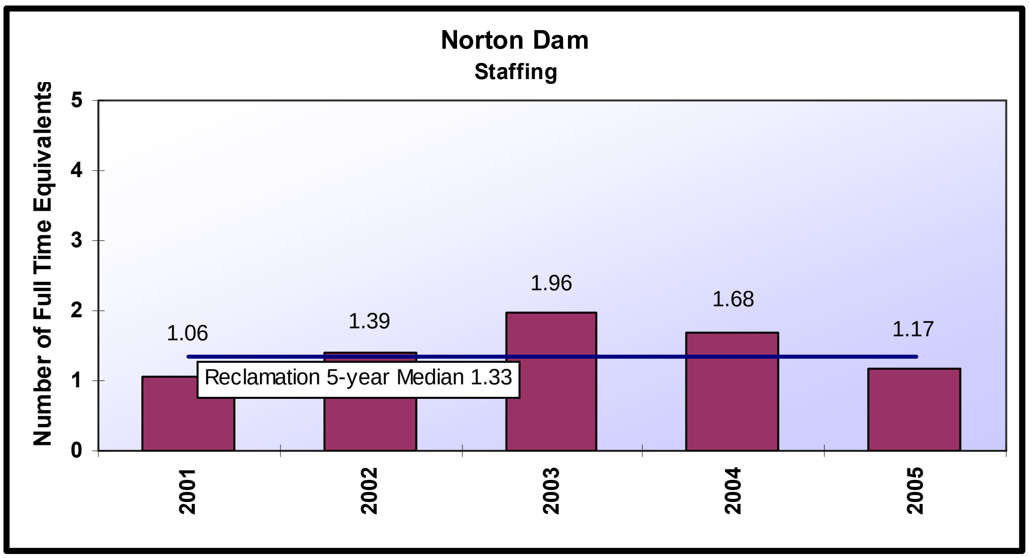
Cost Benchmarks







Staffing Benchmark



Prosser Creek Dam

(Prosser Creek Reservoir)

Original construction completed: 1962 by the Bureau of Reclamation (45 years old)

Completion date and nature of subsequent modifications: a safety of dams modification that added a parapet wall to the dam crest to accommodate a probable maximum flood was performed in 2005

Watercourse: Prosser Creek, about 1.5 miles above the confluence of Prosser Creek and the Truckee River

Type: earthfill

Structural height: 166 feet

Dam crest length: 1,830 feet

Dam crest elevation: 5765 feet (top of parapet wall is minimum 5767.6 feet)

Dam embankment volume: 1,800,000 ft^3

Active reservoir capacity: approximately 30,000 acre-feet at top of joint use elevation 5745.2 feet

Authorized benefits: flood control, recreation, and fish flows for the Truckee River

Spillway description: concrete ogee crest at elevation 5745.2 feet; design capacity – 2,750 ft^3/s at original maximum water surface elevation 5758.5 feet.

Outlet works description: Conduit is cut and cover and is located beneath the dam at the left abutment. The outlet works consists of a trashracked intake structure, an 8-foot-diameter concrete pressure upstream conduit, a gate chamber housing two 3-foot by 6.5-foot high-pressure emergency gates and two 3-foot by 6.5-foot high-pressure regulating gates, and 9-foot-diameter modified horseshoe downstream conduit.

Other features associated with dam: Paved road on the dam's crest that is open to the general public and it connects to U.S. Forest Service roads at each end of the dam. A 15-foot-long bridge spans the spillway channel.

Complexity Number: 28

Owner: Bureau of Reclamation

Jurisdiction: Mid Pacific Region, Lahontan Basin Area Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by Lahontan Basin Area Office personnel

Supervisory/remote control: all operations are performed locally; reservoir water surface elevation and other data are monitored remotely via the Hydromet system

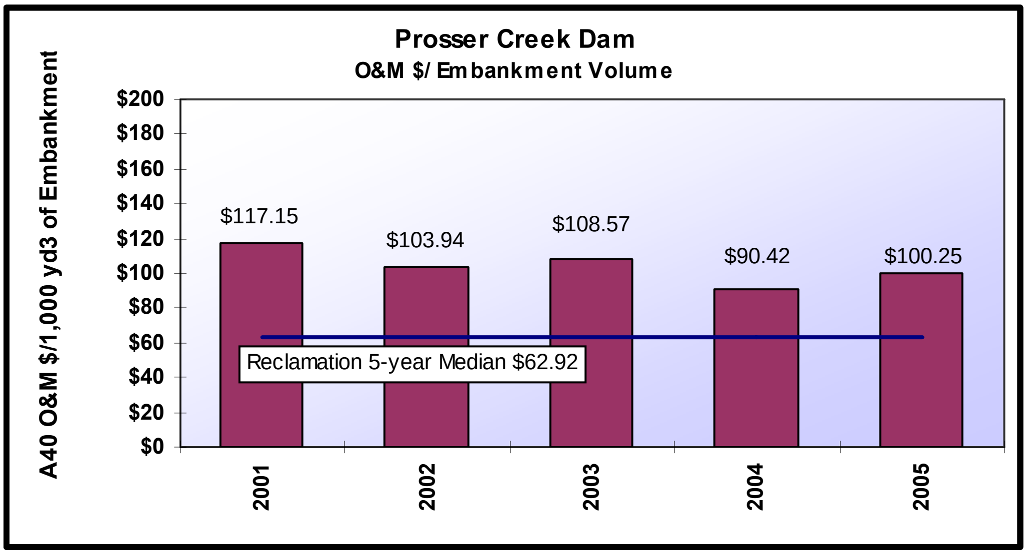
Prosser Creek Dam Statistics by Fiscal Year

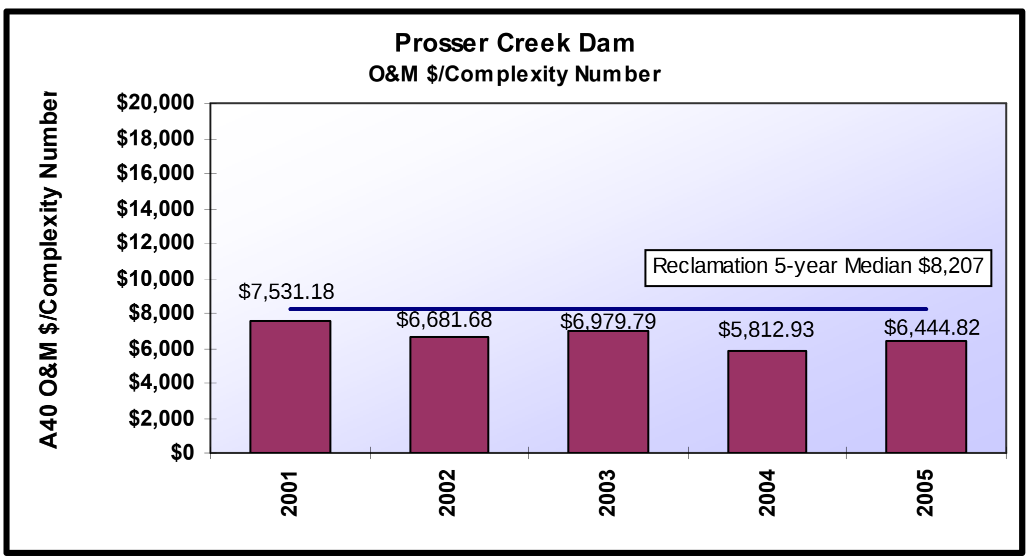
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$210,873	$210,873	18.0%	12,900	27,111
2002	$187,087	$187,087	25.0%	22,600	38,957
2003	$209,996	$195,434	18.2%	30,600	51,814
2004	$162,762	$162,762	25.1%	17,800	48,664
2005	$180,455	$180,455	19.1%	30,000	56,871
Median	**$187,087**	**$187,087**	**21.1%**		

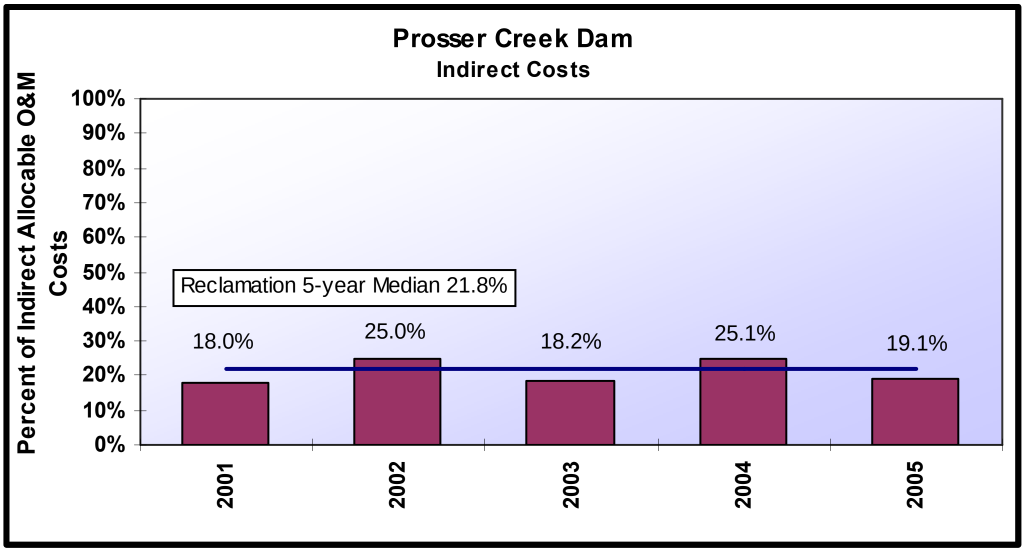
Benchmarking Analysis

Prosser Creek Dam Benchmark Summary			
Benchmark	**Prosser Creek Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 103.94	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 6,681.68	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	19.15%	21.8%	15.61%
Full Time Equivalents	0.91	1.33	0.58

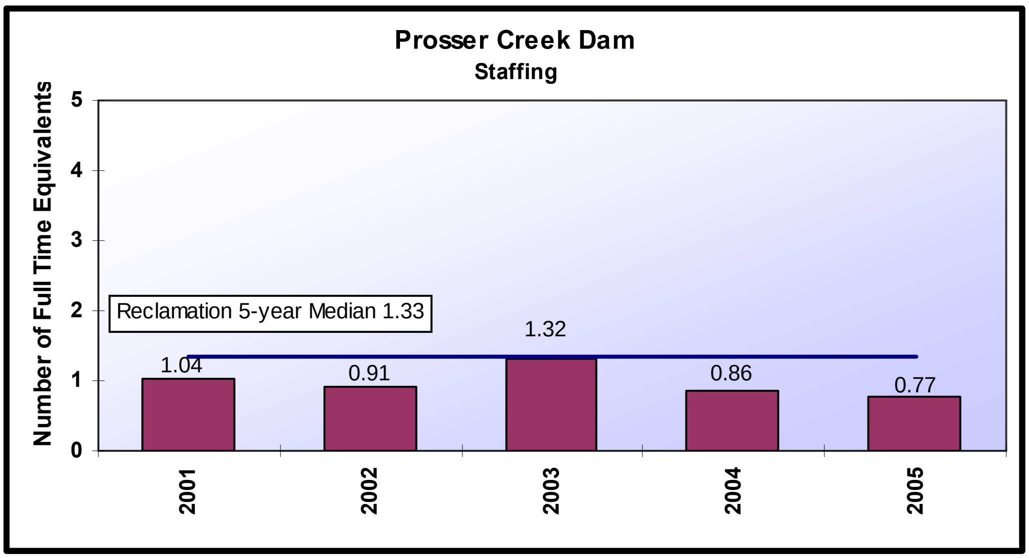
Cost Benchmarks







Staffing Benchmark



Red Willow Dam

(Hugh Butler Lake)

Original construction completed: 1962 by Bureau of Reclamation (45 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Red Willow Creek, approximately 10 miles north of McCook, Nebraska

Type: zoned earthfill

Structural height: 126 feet

Dam crest length: 3159 feet

Dam crest elevation: 2634 feet

Dam embankment volume: 2,991,000 ft^3

Active reservoir capacity: 76,149 acre-feet at top of exclusive flood control elevation 2604.9 feet

Authorized benefits: irrigation, flood control (exclusive flood control zone between elevations 2581.8 and 2604.9 feet (spillway crest)), recreation, fish and wildlife

Spillway description: right abutment; morning glory inlet structure with uncontrolled crest at elevation 2604.9 feet and a design capacity of 4910 ft^3/s at elevation 2628 feet; spillway has a 31.5-foot-diameter crest that reduces to a 13.5-foot-diameter conduit, which then transitions to a chute leading to a stilling basin at the downstream toe of the dam. To date, no flow has ever passed through the spillway.

Outlet works description: right abutment; consists of trashracked intake structure with crest elevation 2552 feet leading to 82-inch-diameter steel-lined concrete pressure conduit, to a gate chamber with a 5-foot by 6-foot high-pressure emergency gate; gate chamber connects downstream to an 11.5-foot-diameter concrete conduit with an 82-inch-diameter steel pipe that bifurcates into two smaller pipes at the control house; control house contains two 3.5-foot-square high-pressure regulating gates that discharge into a concrete chute and stilling basin; design capacity of 1,170 ft^3/s at top of flood control pool elevation 2604.9 feet

Other features associated with dam: SCADA system, outlet works ventilation system, piezometer well, house and shop generator

Complexity Number: 18

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator lives onsite and visits the dam daily, performs daily O&M; large maintenance tasks are responsibility of Water Operations and Maintenance Groups of McCook Field Office

Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

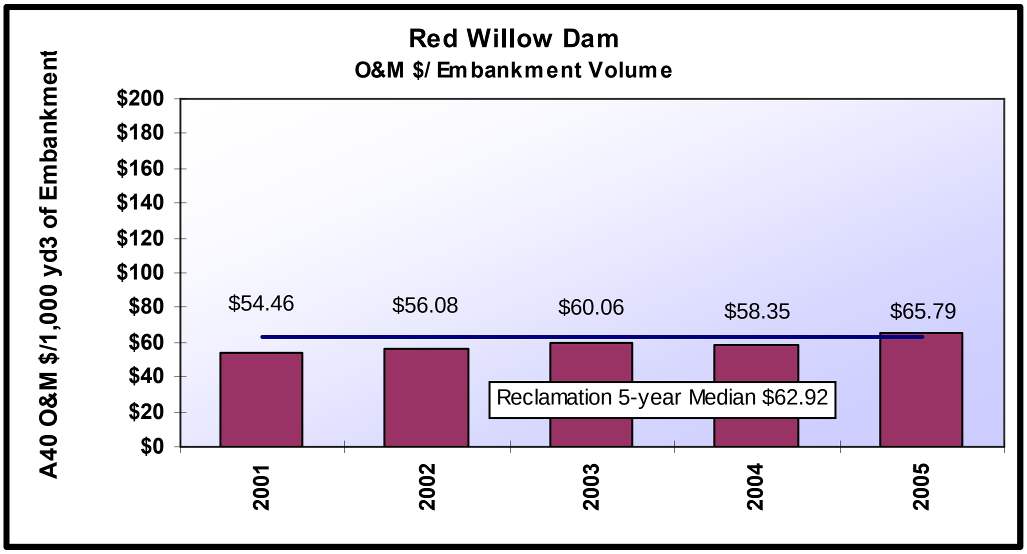
Red Willow Dam Statistics by Fiscal Year

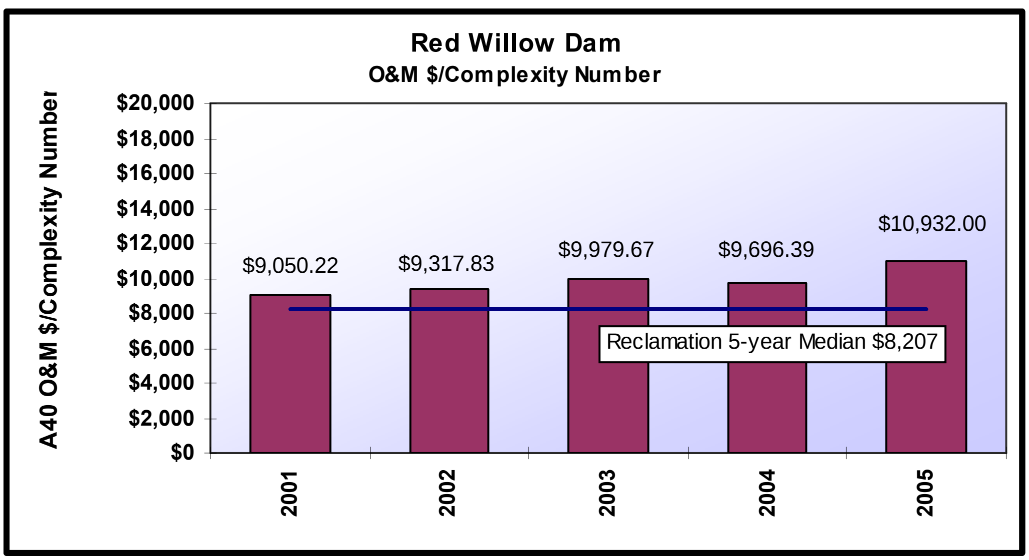
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$162,904	$162,904	22.8%	31,317	14,916
2002	$1,173,303	$167,721	10.4%	20,737	11,917
2003	$233,752	$179,634	17.8%	17,160	2,890
2004	$190,515	$174,535	17.9%	16,578	2,904
2005	$198,868	$196,776	19.5%	21,630	2,896
Median	**$198,868**	**$174,535**	**17.7%**		

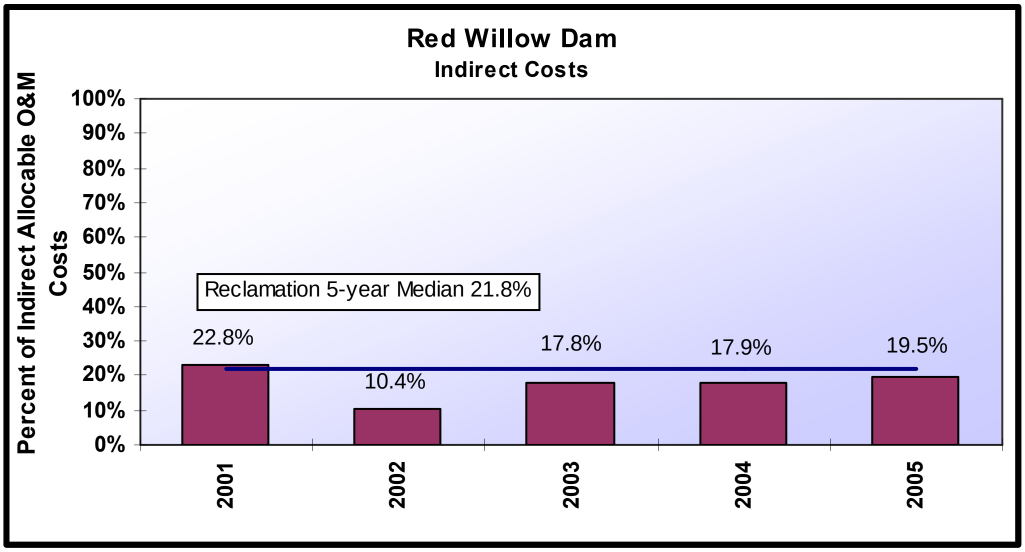
Benchmarking Analysis

Red Willow Dam Benchmark Summary			
Benchmark	Red Willow Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 58.35	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 9,696.39	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	17.89%	21.8%	15.61%
Full Time Equivalents	1.22	1.33	0.58

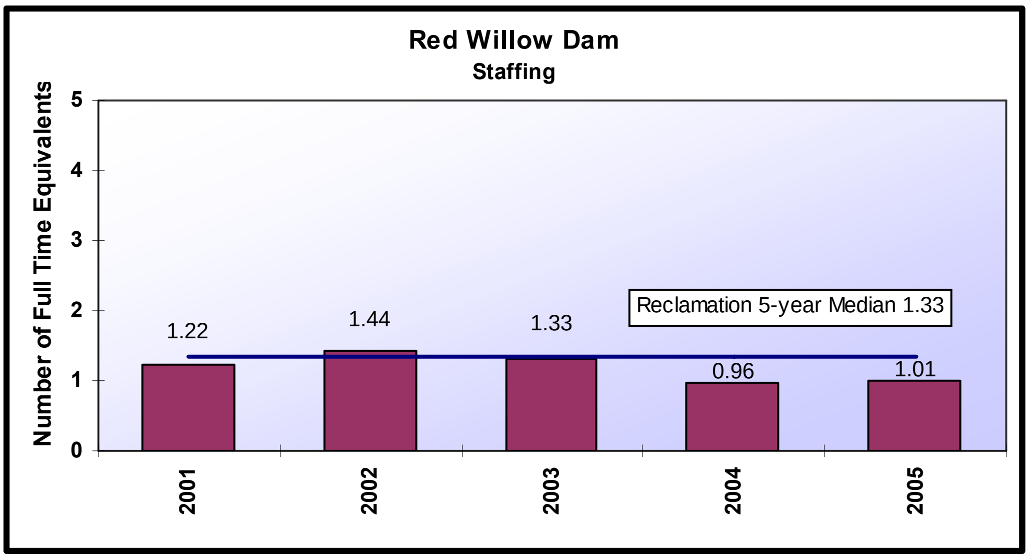
Cost Benchmarks







Staffing Benchmark



Ririe Dam

(Ririe Reservoir)

Original construction completed: 1976 by U.S. Army Corps of Engineers (31 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Willow Creek, approximately 15 miles northeast of Idaho Falls, Idaho

Type: zoned earth and rockfill

Structural height: 253 feet

Dam crest length: 1,070 feet

Dam crest elevation: 5128.0 feet

Dam embankment volume: 2,676,000 ft^3

Active reservoir capacity: 90,500 acre-feet at top of exclusive flood control elevation 5119.0 feet

Authorized benefits: irrigation, flood control, recreation, fish and wildlife

Spillway description: concrete ogee crest at elevation 5093.0 feet with two 40.5-foot-wide by 27.32-foot-high motor-operated radial gates; design capacity – 48,762 ft^3/s at top of exclusive flood control elevation 5119.0 feet

Outlet works description: intake tower, two sets of 3.75-foot-wide by 7-foot-high emergency and regulating slide gates in tandem, reinforced-concrete oval-shaped conduit, stilling basin; design capacity – approximately 4,100 ft^3/s s at top of joint use elevation 5112.8 feet

Other features associated with dam: two vehicular bridges: one bridge is open only to O&M and contract vehicles, the other is presently closed to public traffic due to questionable quality of substructure; maintenance shop and yard; two engine generators: one permanently installed, the other on a trailer; elevator; Ririe Flood Channel

Complexity Number: 32

Owner: Bureau of Reclamation (U.S. Army Corps of Engineers transferred title and O&M responsibility in 1978)

Jurisdiction: Pacific Northwest Region, Snake River Area Office, Palisades Field Branch

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by Palisades Field Branch personnel

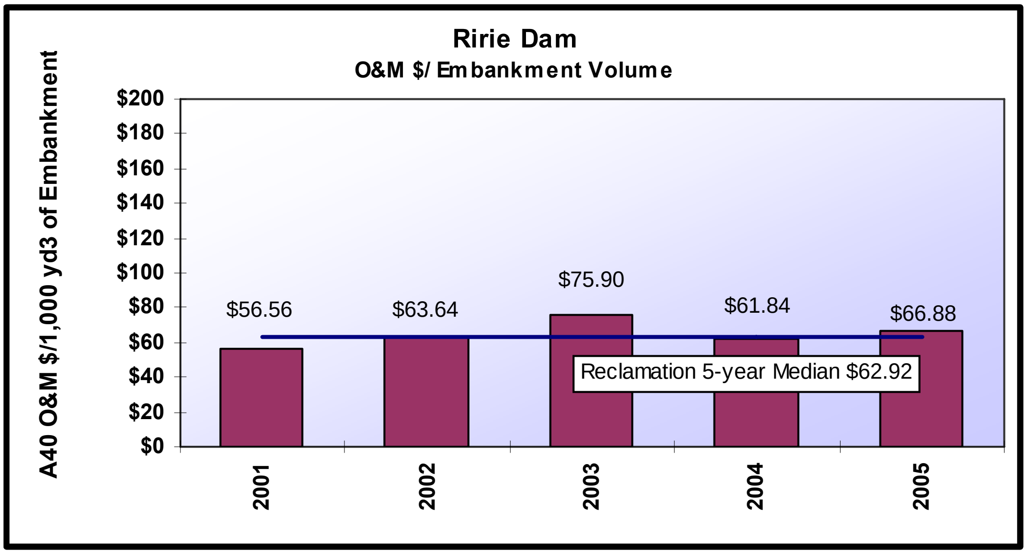
Supervisory/remote control: all operations are performed locally; reservoir water surface elevation and other data are monitored remotely via the Hydromet system

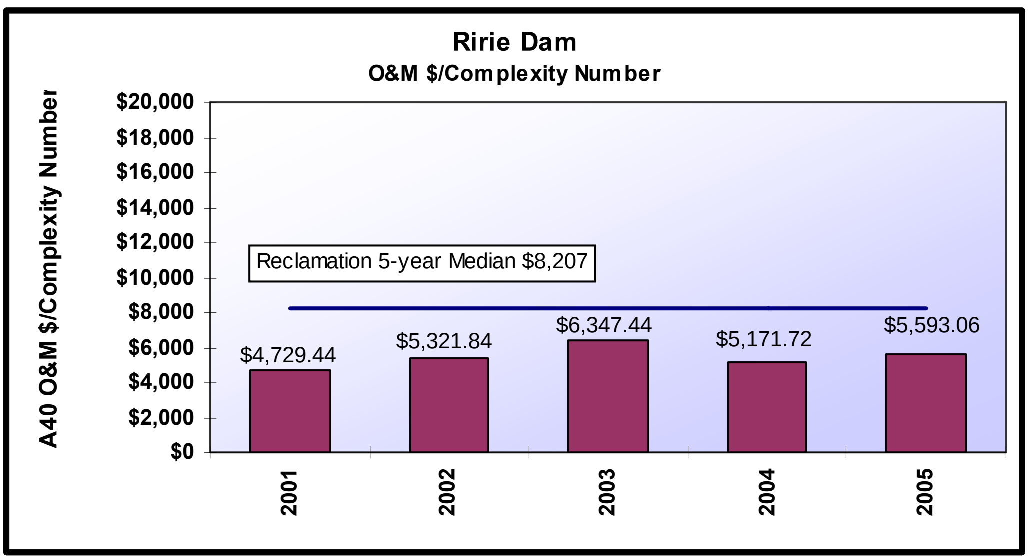
Ririe Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$151,342	$151,342	18.9%	53,086	56,294
2002	$170,299	$170,299	15.4%	45,012	23,439
2003	$203,118	$203,118	13.5%	46,313	28,305
2004	$165,495	$165,495	19.4%	46,603	32,353
2005	$242,887	$178,978	15.8%	60,762	22,696
Median	**$170,299**	**$170,299**	**16.6%**		

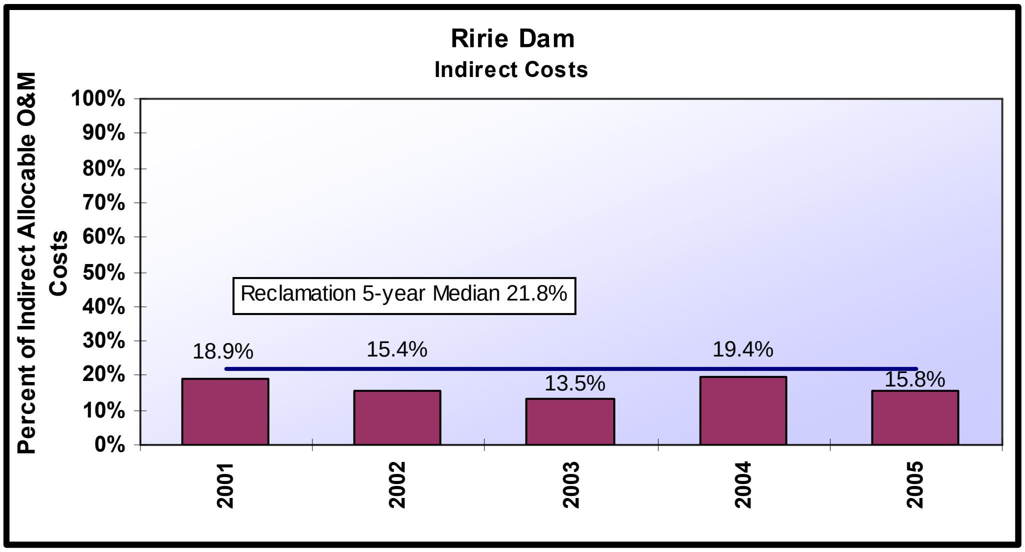
Benchmarking Analysis

Ririe Dam Benchmark Summary			
Benchmark	Ririe Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 63.64	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 5,321.84	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	15.81%	21.8%	15.61%
Full Time Equivalents	0.94	1.33	0.58

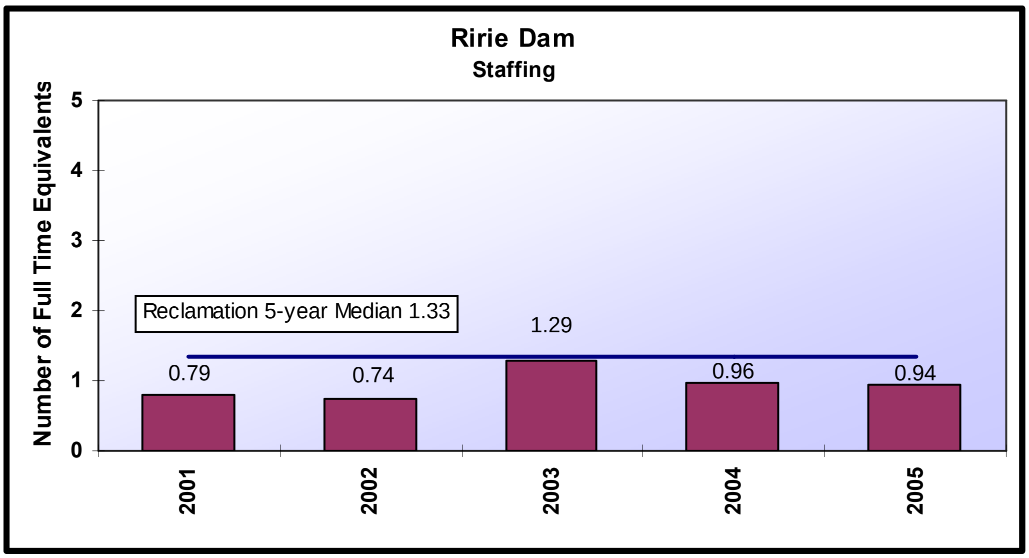
Cost Benchmarks







Staffing Benchmark



Ruedi Dam

(Ruedi Reservoir)

Original construction completed: 1968 by Bureau of Reclamation (39 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Fryingpan River, approximately 14 miles east of Basalt, Colorado

Type: zoned earthfill

Structural height: 322 feet

Dam crest length: 1060 feet

Dam crest elevation: 7788.0 feet

Dam embankment volume: 3,745,200 ft^3

Active reservoir capacity: 101,278 acre-feet at reservoir water surface elevation 7766.0 feet (spillway crest, top of active conservation)

Authorized benefits: provides replacement water for water diverted to the eastern slope of Colorado and for other beneficial uses on the western slope of the Continental Divide in Colorado

Spillway description: concrete spillway on right abutment; consists of an inlet channel, an inlet structure with a bridge and a 25-foot-wide ogee crest at elevation 7766 feet, a chute, a stilling basin, and an outlet channel; design capacity of 5540 ft^3/s at reservoir water surface elevation 7781.8.0 feet

Outlet works description: main river outlet works is located through the right abutment; consists of a trashracked intake structure, a 10-ft-diameter concrete-lined tunnel, a gate chamber housing a 5-foot by 6-foot high-pressure emergency gate, an 11-foot-diameter downstream horseshoe-shaped tunnel with a 76-inch-diameter steel outlet pipe that bifurcates at the control house to two smaller pipes and through two sets of tandem gates (housed in control house), discharge into a steel-line chute and a concrete stilling basin; main outlet works has discharge design capacity of 1,770 ft^3/s at reservoir water surface elevation 7766 feet

Auxiliary river outlet works is located through right abutment, with the gate chamber and downstream tunnel located directly beneath the centerline of the spillway; consists of a trashracked intake structure, a 6-foot-diameter concrete-lined tunnel, a gate chamber housing two 2.5-foot by 3-foot gates arranged in tandem, a concrete-lined 5-foot by 6-foot flat-bottomed tunnel, access adits, a vertical access shaft, and a shaft house, the auxiliary outlet works has a design discharge capacity of 750 ft^3/s at water surface elevation 7766 feet

Other features associated with dam: Rocky Fork Creek Bypass, electrical system (including standby power generator), ventilation systems, heating equipment, traveling crane in outlet works control house, spider man lift, ice prevention equipment, stilling basin stoplogs, control house weather barriers

Complexity Number: 18

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Eastern Colorado Area Office, Mount Elbert Powerplant Office, Twin Lakes Branch,

Operation and maintenance responsibility: dam operator duties are performed by Meredith Field Office personnel under the direction of the foreman, Twin Lakes Branch; large maintenance tasks are provided for by Twin Lakes Branch and Meredith Field Office personnel

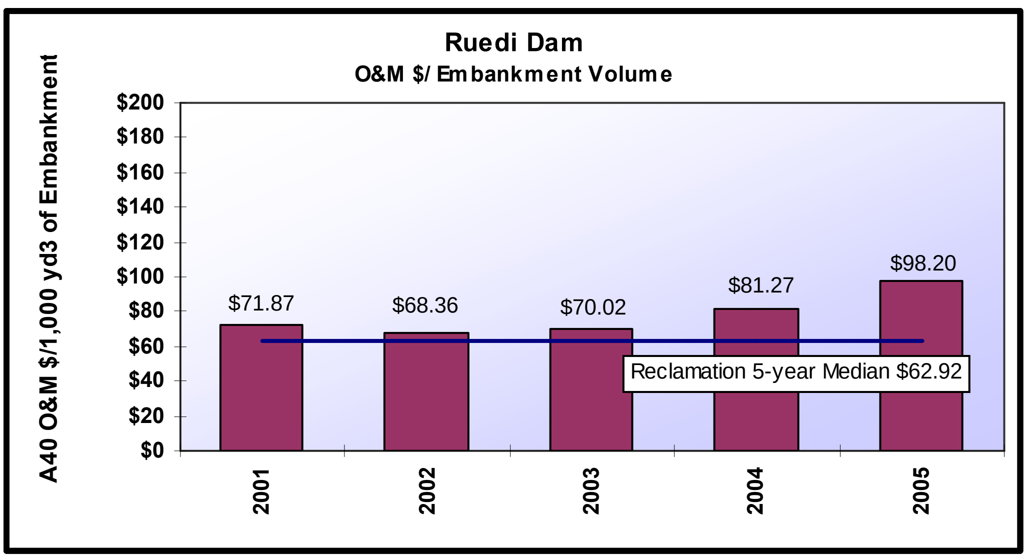
Supervisory/remote control: none

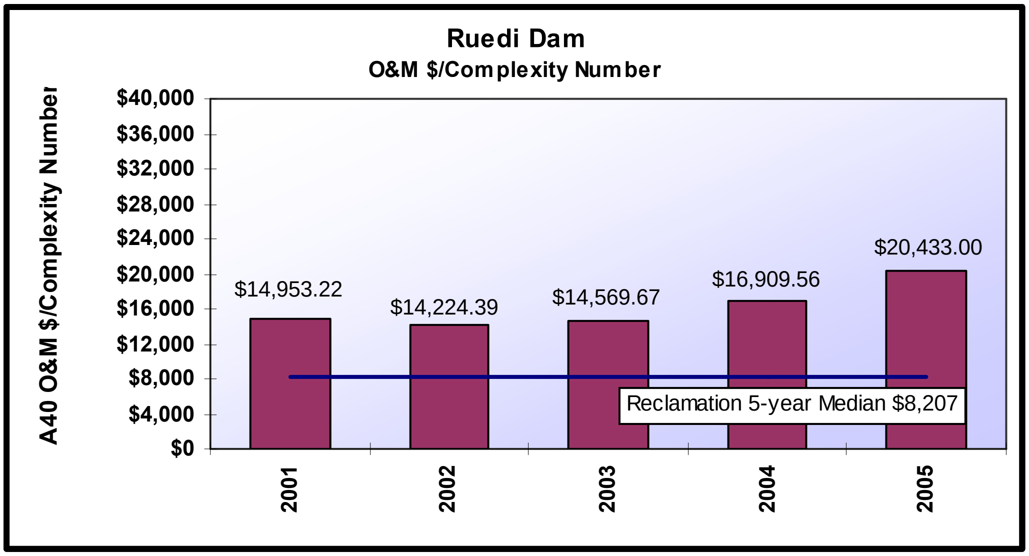
Ruedi Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$276,644	$269,158	27.1%	96,204	86,502
2002	$263,349	$256,039	29.6%	77,817	78,915
2003	$441,475	$262,254	18.6%	98,162	64,302
2004	$1,857,014	$304,372	8.8%	93,697	82,193
2005	$415,635	$367,794	24.9%	102,383	95,798
Median	**$415,635**	**$269,158**	**21.8%**		

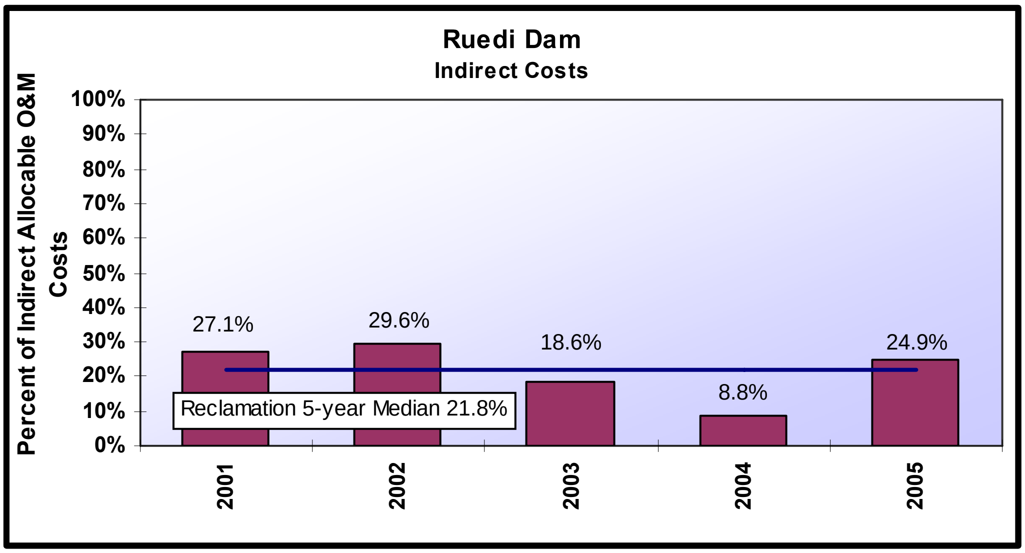
Benchmarking Analysis

Ruedi Dam Benchmark Summary			
Benchmark	Ruedi Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 71.87	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 14,953.22	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	24.94%	21.8%	15.61%
Full Time Equivalents	0.97	1.33	0.58

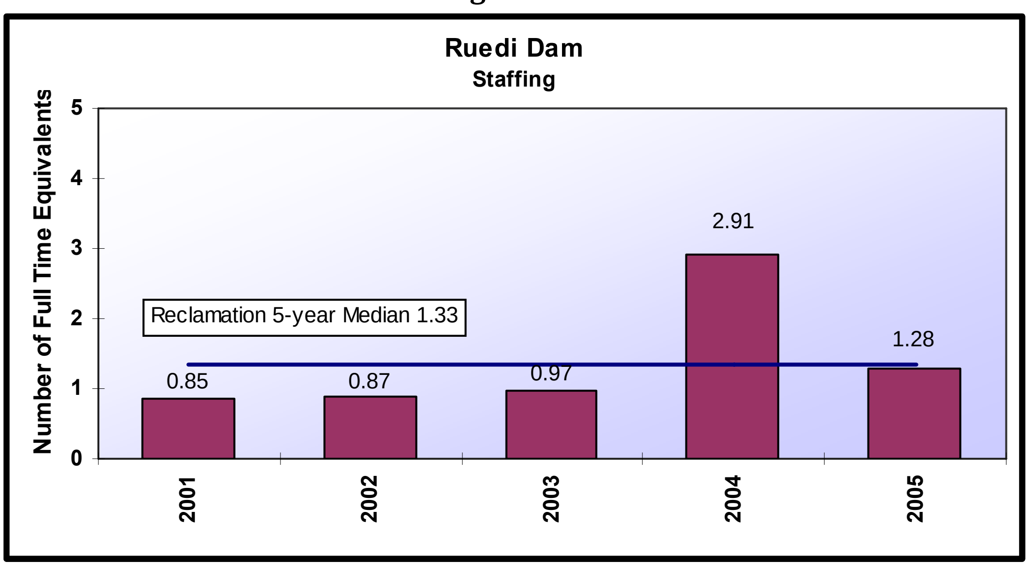
Cost Benchmarks







Staffing Benchmark



Shadehill Dam

(Shadehill Reservoir)

Original construction completed: 1951 by Bureau of Reclamation (56 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: Grand River, about 12 miles south of Lemmon, South Dakota

