

Trinity River Restoration Program

Data Management and Utility Plan (DRAFT)

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Version note: this may become the final version, pending discussion by the IDT.

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EXECUTIVE SUMMARY

The ultimate products of the Trinity River Restoration Program (TRRP) will be two-fold: a more functional river, and the information we gather about it. To provide either of these, TRRP needs data use and management to be clear and efficient. This **Data Management and Utility Plan** establishes important procedures for data management and utility both within the TRRP, and outward toward stakeholders and the public. Use of these procedures will improve TRRP adaptive management, the design of restoration projects, the efficacy of scientific projects within TRRP, and communication with stakeholders and the public, thereby improving our efforts to restore the Trinity River.

This plan is the product of TRRP's Data Team, a committee called together to improve efficiency of data use within TRRP, especially with regards to data-use across partner agencies and between the various monitoring projects and assessments conducted for TRRP. **[The plan has been reviewed by TRRP's Interdisciplinary Team (IDT). – Pending]** *The implications of the plan will pervade nearly all aspects of TRRP activities: clarifying data uses, fostering integrative analyses, improving efficiency of adaptive management, and ensuring that current data collections will remain useful for future generations.*

Audience and Scope

This plan describes how government standards and TRRP procedures apply to all TRRP funded activities including work by non-Trinity Management Council (TMC) member collaborators and contractors. Therefore, the audience for this document is **all** staff of agencies with membership on the Trinity Management Council who regularly work with Trinity River Restoration Program (TRRP) data, **and** their supervisors who need to understand data challenges, policies, and procedures for collaborative participation in TRRP. While contractors working with TRRP derived funds may not be considered TRRP Staff, the contracting agency is responsible for application of this plan to contract specifications and deliverables.

Throughout this document “**TRRP Partners**” refers to the federal, state, county, and tribal agencies with voting membership on the TMC and “**TRRP Staff**” refers to all staff members of these TMC-member agencies working with TRRP funding, including staff working part-time with TRRP funding. “**TRRP Project**” refers to specific activities within TRRP, typically with a written investigation plan or proposal, such as the monitoring of out-migrant salmonids, and inclusive of restoration implementation actions.

Conceptual Foundations (Section 1)

Section 1 of this plan provides the conceptual basis of data management and use for TRRP, including a process model and the concept of the Data Package.

The need for efficient data access is outlined, both among TRRP Partners and outwardly to stakeholders and the public. Concepts of data stewardship are presented, including the Data Life Cycle. Data are discussed as products of TRRP activities and the concept of the **Data Package** is defined (Section 1.2.4). Data Packages will become required products of TRRP investigations. *The intent of the Data Package concept is to provide timely submission of data deliverables that will enable multi-purposing of data for integrative assessments and other adaptive management needs, plus provide cohesive management and access both now and in the future.*

The plan then places data management in the context of adaptive management, providing a unified process model that demonstrates the linkage between data and adaptive management (Section 1.3). This model should be useful in the development of future work plans for TRRP projects.

Accessibility of data is covered with respect to preliminary data and sensitive data (Section 1.4). TRRP Data Packages and other information products (e.g. reports) will be maintained in the TRRP Information Repository, including the Online Data Portal (Section 2.4).

Data Responsibilities (Section 2)

Section 2 explores how data concepts apply to TRRP Partners and staff.

The context within which various TRRP Partners work is acknowledged, as well as implications of the Record of Decision (Section 2.2 and Appendix B). Then recommended roles and responsibilities for data management are given (Section 2.3).

Data Standards (Section 3)

Section 3 adds discussion of data standards and the breadth of information that may be considered data.

This plan does not seek to establish standards for particular datasets, but rather conveys relevant U.S. federal government requirements and provides overall guidelines for TRRP. Discussion includes the application of metadata including Federal Geographic Data Committee (FGDC) standards and inclusion of sampling design, collection protocols, and quality assurance / quality control (QA/QC) (Section 3.2). Federal requirements and TRRP guidelines are given for other types of information including reports, presentations, photography, and biological specimens (Section 3.3). Finally, procedures for backing-up and archiving information are covered (Section 3.4).

Appendices

Appendices to the plan include:

- TRRP Data Use Agreement
- An annotated list of laws and policies relevant to TRRP data management
- TRRP generalized information standards
- Standard Operating Procedures
 - Metadata
 - QA/QC
 - Data Sharing
 - Backup and Archive
- A glossary with acronyms

Section 1. CONCEPTUAL FOUNDATIONS

1.1. TRRP's Need for Data Utility

TRRP is a collaborative program among federal, state, county, and tribal agencies that works to restore the Trinity River and its dependant tribal and non-tribal fisheries. As stated by the 1999 Trinity River Flow Evaluation Final Report, page 279, the primary hypothesis that TRRP investigates is “that a combination of managed highflow releases, mechanical riparian berm removal, and gravel augmentation will redirect geomorphic processes so that a more complex channel form will evolve, creating the mosaic of aquatic habitats necessary to enhance freshwater salmonid production.”

The U.S. Department of Interior's (DOI) Record of Decision (ROD) that authorized the TRRP specified a platform of Adaptive Environmental Assessment and Management (AEAM), or *adaptive management* (as it shall be referred to hereafter). Adaptive management is an explicit and analytical process for adjusting management and research decisions to better achieve management objectives; this process should be quantitative