Type: homogeneous earthfill

Structural height: 145 feet

Dam crest length: 12,843 feet

Dam crest elevation: 2318.0 feet

Dam embankment volume: 3,500,000 ft^3

Active reservoir capacity: 306,307 acre-feet at top of exclusive flood control at elevation 2302 (U.S. Army Corps of Engineers responsible for flood operations when the reservoir is in exclusive flood control range, between elevations 2272 and 2302 feet); active conservation is 76,303 acre-feet at elevation 2272 feet

Authorized benefits: flood control, fish and wildlife, recreation, irrigation

Spillway description: both a service spillway and an emergency spillway; service spillway is an uncontrolled morning-glory type inlet structure with crest elevation 2272 feet to a circular concrete conduit 13.5 feet in diameter; design capacity of service spillway is 5700 ft^3/s at water surface elevation 2312 feet; emergency spillway is located about 8000 feet downstream from the main dam left abutment, and consists of uncontrolled, unlined channel and has a rated capacity of 127,000 ft^3/s at water surface elevation 2312 feet

Outlet works description: left of service spillway on the left riverbank; consists of trashracked intake structure, an 84-inch-diameter steel-lined upstream conduit, a gate chamber containing a 6-foot emergency slide gate, a 6-foot regulating radial gate, an access shaft and hoist house above gate chamber, and a 7.25-foot free flow horseshoe-shaped downstream conduit leading to a stilling basin; discharge capacity of the outlet works is 600 ft^3/s at reservoir water surface elevation 2272 feet (top of active conservation)

Other features associated with dam: two dikes situated in topographic saddles, about 800 feet south of the right dam abutment

Complexity Number: 11

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Dakotas Area Office, Rapid City Field Office

Operation and maintenance responsibility: dam operator lives in Rapid City, SD (approximately 180 miles from damsite), and performs periodic O&M; large maintenance tasks are performed by Rapid City Field Office personnel

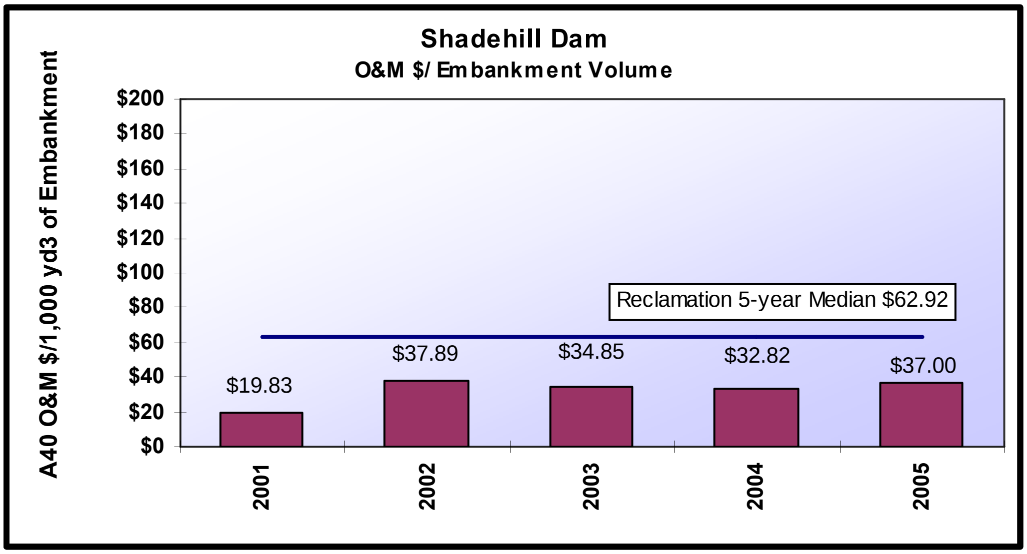
Supervisory/remote control: None

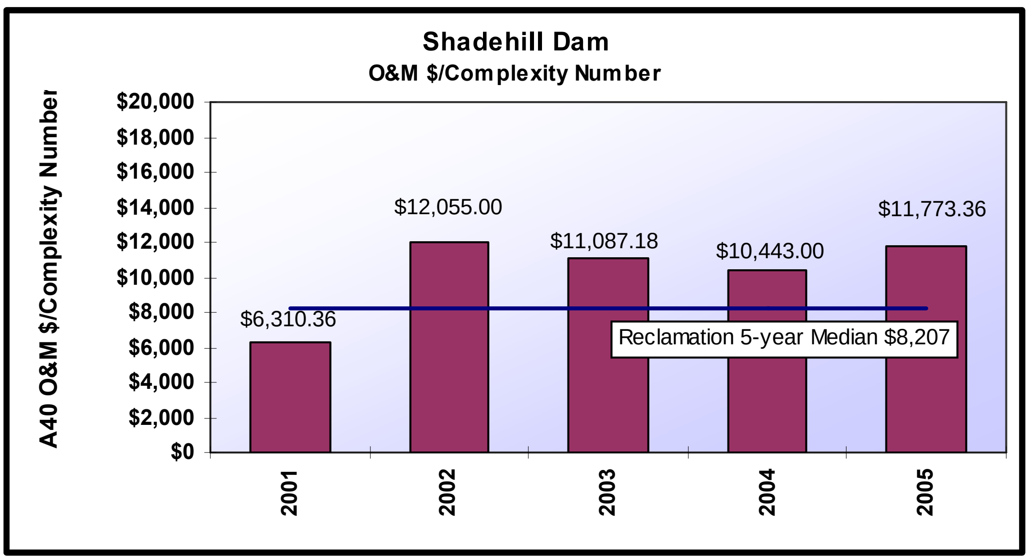
Shadehill Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$69,414	$69,414	28.0%	128,087	124,505
2002	$132,605	$132,605	25.4%	105,214	25,828
2003	$121,959	$121,959	24.8%	85,164	15,207
2004	$114,873	$114,873	24.2%	112,027	16,952
2005	$129,507	$129,507	26.3%	99,170	16,862
Median	**$121,959**	**$121,959**	**25.7%**		

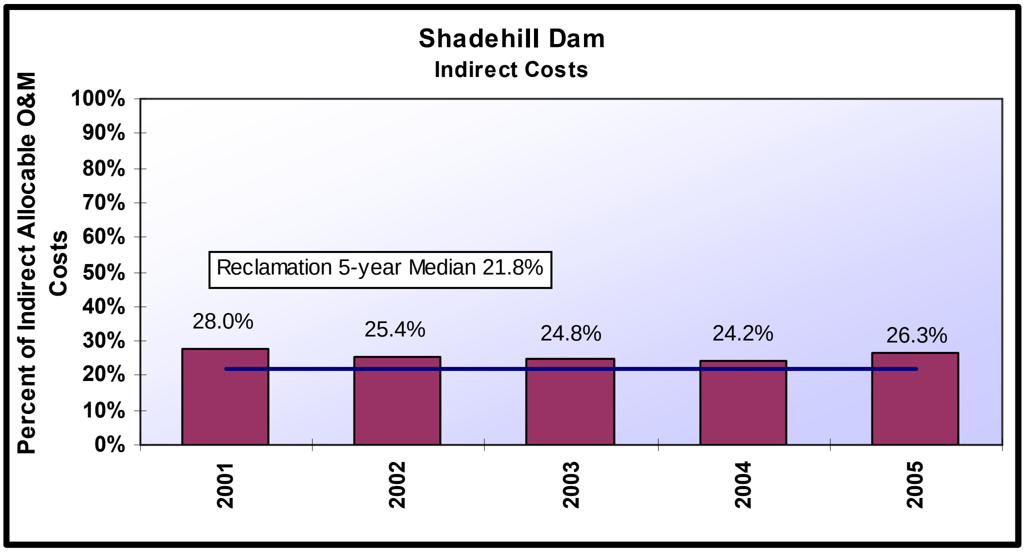
Benchmarking Analysis

Shadehill Dam Benchmark Summary			
Benchmark	**Shadehill Dam 5-year Median**	**Reclamation 5-year Median**	**Group Low**
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 34.85	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 11,087.18	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	25.42%	21.8%	15.61%
Full Time Equivalents	0.75	1.33	0.58

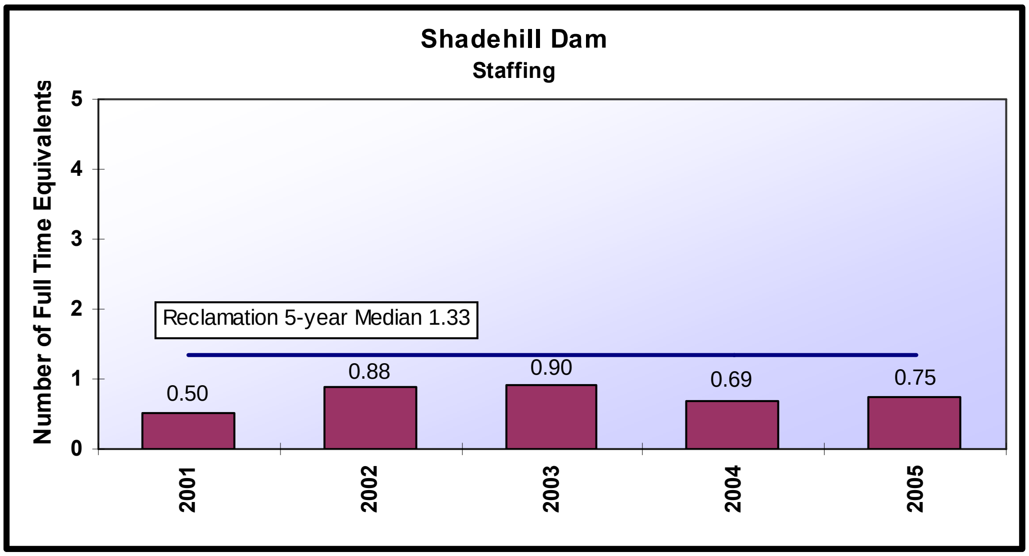
Cost Benchmarks







Staffing Benchmark



Sugar Loaf Dam

(Turquoise Lake)

Original construction completed: 1967 by Bureau of Reclamation (40 years old)

Completion date and nature of subsequent modifications: Mt. Elbert Conduit was added in 1979, with a FERC-regulated powerplant completed in 1986

Watercourse: Lake Fork of the Arkansas, approximately 5 miles west of Leadville, CO

Type: earthfill

Structural height: 162 feet

Dam crest length: 2020 feet

Dam crest elevation: 9879.0 feet

Dam embankment volume: 1,833,700 ft^3

Active reservoir capacity: 120,478 acre-feet at top of active conservation elevation 9869.4 feet

Authorized benefits: irrigation, flood control, municipal benefits, recreation, fish and wildlife

Spillway description: morning glory inlet structure with a 40-foot-diameter uncontrolled crest at elevation 9869.4 feet, to a 16.5-foot-diameter circular conduit, a chute varying in width from 16.5 to 24 feet, and a 24-foot-wide hydraulic jump stilling basin, with a capacity of 2920 ft^3/s at elevation 9872.8 feet

Outlet works description: capacity at elevation 9872.8 feet is 1120 ft^3/s; release water to Lake Fork Creek and to Mt. Elbert Conduit; features include a trashracked intake structure, a 7-foot-diameter steel-lined upstream conduit with a gate chamber housing a 5-foot by 6-foot emergency gate, and an 11-foot-diameter conduit with a 6-foot-diameter steel outlet pipe (which then parallel branches into two sets of 3.5-foot-square tandem gates

Other features associated with dam: outlet works has a steel bypass pipe, equipped with a 12-inch jet-flow gate inside a control house, which is used to maintain releases to Lake Fork Creek; Mt. Elbert Conduit connects into outlet pipe just upstream of control house bifurcation; the capacity of the outlet to the Mt. Elbert Conduit is 370 ft^3/s at a water surface elevation 9872.8 feet

Complexity Number: 17

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Eastern Colorado Area Office, Mt. Elbert Powerplant Office, Twin Lakes Branch

Operation and maintenance responsibility: Twin Lakes Branch of Mt. Elbert Powerplant Office performs daily O&M and provides for large maintenance tasks.

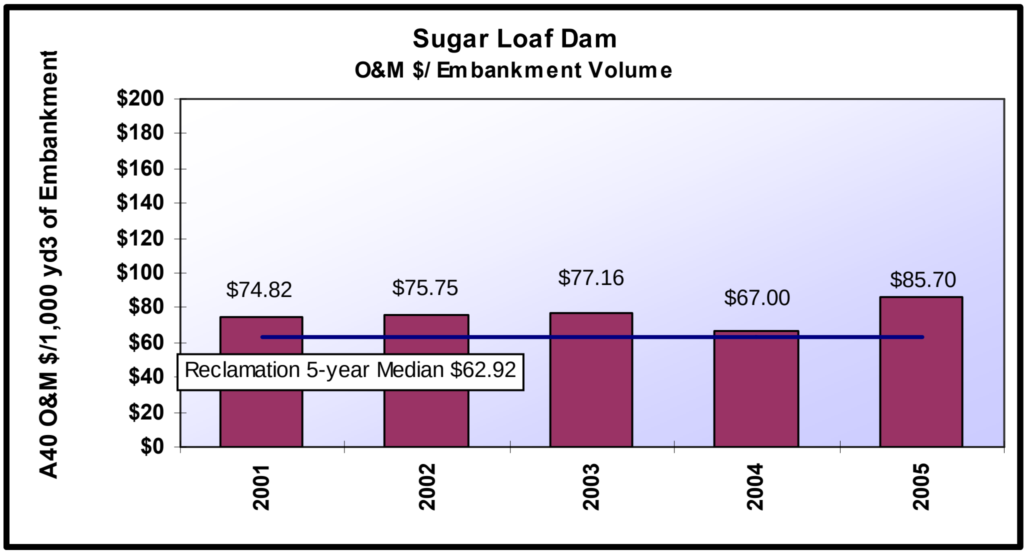
Supervisory/remote control: none

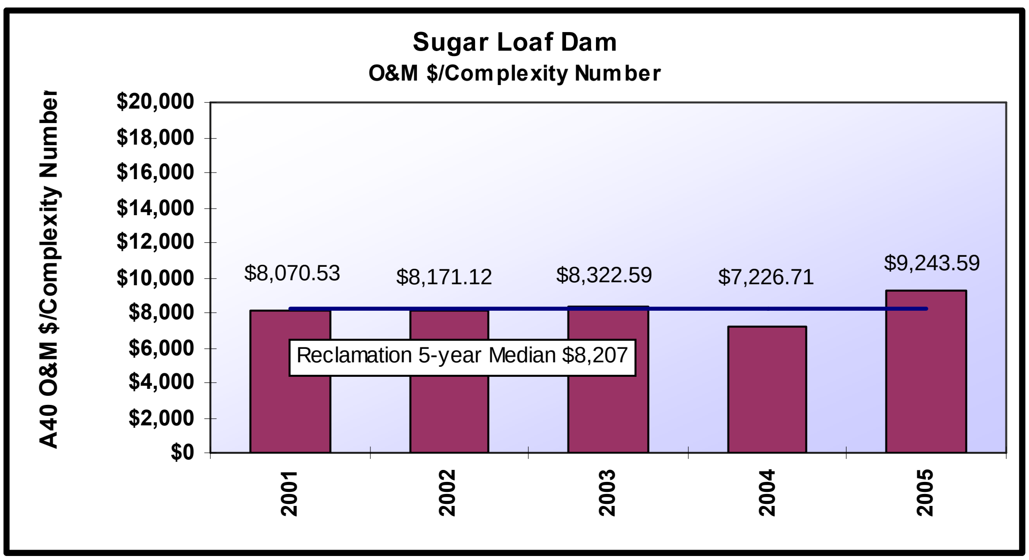
Sugar Loaf Dam Statistics by Fiscal Year					
Fiscal Year	**Total O&M Costs**	**A40 O&M Costs**	**Percent of Indirect Allocable O&M Costs**	**Peak Reservoir Storage (acre-feet)**	**Total Discharge (acre-feet)**
2001	$218,909	$137,199	17.4%	121,760	121,315
2002	$138,909	$138,909	25.9%	106,411	108,845
2003	$141,484	$141,484	23.2%	89,952	71,163
2004	$123,377	$122,854	24.7%	103,801	82,493
2005	$157,311	$157,141	24.7%	122,991	66,621
Median	**$141,484**	**$138,909**	**23.2%**		

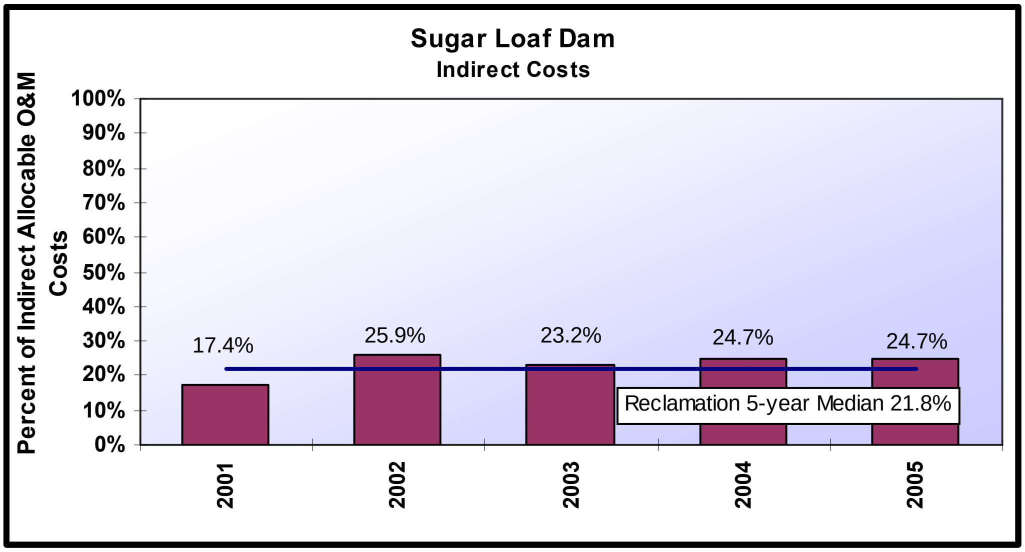
Benchmarking Analysis

Sugar Loaf Dam Benchmark Summary			
Benchmark	Sugar Loaf Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 75.75	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 8,171.12	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	24.70%	21.8%	15.61%
Full Time Equivalents	0.62	1.33	0.58

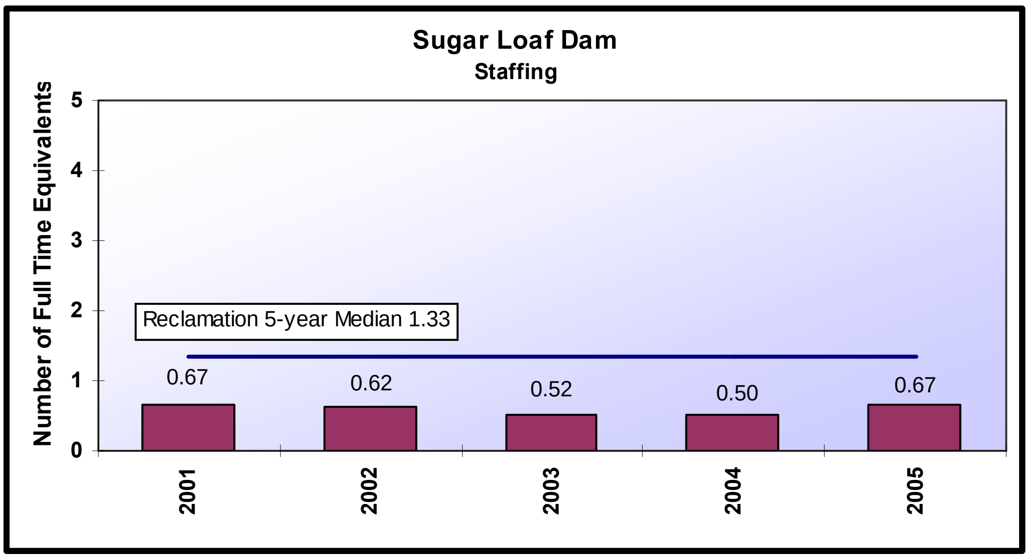
Cost Benchmarks







Staffing Benchmark



Tiber Dam

(Lake Elwell)

Original construction completed: 1956 by Bureau of Reclamation (51 years old)

Completion date and nature of subsequent modifications: 1969 construction of auxiliary outlet works; the spillway and most of the stilling basin was replaced during 1977 to 1979 because the spillway radial gates had become inoperative due to large settlements of the crest structure; 1981 embankment, raised crest elevation 5 feet to 3026 feet
privately owned FERC powerplant constructed in 2002

Watercourse: Marias River, approximately 20 miles southwest of Chester, Montana

Type: zoned earthfill

Structural height: 206 feet

Dam crest length: 4300 feet

Dam crest elevation: 3026 feet

Dam embankment volume: 11,740,000 ft^3

Active reservoir capacity: 790,533 acre-feet at top of exclusive flood control elevation 3012.5 feet

Authorized benefits: irrigation, municipal uses, flood control, recreation, fish and wildlife, power generation (privately-owned FERC regulated powerplant)

Spillway description: right abutment; consists of an inlet structure varying in width from 132 to 76 feet, a crest structure with a 66-foot-wide gated overflow crest at elevation 2975 feet, regulated by three 22-foot-wide by 38-foot-high radial gates, a chute varying in width from 76 to 200 feet, and a 200-foot-wide hydraulic jump stilling basin; the spillway has a design discharge capacity of 81,400 ft^3/s at dam crest elevation 3026 feet

Outlet works description: auxiliary outlet works, located in the left abutment of the dam, was constructed in the late 1960s by tying into the canal outlet works that was never used; consists of a trashracked concrete intake structure with invert elevation 2955.3 feet, an 8-foot by 12-foot twin box concrete conduit, a concrete gate structure housing two 7-foot by 12-foot emergency slide gates, a varying-size concrete-lined tunnel leading to a 7.25-foot by 9.25-foot high pressure regulating slide gate, a concrete chute, a 25-foot-wide concrete stilling basin, and an outlet channel; discharge capacity is 4390 ft^3/s at dam crest elevation 3026 feet

River outlet works include a tower-type trashracked intake structure, a 14-foot-diameter circular tunnel, a gate chamber housing a 5-foot by 5-foot high-pressure emergency gate, a 14-foot-diameter circular tunnel housing one 72-inch steel pip, a modified valve house used at the entrance tunnel entrance, a control house that contains a 5-foot by 5-foot high pressure regulating gate, and a stilling basin

Outlet works capacity is 5845 ft^3/s at reservoir water surface elevation 3029.2 feet

Other features associated with dam: homogeneous earthfill dike (also raised 5 feet in 1981) located about 1 mile southwest of dam, and has a structural height of about 66 feet and is about 16,650 feet long with a 20-foot-wide crest at elevation 3026 feet; a control house for the spillway radial gates houses an auxiliary engine generator set for emergency operation of the gates during a power outage; a privately owned FERC regulated powerplant located adjacent to the river outlet works has a 125-kW auxiliary diesel-powered engine generator for standby power and serves as emergency and auxiliary power for the river outlet works hydraulic power unit, sump pumps, lighting, and ventilation systems

Complexity Number: 50

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Montana Area Office, Tiber Dam Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by Tiber Dam Field Office personnel

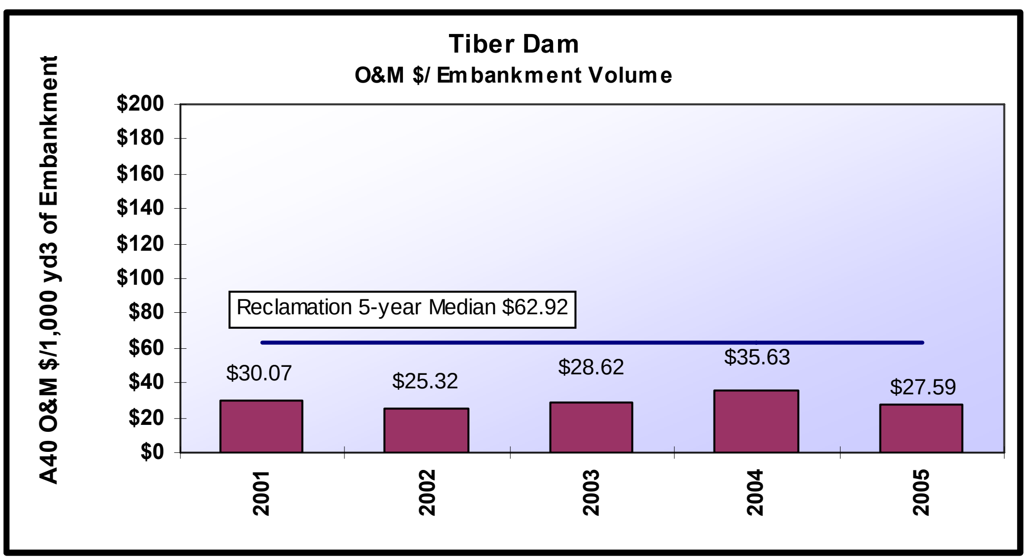
Supervisory/remote control: remote operation of the river outlet works regulating gate and 96-inch butterfly valve from the newly constructed privately owned FERC powerplant; reservoir water surface elevation and other data are monitored remotely via the Hydromet system.

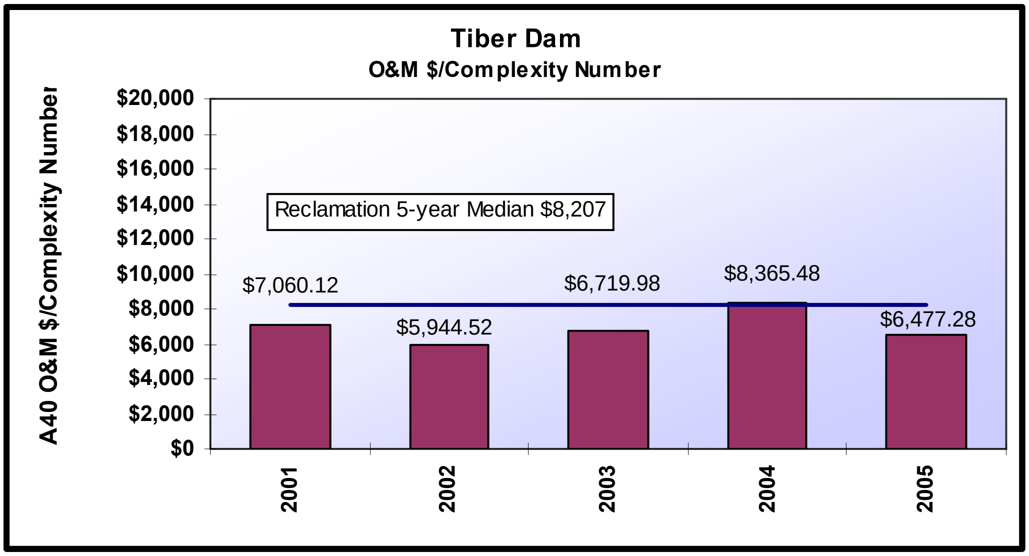
Tiber Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$923,033	$353,006	10.1%	807,777	252,582
2002	$510,503	$297,226	17.3%	1,019,705	647,625
2003	$582,745	$335,999	11.8%	945,744	395,687
2004	$462,877	$418,274	21.3%	856,368	366,711
2005	$339,364	$323,864	17.8%	841,056	344,619
Median	**$510,503**	**$335,999**	**15.7%**		

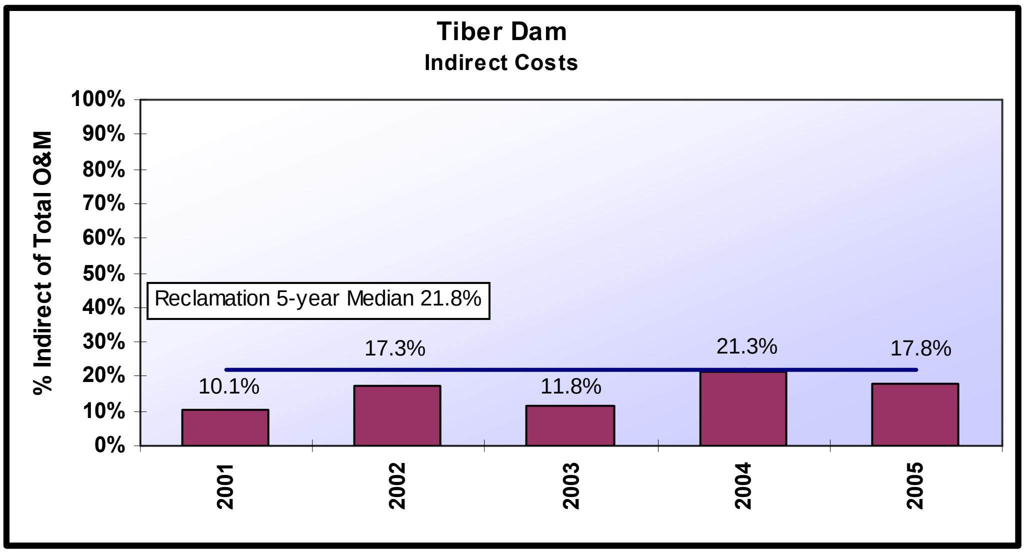
Benchmarking Analysis

Tiber Dam Benchmark Summary			
Benchmark	Tiber Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 28.62	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 6,719.98	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	17.35%	21.8%	15.61%
Full Time Equivalents	2.37	1.33	0.58

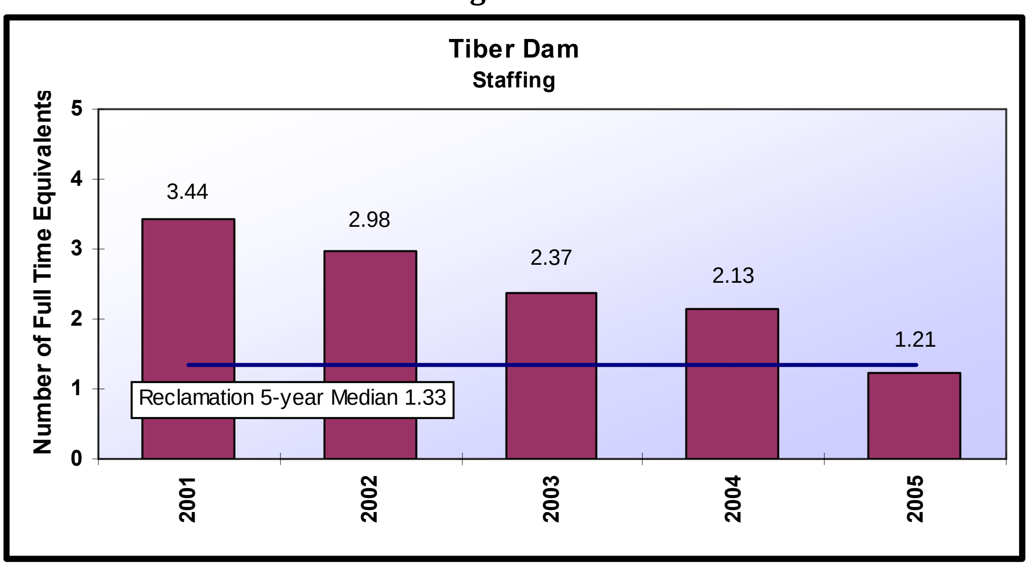
Cost Benchmarks







Staffing Benchmark



Trenton Dam

(Swanson Lake)

Original construction completed: 1953 by Bureau of Reclamation (54 years old)

Completion date and nature of subsequent modifications:

Watercourse: Republican River, approximately 22 miles west of McCook, Nebraska

Type: zoned earthfill

Structural height: 144 feet

Dam crest length: 8600 feet

Dam crest elevation: 2793 feet

Dam embankment volume: 8,130,000 ft^3

Active reservoir capacity: 233,861 acre-feet at top of exclusive flood control elevation 2773 feet

Authorized benefits: irrigation, flood control

Spillway description: left abutment; consists of a 70-foot-wide riprap-lined approach channel upstream from the 142-foot-wide apron and crest (crest elevation 2743 feet), controlled by three 42-foot-wide by 30-foot-high radial gates; the chute flares from 142 feet to 266 feet wide, approximately 760 ft d/s to a stilling basin which is 266 feet wide and 125 feet long; design discharge capacity of spillway is 133,000 ft^3/s at reservoir water surface elevation 2785 feet

Outlet works description: river outlet works consist of two gated conduits located in the spillway; each conduit is 6 feet wide, 7.5 feet high, and approximately 87 feet long with invert elevations of 2710 feet and are controlled by high-pressure guard and regulating gates; combined discharge capacity of both river outlet works conduits is 4300 ft^3/s at reservoir water surface elevation 2773 feet (top of spillway gates)

Canal outlet works are located at the right dam abutment and consist of a trashracked intake with invert elevation 2710 feet; from there, a 5.5-foot-diameter concrete shaft drops vertically to a horizontal conduit section with invert elevation 2671 feet, which runs 206 feet and then transitions to the emergency gate chamber where flow is controlled by a 4-foot-square high-pressure emergency slide gate to a 56-inch-diameter steel pressure pipe to a 4-foot-square high-pressure regulating gate in a gate chamber, to a stilling well; canal outlet works discharge capacity is 300 ft^3/s at reservoir water surface elevation 2720 feet and 690 ft^3/s at reservoir water surface elevation 2773 feet

Other features associated with dam: SCADA system, ventilation systems for outlet works chambers and the piezometer terminal well, sump pumps, standby generators, heating systems, and electrical systems; three counterweighted radial gates (each with motor-driven, wire-rope hoists installed on the hoist deck and also asphalt-filled floats – two for each radial gate, inside float wells)

Complexity Number: 37

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

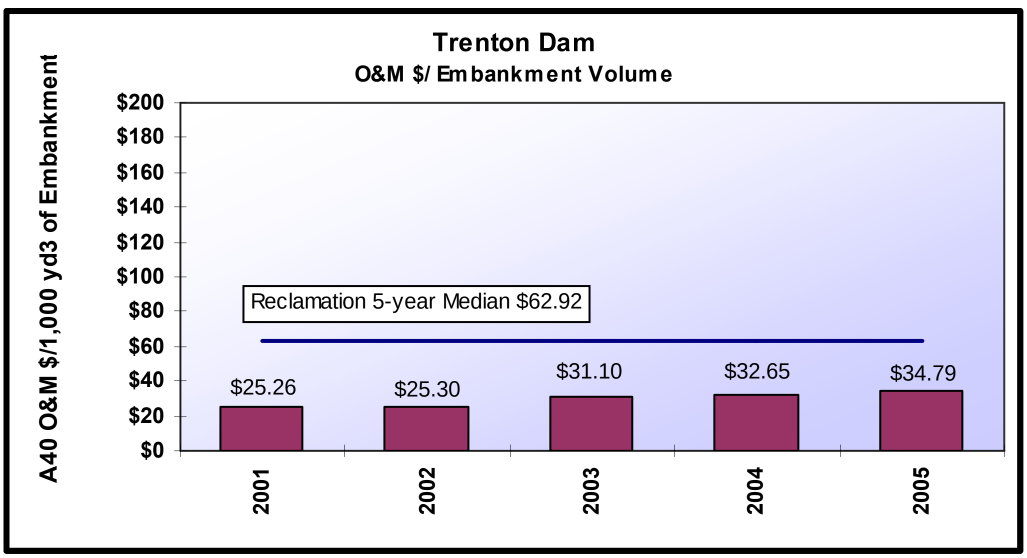
Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

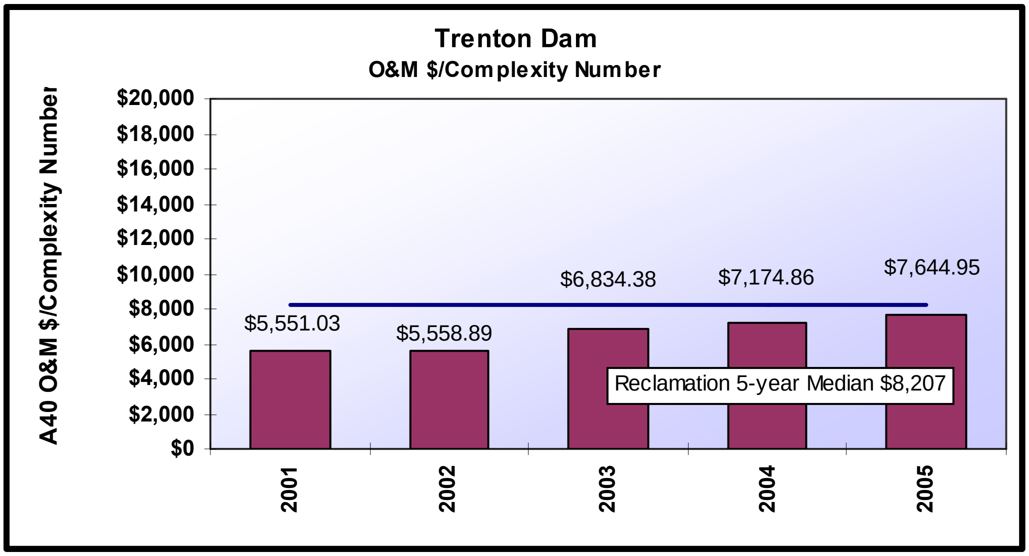
Trenton Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$524,331	$205,388	9.5%	72,168	21,261
2002	$212,375	$205,679	21.5%	32,822	10,729
2003	$252,872	$252,872	16.4%	32,944	724
2004	$302,038	$265,470	17.2%	27,484	726
2005	$359,847	$282,863	19.1%	37,292	-
Median	**$302,038**	**$252,872**	**16.8%**		

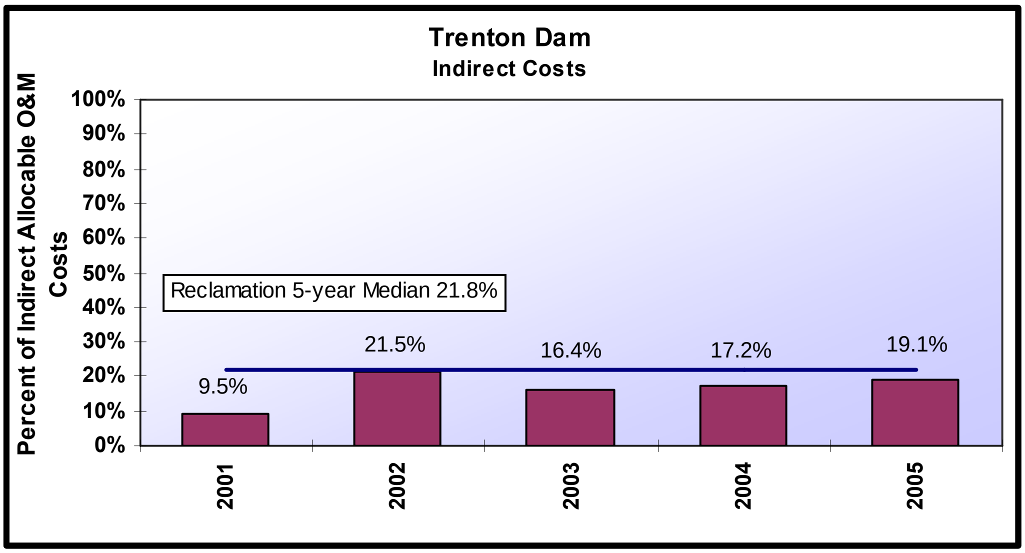
Benchmarking Analysis

Trenton Dam Benchmark Summary			
Benchmark	Trenton Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 31.10	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 6,834.38	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	17.23%	21.8%	15.61%
Full Time Equivalents	1.39	1.33	0.58

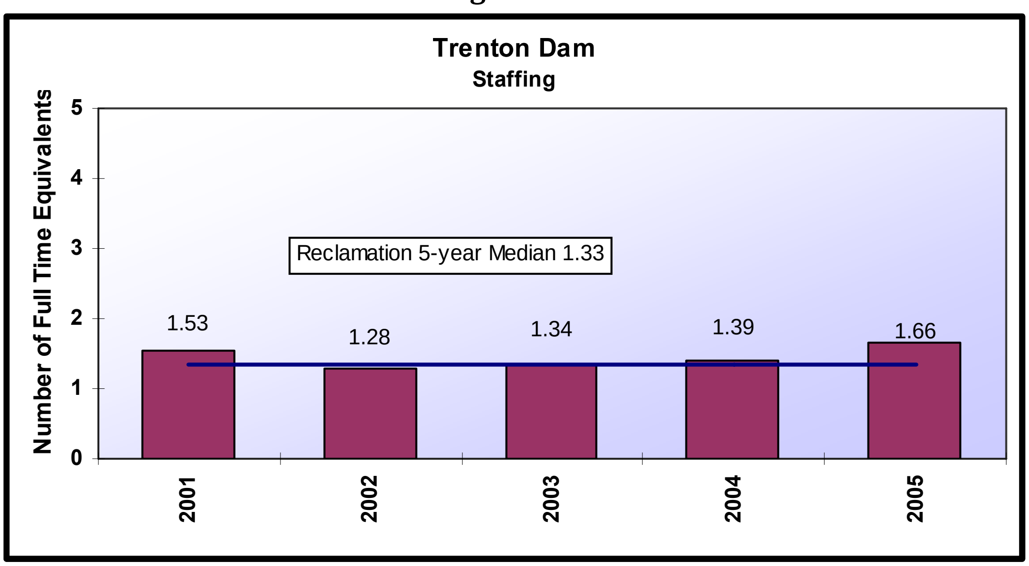
Cost Benchmarks







Staffing Benchmark



Webster Dam

(Webster Reservoir)

Original construction completed: 1956 by Bureau of Reclamation (51 years old)

Completion date and nature of subsequent modifications: N/A

Watercourse: South Fork of Solomon River, approximately 8 miles west of Stockton in northern Kansas

Type: homogeneous earthfill

Structural height: 154 feet

Dam crest length: 10,720 feet

Dam crest elevation: 1944 feet

Dam embankment volume: 8,145,000 ft^3

Active reservoir capacity: 255,279 acre-feet at top of exclusive flood control elevation 1923.7 feet

Authorized benefits: irrigation, flood control, recreation, fish and wildlife

Spillway description: near left end of dam; consists of entrance channel, a concrete ogee crest with three 33.33-foot-wide by 39.51-foot-high radial gates (operated with electric-motor driven hoists from the operating platform above the gate bays), a 658-foot-long concrete-lined chute, and a concrete stilling basin; features of radial gates include gate control float wells, gallery, generator building, electrical power and control panels located on spillway deck; design discharge capacity 138,000 ft^3/s at reservoir water surface elevation 1938 feet

Outlet works description: water enters a vertical 4.50foot-diameter concrete conduit through a trashracked intake structure, conduit transitions to horizontal and 220 feet downstream to a concrete emergency gate chamber, where it transitions a 3.5-foot-square metal-lined conduit controlled by a 3.5-foot-square high-pressure emergency gate, then transitions to a 48-inch-diameter steel pressure pipe with an 8-foot-diameter horseshoe-shaped concrete conduit; pressure pipe and conduit extend downstream 278 feet to the regulating gate chamber with another 3.5-foot-square high-pressure gate, which controls flow into the spilling basin; river outlet works discharge capacity of 380 ft^3/s at reservoir water surface elevation 1892.45 feet

Other features associated with dam: SCADA system; Woodston Diversion Dam (four pumping plants, Osborne Canal, laterals, and drains) are also part of Webster Unit; 20-foot high saddle dike located one-half mile north of dam; outlet works channel Parshall flume, ventilation system, sump pump

Complexity factor: 41

Owner: Bureau of Reclamation

Jurisdiction: Great Plains Region, Nebraska-Kansas Area Office, McCook Field Office

Operation and maintenance responsibility: dam operator performs daily O&M; large maintenance tasks are performed by McCook Field Office personnel

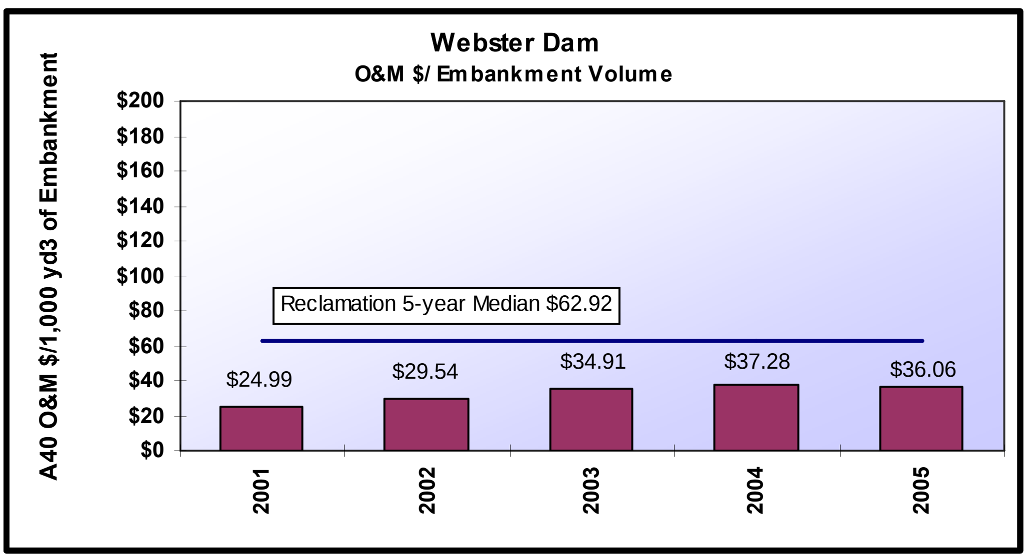
Supervisory/remote control: programmable SCADA system master station located in McCook Field Office uses remote transmitting units at facility; SCADA system is used to assist in the operational management of eleven dams under Reclamation jurisdiction

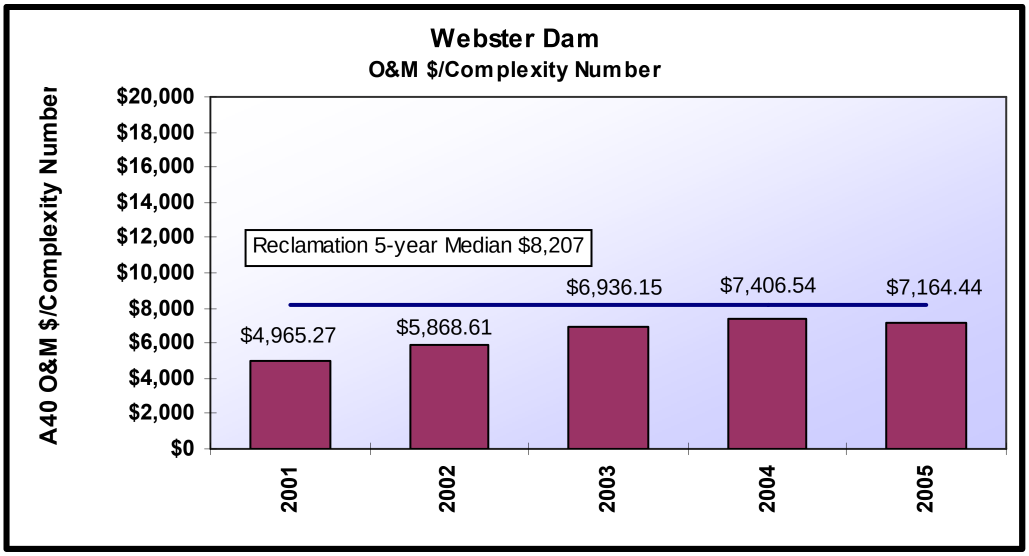
Webster Dam Statistics by Fiscal Year					
Fiscal Year	Total O&M Costs	A40 O&M Costs	Percent of Indirect Allocable O&M Costs	Peak Reservoir Storage (acre-feet)	Total Discharge (acre-feet)
2001	$203,576	$203,576	14.8%	82,649	17,877
2002	$265,620	$240,613	19.1%	61,400	20,192
2003	$294,776	$284,382	17.8%	36,773	13,474
2004	$407,356	$303,668	16.0%	19,212	6,932
2005	$421,508	$293,742	14.0%	12,405	-
Median	**$294,776**	**$284,382**	**16.4%**		

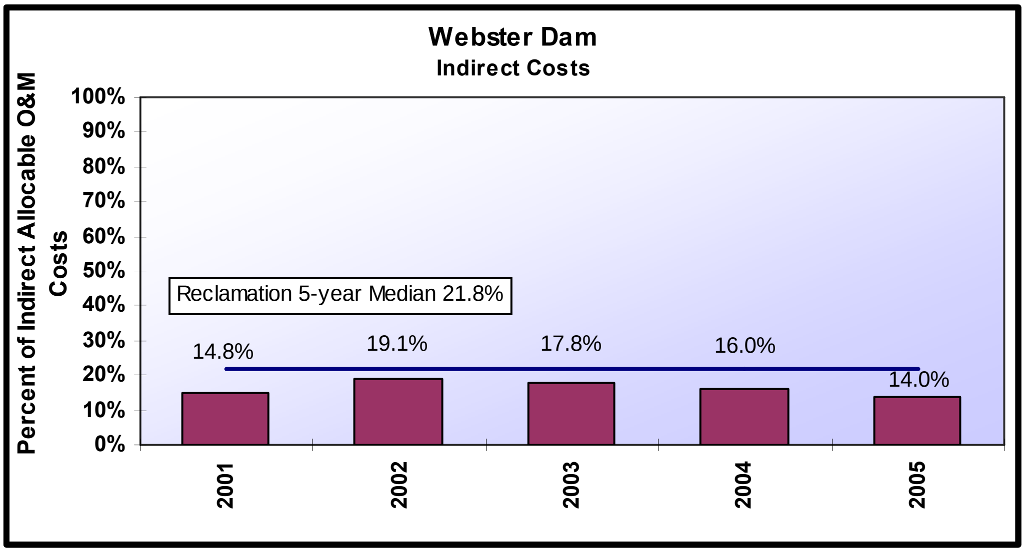
Benchmarking Analysis

Webster Dam Benchmark Summary			
Benchmark	Webster Dam 5-year Median	Reclamation 5-year Median	Group Low
A40 O&M Cost/1,000 yd^3 Embankment Volume	$ 34.91	$ 62.92	$ 27.96
A40 O&M Cost/Complexity Number	$ 6,936.15	$ 8,207	$ 4,035.36
Percent of Indirect Allocable O&M Costs	16.02%	21.8%	15.61%
Full Time Equivalents	1.32	1.33	0.58

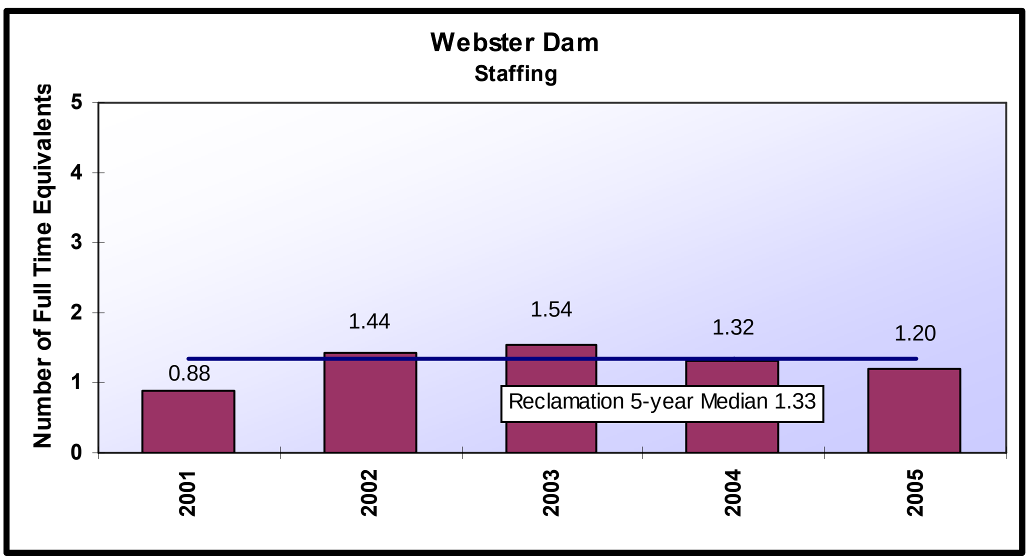
Cost Benchmarks







Staffing Benchmark



Appendix B

Reserved and Transferred Works Storage Dams, and Reserved and Transferred Conveyance and Distribution Facilities

Contents

Page

Appendix B

Reserved and Transferred Works Storage Dams, Reserved and Transferred Works Conveyance and Distribution Facilities

Water-Related Facility Status – Reserved Works

Region	PN	MP	LC	UC	GP	Total
Dams	24	20	4	11	43	102
Water Facilities	8	5	10	6	10	39
Total Reserved Works	32	25	14	17	53	141
Percent Reserved	26%	24%	25%	15%	35%	26%

Water-Related Facility Status – Transferred Works

Region	PN	MP	LC	UC	GP	Total
Dams	34	19	10	46	34	143
Water Facilities	57	61	33	52	63	266
Total Transferred Works	91	80	43	98	97	409
Percent Transferred	74%	76%	75%	85%	65%	74%
Total Facilities	123	105	57	115	150	550

Description of Facility Purposes:

I = irrigation
FC = flood control
F&W = fish & wildlife
M&I = municipal & industrial
N = navigation
P = power
RR = recreation
S = storage

RESERVED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
PN	1978	I-FC-M&I	American Falls Dam	Composite/Other	Bureau of Reclamation
PN	1950	I-P-FC	Anderson Ranch Dam	Embankment	Bureau of Reclamation
PN	1915	I-FC	Arrowrock Dam	Concrete	Bureau of Reclamation
PN	1961	I-FC	Arthur R. Bowman Dam	Embankment	Bureau of Reclamation
PN	1910	I	Bumping Lake Dam	Embankment	Bureau of Reclamation
PN	1948	I-P-FC	Cascade Dam	Embankment	Bureau of Reclamation
PN	1933	I	Cle Elum Dam	Embankment	Bureau of Reclamation
PN	1964	I	Clear Creek Dam	Concrete	Bureau of Reclamation
PN	1931	I-P-FC	Deadwood Dam	Concrete	Bureau of Reclamation
PN	1949	I	Dry Falls Dam	Embankment	Bureau of Reclamation
PN	1942	I-FC	Grand Coulee Dam	Concrete	Bureau of Reclamation
PN	1953	I-P-FC-N	Hungry Horse Dam	Concrete	Bureau of Reclamation
PN	1916	I-FC-F&W	Jackson Lake Dam	Composite/Other	Bureau of Reclamation
PN	1936	I	Kachess Dam	Embankment	Bureau of Reclamation
PN	1917	I	Keechelus Dam	Embankment	Bureau of Reclamation
PN	1927	I	McKay Dam	Composite/Other	Bureau of Reclamation
PN	1906	I-P-FC-F&W	Minidoka Dam	Composite/Other	Bureau of Reclamation
PN	1951	I-P-FC-RR-N	North Dam	Embankment	Bureau of Reclamation
PN	1949	I	O'Sullivan Dam	Embankment	Bureau of Reclamation
PN	1957	I-P-FC-F&W	Palisades Dam	Embankment	Bureau of Reclamation
PN	1948	I	Pinto Dam	Embankment	Bureau of Reclamation
PN	1977	I-FC-F&W	Ririe Dam	Embankment	Bureau of Reclamation
PN	1975	I-M&I-FC	Scoggins Dam	Embankment	Bureau of Reclamation
PN	1925	I	Tieton Dam	Composite/Other	Bureau of Reclamation
MP	1953	I-M&I	Bradbury Dam	Embankment	Bureau of Reclamation
MP	1991	S	Buckhorn Dam	Embankment	Bureau of Reclamation

RESERVED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
MP	1963	I-P	Clair A. Hill Whiskeytown Dam	Embankment	Bureau of Reclamation
MP	1910	I-FC	Clear Lake Dam And Dike	Embankment	Bureau of Reclamation
MP	1956	P-I-FC	Folsom Dam And Dikes	Composite/Other	Bureau of Reclamation
MP	1942	I-FC	Friant Dam And Dike	Concrete	Bureau of Reclamation
MP	1925	I-P	Gerber Dam	Concrete	Bureau of Reclamation
MP	1950	I-M&I	Keswick Dam	Composite/Other	Bureau of Reclamation
MP	1913	I	Lake Tahoe Dam	Concrete	Bureau of Reclamation
MP	1963	I-FC	Lewiston Dam	Embankment	Bureau of Reclamation
MP	1921	I-P	Link River Dam	Concrete	Bureau of Reclamation
MP	1975	F&W	Marble Bluff Dam	Embankment	Bureau of Reclamation
MP	1979	I-P-FC-RR-N-M&I	New Melones Dam	Embankment	Bureau of Reclamation
MP	1955	F&W-S	Nimbus Dam	Concrete	Bureau of Reclamation
MP	1963	FC-F&W	Prosser Creek Dam	Embankment	Bureau of Reclamation
MP	1985	I-M&I	San Justo Dam	Embankment	Bureau of Reclamation
MP	1945	I-P-FC-RR-N-M&I	Shasta Dam	Concrete	Bureau of Reclamation
MP	1963	F&W-S	Spring Creek Debris Dam	Embankment	Bureau of Reclamation
MP	1970	FC-F&W-M&I-P	Stampede Dam and Dike	Embankment	Bureau of Reclamation
MP	1962	I-P	Trinity Dam	Embankment	Bureau of Reclamation
LC	1950	P-FC-M&I	Davis Dam	Embankment	Bureau of Reclamation
LC	1941	I	Headgate Rock Dam	Embankment	Bureau of Reclamation
LC	1936	I-P-FC-RR-N-M&I	Hoover Dam	Concrete	Bureau of Reclamation
LC	1938	I-P-RR	Parker Dam	Concrete	Bureau of Reclamation

RESERVED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
UC	1966	I-P-FC	Blue Mesa Dam	Embankment	Bureau of Reclamation
UC	1938	I-P-FC	Caballo Dam and Arroyo Div.	Embankment	Bureau of Reclamation
UC	1977	P	Crystal Dam	Concrete	Bureau of Reclamation
UC	1916	I-P	Elephant Butte Dam And Dike	Concrete	Bureau of Reclamation
UC	1964	I-P	Flaming Gorge Dam	Concrete	Bureau of Reclamation
UC	1964	I-P-M&I-F&W	Fontenelle Dam	Embankment	Bureau of Reclamation
UC	1966	P-R	Glen Canyon Dam	Concrete	Bureau of Reclamation
UC			Grand Mesa System	Embankment	
UC	1971	I-F&C-F&W-M&I	Heron Dam And Dike	Embankment	Bureau of Reclamation
UC	1968	P	Morrow Point Dam	Concrete	Bureau of Reclamation
UC	1963	I-FC-RR	Navajo Dam	Embankment	Bureau of Reclamation
GP	1938	I-P	Alcova Dam	Embankment	Bureau of Reclamation
GP	1951	I-FC	Bonny Dam	Embankment	Bureau of Reclamation
GP	1952	I-P-FC	Boysen Dam	Embankment	Bureau of Reclamation
GP	1910	I-P-M&I	Buffalo Bill Dam	Concrete	Bureau of Reclamation
GP	1954	I-FC-P-M&I-F&W	Canyon Ferry Dam and Abutment Dikes	Concrete	Bureau of Reclamation
GP	1951	I-FC-M&I	Cedar Bluff Dam	Embankment	Bureau of Reclamation
GP	1946	I-M&I	Deerfield Dam	Embankment	Bureau of Reclamation
GP	1950	I-FC-M&I-F&W	Dickinson Dam	Embankment	Bureau of Reclamation
GP	1951	I-FC	Enders Dam	Embankment	Bureau of Reclamation
GP	1953	I-P	Flatiron Dam	Embankment	Bureau of Reclamation
GP	1939	I-M&I	Fresno Dam	Embankment	Bureau of Reclamation
GP	1969	I-FC-M&I	Glen Elder Dam and Dikes	Embankment	Bureau of Reclamation

RESERVED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
GP	1958	I-P-FC	Glendo Dam And Dikes	Embankment	Bureau of Reclamation
GP	1943	I-P	Green Mountain Dam	Embankment	Bureau of Reclamation
GP	1927	I-P	Guernsey Dam	Embankment	Bureau of Reclamation
GP	1949	I-FC-F&W	Heart Butte Dam and Dike	Embankment	Bureau of Reclamation
GP	1954	I-FC-M&I-F&W	Jamestown Dam	Embankment	Bureau of Reclamation
GP	1952	I-FC-F&W	Keyhole Dam	Embankment	Bureau of Reclamation
GP	1955	I-FC	Kirwin Dam	Embankment	Bureau of Reclamation
GP	1951	P	Kortes Dam	Concrete	Bureau of Reclamation
GP	1921	I	Lake Sherburne Dam	Embankment	Bureau of Reclamation
GP	1957	I-FC	Lovewell Dam	Embankment	Bureau of Reclamation
GP	1949	P	Marys Lake Dikes	Embankment	Bureau of Reclamation
GP	1949	I-FC	Medicine Creek Dam	Embankment	Bureau of Reclamation
GP	1981	I-FC-M&I-F&W	Mt. Elbert Forebay Dam	Embankment	Bureau of Reclamation
GP	1915	I	Nelson Dikes	Embankment	Bureau of Reclamation
GP	1964	I-FC-M&I	Norton Dam	Embankment	Bureau of Reclamation
GP	1949	I-P	Olympus Dam	Composite/Other	Bureau of Reclamation
GP	1956	I-FC-M&I-F&W	Pactola Dam	Embankment	Bureau of Reclamation
GP	1909	I-P	Pathfinder Dam	Composite/Other	Bureau of Reclamation
GP	1975	I-M&I-F&W	Pueblo Dam	Composite/Other	Bureau of Reclamation
GP	1952	P	Rattlesnake Dam	Embankment	Bureau of Reclamation
GP	1962	I-FC	Red Willow Dam	Embankment	Bureau of Reclamation
GP	1968	I-M&I-F&W	Ruedi Dam	Embankment	Bureau of Reclamation
GP	1939	I-P	Seminoe Dam	Concrete	Bureau of Reclamation
GP	1951	I-FC-F&W	Shadehill Dam and Dikes	Embankment	Bureau of Reclamation

RESERVED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
GP	1968	I-M&I-F&W	Sugar Loaf Dam and Dike	Embankment	Bureau of Reclamation
GP	1956	I-F&W	Tiber Dam and Dike	Embankment	Bureau of Reclamation
GP	1953	I-FC	Trenton Dam	Embankment	Bureau of Reclamation
GP	1978	I-M&I-F&W	Twin Lakes Dam	Embankment	Bureau of Reclamation
GP	1956	I-FC	Webster Dam	Embankment	Bureau of Reclamation
GP	1965	P	Yellowtail Afterbay Dam	Composite/Other	Bureau of Reclamation
GP	1966	P	Yellowtail Dam	Concrete	Bureau of Reclamation

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
PN	1966	I-F&W	Agate Dam	Embankment	Rogue River Valley Irrigation District
PN	1935	I-FC	Agency Valley Dam	Embankment	Vale Oregon Irrigation District
PN	1963	I-FC-F&W	Bully Creek Dam	Embankment	Vale Oregon Irrigation District
PN	1908	I	Cold Springs Dam	Embankment	Hermiston Irrigation District
PN	1954	I	Como Dam	Embankment	Bitter Root Irrigation District
PN	1969	I	Conconully Dam	Embankment	Okanogan Irrigation District
PN	1940	I	Crane Prairie Dam	Embankment	Central Oregon Irrigation District
PN	1956	I	Crescent Lake Dam	Embankment	Tumalo Irrigation District
PN	1908	I	Deer Flat Dams	Embankment	Boise Project Board Of Control
PN	1960	I	Emigrant Dam	Composite/Other	Talent Irrigation District
PN	1956	I	Fish Lake Dam	Embankment	Medford Irrigation District
PN	1956	I-F&W-FC	Fourmile Lake Dam	Composite/Other	Medford Irrigation District
PN	1986	I	French Canyon Dam	Embankment	Yakima-Tieton Irrigation District

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
PN	1939	I	Grassy Lake Dam	Embankment	Fremont-Madison Irrigation District
PN	1957	I	Haystack Dam	Embankment	North Unit Irrigation District
PN	1958	I-P-FC	Howard Prairie Dam	Embankment	Talent Irrigation District
PN	1909	I	Hubbard Dam	Embankment	Boise Project Board Of Control
PN	1961	I-FC	Hyatt Dam	Embankment	Talent Irrigation District
PN	1938	I-FC	Island Park Dam	Embankment	Fremont-Madison Irrigation District
PN	1959	I-P-FC	Keene Creek Dam	Embankment	Talent Irrigation District
PN	1960	I-FC-F&W	Little Wood River Dam	Embankment	Little Wood River Irrigation District
PN	1967	I-FC-F&W	Mann Creek Dam	Embankment	Mann Creek Irrigation District
PN	1968	I-FC-F&W	Mason Dam	Embankment	Baker Valley Irrigation District
PN	1950	I-FC	Ochoco Dam	Embankment	Ochoco Irrigation District
PN	1932	I-P-FC	Owyhee Dam	Concrete	Owyhee Project North Board Of Control
PN	1951	I-M&I	Reservoir A (Mann Lake) Dam	Embankment	Lewiston Orchards Irrigation District
PN	1921	I	Salmon Lake Dam	Embankment	Okanogan Irrigation District
PN	1923	I-M&I	Soldiers Meadow Dam	Embankment	Lewiston Orchards Irrigation District
PN	1932	I	Thief Valley Dam	Concrete	Lower Powder River Irrigation District
PN	1938	I	Unity Dam	Embankment	Burnt River Irrigation District
PN	1919	I-FC	Warm Springs Dam	Concrete	Vale Oregon Irrigation District
PN	1959	I	Wasco Dam	Embankment	Juniper Flat District Improvement Company
PN	1949	I	Wickiup Dam	Embankment	North Unit Irrigation District
PN	1969	I	Wild Horse Dam	Concrete	Bureau of Indian Affairs
MP	1967	I-P	B. F. Sisk San Luis Dam	Embankment	California Department Of Water Resources
MP	1939	I	Boca Dam	Embankment	Washoe County Water Conservation District
MP	1954	I-M&I	Carpinteria Dam	Composite/Other	Cachuma Operation And Maintenance Board
MP	1959	I-M&I	Casitas Dam and Dike	Embankment	Casitas Municipal Water District

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
MP	1967	I-M&I	Contra Loma Dam	Embankment	Contra Costa Water District
MP	1910	I	East Park Dam and Dikes	Concrete	Orland Unit Water Users Association
MP	1977	P	Funks Dam	Embankment	Tehama-Colusa Canal Authority
MP	1953	I-M&I	Glen Anne Dam	Composite/Other	Cachuma Operation And Maintenance Board
MP	1915	I-P	Lahontan Dam	Embankment	Truckee-Carson Irrigation District
MP	1952	I-M&I	Lauro Dam	Embankment	Cachuma Operation And Maintenance Board
MP	1966	I-FC	Little Panoche Detention Dam	Embankment	California Department Of Water Resources
MP	1965	I-P-FC-M&I-F&W	Los Banos Detention Dam	Embankment	California Department Of Water Resources
MP	1947	I-P	Martinez Dam	Embankment	Contra Costa Water District
MP	1957	I-FC-M&I-P	Monticello Dam	Concrete	Solano Irrigation District
MP	1967	I-FC-M&I	O'Neill Dam And Dike	Embankment	California Department Of Water Resources
MP	1954	I-M&I	Ortega Dam	Composite/Other	Cachuma Operation And Maintenance Board
MP	1976	I	Rye Patch Dam	Embankment	Pershing County Con. District
MP	1928	I	Stony Gorge Dam	Concrete	Orland Unit Water Users Association
MP	1958	I-FC	Twitchell Dam	Embankment	Santa Maria Valley Water Conservation District
LC	1939	I-P-M&I	Bartlett Dam	Concrete	Salt River Valley Water Users Association
LC	1964	I-P	CC Cragin Dam	Concrete	Salt River Valley Water Users Association
LC	1937	I-M&I	Horse Mesa Dam	Concrete	Salt River Valley Water Users Association
LC	1949	I-P-M&I	Horseshoe Dam	Embankment	Salt River Valley Water Users Association
LC	1938	I-M&I	Mormon Flat Dam	Concrete	Salt River Valley Water Users Association
LC	1992	I-M&I-P-FC	New Waddell Dam	Embankment	Central Arizona Water Conservancy District

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
LC	1977	FC	Reach II Dikes	Embankment	Central Arizona Water Conservancy District
LC	1966	RR-P	Senator Wash Dam and Pump Generator Plant	Embankment	Imperial Irrigation District
LC	1936	I-P-M&I	Stewart Mountain Dam	Concrete	Salt River Valley Water Users Association
LC	1936	I-P-M&I	Theodore Roosevelt Dam	Composite/Other	Salt River Valley Water Users Association
UC	1967	I-FC-F&W-RR	Arthur V. Watkins Dam	Embankment	Weber Basin Water Conservancy District
UC	1907	I	Avalon Dam	Embankment	Carlsbad Irrigation District
UC	1952	I	Big Sandy Dam and Dike	Embankment	Eden Valley Irrigation and Dr. Dist.
UC	1989	FC-I	Brantley Dam	Embankment	Carlsbad Irrigation District
UC	1966	I-F&W-M&I-FC-RR	Causey Dam	Embankment	Weber Basin Water Conservancy District
UC	1962	I-F&W	Crawford Dam	Embankment	Crawford Water Conservancy District
UC	1975	I-F&W-P-M&I-RR	Currant Creek Dam	Embankment	Central Utah Water Conservancy District
UC	1941	I-P-FC-M&I-RR	Deer Creek Dam	Embankment	Provo River Water Users Association
UC	1966	I-F&W-M&I-FC-RR	East Canyon Dam	Concrete	Davis & Weber Counties Canal Company
UC	1931	I-FC-M&I-R	Echo Dam	Embankment	Weber River Water Users Association
UC	1910	I	Eden Dam	Embankment	Eden Valley Irrigation and Drainage District
UC	1935	I-P	El Vado Dam	Composite/Other	Bureau of Reclamation
UC	1938	I	Fruitgrowers Dam	Embankment	Orchard City Irrigation District
UC	1966	I-M&I-RR	Huntington North Dam	Embankment	Emery Water Conservancy District
UC	1935	I-RR	Hyrum Dam	Embankment	South Cache Water Users Association
UC	1949	I	Jackson Gulch Dam	Embankment	Mancos Water Conservancy District
UC	1966	I-M&I-RR	Joes Valley Dam	Embankment	Emery Water Conservancy District

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
UC	1998	I-M&I	Jordanelle Dam	Embankment	Central Utah Water Conservancy District
UC	1963	I	Lemon Dam	Embankment	Florida Water Conservancy District
UC	1966	I-FC-RR	Lost Creek Dam	Embankment	Weber Basin Water Conservancy District
UC	1931	I	Lost Lake Dam	Embankment	Central Utah Water Conservancy District
UC	1993	I-FC-F&W-M&I	McPhee Dam and Great Cut Dike	Embankment	Dolores Water Conservancy District
UC	1971	I-F&W	Meeks Cabin Dam	Embankment	Bridger Valley Water Conservancy
UC	1938	I-RR	Moon Lake Dam	Embankment	Moon Lake Water Users Association
UC	1976	I-FC-F&W	Nambe Falls Dam	Concrete	Pojoaque Valley Irrigation District
UC	1946	I-RR	Newton Dam	Embankment	Newton Water Users Association
UC	1962	I-FC-F&W	Paonia Dam	Embankment	North Fork Water Conservancy District
UC	1937	I-M&I-FC-RR	Pineview Dam	Embankment	Ogden River Water Users Association
UC	1951	I-FC	Platoro Dam	Embankment	Conejos Water Conservancy District
UC	1980	I-M&I-RR	Red Fleet Dam	Embankment	Uintah Water Conservancy District
UC	1987	I-FC-F&W-M&I	Ridgway Dam	Embankment	Tri-County Water Conservancy District
UC	1967	I-F&W	Rifle Gap Dam	Embankment	Silt Water Conservancy District
UC	1946	I-M&I-RR	Scofield Dam	Embankment	Carbon Water Conservancy District
UC	1971	I-F&W	Silver Jack Dam	Embankment	Bostwick Park Water Conservancy District
UC	1973	I-M&I	Soldier Creek Dam	Embankment	Central Utah Water Conservancy District
UC	1970	I-M&I-F&W-RR-P	Starvation Dam	Embankment	Central Utah Water Conservancy District
UC	1981	M&I	Stateline Dam	Embankment	Bridger Valley Water Conservancy
UC	1961	I-M&I	Steinaker Dam	Embankment	Uintah Water Conservancy District
UC	1937	I-FC	Sumner Dam	Embankment	Carlsbad Irrigation District
UC	1937	I	Taylor Park Dam	Embankment	Uncompahgre Valley Water Users Association
UC	1914	I	Trial Lake Dam	Embankment	Central Utah Water Conservancy District

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
UC	1987	I-M&I-FRW-RR-P	Upper Stillwater Dam	Concrete	Central Utah Water Conservancy District
UC	1941	I	Vallecito Dam	Embankment	Pine River Irrigation District
UC	1959	I-F&W	Vega Dam	Embankment	Collbran Water Conservancy District
UC	1957	I-F&W-M&I	Wanship Dam	Embankment	Weber Basin Water Conservancy District
UC	1910	I	Washington Lake Dam	Embankment	Central Utah Water Conservancy District
GP	1945	I-FC-M&I	Altus Dam and Dikes	Composite/Other	Lugert-Altus Irrigation District
GP	1960	I-FC-F&W	Anchor Dam	Concrete	Owl Creek Irrigation District
GP	1949	I-FC-F&W	Angostura Dam	Composite/Other	Angostura Irrigation District
GP	1937	I	Anita Dam	Embankment	Huntley Irrigation District
GP	1966	FC-M&I-F&W	Arbuckle Dam	Embankment	Arbuckle Master Conservancy District
GP	1907	I	Belle Fourche Dam	Embankment	Belle Fourche Irrigation District
GP	1946	I	Box Butte Dam	Embankment	Mirage Flats Irrigation District
GP	1938	I-P	Bull Lake Dam	Embankment	Midvale Irrigation District
GP	1952	I-P-M&I	Carter Lake Dams	Embankment	Northern Colorado Water Conservancy District
GP	1965	FC-M&I-F&W	Cheney Dam	Embankment	City Of Wichita, Kansas
GP	1982	M&I-F&W	Choke Canyon Dam	Embankment	City of Corpus Christi, Texas
GP	1964	I-FC-F&W	Clark Canyon Dam	Embankment	East Bench Irrigation District
GP	1990	I	Davis Creek Dam	Embankment	Twin Loups Reclamation District
GP	1918	I	Deaver Dam	Embankment	Deaver Irrigation District
GP	1959	I-FC-M&I-F&W	Fort Cobb Dam	Embankment	Fort Cobb Reservoir Master Conservancy District
GP	1961	I-FC-M&I-F&W	Foss Dam	Embankment	Fort Cobb Reservoir Master Conservancy District
GP	1929	I	Gibson Dam	Concrete	Greenfields Irrigation District
GP	1950	I-P	Granby Dam And Dikes	Embankment	Northern Colorado Water Conservancy District
GP	1958	I-M&I-F&W	Helena Valley Dam	Embankment	Helena Valley Irrigation District

TRANSFERRED WORKS STORAGE DAMS

Region	Date of Construction	Purposes	Dam Name	Dam Type	Operating Organization
GP	1949	I-P	Horsetooth Dams And Dike	Embankment	Northern Colorado Water Conservancy District
GP	1913	I	Lake Alice Dams	Embankment	Pathfinder Irrigation District
GP	1987	FC-M&I-F&W	McGee Creek Dam	Embankment	McGee Creek Authority
GP	1964	I	Merritt Dam	Embankment	Ainsworth Irrigation District
GP	1915	I	Minatare Dam	Embankment	Pathfinder Irrigation District
GP	1975	M&I-FC-F&W	Mountain Park Dam	Concrete	Mountain Park Master Conservancy District
GP	1965	FC-M&I-F&W	Norman Dam	Embankment	Central Oklahoma Master Con. District
GP	1926	I	Pilot Butte Dams	Embankment	Midvale Irrigation District
GP	1931	I	Pishkun Dikes	Embankment	Greenfields Irrigation District
GP	1965	FC-M&I-F&W	Sanford Dam	Embankment	Canadian River Municipal Water Authority
GP	1946	I-P	Shadow Mountain Dam	Embankment	Northern Colorado Water Conservancy District
GP	1963	I-FC-M&I-F&W	Twin Buttes Dam	Embankment	San Angelo Water Supply Corporation
GP	1986	I-F&W	Virginia Smith Dam	Embankment	Twin Loups Reclamation District
GP	1953	I	Willow Creek Dam	Embankment	Northern Colorado Water Conservancy District
GP	1911	I	Willow Creek Dam and Dikes	Embankment	Greenfields Irrigation District

RESERVED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
PN	Boise Project	Black Canyon Diversion Dam	Bureau of Reclamation
PN	Columbia Basin Project	Grand Coulee Feeder Canal/Pump Generating Plant	Bureau of Reclamation
PN	Umatilla Project	Water Exchange Facilities	Bureau of Reclamation
PN	Umatilla Project	WEID Pumping Plant	Bureau of Reclamation
PN	Yakima Project	Chandler Power Canal	Bureau of Reclamation
PN	Yakima Project	Prosser Diversion Dam	Bureau of Reclamation
PN	Yakima Project	Roza Diversion Dam	Bureau of Reclamation
PN	Yakima Project	Roza Power Canal	Bureau of Reclamation
MP	Central Valley Project	Columbia-Mowry Relift Facilities	Bureau of Reclamation
MP	Central Valley Project	Delta Cross Channel	Bureau of Reclamation
MP	Central Valley Project	Folsom South Canal	Bureau of Reclamation
MP	Central Valley Project	Red Bluff Diversion Dam	Bureau of Reclamation
MP	Klamath Project	Reserved Works	Bureau of Reclamation
LC	Central Arizona Project	Ak-Chin Farms System	Bureau of Reclamation
LC	Central Arizona Project	Santa Rosa Canal	Bureau of Reclamation
LC	Colorado River Basin Salinity Control Project	Bypass Drain - United States	Bureau of Reclamation
LC	Colorado River Basin Salinity Control Project	Pittman Bypass Pipeline	Bureau of Reclamation
LC	Colorado River Basin Salinity Control Project	Protective And Regulatory Pumping Unit	Bureau of Reclamation
LC	Colorado River Front Work And Levee System	Channelization & Topock Marsh Facilities	Bureau of Reclamation
LC	Colorado River Front Work And Levee System	Main Outlet Drain	Bureau of Reclamation
LC	Colorado River Front Work And Levee System	South Gila Valley Drainage System	Bureau of Reclamation

RESERVED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
LC	Colorado River Front Work And Levee System	Yuma Valley Ground Water Recovery	Bureau of Reclamation
LC	Delivery Of Water To Mexico	Main Outlet Drain Extension	Bureau of Reclamation
UC	Collbran Project	Bonham-Cottonwood Collection System	Bureau of Reclamation
UC	Colorado River Basin Salinity Control Project	Paradox Valley Facilities	Bureau of Reclamation
UC	Middle Rio Grande Project	Rio Grande Channelization	Bureau of Reclamation
UC	Pecos River Water Salvage Project	Pecos River Water Salvage	Bureau of Reclamation
UC	San Juan-Chama Project	Diversion, Collection, And Channelization System	Bureau of Reclamation
UC	San Luis Valley Project	Closed Basin System	Bureau of Reclamation
GP	Colorado Big Thompson Project	Alva B. Adams Tunnel	Bureau of Reclamation
GP	Colorado Big Thompson Project	Big Thompson Diversion Dam	Bureau of Reclamation
GP	Colorado Big Thompson Project	Pole Hill-Canal, Afterbay & Tunnel	Bureau of Reclamation
GP	Fryingpan-Arkansas Project	West Slope Collection System	Bureau of Reclamation
GP	Kendrick Project	Casper Canal Tunnel No. 1	Bureau of Reclamation
GP	Leadville Arkansas River Recovery	Leadville Treatment Plant	Bureau of Reclamation
GP	Milk River Project	St. Mary Canal System	Bureau of Reclamation
GP	Pick-Sloan Missouri Basin Program	Frenchman Creek Stabilization	Bureau of Reclamation
GP	Shoshone Project	Shoshone Canyon Conduit Division Works Spillway	Bureau of Reclamation
GP	Shoshone Project	Shoshone Canyon Conduit Pressurized Section	Bureau of Reclamation

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
PN	Arnold Project	Arnold Irrigation District System	Arnold Irrigation District
PN	Avondale Project	Avondale Irrigation District System	Avondale Irrigation District
PN	Baker Project	Baker Valley Irrigation District System	Baker Valley Irrigation District
PN	Bitter Root Project	Bitter Root Irrigation District System	Bitter Root Irrigation District
PN	Boise Project	Black Canyon Irrigation District System	Black Canyon Irrigation District
PN	Boise Project	Boise Board of Control System	Boise Project Board of Control
PN	Boise Project	Boise River Diversion Dam	Boise Project Board of Control
PN	Chief Joseph Dam Project	Brewster Flat Irrigation District System	Brewster Flat Irrigation District
PN	Chief Joseph Dam Project	Bridgeport Bar Irrigation District System	Bridgeport Bar Irrigation District
PN	Chief Joseph Dam Project	Greater Wenatchee Irrigation District System	Greater Wenatchee Irrigation District
PN	Chief Joseph Dam Project	Lake Chelan Reclamation District System	Lake Chelan Reclamation District
PN	Chief Joseph Dam Project	Whitestone Reclamation District System	Whitestone Reclamation District
PN	Columbia Basin Project	CB Project – Reserved Works	Quincy Columbia Basin Irrigation District
PN	Columbia Basin Project	East System	East Columbia Basin Irrigation District
PN	Columbia Basin Project	Quincy System	Quincy Columbia Basin Irrigation District
PN	Columbia Basin Project	South System	South Columbia Basin Irrigation District
PN	Crescent Lake Dam Project	Tumalo Irrigation District System	Tumalo Irrigation District
PN	Crooked River Project	Ochoco Irrigation District System	Ochoco Irrigation District
PN	Dalton Gardens Project	Dalton Gardens Irrigation District System	Dalton Gardens Irrigation District
PN	Deschutes Project	Central Oregon Irrigation District System	Central Oregon Irrigation District
PN	Deschutes Project	North Unit Irrigation District System	North Unit Irrigation District
PN	Frenchtown Project	Frenchtown Irrigation District System	Frenchtown Irrigation District
PN	Grants Pass Project	Savage Rapids Diversion Dam (also considered to be a high-hazard storage dam)	Grants Pass Irrigation District
PN	Lewiston Orchards Project	Lewiston Orchards Irrigation District	Lewiston Orchards Irrigation District
PN	Michaud Flats Project	Falls Irrigation District	Falls Irrigation District
PN	Minidoka Project	A&B Irrigation District System	A&B Irrigation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
PN	Minidoka Project	American Falls Reservoir District No. 2 System	American Falls Reservoir District No. 2
PN	Minidoka Project	Minidoka Irrigation District System	Minidoka Irrigation District
PN	Missoula Valley Project	Big Flat Irrigation District System	Big Flat Irrigation District
PN	Okanogan Project	Okanogan Irrigation District System	Okanogan Irrigation District
PN	Owyhee Project	Owyhee Irrigation District System	Owyhee Irrigation District
PN	Owyhee Project	Owyhee South Board Of Control System	Owyhee South Board Of Control S
PN	Rathdrum Prairie Project	East Greenacres Irrigation District System	East Greenacres Irrigation District
PN	Rathdrum Prairie Project	Hayden Lake Irrigation District System	Hayden Lake Irrigation District
PN	Rogue River Basin Project	Joint Works - RRBP	Medford Irrigation District
PN	Rogue River Basin Project	Medford Irrigation District System	Medford Irrigation District
PN	Rogue River Basin Project	Rogue River Valley Irrigation District System	Rogue River Valley Irrigation District
PN	Rogue River Basin Project	Talent Irrigation District System	Talent Irrigation District
PN	Spokane Valley Project	Consolidated Irrigation District 19 System	Consolidated Irrigation District 19
PN	The Dalles Project	The Dalles Irrigation District System	The Dalles Irrigation District
PN	Tualatin Project	Tualatin Valley Irrigation District System	Tualatin Valley Irrigation District
PN	Umatilla Project	Hermiston Irrigation District System	Hermiston Irrigation District
PN	Umatilla Project	West Extension Irrigation District System	West Extension Irrigation District
PN	Vale Project	Vale Oregon Irrigation District System	Vale Oregon Irrigation District
PN	Yakima Project	Benton Irrigation District System	Benton Irrigation District
PN	Yakima Project	Cascade Irrigation District System	Cascade Irrigation District
PN	Yakima Project	Easton Diversion Dam	Kittitas Reclamation District
PN	Yakima Project	Grandview Irrigation District System	Grandview Irrigation District
PN	Yakima Project	Granger Irrigation District System	Granger Irrigation District
PN	Yakima Project	Kennewick Irrigation District System	Kennewick Irrigation District
PN	Yakima Project	Kittitas Reclamation District System	Kittitas Reclamation District
PN	Yakima Project	Outlook Irrigation District System	Outlook Irrigation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
PN	Yakima Project	Roza Irrigation District System	Roza Irrigation District
PN	Yakima Project	Snipes Mountain Irrigation District System	Snipes Mountain Irrigation District
PN	Yakima Project	Sunnyside Valley Irrigation District & Board Of Control System	Sunnyside Valley Irrigation District & Board Of Control
PN	Yakima Project	Yakima River Pressure Tunnel	Kittitas Reclamation District
PN	Yakima Project	Yakima-Tieton Irrigation District System	Yakima-Tieton Irrigation District
MP	Cachuma Project	Goleta County Water District System	Goleta County Water District
MP	Cachuma Project	South Coast Conduit System	Cachuma Operation and Maintenance Board
MP	Cachuma Project	Summerland County Water District System	Summerland County Water District
MP	Cachuma Project	Tecolote Tunnel	Cachuma Operation & Maintenance Board
MP	Central Valley Project	Bella Vista Water District System	Bella Vista Water District
MP	Central Valley Project	Colusa County Water District System	Colusa County Water District
MP	Central Valley Project	Contra Costa Canal	Contra Costa Water District
MP	Central Valley Project	Corning Canal System	Tehama Colusa Canal Authority
MP	Central Valley Project	Corning Water District System	Corning Water District
MP	Central Valley Project	County of Colusa Pumping Plants	Glen Valley Water District
MP	Central Valley Project	Coyote Pumping Plant	Santa Clara Valley Water District
MP	Central Valley Project	Delano-Earlimart Irrigation District System	Delano-Earlimart Irrigation District
MP	Central Valley Project	Delta-Mendota Canal	San Luis & Delta Mendota Water Authority
MP	Central Valley Project	Dos Amigos Pumping Plant	California Department of Water Resources
MP	Central Valley Project	Dunnigan Water District System	Dunnigan Water District
MP	Central Valley Project	Exeter Irrigation District System	Exeter Irrigation District
MP	Central Valley Project	Friant-Kern Canal	Friant Water Users Authority
MP	Central Valley Project	Gianelli Pumping-Generating Plant	California Department of Water Resources
MP	Central Valley Project	Glide System	Glide Water District
MP	Central Valley Project	Ivanhoe Irrigation District System	Ivanhoe Irrigation District
MP	Central Valley Project	Kanawha System	Kanawha Water District No. 1, 2, 3

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
MP	Central Valley Project	Lindmore Irrigation District System	Lindmore Irrigation District
MP	Central Valley Project	Lindsay-Strathmore Irrigation District System	Lindsay-Strathmore Irrigation District
MP	Central Valley Project	Madera Canal	Madera Irrigation District & Chowchilla Water District
MP	Central Valley Project	Madera Irrigation District System	Madera Irrigation District
MP	Central Valley Project	Muletown Conduit	Clear Creek Community Services District
MP	Central Valley Project	O'Neill Pumping/Generating Plant	San Luis & Delta Mendota Water Authority
MP	Central Valley Project	Orland-Artois Water District System, Unit 1	Orland-Artois Water District
MP	Central Valley Project	Pacheco Conduit	Santa Clara Valley Water District
MP	Central Valley Project	Pacheco Pumping Plant	Santa Clara Valley Water District
MP	Central Valley Project	Panoche Water District System	Panoche Water District
MP	Central Valley Project	Plain View Water District System	Plain View Water District
MP	Central Valley Project	Pleasant Valley Pumping Plant	Westlands Water District
MP	Central Valley Project	San Benito System	San Benito County Water District
MP	Central Valley Project	San Luis Canal	California Department of Water Resources
MP	Central Valley Project	San Luis Drain	San Luis & Delta Mendota Water Authority
MP	Central Valley Project	San Luis Water District System	San Luis Water District
MP	Central Valley Project	Santa Clara System	Santa Clara Valley Water District
MP	Central Valley Project	Shafter-Wasco Irrigation District System	Shafter-Wasco Irrigation District
MP	Central Valley Project	Shasta Dam Area PUD System	Shasta Dam Area Public Utility District
MP	Central Valley Project	So. San Joaquin Municipal Water District System	So. San Joaquin Municipal Water District
MP	Central Valley Project	Stone Corral Irrigation District System	Stone Corral Irrigation District
MP	Central Valley Project	Tea Pot Dome Water District System	Tea Pot Dome Water District
MP	Central Valley Project	Tehama-Colusa Canal	Tehama-Colusa Canal Authority
MP	Central Valley Project	Toyon Pipeline	Shasta Dam Area Public Utilities District
MP	Central Valley Project	Tracy Pumping Plant	San Luis & Delta Mendota Water Authority
MP	Central Valley Project	Westlands Water District System	Westlands Water District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
MP	Central Valley Project	Westside System	Westside Water Improvement District No. 1
MP	Humboldt Project	Pershing County Water Conservation District System	Pershing County Water Conservation District
MP	Klamath Project	Klamath Irrigation District System	Klamath Irrigation District
MP	Klamath Project	Klamath Project Area F	Klamath Irrigation District
MP	Klamath Project	Langell Valley Irrigation District System	Langell Valley Irrigation District
MP	Klamath Project	Shasta View Irrigation District System	Shasta View Irrigation District
MP	Klamath Project	Tulelake Irrigation District System	Tulelake Irrigation District
MP	Newlands Project	Truckee-Carson Irrigation District System	Truckee-Carson Irrigation District
MP	Orland Project	Orland Unit Water Users Association System	Orland Unit Water Users Association
MP	Public Law 130 Project	Proberta Water District System	Proberta Water District
MP	Solano Project	Putah Diversion Dam	Solano Irrigation District
MP	Solano Project	Putah South Canal	Solano County Water District
MP	Solano Project	Solano County Water Agency System	Solano County Water District
MP	Ventura River Project	Casitas Municipal Water District System	Casitas Municipal Water District
LC	Boulder Canyon Project	Coachella Valley Irrigation District system	Coachella Valley Water District
LC	Boulder Canyon Project	Imperial Diversion Dam	Imperial Irrigation District
LC	Boulder Canyon Project	Imperial Irrigation District System	Imperial Irrigation District
LC	Central Arizona Project	CAP Headquarters Complex	Central Arizona Water Conservancy District
LC	Central Arizona Project	Central Arizona Irrigation & Drainage District System	Central Arizona Irrigation & Drainage District
LC	Central Arizona Project	Central Arizona Project Aqueducts	Central Arizona Water Conservancy District
LC	Central Arizona Project	Central Arizona Project Pumping Plants	Central Arizona Water Conservancy District
LC	Central Arizona Project	Fountain Hills Water Delivery System	Chaparral City Water Company
LC	Central Arizona Project	Ft. McDowell Indian System	Ft. McDowell Tribe
LC	Central Arizona Project	Gila River Farms	Gila River Farms
LC	Central Arizona Project	HoHoKam Irrigation Drainage System	HoHoKam Irrigation Drainage District
LC	Central Arizona Project	Joint Distribution System	Queen Creek Irrigation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
LC	Central Arizona Project	Maricopa-Stanfield System	Maricopa-Stanfield Irrigation & Drainage District
LC	Central Arizona Project	New Magma Irrigation & Drainage District System	New Magma Irrigation & Drainage District
LC	Central Arizona Project	Tonopah System	Tonopah Irrigation and Drainage District
LC	Colorado River Basin Salinity Control Project	Bypass Drain – Mexico	Government of Mexico
LC	Gila Project	Drainage Wells And Drain Carriage System	Wellton-Mohawk Irrigation & Drainage District
LC	Gila Project	Gila Gravity Main Canal	Gila Project Contractors
LC	Gila Project	South Gila Carriage, Distribution, & Drain System	Yuma Irrigation District
LC	Gila Project	Wellton-Mohawk Canal System	Wellton-Mohawk Irrigation & Drainage District
LC	Gila Project	Wellton-Mohawk Pumping Plants	Wellton-Mohawk Irrigation & Drainage District
LC	Gila Project	Yuma Mesa Carriage, Distribution & Drainage System	Yuma Mesa Irrigation & Drainage District
LC	Gila Project	Yuma Mesa Pumping Plant	Yuma Mesa Irrigation & Drainage District
LC	Lower Colorado Water Supply Project	Production Wells No. 1 & 2	Imperial Irrigation District
LC	Palo Verde Diversion Project	Palo Verde Diversion Dam	Palo Verde Irrigation District
LC	Salt River Project	Granite Reef Diversion Dam	Salt River Valley Water Users Association
LC	Salt River Project	Power Canal Diversion Dam	Fish & Wildlife Service and Arizona Department of Fish and Game
LC	Salt River Project	Salt River Pima Maricopa Indian Community System	Salt River Pima Maricopa Tribe
LC	Salt River Project	Salt River Valley Water Users' Association System	Salt River Valley Water Users Association
LC	Yuma Auxiliary Project	Unit B Irrigation System	Unit B Irrigation & Drainage District
LC	Yuma Project	Laguna Diversion Dam	Imperial Irrigation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
LC	Yuma Project	Reservation Division System	Bard Water District
LC	Yuma Project	Yuma County Water Users System	Yuma County Water Users Association
UC	Balmorhea Project	Reeves County Water Improvement District No. 1	Reeves County Water Improvement District No. 1
UC	Bostwick Park Project	Bostwick Park Water Conservancy District System	Bostwick Park Water Conservancy District
UC	Central Utah Project	Alpine Aqueduct System	Central Utah Water Conservancy District
UC	Central Utah Project	Jordan Aqueduct System	Central Utah Water Conservancy District
UC	Central Utah Project	Sixth Water Aqueduct	Central Utah Water Conservancy District
UC	Central Utah Project	Strawberry Collection System	Central Utah Water Conservancy District
UC	Central Utah Project	Syar Tunnel	Central Utah Water Conservancy District
UC	Central Utah Project	Tyzack Pumping Plant and Aqueduct	Uintah Water Conservancy District
UC	Central Utah Project	Uintah Water Conservancy District System	Uintah Water Conservancy District
UC	Collbran Project	Collbran Conservancy District System	Collbran Conservancy District
UC	Dolores Project	Dolores Pumping Plants	Dolores Water Conservancy District
UC	Dolores Project	Dolores Tunnel, Canal and Laterals	Dolores Water Conservancy District
UC	Eden Project	Eden Valley Irrigation & Drainage District System	Eden Valley Irrigation & Drainage District
UC	Emery County Project	Emery Water Conservancy District System	Emery Water Conservancy District
UC	Emery County Project	Swasey Diversion Dam	Emery Water Conservancy District
UC	Florida Project	Florida Water Conservancy District System	Florida Water Conservancy District
UC	Fort Sumner Project	Fort Sumner Irrigation District System	Fort Sumner Irrigation District
UC	Fruitgrowers Dam Project	Orchard City Irrigation District System	Orchard City Irrigation District
UC	Grand Valley Project	Grand Valley Diversion Dam	Grand Valley Water Users Association
UC	Grand Valley Project	Grand Valley Water Users Association System	Grand Valley Water Users Association
UC	Grand Valley Project	Orchard Mesa Irrigation District System	Orchard Mesa Irrigation District
UC	Hammond Project	Hammond Conservancy District System	Hammond Conservancy District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
UC	Hyrum Project	South Cache Water Users System	South Cache Water Users Association
UC	Mancos Project	Mancos Water Conservancy District System	Mancos Water Conservancy District
UC	Middle Rio Grande Project	Middle Rio Grande Conservancy District System	Middle Rio Grande Conservancy District
UC	Moon Lake Project	Moon Lake Water Users System	Moon Lake Water Users Association
UC	Newton Project	Newton Water Users System	Newton Water Users Association
UC	Ogden River Project	Pine View Water Systems	Ogden River Water Users Association
UC	Paonia Project	Fire Mountain Diversion Dam	North Fork Water Conservancy District
UC	Paonia Project	North Fork Water Conservation District System	North Fork Water Conservancy District
UC	Preston Bench Project	Preston Riverdale & Mink Creek Canal System	Preston Riverdale & Mink Creek Canal Company
UC	Provo River Project	Metropolitan Water District System	Metropolitan Water District of Salt Lake City
UC	Provo River Project	Provo River System - East Side	Provo River Water Users Association
UC	Provo River Project	Provo River System - West Side	Provo River Water Users Association
UC	Rio Grande Project	Leasburg Diversion Dam	El Paso District No. 1
UC	Rio Grande Project	Lucero Detention Dike	Elephant Butte Irrigation District
UC	Rio Grande Project	Mesilla Diversion Dam	Elephant Butte Irrigation District
UC	Rio Grande Project	Percha Diversion Dam	Elephant Butte Irrigation District
UC	Sanpete Project	Ephraim Irrigation Company System	Ephraim Irrigation Company
UC	Sanpete Project	Horseshoe Irrigation Company System	Horseshoe Irrigation Company
UC	Silt Project	Silt Water Conservancy District System	Silt Water Conservancy District
UC	Smith Fork Project	Crawford Water Conservancy District System	Crawford Water Conservancy District
UC	Smith Fork Project	Smith Fork Diversion Dam	Crawford Water Conservancy District
UC	Strawberry Valley Project	Highline Canal Company System	Highline Canal Company
UC	Strawberry Valley Project	Springville-Mapleton System	Mapleton Irrigation Company & Springville Irrigation District
UC	Strawberry Valley Project	Strawberry Water Users System	Strawberry Water Users Association

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
UC	Tucumcari Project	Arch Hurley Conservancy District System	Arch Hurley Conservancy District
UC	Uncompahgre Project	Gunnison Diversion Dam	Uncompahgre Valley Water Users Association
UC	Uncompahgre Project	Uncompahgre Valley Water Users System	Uncompahgre Valley Water Users Association
UC	Weber Basin Project	Slaterville Diversion Dam	Weber Basin Water Conservancy District
UC	Weber Basin Project	Stoddard Diversion Dam	Weber Basin Water Conservancy District
UC	Weber Basin Project	Weber Basin Water Conservancy District System	Weber Basin Water Conservancy District
GP	Arbuckle Project	Arbuckle Aqueduct System	Arbuckle Master Conservancy District
GP	Buffalo Rapids Project	Buffalo Rapids Project Board Of Control System	Buffalo Rapids Project Board Of Control
GP	Buford-Trenton Project	Buford-Trenton Irrigation District System	Buford-Trenton Irrigation District
GP	Colorado Big Thompson Project	Farr Pumping Plant and Granby Power Canal	Northern Colorado Water Conservancy District
GP	Colorado Big Thompson Project	Northern Colorado Water Conservancy District System	Northern Colorado Water Conservancy District
GP	Colorado Big Thompson Project	Willow Creek Pumping Plant	Northern Colorado Water Conservancy District
GP	Fryingpan-Arkansas Project	Fountain Valley System	Fountain Valley Authority
GP	Huntley Project	Huntley Project Irrigation District System	Huntley Project Irrigation District
GP	Intake Project	Intake Irrigation District System	Lower Yellowstone Project Board of Control
GP	Kendrick Project	Casper-Alcova Irrigation District System	Casper-Alcova Irrigation District
GP	Lower Yellowstone Project	Lower Yellowstone Irrigation District System No. 1 & 2	Lower Yellowstone Project Board of Control
GP	McGee Creek Project	McGee Creek Aqueduct System	McGee Creek Authority
GP	Milk River Project	Glasgow Irrigation District System	Glasgow Irrigation District
GP	Milk River Project	Malta Irrigation District System	Malta Irrigation District
GP	Milk River Project	Paradise Diversion Dam	Paradise Valley Irrigation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
GP	Mirage Flats Project	Mirage Flats Irrigation District System	Mirage Flats Irrigation District
GP	Mountain Park Project	Mountain Park Aqueduct System	Mountain Park Master Conservancy District
GP	Norman Project	Norman Aqueduct System	Central Oklahoma Master Conservancy District
GP	North Platte Project	Farmers Irrigation District System	Farmers Irrigation District
GP	North Platte Project	Gering-Ft. Laramie Irrigation District System	Gering-Ft. Laramie Irrigation District
GP	North Platte Project	Goshen Irrigation District System	Goshen Irrigation District
GP	North Platte Project	Northport Irrigation District System	Northport Irrigation District
GP	North Platte Project	Pathfinder Irrigation District System	Pathfinder Irrigation District
GP	Pick-Sloan Missouri Basin Program	Ainsworth Irrigation District System	Ainsworth Irrigation District
GP	Pick-Sloan Missouri Basin Program	Almena Irrigation District System	Almena Irrigation District
GP	Pick-Sloan Missouri Basin Program	Anchor Dikes	Owl Creek Irrigation District
GP	Pick-Sloan Missouri Basin Program	Angostura Irrigation District System	Angostura Irrigation District
GP	Pick-Sloan Missouri Basin Program	Belle Fourche Irrigation District System	Belle Fourche Irrigation District
GP	Pick-Sloan Missouri Basin Program	East Bench Irrigation District System	East Bench Irrigation District
GP	Pick-Sloan Missouri Basin Program	Fort Clark Irrigation District System	Fort Clark Irrigation District
GP	Pick-Sloan Missouri Basin Program	Frenchman Valley Irrigation District System	Frenchman Valley Irrigation District
GP	Pick-Sloan Missouri Basin Program	Frenchman-Cambridge Irrigation District System (Meeker Driftwood Unit)	Frenchman-Cambridge Irrigation District
GP	Pick-Sloan Missouri Basin Program	Frenchman-Cambridge Irrigation District System (Cambridge and Red Willow Units)	Frenchman-Cambridge Irrigation District
GP	Pick-Sloan Missouri Basin Program	Gray Goose System	Gray Goose Irrigation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
GP	Pick-Sloan Missouri Basin Program	H&RW Irrigation District System	H&RW Irrigation District
GP	Pick-Sloan Missouri Basin Program	Helena Valley Irrigation District System	Helena Valley Irrigation District
GP	Pick-Sloan Missouri Basin Program	Helena Valley Pumping Plant	Helena Valley Irrigation District
GP	Pick-Sloan Missouri Basin Program	Highland-Hanover Irrigation District System	Highland-Hanover Irrigation District
GP	Pick-Sloan Missouri Basin Program	Hilltop System	Hilltop Irrigation District
GP	Pick-Sloan Missouri Basin Program	James Diversion Dam	City of Huron, South Dakota
GP	Pick-Sloan Missouri Basin Program	Kansas-Bostwick Irrigation District System	Kansas-Bostwick Irrigation District
GP	Pick-Sloan Missouri Basin Program	Kirwin Irrigation District System	Kirwin Irrigation District System
GP	Pick-Sloan Missouri Basin Program	Lucerne Pumping Plants	Owl Creek Irrigation District
GP	Pick-Sloan Missouri Basin Program	Midvale Irrigation District System	Midvale Irrigation District
GP	Pick-Sloan Missouri Basin Program	Minot Extension	City of Minot North Dakota
GP	Pick-Sloan Missouri Basin Program	Nebraska-Bostwick Irrigation District System	Bostwick Irrigation District in Nebraska
GP	Pick-Sloan Missouri Basin Program	Owl Creek Irrigation District System	Owl Creek Irrigation District
GP	Pick-Sloan Missouri Basin Program	Savage Irrigation District System	Lower Yellowstone Project Board of Control
GP	Pick-Sloan Missouri Basin Program	Toston Irrigation District System	Toston Irrigation District
GP	Pick-Sloan Missouri Basin Program	Twin Loups Reclamation District System	Twin Loups Reclamation District

TRANSFERRED WORKS CONVEYANCE AND DISTRIBUTION FACILITIES/SYSTEMS

Region	Project	Facility	Operating Organization
GP	Pick-Sloan Missouri Basin Program	Upper Bluff Irrigation District System	Upper Bluff Irrigation District
GP	Pick-Sloan Missouri Basin Program	Webster Irrigation District System	Webster Irrigation District
GP	Pick-Sloan Missouri Basin Program	Western Heart River Irrigation System	Western Heart River Irrigation
GP	San Angelo Project	Tom Green County WC&ID No. 1 System	Tom Green County WC&ID No. 1
GP	Shoshone Project	Deaver Irrigation District System	Deaver Irrigation District
GP	Shoshone Project	Heart Mountain Irrigation District System	Heart Mountain Irrigation District
GP	Shoshone Project	Shoshone Irrigation District System	Shoshone Irrigation District
GP	Shoshone Project	Willwood Irrigation District System	Willwood Irrigation District
GP	Sun River Project	Fort Shaw Irrigation District System	Fort Shaw Irrigation District
GP	Sun River Project	Greenfields Irrigation District System	Greenfields Irrigation District
GP	W. C. Austin Project	Lugert-Altus Irrigation District System	Lugert-Altus Irrigation District
GP	Washita Basin Project	Anadarko Aqueduct	Fort Cobb Reservoir Master Conservancy District
GP	Washita Basin Project	Foss Aqueduct	Foss Reservoir Master Conservancy District

Appendix C

Examples of Water Operation and Maintenance Activities

Appendix C
Examples of Water O&M Activities

Operation Activities

- Forecast short- and long-term inflows
- Coordinate operations with other entities
- Prepare annual operating plans
- Prepare, periodically review, and revise the Standing Operating Procedures (SOP), Emergency Action Plan (EAP), and Site Security Plan (SSP).
- Participate in triennial EAP exercises
- Comply with applicable training requirements
- Training
  - Classroom and on-site dam operator training
  - Pesticide application
  - Confined space entry/Hazardous Energy Control
  - Boat safety
  - Spill Prevention and Containment
  - Hazardous Waste Management
- Identify potential public and personnel safety hazards and mitigate the hazard (i.e., post sign, erect fence, provide safety buoy line) or report the hazards to the responsible entity (i.e., Bureau of Land Management, Forest Service, county)
- Operate spillway, river outlet works, and/or canal outlet works gates/valves as per approved operating procedures to fulfill contractual obligations and prevent or minimize the potential for adverse impacts downstream during a flood event or other unusual situation.
- Monitor inflow, reservoir water surface elevation, discharges, and other pertinent data; record data and O&M activities; and report data and information as applicable.

- Manage land resources (i.e., responding to trespass and illegal dumping, protecting cultural resources)

- Comply with applicable environmental laws and regulations

- Manage hazardous materials (i.e., proper handling, storage, and disposal)

- Conduct public tours

- Perform periodic site inspections and report any concerns and problems

- Complete the Ongoing Visual Inspection Checklist (OVIC), collect instrumentation data, and transmit the data as prescribed by the Schedule for Periodic Readings, L-23, form.

- Participate in the Annual Inspection Checklist (AIC), Periodic Facility Review (PFR), Comprehensive Facility Review (CFR), and special (underwater, rope supported access, remotely-operated camera) examinations.

- Respond to unusual and emergency situations as per the EAP

Maintenance Activities

- Perform routine maintenance at prescribed intervals (i.e., lubricate moving parts; replace fluids, filters, seals; inspect electrical components)

- Repair damaged and deteriorated concrete and protective coatings

- Repair, rehabilitate, and upgrade equipment as necessary

- Replace equipment at end of useful life

- Maintain public and personnel safety features (signs, buoy line) and equipment (safety harness, handrail), security features (i.e., signs, fence, locks), automated control systems, and mobile equipment.

- Maintain instrumentation devices (i.e., remove moss, algae, beaver dam adjacent to a seepage measurement device; vegetation control adjacent to an instrument, repair vandalism damage).

- Maintain inventory of parts and equipment

- Periodically test all mechanical equipment (i.e., gates, valves, air bubbler ice prevention system compressors, emergency backup generators).

- Remove (i.e., manual collection, flush downstream with spillway discharges) and properly dispose (i.e., burn, stockpile in public area, or contracted removal).

- Control vegetation (i.e., remove, cut, apply herbicide in accordance with applicable rules and regulations) that grows in and adjacent to embankments, adjacent to concrete structures and other appurtenant features, and along the alignment of buried features.

- Control rodents (i.e., shoot, poison, trap and relocate in accordance with applicable rules and regulations) that burrow into and near embankments.

- Grade gravel-surfaced crest roadway to ensure that surface runoff drains toward a protected slope (typically the upstream face of the dam).

- Repair paved crest roadway and other paved surfaces.

Appendix D
Complexity Number Form

Appendix D
Complexity Number Form

Feature/factor that increases facility complexity*	Points possible	Points
Dam features/factors		
1,000,000 yd^3 ≤ Total embankment(s) volume ≤ 2,000,000 yd^3	1	
2,000,001 yd^3 ≤ Total embankment(s) volume ≤ 3,000,000 yd^3	2	
3,000,001 yd^3 ≤ Total embankment(s) volume ≤ 4,000,000 yd^3	3	
4,000,001 yd^3 ≤ Total embankment(s) volume ≤ 6,000,000 yd^3	5	
6,000,001 yd^3 ≤ Total embankment(s) volume ≤ 8,000,000 yd^3	7	
8,000,001 yd^3 ≤ Total embankment(s) volume ≤ 10,000,000 yd^3	9	
Total embankment(s) volume > 10,000,000 yd^3	10	
Significant vegetation control efforts are required	2	
Significant rodent control efforts are required	1	
Significant debris removal efforts are required	1	
Public gravel-surfaced crest roadway	1	
Public asphalt-paved crest roadway	2	
Monthly instrumentation data collection/OVIC	1	
Weekly instrumentation data collection/OVIC	2	
Instrumentation data collection/OVIC more than once a week	3	
Increased instrumentation data collection/OVIC required under normal operating conditions (i.e., season, reservoir elevation below normal water surface) *NOTE: excludes seismic events, reservoir water surface elevation above historic high, etc.*	4	
	Subtotal points possible = 20	Subtotal:
Spillway features/factors		
Bulkhead(s) stored on site	1	
1 gate	2	
2 gates	4	
3 ≤ number of gates ≤ 5	7	
6 ≤ number of gates ≤ 8	10	
9 ≤ number of gates ≤ 11	13	
Number of gates ≥12	14	

Feature/factor that increases facility complexity*	Points possible	Points
Ice prevention (bubbler) system/gate seal heating system	1	
Stilling basin (versus stilling pool)	1	
History of repeated stilling basin repairs	2	
Gantry crane	2	
Jib crane	1	
Engine generator with above-ground fuel storage tank	1	
Engine generator with buried fuel storage tank	2	
Footbridge	1	
Type 2 bridge	2	
Type 1 bridge	3	
	Subtotal points possible = 30	Subtotal:
Outlet works features/factors		
Bulkhead(s) stored on site	1	
Total number of gates/valves = 2	1	
3 ≤ Total number of gates/valves ≤ 4	2	
5 ≤ Total number of gates/valves ≤ 8	4	
Total number of gates/valves ≥ 9	6	
Gate chamber with one access	1	
Gate chamber with more than one access	2	
Total number of concrete-lined waterways = 2	1	
Total number of concrete-lined waterways ≥ 3	2	
Total number of discharge pipes within conduit/tunnel ≤ 2	2	
Total number of discharge pipes within conduit/tunnel ≥ 3	3	
Stilling basin (versus stilling pool) *NOTE: Do not count if shared with spillway*	1	
History of repeated stilling basin repairs *NOTE: Do not count if shared with spillway*	2	
Elevator	2	

Feature/factor that increases facility complexity*	Points possible	Points
Gantry crane *NOTE: Do not count if shared with spillway*	2	
Jib crane *NOTE: Do not count if shared with spillway*	1	
Engine generator with above-ground fuel storage tank *NOTE: Do not count if shared with spillway*	1	
Engine generator with buried fuel storage tank *NOTE: Do not count if shared with spillway*	2	
Footbridge	1	
Type 1 bridge	2	
Type 2 bridge	3	
	Subtotal points possible = 30	Subtotal:
Other features/factors		
Residence	2	
Office	2	
Shop/warehouse	2	
Visitor center	2	
Other significant feature (pump station, fire protection equipment)	1-3	
Remote location	1	
Severe weather conditions	1	
History of vandalism	1	
Known concrete deficiency (i.e., ASR)	1	
Other significant activity (i.e., reservoir rim stabilization, excessive debris removal)	1-3	
MC criticality designation	1	
MMC criticality designation	**2**	
	Subtotal points possible = 20	Subtotal:
	Total points possible = 100	Total:

* Consider only if operating entity is responsible for the associated O&M, and if cost is included in the total cost of operating and maintaining the dam.

Appendix E
Facility Reliability Rating (FRR) Form

Appendix E

Facility Reliability Rating Form

Revised FACILITY RELIABILITY RATING (FRR) SYSTEM for HIGH- AND SIGNIFICANT-HAZARD DAMS

SLEEPY SEÑOR DAM NO. 10	Reliability Rating Dated:	6/14/2005	=	100

MAX SCORE	SITE INSPECTIONS	SCORE
2	**Completed CFR within last 6 years or documented decision to do otherwise**	2
2	**Completed PFR within last 6 years or documented decision to do otherwise**	2
1	**Completed annual site inspection within the last year (unless PFR or CFR performed in lieu of, or SOD Modification Construction in progress)**	1
1	**O&M Recommendations updated in DSIS within the last year as directed by Denver**	1
1	**Status of SOD recommendations reviewed within past year and recommendations updated as necessary**	1
7	MAX SUBTOTAL — SUBTOTAL	7

MAX SCORE	CURRENT OPERATING PROCEDURES / DOCUMENTS / EXERCISING	SCORE
3	**SOP - Chapters I through IV only**	3
	0 - No SOP exists	
	1 - Contents of SOP do not reflect existing features and operating criteria and/or there are outstanding SOP-related recommendations greater than 3 years old	
	2 - Contents of SOP substantially reflect existing features and operating criteria and/or there are no outstanding SOP-related recommendations greater than 3 years old	
	3 - Contents of SOP reflect existing features and operating criteria and there are no outstanding SOP-related recommendations	
2	**EAP**	2
	0 - No EAP exists	
	1 - There are outstanding EAP-related recommendations and/or the EAP has not been exercised in last 3 years	
	2 - There are no outstanding EAP-related recommendations and the EAP has been exercised in last 3 years	
1	**Communications check performed and identified revisions made to Communications Directory within past year**	1
1	**Security Plan (formal, written plan) prepared**	1
7	MAX SUBTOTAL — SUBTOTAL	7

MAX SCORE	TRAINED DAM OPERATORS (PRIMARY OPERATOR AND ALTERNATES)	SCORE
2	**Dam operator current in on-site training**	2
1	**Dam operator current in classroom training**	1
2	**Alternate dam operator current in on-site training**	2
1	**Alternate dam operator current in classroom training**	1
6	MAX SUBTOTAL ` — SUBTOTAL	6

MAX SCORE	SECURITY	SCORE
5	**Security Assessments and Recommendations**	5
	0 - No security assessment performed, or slipped incomplete security recommendations exist	
	3 - No slipped incomplete security recommendations	
	5 - No incomplete security recommendations	
5	MAX SUBTOTAL — SUBTOTAL	5

MAX SCORE	RESERVOIR AND OPERATING RESTRICTIONS	SCORE
20	**Reservoir and Operating Restrictions (due to maintenance or dam safety reasons)**	20
	0 - Emergency restriction (emergency drawdown)	
	8 - Year-round restriction (temporary until modification complete to correct deficiency)	
	15 - Seasonal restriction (temporary until modification complete to correct deficiency)	
	20 - No emergency or temporary restrictions	
20	MAX SUBTOTAL — SUBTOTAL	20

MAX SCORE	DAM SAFETY PROGRAM	SCORE
15	**Dam Safety Recommendations and Decisions**	**15**
	0 - SOD modification is required and is incomplete or a project plan for the completion of an A-ranked recommendation has not been completed within 90 days.	
	4 - An A-ranked recommendation is incomplete, but a project plan to address the recommendation has been completed, or a B-ranked recommendation is incomplete over 7 years.	
	10 - No incomplete A-ranked recommendations or any B-ranked recommendation are incomplete for less than 7 years	
	13 - No incomplete A- or B-ranked recommendations	
	15 - No incomplete A- or B- or C- ranked recommendations	
15	MAX SUBTOTAL — **SUBTOTAL**	**15**

MAX SCORE	STRUCTURAL PERFORMANCE	SCORE
3	**Instrument and visual data within expected performance limits**	**3**
	0 - Data not within expected performance limits	
	3 - Data within expected performance limits	
2	**Quarterly delinquent instrumentation reporting**	**2**
	0 - Delinquent data noted on three or more of the last four quarterly reports	
	1 - Delinquent data noted on one or two of the last four quarterly reports	
	2 - No delinquent data noted on any of the last four quarterly reports	
5	MAX SUBTOTAL — **SUBTOTAL**	**5**

MAX SCORE	RESERVOIR OPERATIONS MONITORING	SCORE
3	**Availablility and maintenance of operational records for operational decisions (inflow, storage, etc.)**	**3**
	0 - Critical equipement used for reservoir data management is inoperable or producing unreliable data.	
	2 - Partial records available and maintained for operational decisions.	
	3 - Complete records available and maintained for operational decisions by operating entity	
2	**Oversight of data collection by Reclamation staff off-site**	**2**
	0 - Operations/data not reviewed by area or regional office staff	
	2 - Operations/data reviewed by area or regional office staff	
5	MAX SUBTOTAL — **SUBTOTAL**	**5**

MAX SCORE	AVERAGE AGE OF CATEGORY 1 AND 2 O&M RECOMMENDATIONS	SCORE
30	**Total Age of Incomplete O&M Recommendations/Total Number of Incomplete Recommendations**	**30**
	0 - Ratio > 5.0	
	10 - 4.0 < Ratio = 5.0	
	18 - 3.0 < Ratio = 4.0	
	24 - 2.0 < Ratio = 3.0 — ***NOTE* : Do not include SOP- or EAP-related**	
	28 - 1.0 < Ratio = 2.0 — ***recommendations in calculations***	
	30 - Ratio = 1.0	
30	MAX SUBTOTAL — **SUBTOTAL**	**30**

100	**MAXIMUM TOTAL**

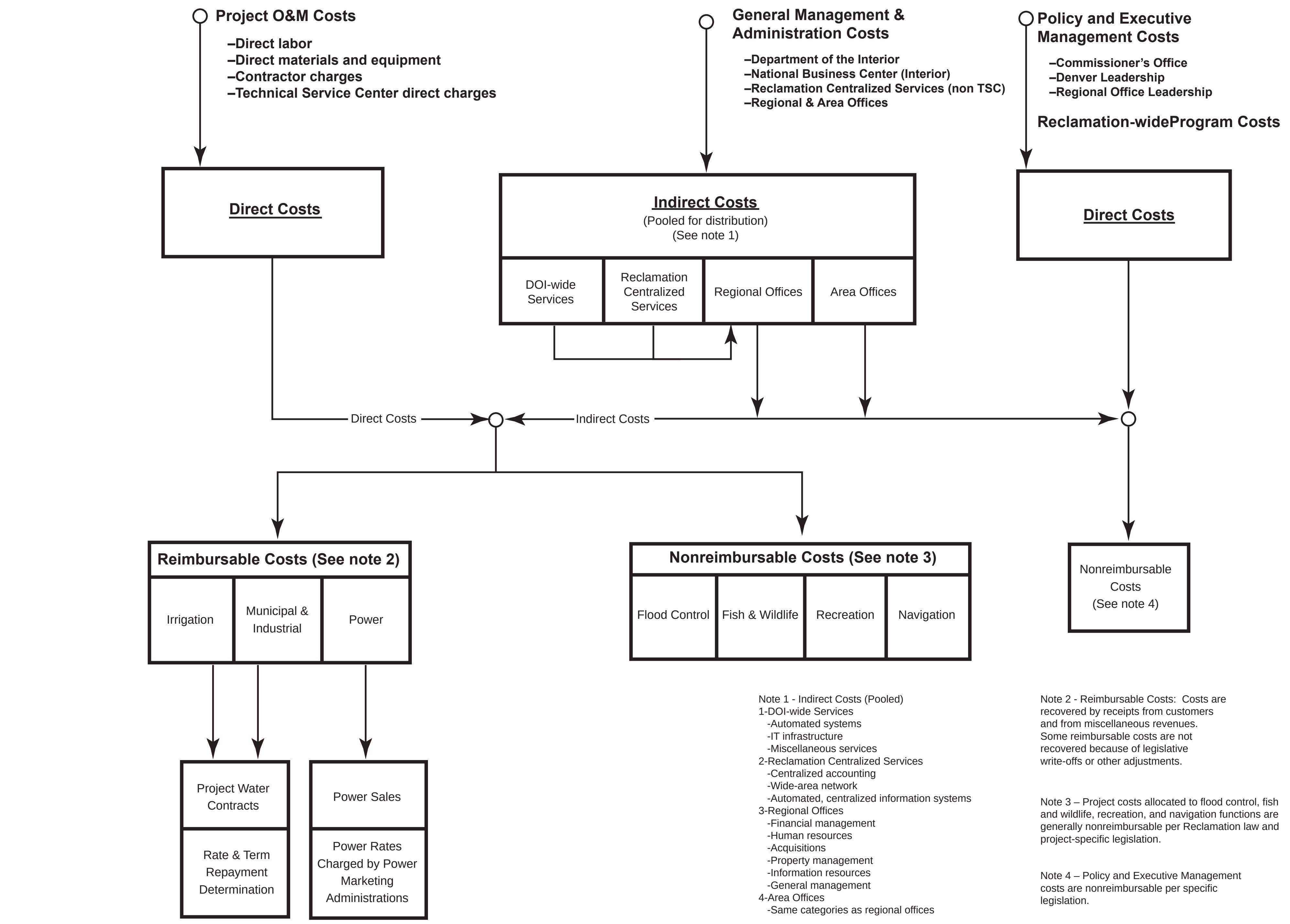
COMMENTS:

Assignment of Reliability Condition Descriptor - For the scores resulting from this FRR system, the following descriptor will be assigned: Good - 80 or greater; Fair - 60 to 79; Poor - 59 or less.

Appendix F

Cost Accounting – Allocation and Distribution

Figure 1: Bureau of Reclamation Cost Accounting



Appendix G
Budget Object Class Listing

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Full-Time Permanent	**11.1**					
FTP Regular Civilian (GS and equivalent pay system)		111A	111A	111A	Regular salaries and wages paid to employees.	
FTP Federal Wage Sys&Adm Determined		111B	111B	111B	Negotiated regular salaries and wages paid to employees.	
FTP Consultant/Expert/Advisory		111C	111C	111C	Salaries and wages paid to non-Federal personnel.	
FTP Other Employees		111E	111E	111E	Regular salaries and wages paid to other employees.	
FTP Terminal Leave - Lump Sum		111F	111F	111F	Lump sum annual leave payments upon separation.	
FTP Leave Assessment		111G	111G	111G	Regular salaries and wages paid while employees on leave.	
FTP Time Off Awards		111T	111T	111T	Regular salaries and wages paid while employees on time off award.	
Other Than Full-Time Permanent	**11.3**					
OTP Regular Civilian (GS and equivalent pay systems)		113A	113A	113A	Regular salaries and wages paid to part-time, temporary, or intermittent employees.	
OTP Federal Wage Sys&Adm Determined		113B	113B	113B	Negotiated regular salaries or wages paid to part-time, temporary, or intermittent employees.	
OTP Consultant/Expert/Advisory		113C	113C	113C	Salaries and wages paid to part-time employees.	
OTP Other Employees		113E	113E	113E	Salaries and wages paid to part-time employees.	
OTP Terminal Leave - Lump Sum		113F	113F	113F	Lump sum annual leave payments upon separation.	
OTP Leave Assessment		113G	113G	113G	Regular salaries and wages paid while employees on leave.	
OTP Time Off Awards		113T	113T	113T	Regular salaries and wages paid while part-time employees on time off award.	
Other Personnel Compensation	**11.5**					
Overtime		115A	115A	115A	Compensation above the basic rates paid directly to civilian employees.	
Awards - Monetary		115B	115B	115B	Cash awards payments that do not become part of the civilian employees basic rate of pay.	
Interest on Back Pay		115C	115C	115C	Interest payments to civilian employees on salaries or wages owed retroactively.	
Credit Hours - Paid		115D	115D	115D	Compensation for hours granted by supervisor or agency as an incentive award.	
Awards - Non-Monetary		115E	115E	115E	Non-monetary awards to civilian employees.	
Paid Holidays Worked		115F	115F	115F	Compensation to civilian employees who worked on national holidays.	
Other Comp - Leave Assessment		115G	115G	115G	Other compensation to civilian employees while on leave.	
Environmental/Hazardous Duty		115H	115H	115H	Pay rate is above the basic rate due to the hazardous nature or physical handicaps of the assignments.	
Premium Pay - Standby		115J	115J	115J	Payments above basic rate to civilian employees.	
Premium Pay - In Lieu of Overtime		115K	115K	115K	Payments above basic rate to civilian employees.	
Compensatory Time - Paid		115M	115M	115M	Extra hours worked by a civilian employee that results in extra pay at the basic pay rate.	
Stipend In-Lieu of Premium/Compensatory Pay		115N	115N	115N	Specific payment instead of premium/compensatory pay.	
Post Differential Foreign		115P	115P	115P	Pay above the basic rates for duty at hardship posts abroad.	
Post Differential Non-Foreign		115Q	115Q	115Q	Pay above the basic rates for duty at hardship posts within the continental U.S.	
Royalties to Federal Scientists and Inventors			**115R**	**115R**	Royalties paid to Federal employees which may last up to 17 years and may be paid after the employee has left Federal service or to the employee's beneficiary.	**restored**
Sunday Pay		115T	115T	.	Pay above the basic rate	
Nightwork Differential		115V	115V	115V	Pay above the basic rate for regularly scheduled night work.	
Penalty Pay				115X0	FBMS Requirement.	**FBMS Requirement**
Staffing Differential		115Y	115Y	115Y	Pay above the basic rate to adjust the rate for specialized positions.	
Supervisory Differential		115Z	115Z	115Z	Pay above the basic rate to adjust compensation of a supervisor to a level greater than the highest paid subordinate.	
Untitled			**116B**			**Previously used by FWS**
Special Personal Services Payments	**11.8**					
Non-Federal Employee Compensation/Awards		118A	118A	118A	Witnesses, casual workers, patient and inmate help, and allowances for trainees and volunteers.	**Agreed by BOCT**
Federal Employee Compensation				118B	Payments for personal services that do not represent salaries or wages paid directly to civilian employees.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Emergency Firefighter Pay		118D	118D	118D	Pay rate for emergency firefighters.	
CSRS Reimburse Reemployed Annuitant		118P	118P	118P	Retired Federal employee who returns to Federal service.	
FERS Reimburse Reemployed Annuitant		118R	118R	118R	Retired Federal employee who returns to Federal service.	
Total Personnel Compensation (MAX System)	**11.9**					
Personnel Benefits						
Civilian Personnel Benefits	**12.1**					
Contributions - Medicare		121A	121A	121A	Benefits for currently employed civilian employees.	
Contributions - OASDI		121B	121B	121B	Benefits for currently employed civilian employees.	
Retention Allowance		121C	121C	121C	Payments above basic rate for retention purposes..	
Public Transportation Benefits		121D	121D	121D	Monthly public transportation allowance to employees.	
Contributions - Thrift Plan Basic (1%)		121E	121E	121E	FERS civilian employee TSP agency contribution.	
Contributions - Thrift Plan Match (5%)		121F	121F	121F	FERS civilian employee TSP agency contribution.	
Personnel Benefits - Leave Assessment		121G	121G	121G	Current civilian employee leave benefits.	
Contributions - Accident Comp-OWCP		121H	121H	121H	Work injury disabilities or death and professional liability insurance.	
Lost Thrift Savings Earnings		121i	121i	121i	Insurance payments to finance fiduciary insurance for TSP Board.	
Contributions - CSRS Retirement		121J	121J	121J	Agency retirement contribution.	
Contributions - FERS Retirement		121K	121K	121K	Agency retirement contribution.	
Longevity Pay - Park Police		121L	121L	121L	Agency law enforcement payment.	
Recruitment Bonus		121M	121M	121M	Payments above basic rate for recruitment purposes..	
Allowances - Non Foreign		121N	121N	121N	Personal allowances based upon assignment or position.	
Allowances - Foreign		121O	121O	121O	Cash allowances for separate maintenance, education for dependents, transfers for employees stationed abroad and overseas differential.	
Contributions - Park Police Retirement		121P	121P	121P	Agency contribution.	
Contributions - Park Police Medical		121Q	121Q	121Q	Agency contribution.	
Allowances - Quarters, Meals, Uniforms, and Electricity		121R	121R	121R	Allowances for uniforms and quarters.	
Employee Settlements (not court-ordered)		121S	121S	121S	Special pay that is paid in a lump sum.	
Contributions - Life Insurance/Professional Liability Insurance		121T	121T	121T	Employer's share of payments for life insurance and professional liability insurance.	
Allowances - Visual Identity Apparel (USGS)		121U	121U	121U	Agency payments for visual identity apparel.	
Supervisory Overhead Assessment				**121V0**	FBMS Requirement.	**FBMS Requirement**
Contributions - Health Benefits		121W	121W	121W	Agency insurance payments for employees.	
General Overhead Assessment				**121X0**	FBMS Requirement.	**FBMS Requirement**
Other Employee Benefits		121Y	121Y	121Y	Other agency payments for current employee benefits.	
Employer Cont. Tax Fringe Benefits		121Z	121Z	121Z	Share of any employment taxes (FICA, Medicare, etc.) related to employee taxable fringe benefits (e.g., taxable parking.)	
Employer Contribution Tax Fringe Benefits(paid directly to employee)				121Z0	FBMS Requirement.	**FBMS Requirement**
Relocation Bonus		1211	1211	1211	Payments above basic rate for relocation purposes..	
Relocation - Subsistence in Temporary Quarters		1212	1212	1212	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	
Relocation - Real Estate Transactions (Direct Reimb)		1213	1213	1213	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	
Relocation - Relocation Service Contractor		1214	1214	1214	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	
Relocation - Income Tax Allowance and Withholding		1215	1215	1215	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	
Relocation - Miscellaneous Moving Allowance		1216	1216	1216	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	

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Description	GROUP	2005	2006	2007	Definitions	Comments
Relocation - Home Sale Incentive		1217	1217	1217	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	
Extended Assignment Incentives				1218	Cash payments for extended assignment activities.	
Relocation - Subsistence - Temporary Quarters			**123A**			**Previously used by FWS**
Relocation - Service Contractor			**123B**			**Previously used by FWS**
Relocation - Misc Moving Allowance			**123F**			**Previously used by FWS**
Benefits for Former Personnel	**13.0**					
Severance Pay		130A	130A	130A	Separation pay, which are severance payments to former employees who were involuntarily separated through no fault of their own and voluntary separation incentive payments.	
Labor Department Unemployment Compensation		130B	130B	130B	Payments to other funds for ex-civilian employees and other benefits paid directly to the beneficiary.	
Full-time Permanent Employees - VSI Payments		130C	130C	130C	Voluntary separation incentive payments to full-time employees.	
Less than Full-time Permanent Employees - VSI Pmts.		130D	130D	130D	Voluntary separation incentive payments to less than full-time employees.	
Other Employee Benefits		130G	130G	130G	Benefits for former employees or their survivors that are based on the length of service to the Federal Government.	
Former Personnel - Severance Pay				130A0	FBMS Requirement.	
Former Personnel - Unemployment Compensation				130B0	FBMS Requirement.	
Former Personnel - Full-Time Employees - Voluntary Separation				130C0	FBMS Requirement.	
Incentive Program				130D0	FBMS Requirement.	
Former Personnel - Other Employee Benefits				130G0	FBMS Requirement.	
Travel and Transportation of Persons	**21.0**					
Non-Foreign Travel	**21.1**					
Non-Foreign ATM Travel Advance Expense		211A	211A	211A	Costs associated with withdrawing ATM advances for official travel purposes.	
Non-Foreign TMC Transaction Fees		211B	211B	211B	Non-Foreign late payment charges paid to Federal employees when reimbursement for travel expenses are later than 30 days.	
Non-Foreign Commercial Transportation-Tourist Class		211C	211C	211C	Use of contracts to transport employees from place to place by land, air, or water.	
Non-Foreign Employee Per Diem		211D	211D	211D	Travel allowance related to temporary duty station travel.	
Non-Foreign Trans-Exceeds Tourist		211F	211F	211F	Use of contracts to transport employees from place to place by land, air, or water that exceeds tourist class.	
Non-Foreign Other Incidental Expenses		211i	211i	211i	Incidental travel expenses which are other expenses directly related to official travel such as baggage transfers, and telephone and telegraph services.	
Non-Foreign Local Travel		211L	211L	211L	Local travel and transportation of persons in and around the official duty station of an employee.	
Non-Foreign POV Mileage Allowance		211P	211P	211P	Based on POV mileage rate established by GSA for POV mileage while on official business or authorized temporary duty station travel.	
Non-Foreign Passenger Vehicle Rental		211R	211R	211R	Rental or lease of passenger cars while in official temporary duty travel status.	
Non-Foreign Taxi Fare		211T	211T	211T	Local travel and transportation of persons in and around the official or temporary duty station of an employee.	
Non-Foreign Per Diem House Hunting				**211V**	Relocation and other expenses related to a permanent change of station (PCS move, except expenses for travel and transportation and the storage and care of vehicles and household goods.	
Non-foreign Transportation Advance			**211W**			**Previously used by FWS**
Non-Foreign Travel				**2110**	Use of contracts to transport employees from place to place by land, air, or water.	**Used by FWS**

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Non-Foreign Late Payment Costs Payable to Employees			**211U**	**211U**	Non-Foreign late payment charges paid to Federal employees when reimbursement for travel expenses are later than 30 days.	**restored**
Foreign Travel	**21.2**					
Foreign - ATM Travel Advance Expense		212A	212A	212A	Costs associated with withdrawing ATM advances for official travel purposes.	
Foreign - TMC Transaction Fees		212B	212B	212B	Foreign transaction fee charges on the travel charge card for foreign travel.	
Foreign - Commercial Trans Tourist Class		212C	212C	212C	Use of contracts to transport employees from place to place by land, air, or water.	
Foreign - Employee Per Diem		212D	212D	212D	Travel allowance related to temporary duty station travel.	
Foreign - Other Incidental Expenses		212i	212i	212i	Incidental travel expenses which are other expenses directly related to official travel such as baggage transfers, and telephone and telegraph services.	
Foreign - Local Travel		212L	212L	212L	Local travel and transportation of persons in and around the official duty station of an employee.	
Foreign - POV Mileage Allowance		212P	212P	212P	Based on POV mileage rate established by GSA for POV mileage while on official business or authorized temporary duty station travel.	
Foreign - Passenger Vehicle Rental		212R	212R	212R	Rental or lease of passenger cars while in official temporary duty travel status.	
Foreign - Taxi Fare		212T	212T	212T	Local travel and transportation of persons in and around the official or temporary duty station of an employee.	
Foreign - Late Payment Costs Payable to Employees			**212U**	**212U**	Foreign late payment charges paid to Federal employees when reimbursement for travel expenses are later than 30 days.	
Non-Foreign Relocation	**21.3**				Costs associated with withdrawing ATM advances for official travel purposes.	
Non-Foreign ATM Travel Advance Expense		213A	213A	213A	Non-Foreign late payment charges paid to Federal employees when reimbursement for travel expenses are later than 30 days.	
Non-Foreign TMC Transaction Fees		213B	213B	213B	Transaction fee charges on the travel charge card for travel.	
Non-Foreign Commercial Transportation-Tourist Class		213C	213C	213C	Use of contracts to transport employees from place to place by land, air, or water.	
Non-Foreign Employee Per Diem		213D	213D	213D	Travel allowance related to PCS move authorizations.	
Non-Foreign Trans-Exceeds Tourist		213F	213F	213F	Use of contracts to transport employees from place to place by land, air, or water that exceeds tourist class.	
Non-Foreign Other Incidental Expenses		213i	213i	213i	Travel allowance related to PCS move authorizations.	
Non-Foreign Local Travel		213L	213L	213L	PCS related local travel of employees.	
Non-Foreign POV Mileage Allowance		213P	213P	213P	Travel allowance related to PCS move authorizations.	
Non-Foreign Passenger Vehicle Rental		213R	213R	213R	Rental or lease of passenger cars while in permanent change of move status.	
Non-Foreign Taxi Fare		213T	213T	213T	PCS related taxi fares of employees.	
Non-Foreign Late Payment Costs Payable to Employees		213U	213U	213U	Late payment charges paid to Federal employees when reimbursement for travel expenses are later than 30 days.	
Non-Foreign Per Diem - House Hunting		213V	213V	213V	Travel allowance related to PCS move authorizations.	
Non-Foreign Transportation - Advance House Hunting		213W	213W	213W	Travel allowance related to PCS move authorizations.	
Student Travel	**21.9**					
Daily Bus Pupil To/From School		219D	219D	219D	Contracts to transport people from place to place by land.	
Pupil Travel - Begin/End Term		219H	219H	219H	Contracts to transport people from place to place by land.	
Pupil Field Trips - Federal		219M	219M	219M	Contracts to transport people from place to place by land.	
Pupil Field Trips - Non-Federal		219N	219N	219N	Contracts to transport people from place to place by land.	
Non-Pupil Travel - Begin/End Term		219O	219O	219O	Contracts to transport people from place to place by land.	
Discount & Interest	**21.9**					
Discount - Travel		2198	2198	2198	Discounts on travel.	
Interest - Travel		2199	2199	2199	Interest on relocation expenses.	
Transportation of Things	**22.0**					

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Freight - Equipment		221A	221A	221A	Freight and express charges by common carrier and common carrier, including freight and express, switching, crating, refrigerating, and other incidental expenses.	
Freight - Other		221B	221B	221B	Freight and express charges by common carrier and common carrier, including freight and express, switching, crating, refrigerating, and other incidental expenses. Includes freight or transportation charges by common or contract carriers not billed as part of the original invoice.	
GSA Shipping Surcharges		221C	221C	221C	Trucking and other local transportation charges for hauling, handling, and other services.	
Truck Transportation - Rental		222C	222C	222C	Trucking and other local transportation charges for hauling, handling, and other services.	
Truck Transport - Bureau Owned		222D	222D	222D	Trucking and other local transportation charges for hauling, handling, and other services.	
Truck Transportation - GSA		222E	222E	222E		
Mail Transport - Parcel Post		223A	223A	223A	Mail transportation charges for express package services and postage used in parcel post. Excludes other postage which is classified under object Class 23.5A thru 23.5J.	
Transportation - Household Goods - GBL		224F	224F	224F	PCS related moving expenses including temporary storage of household goods of less than 120 days; for longer term storage, see Object Class 25.7P.	
Transportation - Household Goods-Non-GBL		224G	224G	224G	PCS related moving expenses - commuted rate or actual expense.	
Transportation of Mobile Home		224K	224K	224K	PCS related moving expenses.	
Transportation of POV		224L	224L	224L	PCS related moving expenses, excludes mileage for POV driven by employee or family, see Object Class 21.1P.	
Mail Transport - Parcel Post			**2230**			**Previously used by FWS**
Discount & Interest	**22.9**					
Discount - Transportation		2298	2298	2298	Discounts on transportation of things.	
Interest - Transportation		2299	2299	2299	Interest on transportation related payments.	
Rent, Communications, and Utilities						
Rental Payments to GSA	**23.1**					
Space Rental Payments To GSA		231A	231A	231A	Payments to GSA for rental of space and rent related services.	
Rental Payments to GSA			**2310**			**Previously used by FWS**
Rental Payments to Others	**23.2**					
Space Rental Payments To Others		232A	232A	232A	Payments to a non-Federal source for rental of space, land, and structures.	
Rental of Exhibit Space		232B	232B	232B	Payments to a non-Federal source for exhibit space.	
Rental Payments to Others			**2320**			**Previously used by FWS**
Communications, Utilities and Misc. Charges	**23.3**					
GSA Communications Non-FTS		233A	233A	233A	Payments for IT, utilities and miscellaneous charges.	
GSA Communications FTS		233B	233B	233B	Payments for IT, utilities and miscellaneous charges.	
Commercial Communications Charges - Local		233C	233C	233C	Payments for IT, utilities and miscellaneous charges.	
Commercial Communications Charges - Long Distance		233D	233D	233D	Payments for IT, utilities and miscellaneous charges including electronic mail.	
Wireless Communications		233E	233E	233E	Usage charges incurred for cell phones and pagers. Cost of equipment (cell phones, pagers, and other wireless devices) should be charged to object class 32.1B.	
Telephone Equip - Leases, Rentals, Repairs and Maint.		233F	233F	233F	Rental or lease of IT equipment, or equipment or interconnected system or subsystem of equipment that is used in switching, interchange, transmission or reception of data or information.	
Postage		233G	233G	233G	Postage, exclude parcel post and express mail service for freight.	
Postage - Box & Meter Rental		233H	233H	233H	Postal services and rentals.	
Express Mail		233J	233J	233J	Postal services and rentals.	
Utilities		233K	233K	233K	Utility services include heat, light, power, water, gas, electricity, and other utility services.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Equipment Rental		233L	233L	233L	Not otherwise classified, including commercially rented passenger cars, leased vehicles, and all charges for GSA motor pool passenger cars and buses, when not used for temporary duty travel.	
Equipment Rental - Information Technology		233M	233M	233M	Rental or lease of IT equipment, or equipment or interconnected system or subsystem of equipment that is used in switching, interchange, transmission or reception of data or information.	
Software Rental - Information Technology		233N	233N	233N	Rental or lease of IT equipment, or equipment or interconnected system or subsystem of equipment that is used in switching, interchange, transmission or reception of data or information.	
Equipment Rental - Data Communications		233O	233O	233O	Rental or lease of IT equipment, or equipment or interconnected system or subsystem of equipment that is used in switching, interchange, transmission or reception of data or information.	
Equipment Rental - Copiers		233P	233P	233P	Rental or lease of IT equipment, or equipment or interconnected system or subsystem of equipment that is used in switching, interchange, transmission or reception of data or information.	
Equipment Rental - Heavy		233Q	233Q	233Q	Rental or lease of IT equipment, or equipment or interconnected system or subsystem of equipment that is used in switching, interchange, transmission or reception of data or information.	
Federal Voicemail Communications Services		233R	233R	233R	Data communication services, (voice, data, and wireless) from other Government agencies or accounts.	
Federal Data Communications Services		233S	233S	233S	Data communication services, (voice, data, and wireless) from other Government agencies or accounts.	
Commercial Voicemail Communications Services		233T	233T	233T	Payments for IT, utilities and miscellaneous charges.	
Commercial Data Communications Services		233U	233U	233U	Payments for IT, utilities and miscellaneous charges.	
Commercial Communications						
Commercial Communications - Local			**234A**			**Previously used by FWS**
Commercial Long Distance Communications			**234B**			**Previously used by FWS**
Telegraph/Teletype Services			**234E**			**Previously used by FWS**
Telephone Equip - Lease, Rent, Repr			**234J**			**Previously used by FWS**
Postage			**235A**			**Previously used by FWS**
Postage Box & Meter Rental			**235D**			**Previously used by FWS**
Express Mail			**235J**			**Previously used by FWS**
Utilities			**236A**			**Previously used by FWS**
Equipment Rental			**237A**			**Previously used by FWS**
Equipment Rental ADP			**237D**			**Previously used by FWS**
Software Rental ADO			**237E**			**Previously used by FWS**
Equipment Rental DATA Communications			**237J**			**Previously used by FWS**
Equipment Rental - Copiers			**237P**			**Previously used by FWS**
Equipment Rental - Heavy			**237T**			**Previously used by FWS**
Employee Collect - Gov Prov/Qtrs/Utility			**238A**			**Previously used by FWS**
Discount & Interest	**23.9**					
Discount - Rent, Communications & Utilities		2398	2398	2398	Discounts on rent, communications, and utilities.	
Interest - Rent, Communications & Utilities		2399	2399	2399	Interest payments related to rents, communications, and utilities.	
Printing and Reproduction	**24.0**					
Printing & Reproduction - GPO		241A	241A	241A	Printing and reproduction obtained from GPO.	
Binding - GPO		241B	241B	241B	Printing and reproduction obtained from GPO.	

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<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Print & Reproduction - Within Government - Not GPO		241E	241E	241E	Printing and reproduction obtained from other Federal entities.	
Binding - Within Government, Not GPO		241F	241F	241F	Printing and reproduction obtained from other Federal entities.	
Print & Reproduction - Commercial		242A	242A	242A	Printing and reproduction obtained from the private sector. Includes commercial printers and photographers.	
Binding - Commercial		242B	242B	242B	Printing and reproduction obtained from the private sector.	
Copy Centers		243C	243C	243C	Printing and reproduction obtained from the private sector. Charges incurred for all common processes of duplicating obtained on a contractual basis for equipment such as coping machines, mimeographing and stencil equipment.	
Graphics Centers		243D	243D	243D	Printing and reproduction obtained from the private sector.	
Other Contractual Services						
Advisory and Assistance Services	**25.1**					
Contracts - Consultants		251A	251A	251A	Services acquired by contract from non-Federal sources.	
Information Technology Support Services		251B	251B	251B	Services acquired by contract from non-Federal sources.	
Repairs & Maintenance - Equipment			**251C**			**Previously used by FWS**
Repairs & Maintenance -Vehicle			**251D**			**Previously used by FWS**
Repairs & Maintenance - Other			**251E**			**Previously used by FWS**
Per Call Repairs & Maintenance Equipment			**251J**			**Previously used by FWS**
Per Call Repairs & Maintenance - ADP Equipment			**251K**			**Previously used by FWS**
Other Services	**25.2**					
Contracts - Architectural & Engineering		252A	252A	252A	Contracts for professional services of architects and engineers.	
Contracts - Development of Data Sets		252C	252C	252C	Non-Federal contracts issued for development of data in any format that will be manipulated by automated means.	
Contracts - Drilling		252D	252D	252D	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Real Property Appraisals, Titles and Fees		252E	252E	252E	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Direct State Services Vouchers		252G	252G	252G	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Contracts - Indian Self-Determination Services		252i	252i	252i	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Contracts - Consultants - Non Advisory		252J	252J	252J	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Contracts - On Site Contractor				**252K**	Non-Federal contract personnel.	**Used by FWS**
Contracts - Airplanes & Helicopters		252L	252L	252L	Includes service contracts for hire or charter of aircraft with pilot from both commercial services and other government agencies (including OAS).	
Contracts - Mapping		252M	252M	252M	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Contracts - Photolab Operations		252P	252P	252P	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Contracts - Aerial Photography		252Q	252Q	252Q	Contractual services for the collection of data through aerial photography and the related mapping.	
Contracts - Professional Services		252R	252R	252R	Contracts for professional services such as for cadastral surveys, veterinarian services, and work of a similar nature. (Excludes architectural and engineering services that is classified in Object Class 25.2A).	
Tuition		252S	252S	252S	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Training/Conference Registration Fees		252T	252T	252T	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Contracts - Studies		252U	252U	252U	Contracts for studies or inventories which involve the procurement of definitive information or data in support of mission oriented tasks, e.g., archeological inventories, soil-vegetative inventories, wildlife habitat analysis, minerals surveys, geologic information, socioeconomic data collection, environmental studies, etc.	

<---Changes made for FY 2006
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Description	GROUP	2005	2006	2007	Definitions	Comments
Contracts - Training Services		252V	252V	252V	Contractual services to obtain or develop training course materials and/or bureau training courses for bureau employees. Developed off-the-shelf training courses are classified under Object Class 25.2T.	
Advertising - Public Printer		252W	252W	252W	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Advertising - Commercial		252X	252X	252X	Includes newspaper advertisements and notices.	
Student Expenses - Extracurricular		252Y	252Y	252Y	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Other		252Z	252Z	252Z	Report contractual services with non-Federal sources that are not otherwise classified under object class 25.0.	
Purchases of Goods/Services from Government Accounts	**25.3**					
GSA Reimbursable Work Authority - Recurring		253A	253A	253A	Recurring purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
GSA Reimbursable Work Authority - Non-Recurring		253B	253B	253B	Non-Recurring purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
Rental Agreements for Other Federal Agencies		253C	253C	253C	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
Fleet Usage				**253F**	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	**Added by BOR**
Real Property Titles and Fees			**253E**			**Previously used by FWS**
Reimbursable Agreements - Internal		253G	253G	253G		
Reimbursable Agreements - Other Agency		253H	253H	253H	Interagency agreements for contractual services (including the Economy Act).	
WCF Information Technology & Related Services		253M	253M	253M	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Survey, Inspection, and Related Services		253N	253N	253N	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Bureau Operated Vehicles and Aircraft		253O	253O	253O	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Fixed Ownership Rate		253P	253P	253P	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Science, Engineering, and Related Services		253Q	253Q	253Q	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Equipment Use Charge		253R	253R	253R	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Overhead Assessed		253S	253S	253S	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Training Center		253T	253T	253T	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
Fleet Usage				**253U**	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	**Added by BOR**
WCF Drilling and Related Services		253V	253V	253V	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Contributions/Billings		253W	253W	253W	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
WCF Water Studies, Lab Analyses, and Related Services		253X	253X	253X	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
WCF Publications		253Y	253Y	253Y	Purchases from other Federal Government agencies or accounts that are not otherwise classified. Do not use this object class if a more specific object class applies.	
Operation and Maintenance of Facilities	**25.4**					
Operations, Maintenance & Repairs - Buildings		254A	254A	254A	Operation and maintenance of facilities when done by contract with the private sector or another Federal Government account.	
Operations, Maintenance & Repairs - Other Structures & Facilities		254B	254B	254B	Operation and maintenance of facilities when done by contract with the private sector or another Federal Government account.	
Contracts - Drilling			**254D**			**Previously used by FWS**
Contracts - Mapping			**254M**			**Previously used by FWS**
Contracts - Photolab Operations			**254P**			**Previously used by FWS**
Contracts - Research & Development			**254Q**			**Previously used by FWS**
Research and Development Contracts	**25.5**					
Contracts - ADP Services				**255A**	Contracts for the conduct of basic and applied research and development.	**Used by FWS**
Cooperative Agreements - Research & Development			**255B**			**Previously used by FWS**
Contracts - Consultants				**255C**	Contracts for the conduct of basic and applied research and development.	**Used by FWS**
Private Sector - R & D		255D	255D	255D	Contracts for the conduct of basic and applied research and development.	
Joint Funding Agreements			**255F**			**Previously used by FWS**
Contracts - Airplanes & Helicopters			**255L**			**Previously used by FWS**
Contract Operation of Facility			**255M**			**Previously used by FWS**
Contracts - Professional Service			**255R**			**Previously used by FWS**
Contracts - Studies			**255S**			**Previously used by FWS**
Contracts - Training Services			**255T**			**Previously used by FWS**
Contracts - Other			**255Z**			**Previously used by FWS**
Medical Care	**25.6**					
Medical and Health Care Services		256M	256M	256M	Payments to contractors for medical care such as Medicare, private hospitals, nursing homes, HMOs, and carries by the Employees and retired employees' health benefits fund and CHAMPUS.	
Operation and Maintenance of Equipment	**25.7**					
Expenses - Storage		257A	257A	257A	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Expenses - Shop		257B	257B	257B	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Repairs & Maintenance - IT Equipment & Software		257C	257C	257C	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Repairs & Maintenance - Vehicle		257D	257D	257D	Storage and care of vehicles.	
Repairs & Maintenance - Other		257E	257E	257E	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Service Facility - Research Center		257F	257F	257F	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Service Facility - Heavy Equipment		257G	257G	257G	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Service Facility - Other		257H	257H	257H	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Repairs & Maintenance - Equipment		257i	257i	257i	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Maintenance - Voice Communications Equipment		257L	257L	257L	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Maintenance - Data Communications Equipment		257M	257M	257M	Operation, maintenance, repair, and storage of equipment, when done by contract with the private sector or another Federal Government account.	
Storage of Household Goods under PCS		257P	257P	257P	Storage and care of household goods. For storage less than 120 days see Object Class 22.4F.	
Subsistence and Support of Persons	**25.8**					
Subsistence & Lodging		258A	258A	258A	Subsistence and care of person not on travel status and undertaken in a contractual manner.	**Agreed by BOCT**
Expenses - Shop			**258B**			**Previously used by FWS**
Service Facility - Research Ctr			**258F**			**Previously used by FWS**
Service Facility - Heavy Equipment			**258G**			**Previously used by FWS**
Service Facility - Other			**258H**			**Previously used by FWS**
Discount & Interest	**25.9**					
Discount - Other Services		2598	2598	2598	Discounts on miscellaneous services.	
Interest - Other Services		2599	2599	2599	Interest on miscellaneous services.	
Tuition			**259S**			**Previously used by FWS**
Training			**259T**			**Previously used by FWS**
Supplies and Materials	**26.0**					
Office Supplies & Materials		261A	261A	261A	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Student Supplies & Materials		261B	261B	261B	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Stores Inventory Acquisition		261C	261C	261C		
Supplies - FEDSTRIP		261F	261F	261F	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Motor Vehicles Supplies and Materials		261M	261M	261M	Materials and parts used in the repair and maintenance of motor vehicles and heavy equipment.	
Laboratory Supplies		261X	261X	261X	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Books		262A	262A	262A	Commodities that are of little monetary value but are considered supplies and materials.	
Periodicals & Subscriptions		262F	262F	262F	Commodities that are of little monetary value but are considered supplies and materials.	
Library Materials Not Books		262J	262J	262J	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Information Technology Supplies and Materials		263O	263O	263O	Commodities that are ordinary consumed or expended within one year after they are put into use.	
ADP Supplies & Materials or Info Tech Supplies & Mats				2630	Commodities that are ordinary consumed or expended within one year after they are put into use.	**Used by FWS**
Building Supplies		264A	264A	264A	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Field Supplies		264B	264B	264B	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Recurring Reimbursable GSA Special Work		264J	264J	264J	Supplies and materials provided by GSA on a continuous work order.	
Non-Recurring Reimbursable GSA Special Work		264K	264K	264K	Supplies and material provided by GSA by special order.	
Untitled			**264K**			**Previously used by FWS**
Seeds		264S	264S	264S	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Employee Clothing and Clothing Supplies		265C	265C	265C	Clothing and clothing supplies, such as materials and sewing supplies used in manufacture of wearing apparel.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Food & Beverage - Human Consumption		265F	265F	265F	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Employee Supplies - Safety		265S	265S	265S	Instruments and apparatus.	
Ammunition		267A	267A	267A	Ammunition and explosives.	
Animal Food		269A	269A	269A	Provisions for food for animals.	
Satellite Data		269B	269B	269B	Information technology supplies and materials, such as data storage media.	
Ink & Chemicals		269C	269C	269C	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Acquisition of Data Sets		269D	269D	269D	The acquisition of data, other than satellite imagery, that will be manipulated by automated means.	
Fuel - Motor Vehicle, Aircraft, Etc		269F	269F	269F	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Fuel - Cooking, Heating, Etc.		269G	269G	269G	Commodities that are ordinary consumed or expended within one year after they are put into use.	
Discount & Interest	**26.9**					
Discount - Supplies		2698	2698	2698	Discounts on supplies and materials.	
Interest - Supplies		2699	2699	2699	Interest on payments for supplies and services.	
Equipment	**31.0**					
Capitalized - Equipment		311A	311A	311A	Purchases of the initial installation of equipment when performed under contract such as transportation equipment, furniture and fixtures, tools and implements, machinery, instruments and apparatus. Purchase price is above capitalization threshold/	
Capitalized - Equipment On Loan		311B	311B	311B	Long term lease contract of equipment when performed under contract such as transportation equipment, furniture and fixtures, tools and implements, machinery, instruments and apparatus. Lease-contract price is above the capitalization threshold.	
Capitalized - Information Technology Software		311D	311D	311D	Purchase of information technology hardware or software, custom or commercial off-the-shelf. Purchase price is above capitalization threshold.	
Capitalized - Information Technology Equipment		311E	311E	311E	Purchase of information technology hardware or software, custom or commercial off-the-shelf. Purchase price is above the capitalization threshold.	
Capitalized - Furniture & Fixtures		311H	311H	311H	Purchase of furniture and fixtures. Price is above the capitalization threshold.	
Capitalized - Copier/Duplicator		311J	311J	311J	Purchase of copy machine. Price is above the capitalization threshold.	
Capitalized - Heavy Machinery		311K	311K	311K	Purchase of machinery including construction machinery. Price is above the capitalization threshold.	
Capitalized - Transportation Equipment (Includes Horses)		311L	311L	311L	Purchase of transportation equipment. Price is above the capitalization threshold.	
Motor Vehicle Proceeds Expended		311Z	311Z	311Z	Purchase of equipment with proceeds from motor vehicle sales.	
Non-Capitalized - Controlled Equipment		312A	312A	312A	Armaments including special and miscellaneous military equipment.	
Non-Capitalized - Non-Controlled Equipment		312B	312B	312B	Equipment not subject to special handling or control.	
Non-Capitalized - Information Technology Software		312D	312D	312D	Purchase of information technology hardware or software, custom or commercial off-the-shelf. Purchase price is under the bureau's capitalization threshold that is reported in the property system.	
Non-Capitalized - Information Technology Equipment, Controlled		312E	312E	312E	Purchase of information technology hardware or software, custom or commercial off-the-shelf. Price is below the capitalization threshold.	
Non-Capitalized - Information Technology Equipment, Non-controlled		312F	312F	312F	Purchase of information technology hardware or software, custom or commercial off-the-shelf. Price is under bureau's capitalization threshold that is not reported in the property system.	
Non-Capitalized - Furniture & Fixtures, Controlled		312G	312G	312G	Controlled assets that are not depreciated. Price is below the capitalization threshold.	
Non-Capitalized - Furniture & Fixtures, Non-controlled		312H	312H	312H	Non-controlled assets that are not capitalized.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Non-Capitalized - Copier/Duplicator		312J	312J	312J	Assets that are not capitalized. Price is below the capitalization threshold.	
Non-Capitalized - Heavy Machinery		312K	312K	312K	Machinery price below the capitalization threshold.	
Non-Capitalized - Publications, Permanent Collections		312P	312P	312P	Assets price is below the capitalization threshold.	
Non-Capitalized - Vehicles (Includes Horses)		312T	312T	312T	Transportation equipment price is below the capitalization threshold.	
Artwork & Artifacts		312X	312X	312X	Includes costs for purchase of heritage assets that have significant cultural, educational, or artistic importance related to the stewardship mission of the bureau. Decorative wall art or similar items are to be coded to 312A.	
Capital Lease - Equipment		313L	313L	313L	Payments for lease-purchase contracts for IT and telecommunications equipment.	
Discount & Interest	**31.9**					
Discount - Equipment		3198	3198	3198	Discounts on purchase or lease of equipment.	
Interest - Equipment		3199	3199	3199	Interest on purchase or lease of equipment.	
Land and Structures	**32.0**					
Capitalized - Land Acquisition		321A	321A	321A	Purchase and improvement of lands and interest in lands. Price is above the capitalization threshold.	
Capitalized - Easements & Rights-Of-Way		321E	321E	321E	Purchase and improvement of lands and interest in lands, including easements and rights of way. Price is above the capitalization threshold.	
Capitalized - Land or Mineral Interest Acquired and Held for Others		321L	321L	321L	Acquisition of land or mineral interest that are held for others such as the Indian Land Consolidation Act.	
Capitalized - Bridges - Constructed		322B	322B	322B	Buildings and other structures, including principal payments under lease-purchase contracts for construction of buildings.	
Capitalized - Bridges - Purchased		322C	322C	322C	Purchase of buildings and other structures.	
Capitalized - Dams - Constructed		322D	322D	322D	Buildings and other structures, including principal payments under lease-purchase contracts for construction of buildings.	
Capitalized - Dams - Purchased		322E	322E	322E	Purchase of buildings and other structures.	
Capitalized - Roads - Constructed		322R	322R	322R	Buildings and other structures, including principal payments under lease-purchase contracts for construction of buildings.	
Capitalized - Roads - Purchased		322S	322S	322S	Purchase of buildings and other structures.	
Capitalized - Other Non-Structure Improvements		322Z	322Z	322Z	Include landscaping, fences, sewers, wells, and reservoirs, cattleguards, water catchments, pipelines which are considered improvements on public lands when acquired under contract.	
Capitalized - Land Acquisitions - Administrative Site		323A	323A	323A	Includes contract costs for the acquisition of land for stewardship purposes including appraisals, recording fees, surveys, titles, etc.	
Capitalized - Buildings - Constructed		323B	323B	323B	Constructed costs for the construction of a building, when acquired under contract. Maintenance cost for buildings, including care, upkeep, and protection should be charged to Object Class 25 or 26.	
Capitalized - Buildings - Purchased		323C	323C	323C	Purchased costs for the purchase of an existing building, as well as, principal payments under lease-purchase contracts for the acquisition of a building. Maintenance charges for site improvements should be charged to object Class 25 or 26.	
Capitalized - Improvements		323H	323H	323H	Cost for site and leasehold improvements, such as additions, alterations, betterments (including landscaping), or rehabilitations of buildings or structures, when acquired by contract. Maintenance charges for site improvements should be charged to Object Class 25 or 26.	
Capital Lease - Buildings and Structures		323L	323L	323L	Buildings and other structures, including principal payments under lease-purchase contracts for construction of buildings.	
Capitalized - Other Structures & Facilities - Constructed		323Y	323Y	323Y	Reserved for use by NBC Property Management Personnel.	
Capitalized - Other Structures & Facilities - Purchased		323Z	323Z	323Z	Cost for the construction of other structures and facilities, such as recreation or campgrounds, when acquired under contract. Cost for additions, alterations, betterments, or rehabilitation of other structures and facilities should be charged to Object Class 32.3H.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Capitalized - Major Machinery & Fixed Equipment		324J	324J	324J	Fixed equipment when acquired under contract. These fixtures and equipment become permanently attached to or part of buildings or structures.	
Government Furniture Major Machine & Equipment			**324K**			**Previously used by FWS**
Non-Capitalized - Land Acquisition		325A	325A	325A	Includes contract costs for the acquisition of land for stewardship purposes including appraisals, recording fees, surveys, titles, etc.	
Non-Capitalized - Easements & Rights-Of-Way		325E	325E	325E	Includes costs for design, construction, additions, alterations, betterments, and other contract costs for roads, bridges, and dams. Also includes non-labor costs when work is done by bureau force account crew. Contract maintenance charges for roads and bridges, including care, upkeep, and protection are to be coded to object classes 25 or 26.	
Non-Capitalized - Bridges - Constructed		326B	326B	326B	Includes costs for design, construction, additions, alterations, betterments, and other contract costs for roads, bridges, and dams. Also includes non-labor costs when work is done by bureau force account crew. Contract maintenance charges for roads and bridges, including care, upkeep, and protection are to be coded to object classes 25 or 26.	
Non-Capitalized - Bridges - Purchased		326C	326C	326C	Includes costs for the purchase of an existing road and/or bridge, and dams. Contract maintenance charges for roads and bridges are coded to object classes 25 or 26.	
Non-Capitalized - Dams - Constructed		326D	326D	326D	Includes costs for design, construction, additions, alterations, betterments, and other contract costs for roads, bridges, and dams. Also includes non-labor costs when work is done by bureau force account crew. Contract maintenance charges for roads and bridges, including care, upkeep, and protection are to be coded to object classes 25 or 26.	
Non-Capitalized - Dams - Purchased		326E	326E	326E	Includes costs for the purchase of an existing road and/or bridge, and dams. Contract maintenance charges for roads and bridges are coded to object classes 25 or 26.	
Non-Capitalized - Roads - Constructed		326R	326R	326R	Includes costs for design, construction, additions, alterations, betterments, and other contract costs for roads, bridges, and dams. Also includes non-labor costs when work is done by bureau force account crew. Contract maintenance charges for roads and bridges, including care, upkeep, and protection are to be coded to object classes 25 or 26.	
Non-Capitalized - Roads - Purchased		326S	326S	326S	Includes costs for the purchase of an existing road and/or bridge, and dams. Contract maintenance charges for roads and bridges are coded to object classes 25 or 26.	
Non-Capitalized - Other Non-Structure Improvements		326Z	326Z	326Z	Includes costs for installation of fences, wells, reservoirs, cattleguards, water catchments, pipelines, seeding, tree planting, and other items that are considered improvements to the public lands when done by contract. Also includes non-labor costs when work is done by bureau force account crew. These improvements are traditional bureau field office projects. Contract maintenance costs for these items, including care, upkeep, and protection are coded to object classes 25 or 26.	
Non-Capitalized - Land Acquisitions - Administrative Site		327A	327A	327A	Includes cost for purchase of land and buildings.	
Non-Capitalized - Buildings - Constructed		327B	327B	327B	Includes costs for design, construction, additions, alterations, and other contract costs for buildings.	
Non-Capitalized - Buildings - Purchased		327C	327C	327C	Includes costs for the purchase of an existing buildings.	
Non-Capitalized - Improvements		327H	327H	327H	Includes costs to maintain, acquire, construct, reconstruct, rehabilitate, or improve heritage assets that have significant historical, natural, cultural or educational characteristics. Also includes non-labor costs when work is done by bureau force account crew.	
Non-Capitalized - Other Structures & Facilities - Constructed		327Y	327Y	327Y	Buildings and other structures, including principal payments under lease-purchase contracts for construction of buildings.	
Non-Capitalized - Other Structures & Facilities - Purchased		327Z	327Z	327Z	Purchase and improvement of structures.	
Non-Capitalized - Major Machinery & Fixed Equipment		328J	328J	328J	Fixed equipment when acquired under contract. These fixtures and equipment become permanently attached to or part of buildings or structures.	

<---Changes made for FY 2006
<---Changes made for FY 2007

Description	GROUP	2005	2006	2007	Definitions	Comments
Discount & Interest	**32.9**					
Discount - Lands & Structures		3298	3298	3298	Discount on purchase or construction costs for land and structures.	
Interest - Lands & Structures		3299	3299	3299	Interest on purchase or construction costs for land and structures.	
Investments and Loans	**33.0**					
Investments In Securities		331A	331A	331A	Stocks, bonds, debentures, and other securities that are neither U.S. Government securities nor securities of wholly-owned Federal government enterprises.	
Loans		332A	332A	332A	Stocks, bonds, debentures, and other securities that are neither U.S. Government securities nor securities of wholly-owned Federal government enterprises.	
Grants, Subsidies, and Contributions	**41.0**					
Cooperative Agreements		411C	411C	411C	Cash payments to States, political subdivisions, corporations, associations, and individuals.	
Grants		411G	411G	411G	Cash payments to States, political subdivisions, corporations, associations, and individuals.	
PILT - Other Revenue Sharing		411P	411P	411P	Cash payments to States, political subdivisions, corporations, associations, and individuals.	
Subsidies, Contributions, & Other Aid		412A	412A	412A	Cash payments to States, political subdivisions, corporations, associations, and individuals.	
Credit Reform Loan Subsidies		412B	412B	412B	Cash payments for credit program costs.	
Grants, Subsid & Other Contributions			**4120**			**Previously used by FWS**
Indian Tribal Government Grant		413A	413A	413A	Cash payments to Indian tribes.	
Grants to Insular Areas		414A	414A	414A	Cash payments to insular areas.	
Insurance Claims and Indemnities	**42.0**					
Tort Claims - Vehicle		421D	421D	421D	Indemnity payments.	
Tort Claims - Other		421E	421E	421E	Indemnity payments.	
Payments under NOFEAR Act				**421F**	Benefit payments from social insurance.	**Added by FWS**
Indemnities & Other Claims		421J	421J	421J	To veterans and former civilian employees or their survivors for death or disability; claims and judgments arising from court decisions or abrogation of contracts, indemnities for the destruction of livestock, crops; damage or loss of property and personal injury or death.	
Loan Guarantee Defaults		421L	421L	421L	Insurance payments from Federal insurance revolving funds.	
Loan Guarantee Default % Reduction		421R	421R	421R	Insurance payments from Federal insurance revolving funds.	
Interest and Dividends	**43.0**					
Interest		431A	431A	431A	Payments to creditors, distributions of earnings to owners of trust or other funds, interest payments under lease-purchase contracts for construction of buildings.	
Refunds	**44.0**					
Refunds		441A	441A	441A	Payments to correct errors in computations, erroneous billings, payments to former employees or their beneficiaries for employee contributions to retirement and disability fund,etc.	
	81.0					
Unvouchered			**8110**			**Previously used by FWS**
Unvouchered	**91.0**				This major object class covers object classes 91.0 through 99.5.	
Unvouchered		910A	910A	910A	Charges that may be incurred lawfully for confidential purposes and are not subject to detailed vouchering or reporting.	
Undistributed	**92.0**					
Undistributed		920A	920A	920A	Charges that cannot be distributed to the object classes listed above.	

Appendix H
Sample Cost Summary (BOR730) Report

0495-610A-FC -61F -04954991
REPORT ID: BOR730
RUN DATE: 10/02/2005

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

PAGE NO: 3,767
RUN TIME: 18:31
LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT	PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	- UNLQ OBLG
FC 61F	FLOOD CONTROL , NONREIM EXPENSES-FY ACTIVITY									
	04954991	NONREIMB EXPENSES FLOOD							STATUS: N (OPEN)	
		0010000	NK GLEN ELDER DAM & RES				STATUS: N (OPEN - BUT WILL NOT ACCEPT PAYROLL)			
			1062000	257H90	A40	0.00	331.81	0.00	331.81	0.00
			6BMRCNA	257H90	A40	26,387.80	58,429.13	0.00	50,907.31	0.00
			6BMULMN	257H90	A40	44,154.04	442,895.02	0.00	331,143.78	0.00
			6BMULMN	257H90	A50	597.12-	26,121.67	0.00	15,827.05	0.00
			JOB FUND		A40	70,541.84	501,654.96	0.00	382,382.90	0.00
			JOB FUND		A50	597.12-	26,121.67	0.00	15,827.05	0.00
		0010000	* TOTAL JOB			69,944.72	527,776.63	0.00	398,209.95	0.00
		PROGRAM FUND			A40	70,541.84	501,654.96	0.00	382,382.90	0.00
		PROGRAM FUND			A50	597.12-	26,121.67	0.00	15,827.05	0.00
	04954991	** TOTAL PROGRAM				69,944.72	527,776.63	0.00	398,209.95	0.00
		PROJ CAT FUND			A40	70,541.84	501,654.96	0.00	382,382.90	0.00
		PROJ CAT FUND			A50	597.12-	26,121.67	0.00	15,827.05	0.00
PROJECT CAT : 61F		*** TOTAL PROJ CAT				69,944.72	527,776.63	0.00	398,209.95	0.00
		PROJ TYPE FUND			A40	70,541.84	501,654.96	0.00	382,382.90	0.00
		PROJ TYPE FUND			A50	597.12-	26,121.67	0.00	15,827.05	0.00
PROJECT TYPE : FC		**** TOTAL PROJ TYPE				69,944.72	527,776.63	0.00	398,209.95	0.00
FW 61F	FISH AND WILDLIFE , NONREIM EXPENSES-FY ACTIVITY									
	04954993	NONREIMB EXPENSES FISH & WLF C							STATUS: N (OPEN)	
		0010000	NK GLEN ELDER DAM&WACONDA LAKE				STATUS: N (OPEN - BUT WILL NOT ACCEPT PAYROLL)			
			1062000	257H90	A40	0.00	12.30	0.00	12.30	0.00
			6BMRCNA	257H90	A40	145.61	322.37	0.00	280.88	0.00
			6BMULMN	257H90	A40	1,637.49	16,424.02	0.00	12,279.92	0.00
			6BMULMN	257H90	A50	22.15-	968.66	0.00	586.94	0.00
			JOB FUND		A40	1,783.10	16,758.69	0.00	12,573.10	0.00
			JOB FUND		A50	22.15-	968.66	0.00	586.94	0.00
		0010000	* TOTAL JOB			1,760.95	17,727.35	0.00	13,160.04	0.00
		PROGRAM FUND			A40	1,783.10	16,758.69	0.00	12,573.10	0.00
		PROGRAM FUND			A50	22.15-	968.66	0.00	586.94	0.00
	04954993	** TOTAL PROGRAM				1,760.95	17,727.35	0.00	13,160.04	0.00

0495-610A-FW -61F -04957071
REPORT ID: BOR730
RUN DATE: 10/02/2005

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

RUN TIME: 18:31
LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ OPLG--
FW 61F FISH AND WILDLIFE , NONREIM EXPENSES-FY ACTIVITY									
	PROJ CAT FUND			A40	1,783.10	16,758.69	0.00	12,573.10	0.00
	PROJ CAT FUND			A50	22.15-	968.66	0.00	586.91	0.00
PROJECT CAT : 61F	*** TOTAL PROJ CAT				1,760.95	17,727.35	0.00	13,160.04	0.00
	PROJ TYPE FUND			A40	1,783.10	16,758.69	0.00	12,573 10	0.00
	PROJ TYPE FUND			A50	22.15-	968.66	0.00	586.94	0.00
PROJECT TYPE : FW	**** TOTAL PROJ TYPE				1,760.95	17,727.35	0.00	13,160.04	0.00
MI 61B MUNICIPAL AND INDUSTRIAL , OPERATION &MAINTENANCE EXPENSE									
04957071 M@I WATER EXPENSE-OPERATION									STATUS: 1 (OPEN)
3240200 NK GLEN ELDER DAM-CITY BELOIT					STATUS: N (OPEN - BUT WILL NOT ACCEPT PAYROLL)				
		1062000	257H90	A40	0.00	0.76	0.00	0.76	0.00
		6BMRCNA	257H90	A40	36.39	80.62	0.00	70.24	0.00
		6BMULMN	257H90	A40	101.28	1,015.16	0.00	759.00	0.00
		6BMULMN	257H90	A50	1.37-	59.85	0.00	36.24	0.00
	JOB FUND			A40	137.67	1,096.54	0.00	830.00	0.00
	JOB FUND			A50	1.37-	59.85	0.00	36.24	0.00
3240200	* TOTAL JOB				136.30	1,156.39	0.00	866.24	0.00
3240201 NK GLEN ELDER DAM-RURAL WTR #2					STATUS: N (OPEN - BUT WILL NOT ACCEPT PAYROLL)				
		1062000	257H90	A40	0.00	0.77	0.00	0.77	0.00
		6BMULMN	257H90	A40	100.95	1,014.79	0.00	758.64	0.00
		6BMULMN	257H90	A50	1.36-	59.89	0.00	36.26	0.00
	JOB FUND			A40	100.95	1,015.56	0.00	759.41	0.00
	JOB FUND			A50	1.36-	59.89	0.00	36.26	0.00
3240201	* TOTAL JOB				99.59	1,075.45	0.00	795.67	0.00
	PROGRAM FUND			A40	238.62	2,112.10	0.00	1,589.41	0.00
	PROGRAM FUND			A50	2.73-	119.74	0.00	72.50	0.00
04957071	** TOTAL PROGRAM				235.89	2,231.84	0.00	1,661.91	0.00
	PROJ CAT FUND			A40	238.62	2,112.10	0.00	1,589.41	0.00
	PROJ CAT FUND			A50	2.73-	119.74	0.00	72.50	0.00
PROJECT CAT : 61B	*** TOTAL PROJ CAT				235.89	2,231.84	0.00	1,661.91	0.00
	PROJ TYPE FUND			A40	238.62	2,112.10	0.00	1,589.41	0.00

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP	CAT	PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ OBLG--
MI	61N	MUNICIPAL AND INDUSTRIAL , MULTIPURPOSE OPERATIONS									
			PROJ TYPE FUND			A50	2.73-	119.74	0.00	72.50	0.00
PROJECT TYPE : MI			**** TOTAL PROJ TYPE				235.89	2,231.84	0.00	1,661.91	0.00
MP	61N	MULTIPURPOSE , MULTIPURPOSE OPERATIONS									
		04958111	GLEN ELDER UNIT-GLEN ELDER DAM							STATUS: 1 (OPEN)	
			320000Q	QUARTERS-GLEN ELDER EXP			STATUS: N (OPEN - BUT WILL NOT ACCEPT PAYROLL)				
				6000000	257H70	A40	317.48-	3,587.90-	0.00	2,973.98-	0.00
			320000Q	* TOTAL JOB			317.48-	3,587.90-	0.00	2,973.98-	0.00
			3200000	A40 CARTKER FM 175610470011100			STATUS: 1 (OPEN)				
				6B50400	254A	A40	0.00	186.85	0.00	186.85	0.00
				6B50400	254B	A40	0.00	8.48	0.00	8.48	0.00
				6B50400	257E	A40	61.31	364.32	0.00	364.32	0.00
				6B50400	257I	A40	0.00	5.28	0.00	5.28	0.00
				6B50400	261A	A40	0.00	6.99	0.00	6.99	0.00
				6B50400	264B	A40	81.94	156.86	0.00	153.08	0.00
			3200000	* TOTAL JOB			143.25	728.78	0.00	725.00	0.00
			3210000	OPERATION EXPENSES			STATUS: 1 (OPEN)				
				6BDEPE7	88DE15	A40	276.69	4,766.77	0.00	3,936.70	0.00
				6BQEQEN	257H90	A40	315.48	8,488.23	0.00	4,872.00	0.00
				6B10000	111A	A40	19.64	19.64	0.00	19.64	0.00
				6B10000	111G30	A40	5.70	5.70	0.00	5.70	0.00
				6B10000	121A	A40	3.33	3.33	0.00	3.33	0.00
				6B10000	8126	A40	8.31	8.31	0.00	8.31	0.00
				6B10000	8128	A40	8.03	8.03	0.00	8.03	0.00
				6B30000	111A	A40	18.38	496.26	0.00	496.26	0.00
				6B30000	111A20	A40	126.00-	26.00	0.00	26.00	0.00
				6B30000	111G30	A40	5.33	143.91	0.00	143.91	0.00
				6B30000	121A	A40	2.41	64.94	0.00	64.94	0.00
				6B30000	121A20	A40	12.00-	3.00	0.00	3.00	0.00
				6B30000	8126	A40	7.57	206.04	0.00	206.04	0.00
				6B30000	812620	A40	40.00-	8.00	0.00	8.00	0.00
				6B30000	8128	A40	7.31	197.41	0.00	197.41	0.00
				6B30000	812820	A40	39.00-	8.00	0.00	8.00	0.00
				6B30100	252Z	A40	0.00	188.51	0.00	188.51	0.00
				6B50000	211D	A40	0.00	18.27	0.00	18.27	0.00

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REPORT ID: BOR730 ** BOR FEDERAL FINANCIAL SYSTEM ** PAGE NO: 3,770
RUN DATE: 10/02/2005 COST FILE SUMMARY RUN TIME: 18:31
AS OF 09/30/2005 LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP	CAT	PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLO OBLG--
MP	61N	MULTIPURPOSE		, MULTIPURPOSE OPERATIONS							
		04958111		GLEN ELDER UNIT-GLEN ELDER DAM						STATUS: 1 (OPEN)	
			3210000	OPERATION EXPENSES				STATUS: 1 (OPEN)			
				6B50300	111A	A40	733.20	12,389.71	0.00	9,200.06	0.00
				6B50300	111A20	A40	289.00-	757.00-	0.00	1,922.00-	0.00
				6B50300	111G30	A40	212.63	3,546.60	0.00	2,653.52	0.00
				6B50300	115A	A40	0.00	341.77	0.00	143.20	0.00
				6B50300	115F	A40	0.00	71.60	0.00	71.60	0.00
				6B50300	121A	A40	201.91	3,034.40	0.00	2,252.95	0.00
				6B50300	121A20	A40	36.00-	129.00-	0.00	375.00-	0.00
				6B50300	211D	A40	0.00	46.50	0.00	0.00	0.00
				6B50300	254B	A40	0.00	2,325.00	0.00	0.00	0.00
				6B50300	8126	A40	332.85	5,697.97	0.00	4,301.53	0.00
				6B50300	812620	A40	94.00-	104.00-	0.00	691.00-	0.00
				6B50300	8128	A40	321.37	5,427.51	0.00	4,009.95	0.00
				6B50300	812820	A40	91.00-	248.00-	0.00	643.00-	0.00
				6B50400	111A	A40	294.48	4,238.44	0.00	3,017.42	0.00
				6B50400	111A20	A40	17.00	22.00	0.00	1,586.00-	0.00
				6B50400	111B	A40	0.00	308.75	0.00	0.00	0.00
				6B50400	111G30	A40	85.39	1,297.34	0.00	869.02	0.00
				6B50400	115A	A40	0.00	425.44	0.00	98.16	0.00
				6B50400	115F	A40	0.00	31.70	0.00	31.70	0.00
				6B50400	121A	A40	133.19	1,886.15	0.00	1,371.36	0.00
				6B50400	121A20	A40	6.00	11.00	0.00	223.00-	0.00
				6B50400	211D	A40	0.00	274.89	0.00	135.39	0.00
				6B50400	233C	A40	183.48	1,442.34	0.00	1,368.77	0.00
				6B50400	233K	A40	2,263.23	15,424.90	0.00	14,972.69	0.00
				6B50400	261A	A40	0.00	14.97	0.00	14.97	0.00
				6B50400	264B	A40	0.00	63.96	0.00	63.96	0.00
				6B50400	269F	A40	0.00	52.50	0.00	52.50	0.00
				6B50400	8126	A40	148.79	2,415.85	0.00	1,615.74	0.00
				6B50400	812620	A40	7.00	40.00	0.00	545.00-	0.00
				6B50400	8128	A40	143.67	2,292.70	0.00	1,508.64	0.00
				6B50400	812820	A40	6.00	9.00	0.00	507.00-	0.00
				6B50500	111A	A40	0.00	467.87	0.00	467.87	0.00
				6B50500	111G30	A40	0.00	135.69	0.00	135.69	0.00
				6B50500	121A	A40	0.00	154.86	0.00	154.86	0.00
				6B50500	8126	A40	0.00	219.95	0.00	219.95	0.00
				6B50500	8128	A40	0.00	212.36	0.00	212.36	0.00
				6000000	8110	A40	646.64	646.64	0.00	646.64	0.00
			3210000	* TOTAL JOB			5,688.01	78,392.71	0.00	53,312.55	0.00
			3210100	UPDATE STD OPERATING PROCEDURE				STATUS: 3 (CLOSED)			

0495-610A-MP -61N -04958111
REPORT ID: BOR730
RUN DATE: 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM JOB ORGAN OBJ FND ---MONTH COST--- ----FY COST----- --FY ADJ COST--- --TTD/CAL COST-- - UNLQ OBLG

MP 61N MULTIPURPOSE , MULTIPURPOSE OPERATIONS

04958111 GLEN ELDER UNIT-GLEN ELDER DAM STATUS: 1 (OPEN)

3210100 UPDATE STD OPERATING PROCEDURE STATUS: 3 (CLOSED)

ORGAN	OBJ	FND	MONTH COST	FY COST	FY ADJ COST	TTD/CAL COST	UNLQ OBLG
6B50500	111A	A40	0.00	4,023.98	0.00	279.62	0.00
6B50500	111G30	A40	0.00	1,126.71	0.00	78.30	0.00
6B50500	115B	A40	0.00	100.00	0.00	100.00	0.00
6B50500	121A	A40	0.00	968.58	0.00	74.87	0.00
6B50500	8126	A40	0.00	1,518.22	0.00	127.54	0.00
6B50500	8128	A40	0.00	1,711.26	0.00	119.04	0.00
6060320	111A	A40	0.00	982.50	0.00	735.24	0.00
6060320	111A20	A40	0.00	0.00	0.00	475.00-	0.00
6060320	111G30	A40	0.00	275.10	0.00	205.87	0.00
6060320	115B	A40	0.00	100.00	0.00	100.00	0.00
6060320	121A	A40	0.00	259.96	0.00	156.86	0.00
6060320	121A20	A40	0.00	0.00	0.00	155.00-	0.00
6060320	8126	A40	0.00	453.21	0.00	327.33	0.00
6060320	812620	A40	0.00	0.00	0.00	189.00-	0.00
6060320	8128	A40	0.00	302.13	0.00	218.21	0.00
6060320	812820	A40	0.00	0.00	0.00	126.00-	0.00
6060400	111A	A40	0.00	219.24	0.00	0.00	0.00
6060400	111A20	A40	0.00	0.00	0.00	805.00-	0.00
6060400	111G30	A40	0.00	61.39	0.00	0.00	0.00
6060400	115A	A40	0.00	255.78	0.00	0.00	0.00
6060400	121A	A40	0.00	42.59	0.00	0.00	0.00
6060400	121A20	A40	0.00	0.00	0.00	64.00-	0.00
6060400	8126	A40	0.00	173.70	0.00	0.00	0.00
6060400	812620	A40	0.00	0.00	0.00	261.00-	0.00
6060400	8128	A40	0.00	115.80	0.00	0.00	0.00
6060400	812820	A40	0.00	0.00	0.00	174.00-	0.00
3210100	* TOTAL JOB		0.00	12,690.15	0.00	273.88	0.00

3220000 MAINTENANCE EXPENSES STATUS: 1 (OPEN)

ORGAN	OBJ	FND	MONTH COST	FY COST	FY ADJ COST	TTD/CAL COST	UNLQ OBLG
6A20300	254B	A50	0.00	148.78	0.00	148.78	0.00
6A60200	111A	A50	0.00	230.38	0.00	230.38	0.00
6A60200	111B	A50	0.00	2,484.17	0.00	2,484.17	0.00
6A60200	111G30	A50	0.00	787.22	0.00	787.22	0.00
6A60200	121A	A50	0.00	1,012.24	0.00	1,012.24	0.00
6A60200	257E	A50	0.00	144.23	0.00	144.23	0.00
6A60200	264B	A50	0.00	2,822.67	0.00	2,822.67	0.00

0495 610A MP 61N 04958111
REPORT ID: BOR730
RUN DATE: 10/02/2005

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

RUN TIME: 18:31
LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM JOB ORGAN OBJ FND - MONTH COST--- ----FY COST----- --FY ADJ COST--- - TTD/CAL COST - - UNLQ OBLG -

MP 61N MULTIPURPOSE , MULTIPURPOSE OPERATIONS

04958111 GLEN ELDER UNIT-GLEN ELDER DAM STATUS 1 (OPEN)

3220000 MAINTENANCE EXPENSES STATUS: 1 (OPEN)

ORGAN	OBJ	FND	MONTH COST	FY COST	FY ADJ COST	TTD/CAL COST	UNLQ OBLG
6A60200	8126	A50	0.00	1,309.07	0.00	1,309.07	0.00
6A60200	8128	A50	0.00	610.63	0.00	610.63	0.00
6B10000	111A	A40	377.76	1,007.36	0.00	1,007.36	0.00
6B10000	111A20	A40	650.00-	0.00	0.00	0.00	0.00
6B10000	111G30	A40	109.55	292.13	0.00	292.13	0.00
6B10000	121A	A40	91.63	274.89	0.00	274.89	0.00
6B10000	121A20	A40	147.00-	0.00	0.00	0 00	0 00
6B10000	211D	A40	53.95	115.03	0.00	115.03	0 00
6B10000	265S	A40	32.70	32.70	0.00	32.70	0.00
6B10000	8126	A40	167.89	456.57	0.00	456.57	0.00
6B10000	812620	A40	231.00-	0.00	0.00	0.00	0.00
6B10000	8128	A40	162.10	440.82	0.00	440.82	0.00
6B10000	812820	A40	223.00-	0.00	0.00	0.00	0.00
6B50000	257B	A40	0.00	46.36	0.00	46 36	0.00
6B50000	257D	A40	0.00	88.45	0.00	88.45	0 00
6B50400	111A	A40	1,852.52	24,310.80	0.00	18,617.05	0.00
6B50400	111A20	A40	1,214.00-	773.00-	0.00	2,391.00-	0.00
6B50400	111B	A40	2,324.94	32,107.90	0.00	27,113.90	0 00
6B50400	111G30	A40	1,211.47	16,162.26	0.00	13,169 70	0.00
6B50400	115A	A40	0.00	597.88	0.00	0.00	0.00
6B50400	115B	A40	0.00	100.00	0.00	100.00	0.00
6B50400	121A	A40	1,576.79	21,092.52	0.00	17,271.66	0.00
6B50400	121A20	A40	315.00-	175.00-	0.00	562 00-	0 00
6B50400	211B	A40	0.00	1.41	0.00	1.41	0.00
6B50400	211D	A40	53.95	1,036.37	0.00	599.45	0 00
6B50400	233F	A40	0.00	25.89	0.00	19.94	0 00
6B50400	233G	A40	0.00	8.43	0.00	8.43	0.00
6B50400	233H	A40	66.00	132.00	0.00	66.00	0.00
6B50400	233L	A40	54.01	54.01	0.00	54.01	0.00
6B50400	252R	A40	157.38-	0.00	0.00	104.44	0.00
6B50400	252Z	A40	1,323.24	1,630.69	0.00	1,005.37	0.00
6B50400	253H	A40	0.00	5.20	0.00	5.20	0.00
6B50400	254A	A40	0.00	45.95	0.00	45.95	0.00
6B50400	254B	A40	70.92	547.80	0.00	461.05	0.00
6B50400	254B	A50	0.00	2,442.77	0.00	2,442.77	0.00
6B50400	256M	A40	420.00	420.00	0.00	420.00	0.00
6B50400	257B	A40	0.00	87.74	0.00	87.74	0.00

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REPORT ID: BOR730 ** BOR FEDERAL FINANCIAL SYSTEM ** PAGE NO: 3,773
RUN DATE: 10/02/2005 COST FILE SUMMARY RUN TIME: 18:31
AS OF 09/30/2005 LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM JOB ORGAN OBJ FND ---MONTH COST--- ----FY COST----- --FY ADJ COST--- --TTD/CAL COST-- -UNLQ OBLG--

MP 61N MULTIPURPOSE , MULTIPURPOSE OPERATIONS

04958111 GLEN ELDER UNIT-GLEN ELDER DAM STATUS: 1 (OPEN)

JOB	ORGAN / OBJ	FND	MONTH COST	FY COST	FY ADJ COST	TTD/CAL COST	UNLQ OBLG
3220000 MAINTENANCE EXPENSES				STATUS: 1 (OPEN)			
	6B50400 257D	A40	177.55	263.25	0.00	318.76-	0.00
	6B50400 257E	A40	1,625.13	1,943.37	0.00	1,943.37	0.00
	6B50400 257H	A40	136.00	1,633.61	0.00	769.04	0.00
	6B50400 257I	A40	176.30	2,384.09	0.00	1,785.49	0.00
	6B50400 261A	A40	6.42-	448.71	0.00	240.79	0.00
	6B50400 261M	A40	1,187.79-	27.07-	0.00	746.50-	0.00
	6B50400 264A	A40	1,441.88-	1,155.83-	0.00	1,318.13-	0.00
	6B50400 264B	A40	262.59	1,447.90	0.00	1,183.45	0.00
	6B50400 265S	A40	0.00	256.99	0.00	124.00	0.00
	6B50400 269F	A40	1,876.08	5,117.48	0.00	4,269.67	0.00
	6B50400 8126	A40	2,020.05	27,826.76	0.00	22,909.12	0.00
	6B50400 812620	A40	444.00-	225.00	0.00	912.00-	0.00
	6B50400 8128	A40	1,950.39	26,395.55	0.00	21,327.82	0.00
	6B50400 812820	A40	428.00-	265.00-	0.00	827.00-	0.00
	6B50500 111A	A40	130.05	1,446.93	0.00	1,446.93	0.00
	6B50500 111A20	A40	185.00	185.00	0.00	185.00	0.00
	6B50500 111G30	A40	37.71	414.02	0.00	414.02	0.00
	6B50500 121A	A40	49.26	446.40	0.00	446.40	0.00
	6B50500 121A20	A40	54.00	54.00	0.00	54.00	0.00
	6B50500 8126	A40	62.94	702.12	0.00	702.12	0.00
	6B50500 812620	A40	69.00	69.00	0.00	69.00	0.00
	6B50500 8128	A40	60.77	646.05	0.00	646.05	0.00
	6B50500 812820	A40	67.00	67.00	0.00	67.00	0.00
	JOB FUND	A40	12,443.77	170,698.49	0.00	133,204.91	0.00
	JOB FUND	A50	0.00	11,992.16	0.00	11,992.16	0.00
3220000	* TOTAL JOB		12,443.77	182,690.65	0.00	145,197.07	0.00
3220400 A50 REPAIR SPILLWAY DRAIN				STATUS: 1 (OPEN)			
	6B30000 111A	A50	0.00	156.00	0.00	0.00	0.00
	6B30000 111G30	A50	0.00	43.68	0.00	0.00	0.00
	6B30000 121A	A50	0.00	27.28	0.00	0.00	0.00
	6B30000 8126	A50	0.00	51.06	0.00	0.00	0.00
	6B30000 8128	A50	0.00	63.54	0.00	0.00	0.00
	6B30100 111A	A50	0.00	573.48	0.00	0.00	0.00
	6B30100 111G30	A50	0.00	160.58	0.00	0.00	0.00
	6B30100 121A	A50	0.00	198.36	0.00	0.00	0.00

0495-610A-MP -61N -04958111
REPORT ID: BOR730
RUN DATE: 10/02/2005

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

RUN TIME: 18:31
LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP	CAT	PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ OBLG
MP	61N	MULTIPURPOSE		, MULTIPURPOSE OPERATIONS							
		04958111		GLEN ELDER UNIT-GLEN ELDER DAM						STATUS: 1 (OPEN)	
			3220400	A50 REPAIR SPILLWAY DRAIN			STATUS: 1 (OPEN)				
				6B30100	8126	A50	0.00	279.72	0.00	0 00	0.00
				6B30100	8128	A50	0.00	261.07	0.00	0.00	0.00
				6B30200	111A	A50	0.00	463.14	0.00	260.10	0.00
				6B30200	111A20	A50	0.00	32.00-	0.00	390.00-	0.00
				6B30200	111G30	A50	0.00	130.46	0.00	73.61	0.00
				6B30200	121A	A50	0.00	174.05	0.00	98.37	0.00
				6B30200	121A20	A50	0.00	9.00-	0.00	114.00-	0.00
				6B30200	261A	A50	0.00	61.50	0.00	61.50	0.00
				6B30200	8126	A50	0.00	231.59	0.00	130.92	0.00
				6B30200	812620	A50	0.00	6.00-	0.00	151.00-	0.00
				6B30200	8128	A50	0.00	214.95	0.00	120.99	0 00
				6B30200	812820	A50	0.00	12.00-	0.00	141.00-	0 00
				6023000	111A	A50	0.00	155.11	0.00	82.48	0.00
				6023000	111A20	A50	0.00	112.00-	0.00	0.00	0.00
				6023000	111G30	A50	0.00	44.25	0.00	23.92	0.00
				6023000	121A	A50	0.00	44.62	0.00	23.87	0.00
				6023000	121A20	A50	0.00	25.00-	0.00	0.00	0.00
				6023000	8126	A50	0.00	67.70	0.00	40.39	0.00
				6023000	812620	A50	0.00	20.00-	0.00	0.00	0.00
				6031000	111A	A50	0.00	35.43	0.00	35.43	0.00
				6031000	111G30	A50	0.00	10.27	0.00	10.27	0 00
				6031000	121A	A50	0.00	6.68	0.00	6.68	0.00
				6031000	8126	A50	0.00	15.19	0.00	15.19	0.00
				6060200	111A	A50	0.00	1,317.26	0.00	943 08	0.00
				6060200	111A20	A50	0.00	419.00-	0.00	0.00	0.00
				6060200	111G30	A50	0.00	371.29	0.00	266.53	0.00
				6060200	121A	A50	0.00	389.84	0.00	303 50	0 00
				6060200	121A20	A50	0.00	80.00-	0.00	0.00	0 00
				6060200	8126	A50	0.00	562.40	0.00	457.75	0.00
				6060200	812620	A50	0.00	75.00-	0.00	0.00	0.00
				6060200	8128	A50	0.00	441.26	0.00	306.56	0.00
				6060200	812820	A50	0.00	125.00-	0.00	0.00	0.00
				6060210	111A20	A50	0.00	599.00-	0.00	0.00	0.00
				6060210	121A20	A50	0.00	43.00-	0.00	0.00	0.00
				6060210	211D	A50	0.00	2,521.30	0.00	0.00	0 00
				6060210	213R	A50	0.00	100.01	0.00	0.00	0 00
				6060210	812620	A50	0.00	96.00-	0.00	0.00	0 00

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB	ORGAN OBJ FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLO OBLG -
MP 61N MULTIPURPOSE		, MULTIPURPOSE OPERATIONS					
04958111		GLEN ELDER UNIT-GLEN ELDER DAM				STATUS: 1 (OPEN)	
	3220400	A50 REPAIR SPILLWAY DRAIN		STATUS: 1 (OPEN)			
		6060210 812820 A50	0.00	161.00-	0.00	0.00	0.00
	3220400	* TOTAL JOB	0.00	7,359.07	0.00	2,465.11	0.00
	3220500	CAWKER CITY LAGOON		STATUS: 1 (OPEN)			
		6B30200 111A A50	0.00	247.10	0.00	247.10	0.00
		6B30200 111G30 A50	0.00	69.18	0.00	69.18	0.00
		6B30200 121A A50	0.00	93.44	0.00	93.44	0.00
		6B30200 252R A50	0.00	5,621.72-	0.00	0.00	0.00
		6B30200 254B A50	0.00	0.00	0.00	0.00	472.16
		6B30200 8126 A50	0.00	122.91	0.00	122.91	0.00
		6B30200 8128 A50	0.00	114.72	0.00	114.72	0.00
		6B50400 254B A50	0.00	4,613.00	0.00	0.00	0.00
		6023000 111A A50	0.00	103.57	0.00	59.99	0.00
		6023000 111A20 A50	0.00	37.00-	0.00	0.00	0.00
		6023000 111G30 A50	0.00	29.60	0.00	17.40	0.00
		6023000 121A A50	0.00	29.76	0.00	17.36	0.00
		6023000 121A20 A50	0.00	8.00-	0.00	0.00	0.00
		6023000 8126 A50	0.00	43.02	0.00	29.37	0.00
		6023000 812620 A50	0.00	7.00-	0.00	0.00	0.00
		6031000 111A A50	0.00	35.43	0.00	35.43	0.00
		6031000 111G30 A50	0.00	10.27	0.00	10.27	0.00
		6031000 121A A50	0.00	6.68	0.00	6.68	0.00
		6031000 8126 A50	0.00	15.19	0.00	15.19	0.00
		6060200 111A A50	0.00	833.22	0.00	497.44	0.00
		6060200 111A20 A50	330.00-	0.00	0.00	0.00	0.00
		6060200 111G30 A50	0.00	238.28	0.00	111.26	0.00
		6060200 121A A50	0.00	224.53	0.00	132.53	0.00
		6060200 121A20 A50	74.00-	0.00	0.00	0.00	0.00
		6060200 8126 A50	0.00	337.28	0.00	229.92	0.00
		6060200 812620 A50	117.00-	0.00	0.00	0.00	0.00
		6060200 8128 A50	0.00	306.76	0.00	186.00	0.00
		6060200 812820 A50	101.00-	0.00	0.00	0.00	0.00
		6060210 211D A50	0.00	436.90	0.00	0.00	0.00
	3220500	* TOTAL JOB	622.00-	2,237.12	0.00	2,029.19	472.16
	3230100	A40 SH OF MULT ADM & GEN EXP		STATUS: 1 (OPEN)			

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT .
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB	ORGAN OBJ FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	- UNLQ OBLG - -
MP 61N MULTIPURPOSE		, MULTIPURPOSE OPERATIONS					
04958111		GLEN ELDER UNIT-GLEN ELDER DAM				STATUS: 1 (OPEN)	
	3230100	A40 SH OF MULT ADM & GEN EXP		STATUS: 1 (OPEN)			
		1062000 257H90 A40	0.00	345.64	0.00	345.64	0.00
		6BMULFO 257H90 A40	23,208.03	183,239.85	0.00	143,142.51	0.00
		6B50400 265S A40	0.00	27.98	0.00	27.98	0.00
	3230100	* TOTAL JOB	23,208.03	183,613.47	0.00	143,516 13	0.00
	3230200	SH OF EQUIP & BUREAU VEH EXPEN		STATUS: 1 (OPEN)			
		6B200AN 222E A40	4,639.33	22,662.13	0.00	16,903.56	0.00
		6B200AN 233L A40	0.00	5.11-	0.00	5.11-	0.00
		6DVBVCD 257H90 A40	188.85	3,498.09-	0.00	330.04	0.00
	3230200	* TOTAL JOB	4,828.18	19,158.93	0.00	17,228.49	0.00
	3230400	SH OF REMOTE CONTROL		STATUS: 1 (OPEN)			
		6BMRCEY 257H90 A40	26,569.80	58,831.12	0.00	51,258.43	0 00
	3230400	* TOTAL JOB	26,569.80	58,831.12	0.00	51,258.43	0.00
	3240100	TO CA 4991, 4993, 7071		STATUS: 1 (OPEN)			
		1062000 257H90 A40	0.00	345.64-	0.00	345.64-	0.00
		6BMULMN 257H90 A40	45,993.76-	461,348.99-	0.00	344,941.34-	0.00
		6BMULMN 257H90 A50	622.00	27,210.07-	0.00	16,486.49-	0.00
		JOB FUND A40	45,993.76-	461,694.63-	0.00	345,286.98-	0 00
		JOB FUND A50	622.00	27,210.07-	0.00	16,486.49-	0.00
	3240100	* TOTAL JOB	45,371.76-	488,904.70-	0.00	361,773.47-	0.00
	3240200	TO 4991, 4993, 7071 GLEN ELDER		STATUS: 1 (OPEN)			
		6BMRCNA 257H90 A40	26,569.80-	58,831.12-	0.00	51,258.43-	0.00
	3240200	* TOTAL JOB	26,569.80-	58,831.12-	0.00	51,258.43-	0.00
		PROGRAM FUND A40	0.00	0.00	0.00	0.00	0.00
		PROGRAM FUND A50	0.00	5,621.72-	0.00	0.00	472.16
04958111		** TOTAL PROGRAM	0.00	5,621.72-	0.00	0.00	472.16
		PROJ CAT FUND A40	0.00	0.00	0.00	0.00	0 00

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ OBLG--
MP 61N MULTIPURPOSE		, MULTIPURPOSE OPERATIONS							
		PROJ CAT FUND		A50	0.00	5,621.72-	0.00	0.00	472.16
PROJECT CAT : 61N		*** TOTAL PROJ CAT			0.00	5,621.72-	0.00	0.00	472.16
		PROJ TYPE FUND		A40	0.00	0.00	0.00	0.00	0.00
		PROJ TYPE FUND		A50	0.00	5,621.72-	0.00	0.00	472.16
PROJECT TYPE : MP		**** TOTAL PROJ TYPE			0.00	5,621.72-	0.00	0.00	472.16
OT 61F OTHER		, NONREIM EXPENSES-FY ACTIVITY							
04954998		RESOURCE MGMT. & FACILITY OPER * IDP 01-6G2 GLEN ELDR DAM&WACONDA LK 0495 * STATUS: 1 (OPEN)							
	0010100	LRM GENERAL-GLEN ELDER STATUS: 1 (OPEN)							
		6B10000	111A	A40	425.70	4,209.24	0.00	3,903 98	0.00
		6B10000	111A20	A40	351.00-	383.00-	0.00	79.00-	0.00
		6B10000	111G30	A40	123.45	1,217.65	0.00	1,132.18	0.00
		6B10000	121A	A40	59.11	809.81	0.00	748.55	0.00
		6B10000	121A20	A40	47.00-	50.00-	0.00	11.00-	0.00
		6B10000	252Z	A40	0.00	17.93	0.00	17.93	0.00
		6B10000	8126	A40	176.39	1,869.40	0.00	1,743.50	0.00
		6B10000	812620	A40	116.00-	65.00-	0.00	27.00-	0.00
		6B10000	8128	A40	170.31	1,746.29	0.00	1,619.73	0.00
		6B10000	812820	A40	112.00-	121.00-	0.00	25.00-	0.00
		6B200AN	222E	A40	974.85	4,761.95	0.00	3,551.91	0.00
		6B200AN	233L	A40	0.00	1.07-	0.00	1.07-	0.00
		6B20000	252R	A40	0.00	0.00	0.00	0.00	5,200.00
		6B30000	111A	A40	0.00	2,795.17	0.00	2,795.17	0.00
		6B30000	111A20	A40	35.00	192.00	0.00	192.00	0.00
		6B30000	111G30	A40	255.00	2,715.75	0.00	2,715.75	0.00
		6B30000	113A	A40	879.32	6,569.54	0.00	6,569.54	0.00
		6B30000	121A	A40	250.23	2,092.07	0.00	2,092.07	0.00
		6B30000	121A20	A40	7.00	42.00	0.00	42.00	0.00
		6B30000	8126	A40	401.52	4,288.68	0.00	4,288.68	0.00
		6B30000	812620	A40	12.00	68.00	0.00	68.00	0 00
		6B30000	8128	A40	387.67	3,968.29	0.00	3,968.29	0 00
		6B30000	812820	A40	12.00	66.00	0.00	66.00	0 00
		6B30100	111A	A40	1,204.67	5,688.62	0.00	5,671 94	0.00
		6B30100	111A20	A40	212.00-	432.00	0.00	432.00	0.00
		6B30100	111G30	A40	349.36	1,649.60	0.00	1,645.77	0 00
		6B30100	121A	A40	402.57	1,629.42	0.00	1,626.12	0.00
		6B30100	121A20	A40	20.00-	116.00	0.00	116.00	0.00
		6B30100	211D	A40	0.00	127.14	0.00	127.14	0.00

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT	PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ CBLG -
OT 61F	OTHER	, NONREIM EXPENSES-FY ACTIVITY								
	04954998	RESOURCE MGMT. & FACILITY OPER * IDP 01-6G2 GLEN ELDR DAM&WACONDA LK- 0495 * STATUS: 1 (OPEN)								
		0010100	LRM GENERAL-GLEN ELDER STATUS: 1 (OPEN)							
			6B30100	233J	A40	0.00	41.46	0.00	41.46	0.00
			6B30100	411C	A40	0.00	7,000.00	0.00	7,000.00	0.00
			6B30100	8126	A40	545.69	2,575.43	0.00	2,569.19	0.00
			6B30100	812620	A40	19.00-	159.00	0.00	159.00	0.00
			6B30100	8128	A40	526.88	2,432.31	0.00	2,426.48	0.00
			6B30100	812820	A40	18.00-	154.00	0.00	154.00	0.00
			6B30200	111A	A40	1,857.58	14,062.84	0.00	14,062.84	0.00
			6B30200	111A20	A40	292.00	913.00	0.00	913.00	0.00
			6B30200	111G30	A40	538.70	4,078.18	0.00	4,078.18	0.00
			6B30200	121A	A40	334.45	2,504.34	0.00	2,504.34	0.00
			6B30200	121A20	A40	77.00	152.00	0.00	152.00	0.00
			6B30200	211D	A40	323.70	1,859.32	0.00	1,859.32	0.00
			6B30200	252R	A40	0.00	338.00	0.00	338.00	0.00
			6B30200	8126	A40	791.93	6,068.94	0.00	6,068.94	0.00
			6B30200	812620	A40	107.00	309.00	0.00	309.00	0.00
			6B30200	8128	A40	764.61	5,763.67	0.00	5,763.67	0.00
			6B30200	812820	A40	103.00	298.00	0.00	298.00	0.00
			6027000	111A	A40	0.00	95.79	0.00	95.79	0.00
			6027000	111A20	A40	99.00-	0.00	0.00	0.00	0.00
			6027000	111G30	A40	0.00	27.78	0.00	27.78	0.00
			6027000	121A	A40	0.00	19.41	0.00	19.41	0.00
			6027000	121A20	A40	16.00-	0.00	0.00	0.00	0.00
			6027000	8126	A40	0.00	41.46	0.00	41.46	0.00
			6027000	812620	A40	33.00-	0.00	0.00	0.00	0.00
		0010100	* TOTAL JOB			11,345.69	95,346.41	0.00	93,876.04	5,200.00
		0010300	CULTURAL RESOURCES STATUS: 1 (OPEN)							
			6B30000	111A	A40	0.00	159.84	0.00	159.84	0.00
			6B30000	111G30	A40	0.00	46.35	0.00	46.35	0.00
			6B30000	115A	A40	0.00	314.07	0.00	314.07	0.00
			6B30000	121A	A40	0.00	83.35	0.00	83.35	0.00
			6B30000	8126	A40	0.00	178.60	0.00	178.60	0.00
			6B30000	8128	A40	0.00	169.02	0.00	169.02	0.00
		0010300	* TOTAL JOB			0.00	951.23	0.00	951.23	0.00
		0020100	PUBLIC SAFETY-GLEN ELDER STATUS: 1 (OPEN)							

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REPORT ID: BOR730 ** BOR FEDERAL FINANCIAL SYSTEM ** PAGE NO: 3,779

RUN DATE: 10/02/2005 COST FILE SUMMARY RUN TIME: 18:31

AS OF 09/30/2005 LAST UPDATE : 10/02/2005

DIVISION: 6

PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT

SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	- UNLQ OBLG
OT 61F OTHER		, NONREIM EXPENSES-FY ACTIVITY							
04954998		RESOURCE MGMT. & FACILITY OPER * IDP 01-6G2 GLEN ELDR DAM&WACONDA LK- 0495 * STATUS: 1 (OPEN)							
	0020100	PUBLIC SAFETY-GLEN ELDER STATUS: 1 (OPEN)							
		6B10000	111A	A40	62.96	346.28	0.00	346.28	0.00
		6B10000	111A20	A40	162.00-	0.00	0.00	0.00	0.00
		6B10000	111G30	A40	18.26	100.43	0.00	100.43	0.00
		6B10000	121A	A40	18.25	100.72	0.00	100.72	0.00
		6B10000	121A20	A40	37.00-	0.00	0.00	0.00	0.00
		6B10000	8126	A40	28.85	158.76	0.00	158.76	0.00
		6B10000	812620	A40	58.00-	0.00	0.00	0.00	0.00
		6B10000	8128	A40	27.85	153.27	0.00	153.27	0.00
		6B10000	812820	A40	56.00-	0.00	0.00	0.00	0.00
	0020100	* TOTAL JOB			156.83-	859.46	0.00	859.46	0.00
	0030100	RECREATION MANAGEMENT STATUS: 1 (OPEN)							
		6B30100	411C	A40	0.00	0.00	0.00	0.00	15,000.00
	0030100	* TOTAL JOB			0.00	0.00	0.00	0.00	15,000.00
	0040100	A20 RESOURCE MGMT PLANS STATUS: 1 (OPEN)							
		6B10000	111A	A20	383.84	1,100.54	0.00	608.06	0.00
		6B10000	111A20	A20	375.00	175.00-	0.00	60.00	0.00
		6B10000	111G30	A20	111.31	311.97	0.00	174.09	0.00
		6B10000	121A	A20	84.85	255.79	0.00	137.35	0.00
		6B10000	121A20	A20	63.00	9.00-	0.00	4.00	0.00
		6B10000	8126	A20	168.21	494.70	0.00	270.06	0.00
		6B10000	812620	A20	127.00-	34.00	0.00	15.00	0.00
		6B10000	8128	A20	162.39	467.12	0.00	257.45	0.00
		6B10000	812820	A20	123.00	51.00-	0.00	18.00	0.00
		6B30100	111A	A20	355.53	1,272.90	0.00	979.65	0.00
		6B30100	111G30	A20	103.10	366.19	0.00	284.09	0.00
		6B30100	121A	A20	123.47	450.20	0.00	349.52	0.00
		6B30100	411C	A20	0.00	26,330.00	0.00	13,590.00	0.00
		6B30100	8126	A20	168.81	621.67	0.00	478.86	0.00
		6B30100	8128	A20	162.99	585.01	0.00	451.72	0.00
		6027000	111A	A20	0.00	52.88	0.00	0.00	0.00
		6027000	111G30	A20	0.00	14.81	0.00	0.00	0.00
		6027000	121A	A20	0.00	16.10	0.00	0.00	0.00
		6027000	8126	A20	0.00	25.14	0.00	0.00	0.00
	0040100	* TOTAL JOB			2,512.50	32,164.02	0.00	17,677.85	0.00
	0050100	A40 MIS FLOOD CONTROL-GLEN ELD STATUS: 1 (OPEN)							

0495-610A-OT -61F -04954998
REPORT ID: BOR730
RUN DATE: 10/02/2005

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

RUN TIME: 18:31
LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB	ORGAN	OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ OBLG -
OT 61F OTHER		, NONREIM EXPENSES-FY ACTIVITY							
04954998		RESOURCE MGMT. & FACILITY OPER	* IDP 01-6G2	GLEN ELDR DAM&WACONDA LK- 0495 * STATUS: 1 (OPEN)					
	0050100	A40 MIS FLOOD CONTROL-GLEN ELD		STATUS: 1 (OPEN)					
		6B50500	111A	A40	0.00	1,777.41	0.00	1,726.65	0.00
		6B50500	111A20	A40	0.00	130.00-	0.00	0.00	0.00
		6B50500	111G30	A40	0.00	511.32	0.00	497.11	0.00
		6B50500	121A	A40	0.00	427.30	0.00	415.34	0.00
		6B50500	121A20	A40	0.00	24.00-	0.00	0.00	0.00
		6B50500	211D	A40	51.25	97.75	0.00	97.75	0.00
		6B50500	8126	A40	0.00	791.40	0.00	779.86	0.00
		6B50500	812620	A40	0.00	23.00-	0.00	0.00	0.00
		6B50500	8128	A40	0.00	760.47	0.00	738.93	0.00
		6B50500	812820	A40	0.00	43.00-	0.00	0.00	0.00
	0050100	* TOTAL JOB			51.25	4,145.65	0.00	4,255.64	0.00
	0060100	A50 FACIL EXAM GLEN ELDER DAM		STATUS: 1 (OPEN)					
		6B10000	111A	A50	0.00	792.74	0.00	0.00	0.00
		6B10000	111G30	A50	0.00	221.97	0.00	0.00	0.00
		6B10000	115A	A50	0.00	128.12	0.00	0.00	0.00
		6B10000	121A	A50	0.00	225.15	0.00	0.00	0.00
		6B10000	211D	A50	0.00	108.50	0.00	0.00	0.00
		6B10000	8126	A50	0.00	205.20	0.00	0.00	0.00
		6B10000	8128	A50	0.00	383.04	0.00	0.00	0.00
		6B50500	111A	A50	572.22	4,240.18	0.00	825.12	0.00
		6B50500	111A20	A50	295.00	137.00	0.00	295.00	0.00
		6B50500	111G30	A50	165.95	1,195.51	0.00	239.29	0.00
		6B50500	121A	A50	197.03	1,097.55	0.00	293.83	0.00
		6B50500	121A20	A50	87.00	51.00	0.00	87.00	0.00
		6B50500	211D	A50	0.00	422.44	0.00	0.00	0.00
		6B50500	8126	A50	271.21	1,497.19	0.00	402.35	0.00
		6B50500	812620	A50	111.00	82.00	0.00	111.00	0.00
		6B50500	8128	A50	261.85	1,829.30	0.00	380.30	0.00
		6B50500	812820	A50	107.00	53.00	0.00	107.00	0.00
	0060100	* TOTAL JOB			2,068.26	12,669.89	0.00	2,740.89	0.00
		PROGRAM FUND		A20	2,512.50	32,164.02	0.00	17,677.85	0.00
		PROGRAM FUND		A40	11,240.11	101,302.75	0.00	99,942.37	20,200.00
		PROGRAM FUND		A50	2,068.26	12,669.89	0.00	2,740.89	0.00
04954998		** TOTAL PROGRAM			15,820.87	146,136.66	0.00	120,361.11	20,200.00

0495-610A-OT -61F -04952601
REPORT ID: BOR730
RUN DATE: 10/02/2005

** BOR FEDERAL FINANCIAL SYSTEM **
COST FILE SUMMARY
AS OF 09/30/2005

PAGE NO: 3,781
RUN TIME: 18:31
LAST UPDATE : 10/02/2005

DIVISION: 6
PROGRAM CLASS: 0495 P-S MBP, GLEN ELDER UNIT
SGL ACCOUNT : 610A OPERATING EXP/PROGRAM COSTS

TYP CAT PROGRAM	JOB ORGAN OBJ	FND	---MONTH COST---	----FY COST-----	--FY ADJ COST---	--TTD/CAL COST--	--UNLQ OBLG--
OT 61F OTHER	, NONREIM EXPENSES-FY ACTIVITY						
	PROJ CAT FUND	A20	2,512.50	32,164.02	0.00	17,677.85	0.00
	PROJ CAT FUND	A40	11,240.11	101,302.75	0.00	99,942.37	20,200.00
	PROJ CAT FUND	A50	2,068.26	12,669.89	0.00	2,740.89	0.00
PROJECT CAT : 61F	*** TOTAL PROJ CAT		15,820.87	146,136.66	0.00	120,361.11	20,200.00
	PROJ TYPE FUND	A20	2,512.50	32,164.02	0.00	17,677.85	0.00
	PROJ TYPE FUND	A40	11,240.11	101,302.75	0.00	99,942.37	20,200.00
	PROJ TYPE FUND	A50	2,068.26	12,669.89	0.00	2,740.89	0.00
PROJECT TYPE : OT	**** TOTAL PROJ TYPE		15,820.87	146,136.66	0.00	120,361.11	20,200.00
	SGL ACCOUNT FUND	A20	2,512.50	32,164.02	0.00	17,677.85	0.00
	SGL ACCOUNT FUND	A40	83,803.67	621,828.50	0.00	496,487.78	20,200.00
	SGL ACCOUNT FUND	A50	1,446.26	34,258.24	0.00	19,227.38	472.16
SGL ACCOUNT : 610A	***** TOTAL SGL		87,762.43	688,250.76	0.00	533,393.01	20,672.16

Appendix I

Placement of Program Items in Reclamation’s Programmatic Budget Structure

Contents

I. INTRODUCTION

Reclamation's Programmatic Budget Structure (PBS) reflects the major programmatic components of the agency and is responsive to the needs of the Government Performance and Results Act (GPRA) of 1993. The PBS and it's activities cut across programs and projects. For purposes of this document, it is assumed that the activity or task has been assigned to a project or program and that the need is to determine where to place the task or activity in the PBS.

Managers and budget personnel must emphasize the importance of consistent placement of similar activities throughout Reclamation and the adherence to the Standard Processing of Costing (SPOC) to limit budget questions and potential audit issues. Questions concerning placement should be resolved with the Denver or Regional Budget Offices.

This document is for internal guidance for the formulation of project and program budgets.

II. OUTCOME BASED PROGRAMMING

The PBS is linked to GPRA goals and provides Reclamation the means to implement an **outcome-oriented, program-activity based, budgeting and reporting process**. The program activities listed represent Reclamation's major functions and operations and include outcome-related goals and objectives.

It is very important for all managers in Reclamation to understand and utilize the concept of outcome-based, outcome-oriented programming when placing program activities and subactivities into the budget structure to request funding. Some questions that need to be asked are:

- What is the purpose of this activity?
- What is the expected and/or desired outcome wanted from the performance of this activity or subactivity?
- Have the guidelines for the Standard Processes of Costing (SPOC) as issued on September 30, 1999, been followed?

The answers to these questions will lead to the proper placement of the program items in Reclamation's programmatic budget structure.

III. DEFINITIONS OF PBS LEVELS

The first three levels are depicted in the PBS chart following this section. The following definitions are provided as guidance to Reclamation's managers in identifying the placement of program activities, subactivities, and tasks:

LEVEL 1 - An **Appropriation** is an act of Congress that enables Reclamation to incur obligations and to make payments for specific purposes. All Reclamation appropriations are allotted to authorized projects and programs. Reclamation identifies and requests funds from Congress under different appropriations: **Water and Related Resources, Loans, CVP Restoration Fund, California Bay-Delta, Permanent, Working Capital Fund, Trust Funds, Applied Revenue Program, and Policy and Administration.** (Policy and Administration guidelines are not included in this document.)

LEVEL 2 - An **Activity** is a set of related actions or subactivities that contribute to the implementation of a Reclamation project or program.

Funds can be requested under five different Level 2 activities: **Water and Energy Management and Development; Land Management and Development; Fish and Wildlife Management and Development; Facility Operations; and Facility Maintenance and Rehabilitation.** Level 2 is a consolidation of all subactivities performed to accomplish each specific program activity. Delineation of work at levels beyond Level 2 is left to the manager's discretion to justify the program and measure performance. (Note: Funds appropriated by Congress are divided into 2 categories: Resources Management and Development (RMD) which includes the first three activities listed ; and Operation, Maintenance, and Rehabilitation (OM&R) which includes the last two activities.

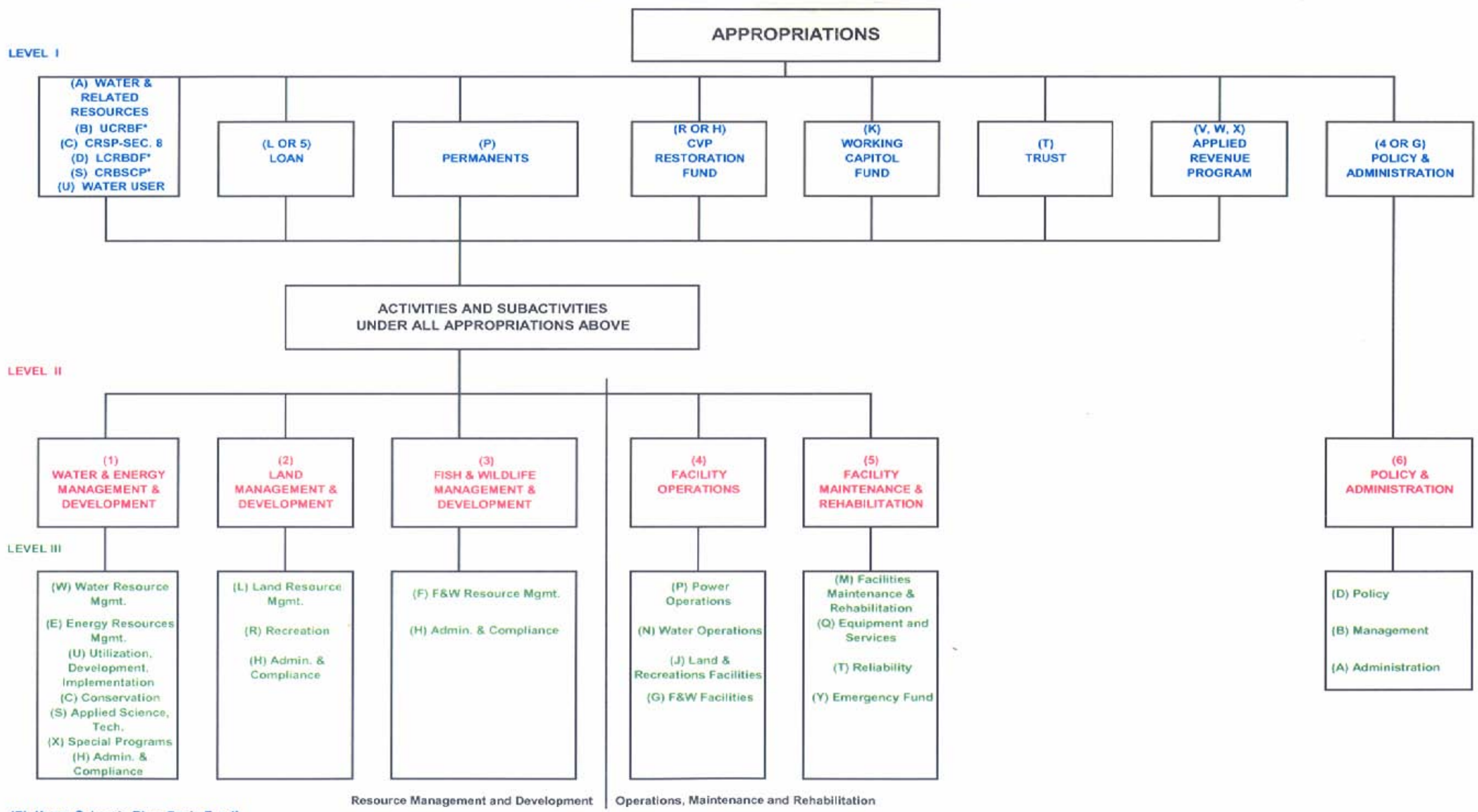
LEVEL 3 - A **Subactivity** is performed to fulfill program and project authorizations and purposes. Subactivities can be tracked using either feature codes or item codes within the budget system and cost accounts, not fund codes in the accounting system.

LEVEL 4 - A **Task** is a specific assignment or responsibility in performance of a subactivity. The number of tasks that can be identified within are unlimited. Each manager identifies the number of tasks necessary to accomplish a given program subactivity.

Some tasks may have the exact same name throughout Reclamation (such as integrated pest management or recreation management) yet could be placed in different program activities, depending on the purpose and desired outcome of the task. In such cases, the project narratives for the work proposed in the Budget documents should reflect the reasons for the placement of the task in the activity.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

PROGRAMMATIC BUDGET STRUCTURE



(B) Upper Colorado River Basin Fund*
(C) Colorado River Storage Project - Section 8
(D) Lower Colorado River Basin Dam Fund*
(S) Colorado River Basin Salinity Control Project*

IV. PLACEMENT OF ACTIVITIES/SUBACTIVITIES

Reclamation managers will use the descriptions listed below to place activities within specific projects and programs.

This document specifically represents the **Water and Related Resources Appropriation**. The same Level 1, 2, and 3 descriptions could also apply to other Level 1 appropriations - Loans, Permanents, California Bay-Delta, CVP Restoration Fund, Working Capital Fund, Trust, and Applied Revenue Program.

The Level 4 representative tasks included in this document are not comprehensive and do not include all examples.

(Note: The alpha-numeric designations listed below and to the left of the activity or subactivity corresponds to the fund designations on the PBS chart. The letter "A" is the most commonly used for the first digit, but other letters can be used (see Level 1 in chart).

LEVEL 1 (Appropriation): WATER AND RELATED RESOURCES

This appropriation provides funds for Reclamation to economically manage, develop, and protect water and related natural resources within Reclamation's area of responsibility. Appropriations are made to specific projects and programs.

A10 LEVEL 2 (Activity): Water and Energy Management and Development

This program activity covers all aspects of the water and energy management and development decision making processes including: water resource management; energy resources management; utilization, development and implementation of water supplies and energy resources; water conservation activities; applied sciences and technology development as related to water supplies and energy; special programs; and administration and legal compliance.

Bureauwide Programs found in this Level 2 activity: Drought Emergency Assistance Program, Efficiency Incentives Program, Environmental and Interagency Coordination Activities, General Planning, Native American Affairs Program, Negotiation and Administration of Water Marketing, Power Program Services, Public Access and Safety Program, Reclamation Law Administration, Science and Technology Program, Technical Assistance to States, Water Reclamation and Reuse Program - Title XVI, and Water Management and Conservation.

A10 (A1W) LEVEL 3 (Subactivity): Water Resources Management

This subactivity includes tasks necessary for the evaluation of management alternatives and decisions related to water resources that do not directly relate to the operation and maintenance of a specific project. Included are studies, investigations, development of water models, and evaluating, assessing and improving management which lead to improved management and enhancement of Reclamation water projects. This also includes plans, procedures, criteria and data collection for the safe and effective management of Reclamation facilities to meet contemporary needs on a long term basis.

LEVEL 4 (Representative Tasks):
Water Quality Investigations
Water Contracting Alternative Studies
Water Measurement & Accounting
Weather Monitoring
Water Resource Modeling
Annual River Plans
Water Allocations/Reallocations
Reservoir and River Evaluation
Water Use Studies
Design and Development of Structural and Nonstructural Tools for Water Management (Control Systems, Forecasting Techniques, Remote Monitoring Systems)
Hydrologic Studies and Investigations
Depletion Studies
Basin and Ecosystem Water Related Planning
Conjunctive Use Investigations

A10 (A1E) LEVEL 3 (Subactivity): Energy Resources Management

This subactivity includes tasks necessary for the formulation of management alternatives and decisions related to hydropower production and development provided by Reclamation projects. Included are energy studies and investigations, development of power system models, analysis of power generation efficiencies, and evaluating, assessing and improving water management activities which lead to the improved management and enhancement of Reclamation power facilities. This also includes plans, developing procedures, criteria and data collection for the safe and effective management of Reclamation facilities to meet contemporary energy needs.

LEVEL 4 (Representative Tasks):
Power Resource Planning
Power Scheduling Automation
Electrical Engineering Studies
Energy Conservation Planning

A10 (A1U) LEVEL 3 (Subactivity): Utilization/Development/Implementation

This subactivity includes tasks for the planning and development of new water delivery and conveyance projects and new or improved energy production projects. Water and energy utilization and development subactivities provide for planning, investigating, and undertaking studies for: development and construction of additional tools and infrastructure necessary for improving operations; to meet changes in water and energy needs, environmental conditions and institutional (legal, compacts, decrees) requirements; and development of new water supplies and new and/or increased power production facilities.

LEVEL 4 (Representative Tasks):

Energy (Power) Improvement and New Development Projects
Native American and other Rural Water Systems
M&I Improvement and Development
Water Quality Facility Development or Improvement
Groundwater Recharge
Irrigation Supply Development
Multiple Purpose Facility Development
Water Supplies for Small Urbanizing Areas
Cultural Resources associated with Ongoing Development
Environmental Mitigation associated with Ongoing Development
Operation and Maintenance during Construction

A10 (A1C) LEVEL 3 (Subactivity): Conservation

This subactivity includes tasks to improve the use of water to more effectively meet present and future needs and to foster improvements in efficiency of use, conservation, and management of water resources. This includes measures other than construction that will reduce the use, loss, and waste of water and improve efficiency in the use of water. This subactivity provides for evaluation, implementation, oversight, coordination and assistance to water users, other agencies, States, and Native Americans.

LEVEL 4 (Representative Tasks):

Water Conservation Field Services Program
Best Management Practices
Water Education
Water Conservation Advisory Center
Water Use Data Base
RRA Water Conservation Plans
Irrigation Efficiency Improvements
Unauthorized Use

A10 (A1S) LEVEL 3 (Subactivity): Applied Sciences and Technology Development

Tasks included this subactivity are directed toward developing technologies to extend the service life and the performance of the water resources infrastructure. Reclamation conducts field and laboratory studies and analytical and testing services to develop and support applications of new technologies to support Reclamation's mission. All activities funded from Reclamation's Science and Technology Program are included in this subactivity. Separate guidelines for the S&T program are coordinated through the Denver Office.

LEVEL 4 (Representative Tasks):
Hydroelectric Infrastructure Protection and Enhancement
Watershed and River Systems Management
Advanced Water Treatment
Desalination and Water Purification
Technology Advancement

A10 (A1X) LEVEL 3 (Subactivity): Special Programs

Tasks included in this subactivity include Reclamation's Investigations Program which are formulated with specific planning guidelines. Activities may include preparation, revision, and issuance of technical guidelines for conducting the technical phases of resource investigations and surveys to existing projects to determine the viability for two types of improvements; (1) remedial action to modify, replace or repair features on older projects, and (2) possible operational adjustments of existing projects to increase benefits and purposes.

LEVEL 4 (Representative Tasks):
Feasibility and Special Studies
Investigation Programs (previously identified as GDP's)
Investigation of Existing Projects
Technical Assistance to Tribes

A10 (A1H) LEVEL 3 (Subactivity): Administration and Compliance

This subactivity includes tasks related to complying with and administering laws, regulations, agreements, contracts or other institutional arrangements related to the control, allocation, use and distribution of water and energy resources. Also included are tasks associated with providing technical guidance and assistance in the development of standards, procedures, instructions, and training related to water management issues.

Included are necessary legal procedures, documents, contracts and agreements to assure that the Federal investment is protected and Reclamation projects are operated in accordance with both State and Federal laws.

LEVEL 4 (Representative Tasks):
Water Rights Filing Monitoring
Indian Reserved Rights Administration
Indian Water Rights Negotiations
Decree Compliance for Water Management Issues
Litigations Related to Water Issues
State Law Coordination and Compliance
Water Contract Activities
Water Marketing, Pricing, and Economic Studies
Prepayment Studies
Repayment Capacity
FERC Compliance and Coordination
Reclamation Reform Act Compliance (RRA)
Water Transfers
Title Transfer Activities
Area Manager Funds

A20 LEVEL 2 (Activity): Land Management and Development

Bureauwide Programs found in this Level 2 activity: Environmental Program Administration, Land Resources Management, Operation and Maintenance Program Management, Reclamation Recreation Management Act - Title XXVII, Recreation and Fish and Wildlife Program Administration, and Soil and Moisture Conservation.

This program activity covers land management and development processes related to land resource administration, recreation management, and legal compliance performed mainly on withdrawn lands. Activities on lands around Reclamation facilities in an "operational status" are programmed under Facility Operations (A40).

A20 (A2L) LEVEL 3 (Subactivity): Land Resources Management

This subactivity includes tasks for the formulation of management alternatives and decisions related to land resources management. This includes resource management planning, studies, evaluations, and investigations, which lead to improved resource management practices. Also included in this area are continued general liaison activities with managing entities, Native Americans, other cooperating agencies, the public, and special interest groups to ensure that Reclamation administered lands are managed consistent with resource objectives. Tasks involve development and direct management and oversight required to protect resources.

LEVEL 4 (Representative Tasks): (Not lands for Project Operation)
Cultural Resource Management Activities
Resource Management Plans
Land Use Planning and Evaluation
Land Suitability Studies
Land Acquisition/Appraisals
Land Resource Surveys
Hazardous Materials (non-operational activities)
Hazardous Waste Site Evaluation and Cleanup
Management and Application of Practices
Land Disposal, Transfers, and Exchanges
Minerals Resource Management
GIS System Activities
Review of Land Operations
Museum Property Initiative
Integrated Pest Management and Weed Control on acquired and withdrawn lands
Project Right-of-Way and Boundary Surveys

A20 (A2R) LEVEL 3 (Subactivity): Recreation

This subactivity includes tasks for the oversight and support services required to facilitate proper management and utilization of lands and waters administered by Reclamation and other agencies to provide recreation. Recreation management subactivities include the review of concessionaire operations and management and development of recreation facilities.

LEVEL 4 (Representative Tasks): (Operation of Recreation Facilities is A40)
Oversight of Managing Entity (Concessionaire)
Facility Planning and Development
Field Reviews and Reports
Recreation Planning
Recreation Workshops and Conferences
Recreation Fee Assessments Administration
Recreation Challenge Grants
Catch a Special Thrill (C.A.S.T.)

A20 (A2H) LEVEL 3 (Subactivity): Administration and Compliance

This subactivity includes tasks related to complying with and administering laws, regulations, execution of agreements, contracts or other agreements for the management of land and recreation facilities and the protection of land resources. Federal Land Management Policy Act (FLPMA) compliance and Native American Graves Protection and Repatriation Act (NAGPRA) activities are also be included.

LEVEL 4 (Representative Tasks):
Inventory requirements
Trespass Resolution
Maintaining Land Records
Maintaining Land Plat Books
FLPMA Withdrawal Reviews
Administrative Reports
Law Enforcement Agreements/Contracts
NAGPRA activities (unless primary reason for activity is mitigation of a project under development, then it is charged to the project)

A30 LEVEL 2 (Activity): Fish and Wildlife Management and Development

This program activity covers conservation, enhancement, restoration (not mitigation of construction impacts) and management and development activities that benefit fish and wildlife.

Bureauwide Programs included in this activity are: Departmental Irrigation Drainage Program, Environmental Program Administration, National Fish and Wildlife Foundation, Recreation and Fish and Wildlife Program Administration, and Wetlands.

A30 (A3F) LEVEL 3 (Subactivity): Fish and Wildlife Resources Management

This subactivity includes tasks to plan, and investigate fish and wildlife issues and implement actions including development of new facilities and new technologies for the protection of fish and wildlife and their habitats. This subactivity also includes management related to the use of facilities, lands, and instream flows for the purpose of sustaining fish and wildlife. Also covered are cooperative efforts for the protection of fish and wildlife, including the development of agreements and partnerships to cost-share in fish and wildlife projects and support conferences and workshops.

LEVEL 4 (Representative Tasks):
Refuge Water Supply
Studies, Investigations, Inventorying, and Monitoring if not associated with a project development
Fish and Wildlife Research Technology and Development (Outside Science & Technology being performed in Denver)
Public outreach and educational programs
Fish and Wildlife Inventory and Monitoring if not associated with a project development
Conferences and Workshops
Protection and Restoration of Fish and Wildlife
Facilities Development for Fish and Wildlife
Endangered Species Recovery Activities

Participation on Endangered and Threatened Species Recovery Teams if not part of a mitigation program
Development of Water Catchments and Basins if not part of a mitigation program
Title 34 Activities, Public Law 102-575 (Central Valley Project Improvement Act)

A30 (A3H) LEVEL 3 (Subactivity): Administration and Compliance

This subactivity includes tasks to facilitate Reclamation's compliance with Federal and State laws pertaining to fish and wildlife, such as the Endangered Species Act, Fish and Wildlife Coordination Act, and Migratory Bird Treaty Act. Other tasks include consultation with other agencies, preparation of studies and reports, and actions taken to mitigate or avoid impacts to fish and wildlife.

LEVEL 4 (Representative Tasks):
Fish and Wildlife Coordination Act
Endangered Species Act
North American Waterfowl Management Plan
Oversight of Fish and Wildlife Agreements

A40 LEVEL 2 (Activity): Facility Operations

This activity covers all resources required to operate Reclamation facilities to provide authorized project benefits for the delivery of water, power, flood control, fish and wildlife and recreation activities commensurate with established purposes and legal compliance. The principle resources provided by Reclamation facilities are:
1) hydroelectric power; 2) water supply delivery systems; 3) fish and wildlife facilities; 4) recreation facilities; and 5) flood control.

Facility Operations includes routine maintenance. Routine maintenance is recurring daily, weekly, monthly, etc. activities of such a nature that the operational availability of critical power and water control is not seriously curtailed or inhibited. Most tasks performed by Reclamation maintenance staff will fall here unless it is classified as replacements, additions or extraordinary maintenance items (RAX). Moveable property and equipment, below the capitalized equipment threshold, acquired for routine operation and maintenance are also placed here.

Bureauwide Programs included in this activity are: Emergency Planning and Disaster Response Program, Examination of Existing Structures, Miscellaneous Flood Control, Operation and Maintenance Program Management, and Site Security.

A40 (A4P) LEVEL 3 (Subactivity): Power Operations

This subactivity includes tasks to operate on-site and remote hydroelectric powerplants, and associated switchyards, transmission/distribution systems, control centers, including support equipment, studies, and technologies. Also included are oversight programs, specialized equipment and training.

LEVEL 4 (Representative Tasks):
Powerplant Operations
SCADA Systems
Supervisory Computer Systems
Powerplant Operation Reviews
Automated Data Acquisitions Systems
Operations of Control Centers
Communications Systems
Standing Operating Procedures
Power Transmission
Power Analysis
Power Wheeling
Powerplant Site Security Administration
Project Specific REMMS (Reclamation's Electronic Maintenance Management System)
Grounds Maintenance around power facility

A40 (A4N) LEVEL 3 (Subactivity): Water Operations

This subactivity includes tasks necessary to operate dams, reservoirs, and water conveyance systems including oversight, and includes facilities operated by others but financed by Reclamation.

LEVEL 4 (Representative Tasks):
Dam Tender Training
Operation of Reclamation Water Facilities, such as: Dams and Reservoirs, Pumping Plants, Water Conveyance Systems, Water Delivery Systems, and Treatment Plants
Emergency Management Action Plans
Early Warning Systems
Flood Control Operations
Instream Flow Operations (for other than F&WL purposes)
Standing Operating Procedures
Water Scheduling
Reservoir and River Operation Evaluation
Salinity Forecasting
Reimbursement to Local Water Users for Operations
Water Supply Forecasting and Monitoring
Hydromet Management & Data Base
Grounds Maintenance for operational facilities and features

A40 (A4J) LEVEL 3 (Subactivity): Land and Recreation Facilities

This subactivity includes tasks to operate Reclamation's land and recreation facilities, and also includes the costs associated with facilities operated by others but financed by Reclamation.

LEVEL 4 (Representative Tasks):
Recreation Facilities Operation
Field Reviews and Reporting
Sanitation Services
Law Enforcement Activities
Grounds Maintenance for Lands and Recreation Facilities

A40 (A4G) LEVEL 3 (Subactivity): Fish and Wildlife Facilities

This subactivity includes tasks to operate Reclamation's fish and wildlife facilities, and also includes the costs associated with facilities operated by others but financed by Reclamation.

LEVEL 4 (Representative Tasks):
Fish & Wildlife Facilities Operation
Field Reviews and Reporting
O&M associated with Fish and Wildlife
Mitigation Commitments
Fish Hatcheries

A50 LEVEL 2 (Activity): Facility Maintenance and Rehabilitation

This program activity covers major and non-routine maintenance, replacement and additions to existing infrastructure and structural facilities, including equipment. This covers all aspects of developing and sustaining the maintenance, safety, reliability, and serviceability of Reclamation's facilities and identifying and scheduling necessary rehabilitation work.

Major maintenance and the Dam Safety Program is included under this activity. Also included under major maintenance are those activities defined as RAX items. (Reference July 1995 "REPLACEMENTS" book)

Bureauwide Programs included in this activity are: Dam Safety Program, Examination of Existing Structures, Federal Building Seismic Safety Program, Operation and Maintenance Program Management, and Site Security.

A50 (A5M) LEVEL 3 (Subactivity): Facility Maintenance and Rehabilitation

This subactivity includes tasks for the proper non- routine maintenance of all facilities owned or operated by Reclamation. This includes the development and administration of maintenance management techniques and programs to provide evaluation of the adequacy and cost effectiveness of maintenance practices. This also includes minor construction if done for purposes of improving the functional or maintenance abilities of a larger, more complex system. Power upratings are also included in this subactivity.

LEVEL 4 (Representative Tasks): Major nonrecurring replacement of, addition to, extraordinary maintenance of, or rehabilitation of:

Roads
Substations/Switchyards
Canals, laterals, drains
Pollution Control Devices
Recreation Facilities
Fish and Wildlife Facilities
Dams
Powerplants
Levees
Bridges
Buildings
Wells
Dredge Sediment Basins

A50 (A5T) LEVEL 3 (Subactivity): Reliability

This subactivity includes tasks, practices, and programs designed to improve or maintain the reliability and integrity of structures, equipment, services, and public health and safety. Included are studies to determine installed equipment service life, safety of dams and structures, protective equipment methods, effectiveness of maintenance practices, formal inspection and analysis of canals, pumping systems, and the physical modification of structures to improve and maintain facilities reliability and integrity.

LEVEL 4 (Representative Tasks):

Emergency Management Activities
Training Aids for Dam Safety Workshops
Inspections (Canals, Bridges, and Structures) (CFR/PFR)
Earthquake Evaluations
Safety Evaluation of Existing Dams (SEED)
Review of Operation and Maintenance Program (reliability)
Site Security Modifications

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V. EXAMPLES OF PLACEMENT OF PROGRAM ACTIVITIES

The following examples are provided to illustrate the placement of funding requests under program activities, subactivities, tasks, and subtasks into the program budget format.

- A Reclamation manager is located in the Wyoming Area Office and needs to request funding in FY XXXX for the replacement of a power plant transformer at Alcova Powerplant. It is determined that Federal funds are needed and the appropriate Level 1 program appropriation is Water and Related Resources (A). Upon reviewing the budget structure, the manager determines that the work proposed is a component of the Level 2 Facility Maintenance and Rehabilitation program activity (A5). After reviewing the Level 3 subactivity choices available under Facility Maintenance and rehabilitation, it is determined that the proper place to fund the work is under the Level 3 subactivity, Facility Maintenance and Rehabilitation (A5M). The manager then identifies the Level 4 task to be the need for power substation maintenance on the Kendrick Project. The Level 5 subtask is then identified to be the specific transformer replacement at the power substation at Alcova Powerplant of the Kendrick Project. Any further delineation by levels are up to the decision of the local manager.

- A Reclamation manager is located in the Dakota Area Office and needs to request funding in FY XXXX for the development of fish and wildlife facilities as a requirement of the rehabilitation and betterment work authorized on the Belle Fourche Unit, Pick-Sloan Missouri Basin Project. It is determined that Federal funds are needed and the appropriate Level 1 appropriation is Water and Related Resources (A). Upon reviewing the budget structure, the manager determines that the work proposed is a component of the Level 2 Fish and Wildlife Management and Development activity (A3). After reviewing the Level 3 subactivity choices available under fish and wildlife management and development, it is determined that the proper place to fund the work is under the Level 3 subactivity, Fish and Wildlife Resource Management (A3F). The manager then identifies the Level 4 task to be the need for the development of specific fish and wildlife facilities on the Belle Fourche Project. The Level 5 subtask is then identified as the development of two fish screens on the project's main water supply delivery canal. Any further delineation by levels are up to the decision of the local manager.

- A manager at Phoenix Area Office needs to request funding in FY1998 for routine maintenance of the newly acquired Black River Pumping Facilities. Upon reviewing the budget structure, the manager determines that the work could be assigned to either Facility Maintenance (A5) or Facility Operations (A4). After clarifying the work with his employees, he determines that there are at least 4 components of work: day-to-day operations of a pumping plant, switchyard and control center; routine maintenance of a flood control dike, a pipeline, other structures, pumps, and motors; major overhaul and rehabilitation of a pump; and replacement of a 50 year old transformer. He further determines that the correct Level 2 Activity for the day-to-day operations and routine maintenance tasks is Facility Operations (A4) with day-to-day operations and routine maintenance tasks assigned to the Level 3 Water Operations subactivity (A4N). The major overhaul and rehabilitation of a pump and the transformer replacement are assigned to the Level 2 Facility Maintenance Activity (A5) and the Level 3 subactivity, Facility Maintenance and Rehabilitation (A5M).

Using these examples, the local manager is responsible for identifying the Level 4 tasks for their program and providing consolidated information to the regional office for the Level 3 subactivity as requested.

Appendix J
Employee Labor Cost/Hour Report

Date: 12/18/20

Labor Cost Report

Time: 03:50PM

Fiscal Year To Date - Staff Hours & Costs

Detail Filter: (Pay Period between '200422' and '200521') and Fiscal Year = '2005' and Region starts with "" and Acct Structure starts with "W400465560132" and Org Code starts with "" and Object Class starts with "" and Acct Structure not starts with 'K90'

Name	Position	Series	Grade	Acct Structure	Acct Structure Desc	FYTD Total	YTD Hours
4310000	OFFICE OF THE AREA MANAGER						
	ASSISTANT AREA MANAGER	0340	14	W40046556013210000	HERON DAM OPERATION	531.92	6.0
	OFFICE OF THE AREA MANAGER TOTAL					$531.92	6.0
4313000	ENVIRONMENT DIVISION						
	SECRETARY (OFFICE AUTOMATION)	0318	05	W40046556013210000	HERON DAM OPERATION	15.05	0.5
	ENVIRONMENT DIVISION TOTAL					$15.05	0.5
4314000	FACILITIES AND LANDS DIVISION						
	CIVIL ENGINEER	0810	13	W40046556013210000	HERON DAM OPERATION	8,775.53	90.0
	CIVIL ENGINEER	0810	13	W40046556013220000	HERON DAM MAINTENANCE	2,525.90	25.5
	STUDENT TRAINEE (SECRETARY)	0399	03	W40046556013210000	HERON DAM OPERATION	1,996.71	103.5
	FACILITIES AND LANDS DIVISION TOTAL					$13,298.14	219.0
4314100	PROJECT ADMINISTRATION GROUP						
	REPAYMENT SPECIALIST	1101	12	W40046556013210000	HERON DAM OPERATION	129.86	2.0
	CIVIL ENGINEERING TECHNICIAN	0802	11	W40046556013210000	HERON DAM OPERATION	36,021.04	551.0
	PROJECT ADMINISTRATION GROUP TOTAL					$36,150.90	553.0
4316000	WATER MANAGEMENT DIVISION						
	SECRETARY (OFFICE AUTOMATION)	0318	07	W40046556013210000	HERON DAM OPERATION	113.11	3.0
	PROGRAM MANAGER	0301	13	W40046556013210000	HERON DAM OPERATION	2,297.40	27.0
	WATER MANAGEMENT DIVISION TOTAL					$2,410.51	30.0
4360000	CHAMA FIELD DIVISION						
	HEAVY MOBILE EQUIP MECH	5803	10	W40046556013220000	HERON DAM MAINTENANCE	313.20	6.0
	ENGINEERING EQUIPMENT OPERAT	5716	10	W40046556013210000	HERON DAM OPERATION	-390.64	0.0
	ENGINEERING EQUIPMENT OPERAT	5716	10	W40046556013220000	HERON DAM MAINTENANCE	901.03	20.0
	SUPVY CIVIL ENGRG TECHNICIAN	0802	12	W40046556013210000	HERON DAM OPERATION	1,270.23	19.0
	SUPVY CIVIL ENGRG TECHNICIAN	0802	12	W40046556013220000	HERON DAM MAINTENANCE	339.38	5.0
	LEAD ENGINEERING TECHNICIAN	0802	11	W40046556013210000	HERON DAM OPERATION	1,158.09	18.0
	LEAD ENGINEERING TECHNICIAN	0802	11	W40046556013220000	HERON DAM MAINTENANCE	661.94	10.0
	HYDROLOGIC TECHNICIAN	1316	07	W40046556013210000	HERON DAM OPERATION	20,415.97	482.0
	HYDROLOGIC TECHNICIAN	1316	07	W40046556013220000	HERON DAM MAINTENANCE	19,425.09	459.0
	ELECTRONICS MECHANIC	2604	11	W40046556013210000	HERON DAM OPERATION	465.08	8.0
	ELECTRONICS MECHANIC	2604	11	W40046556013220000	HERON DAM MAINTENANCE	356.43	6.0
	CHAMA FIELD DIVISION TOTAL					$44,915.80	1,033.0
Report Totals	--					$97,322.32	1,841.50

Appendix K
Scatter Diagrams

Appendix K
Data Analysis Graphs

Description of Figures

Figures 1-10 illustrate several sample relations between facility cost-metric values (vertical axis) and facility characteristic values (horizontal axis). Chosen relationships for illustration include:

- Figure 1 – A40 O&M Cost vs Age
- Figure 2 – A40 O&M Costs vs Crest Length
- Figure 3 – A40 O&M Costs vs Reservoir Capacity
- Figure 4 – A40 O&M Costs vs Complexity Index
- Figure 5 – A40 O&M Cost vs Embankment Volume
- Figure 6 – A40 Staff vs Age
- Figure 7 – A40 Staff vs Crest Length
- Figure 8 – A40 Staff vs Reservoir Capacity
- Figure 9 – A40 Staff vs Complexity Index
- Figure 10 – A40 Staff vs Embankment Volume

The purpose of showing these figures is to permit graphical inspection of the data "scatter." For correlation analysis, the paired-data points would be ideally distributed within a "cloud" of data points. For relations involving statistically significant correlation, the cloud would be angled and pinched, supporting the notion that a linear, albeit "noisy" relationship exists between the two variables (i.e., what is inferred by the statistically significant sample correlation). Conversely, the data may not be evenly distributed. Instead the "cloud" maybe split into two parts, potentially with a group of data points in one plot region and then with several outliers in other region(s). Such orientation isn't "known" when computing a correlation coefficient (or regression line-fit). Further separation of outliers from the group of data points can lead to a seemingly significant correlation coefficient that is actually over-influenced by the outliers. Such correlations should be regarded with skepticism.

Each figure has the following information:

- Paired-data points (i.e., cost-metric and facility characteristic values) for Reclamation facilities (blue circles).

- Median cost-metric and facility characteristic values for the 23 Reclamation facilities indicated by positions of the black dashed lines relative to the vertical and horizontal axes, respectively. Median indicates the middle value in a sorted sample.

- Sample correlation coefficients computed from the paired-data groups (Reclamation and external facility, respectively).

- Percentage confidence levels (rounded to the nearest unit percent) that the sample correlation coefficients are <u>not</u> statistically significant, discussed in the preceding section.

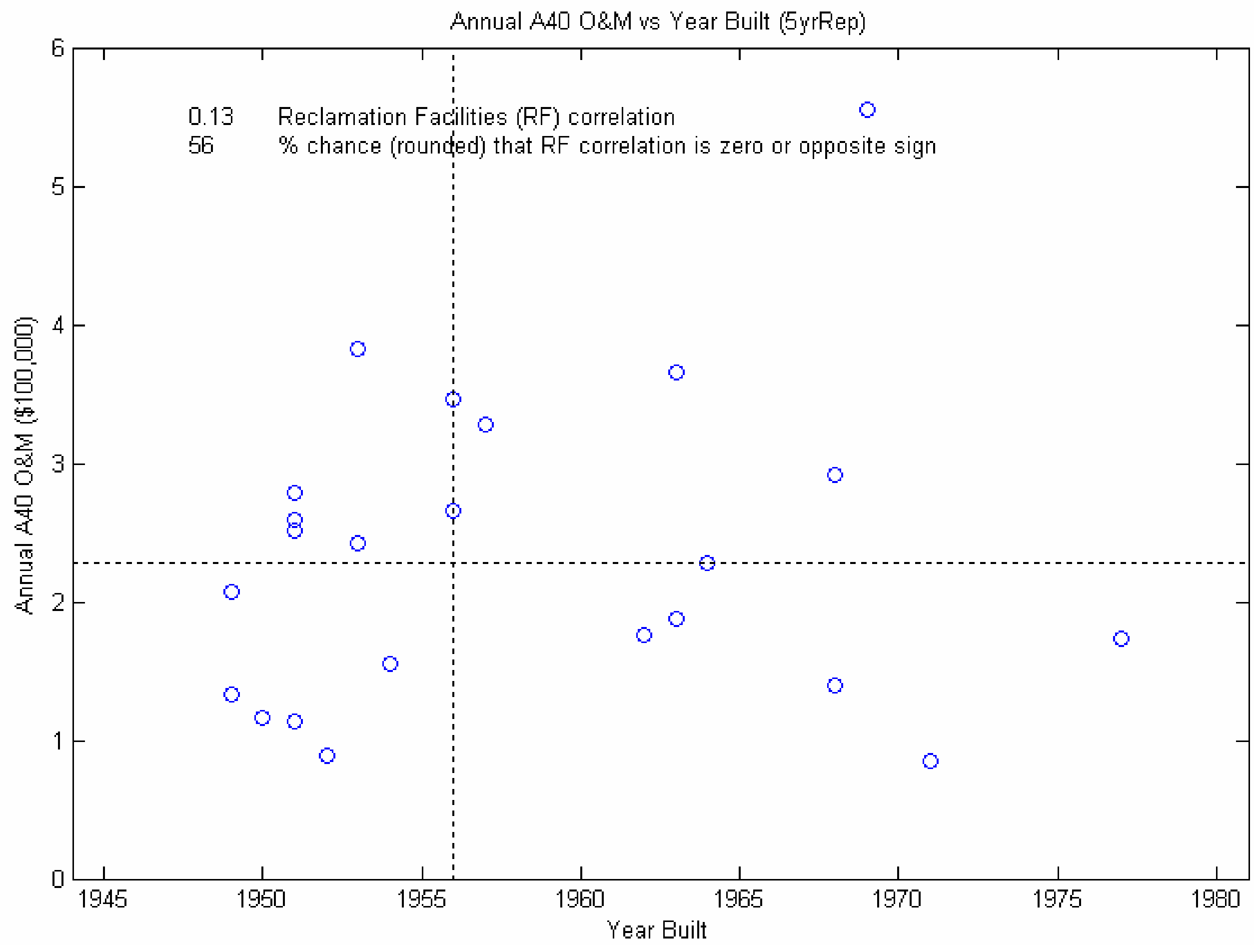

Figure 1 – A40 O&M Cost vs Age

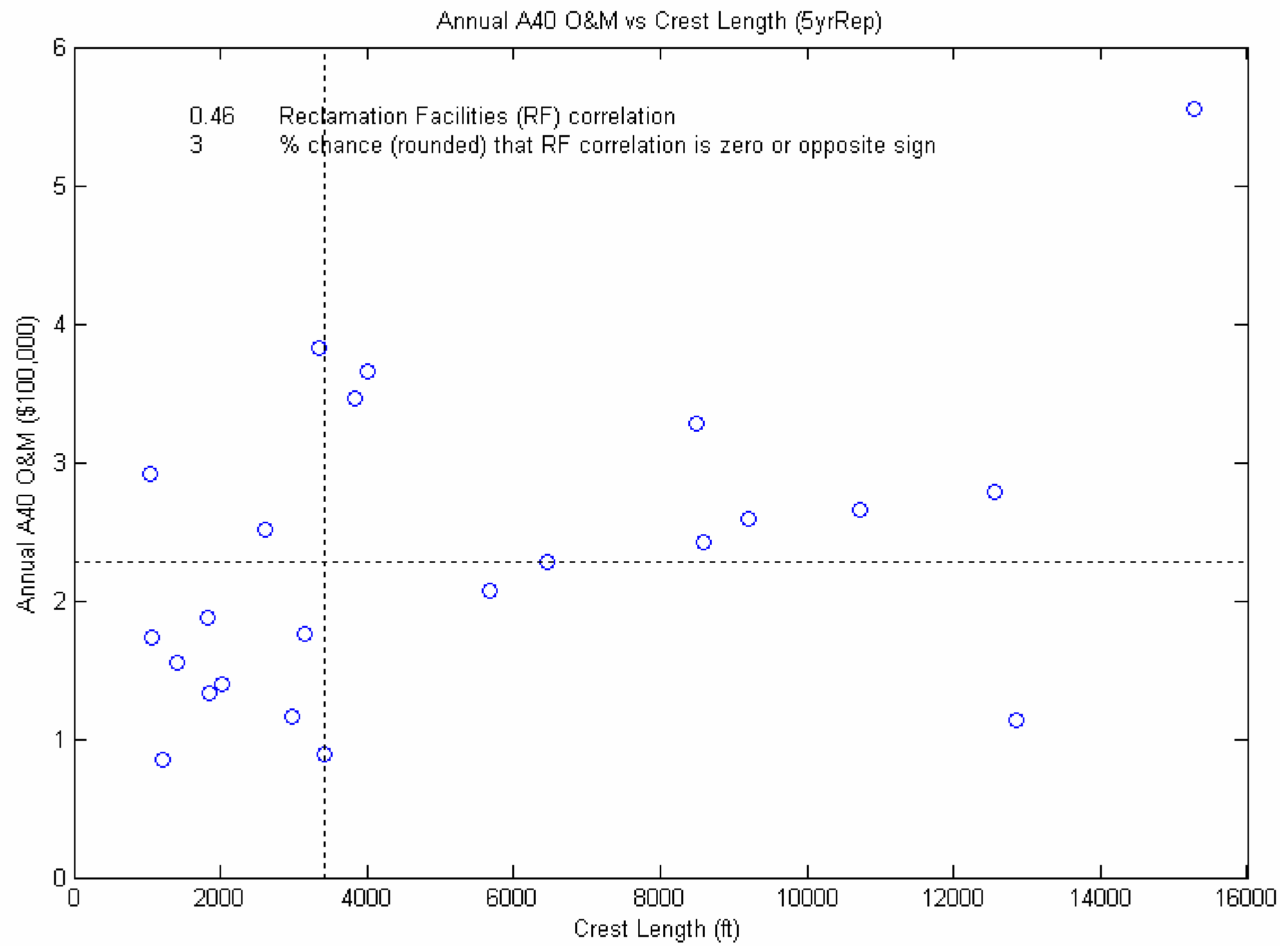

Figure 2 – A40 O&M Costs vs Crest Length

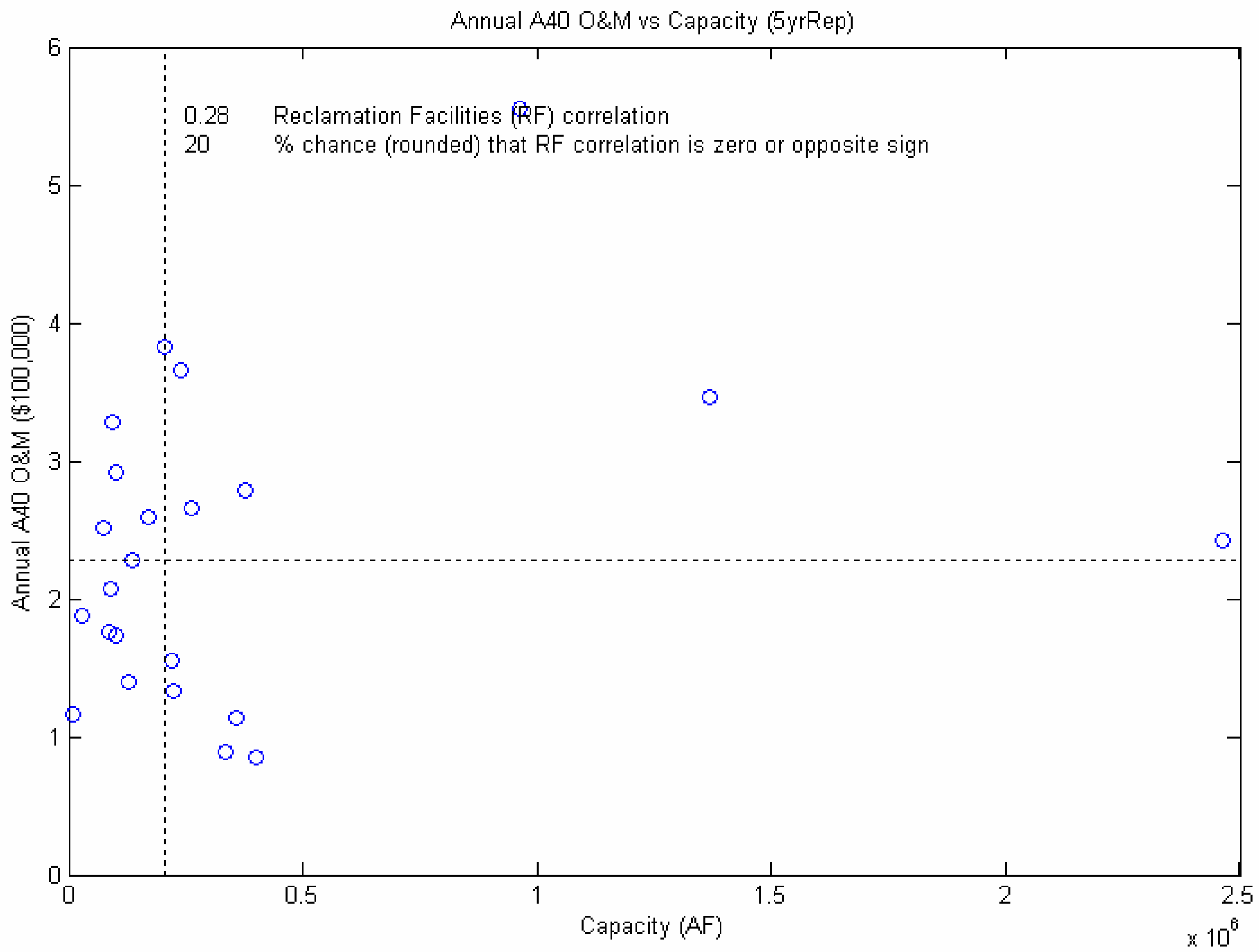

Figure 3 – A40 O&M Costs vs Reservoir Capacity

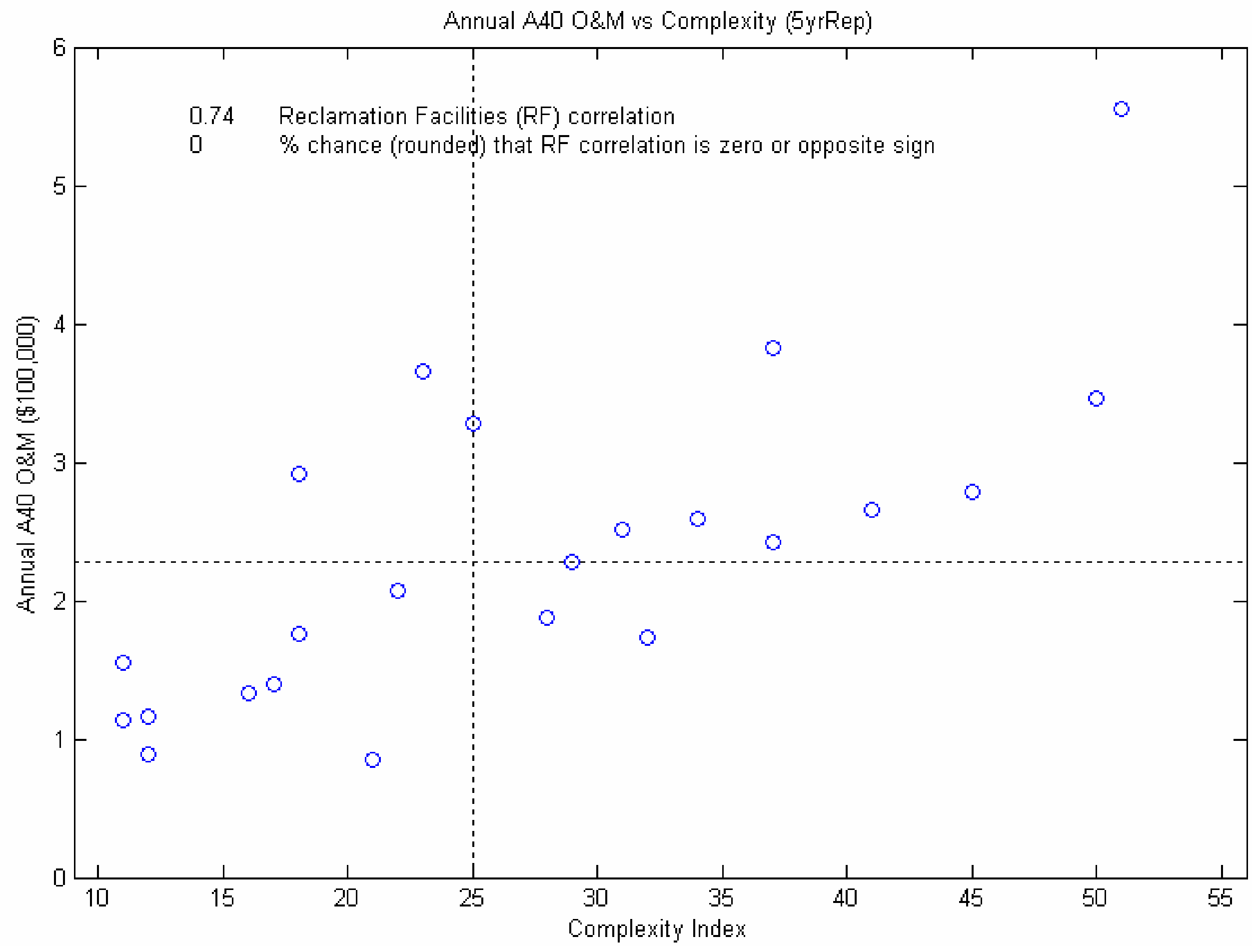

Figure 4 – A40 O&M Costs vs Complexity Index

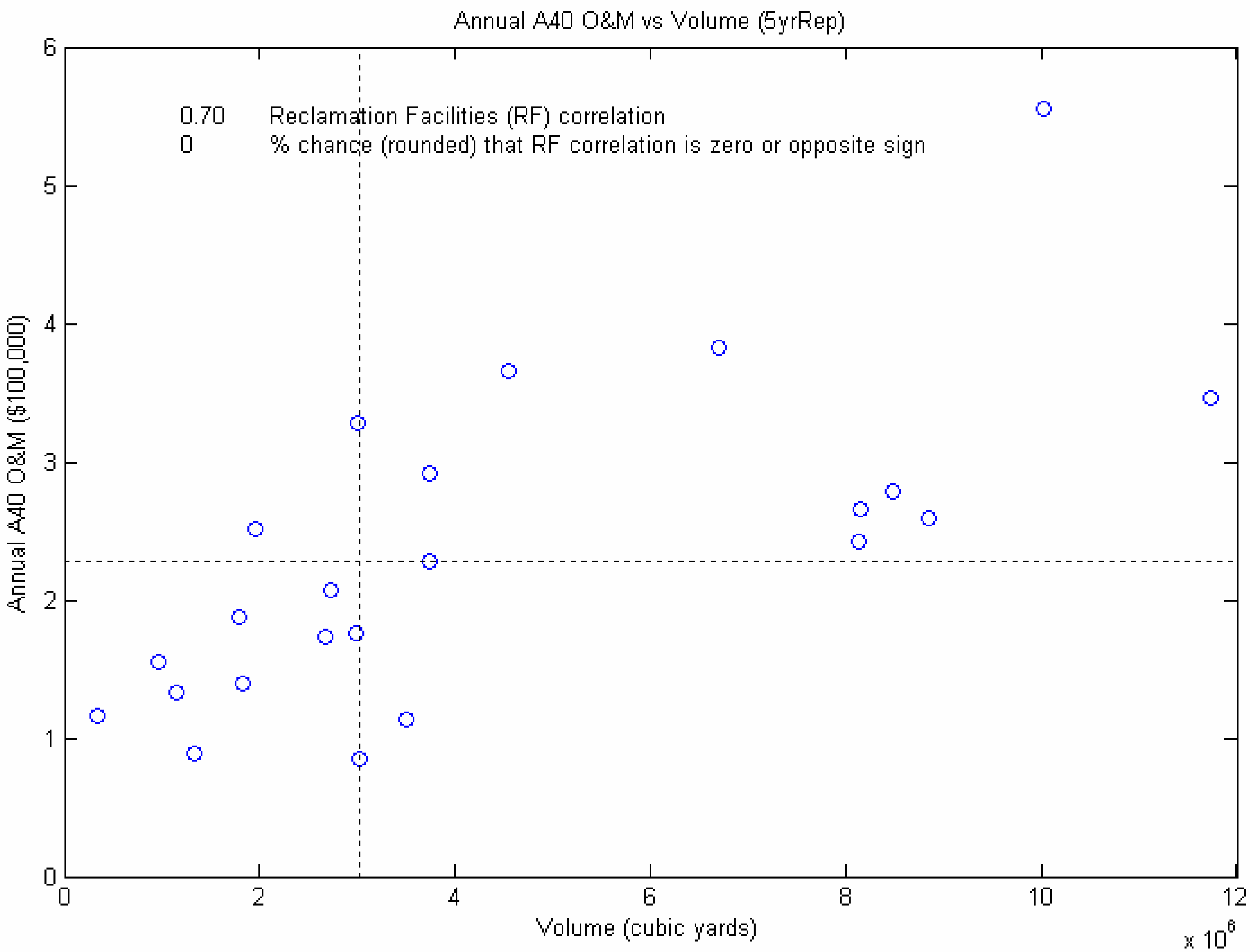

Figure 5 – A40 O&M Cost vs Embankment Volume

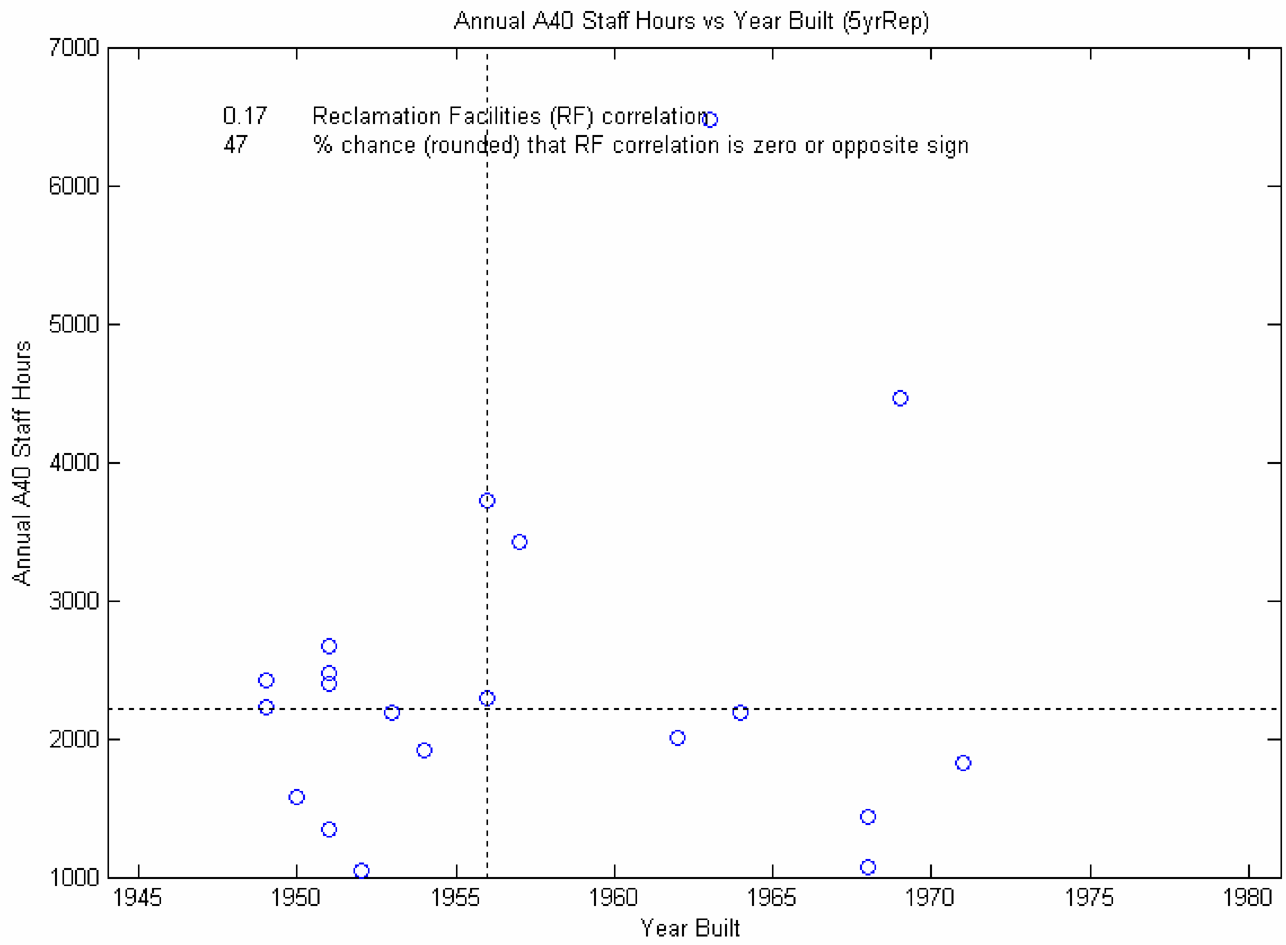

Figure 6 – A40 Staff vs Age

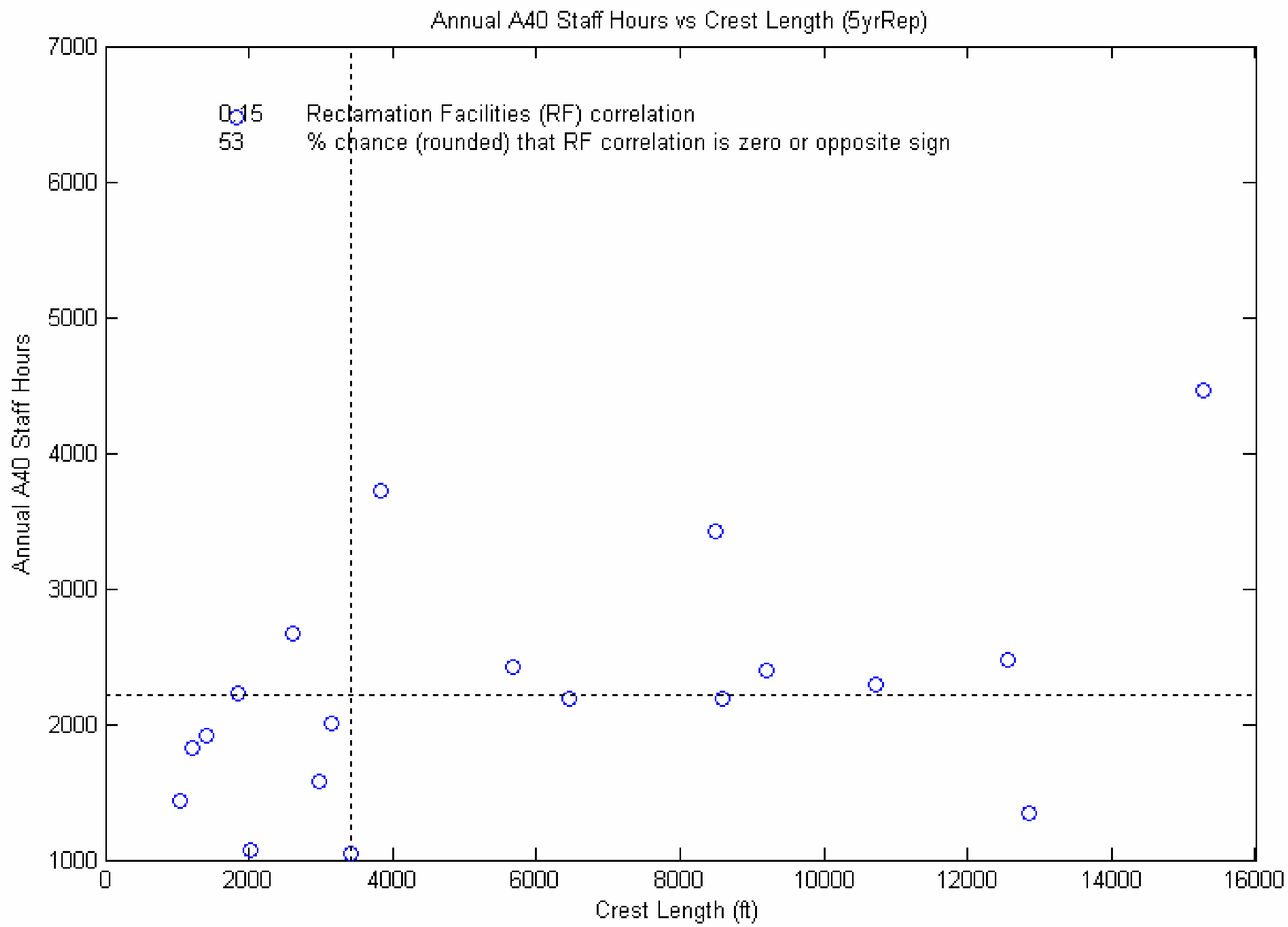

Figure 7 – A40 Staff vs Crest Length

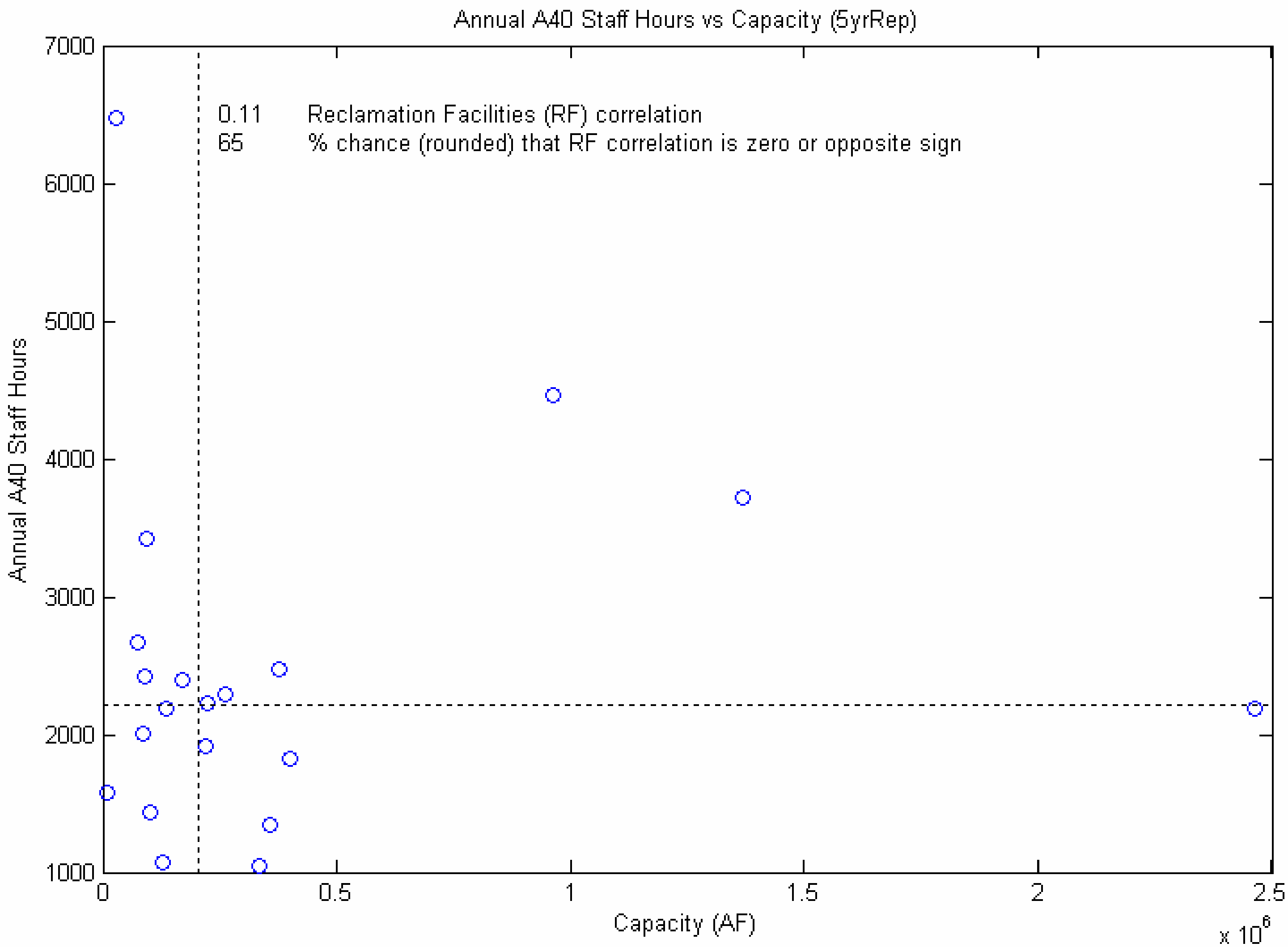

Figure 8 – A40 Staff vs Reservoir Capacity

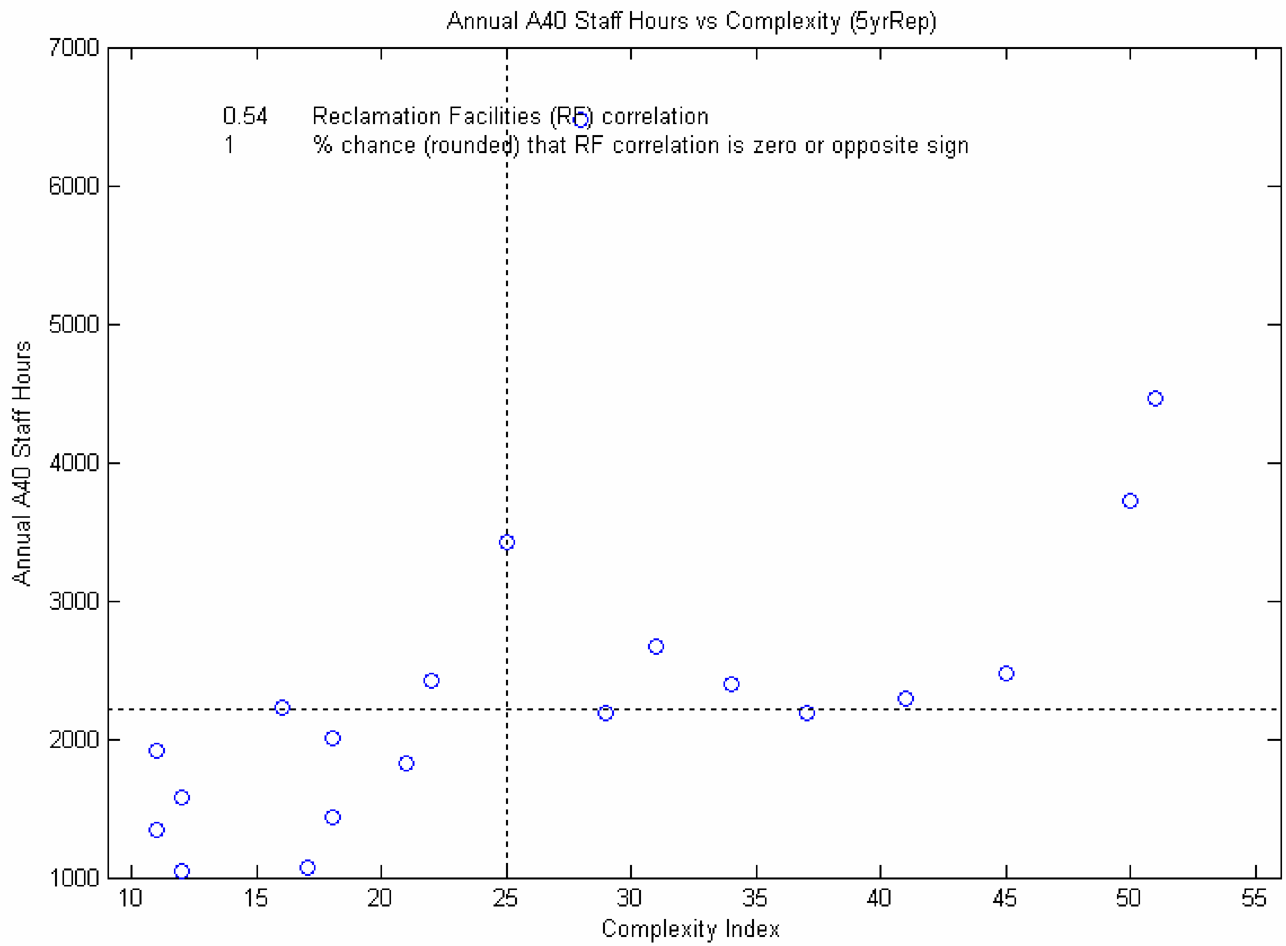

Figure 9 – A40 Staff vs Complexity Index

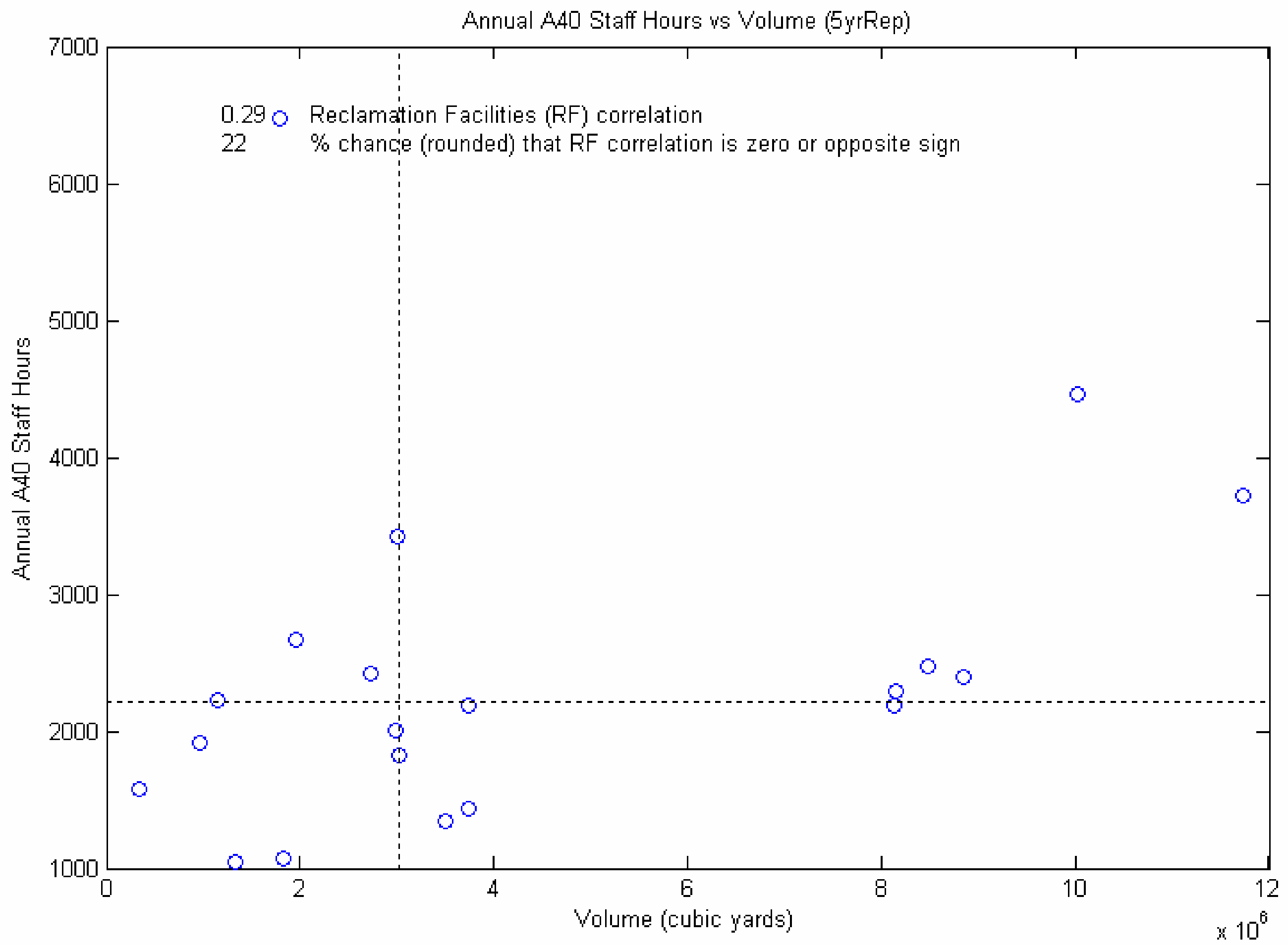

Figure 10 – A40 Staff vs Embankment Volume

Appendix L

Managing for Excellence Team 31 Members, Independent Contractor, Reviewers, and Contributors

Appendix L

Managing for Excellence Team 31 Members, Independent Contractor, Peer Reviewers, and Contributors

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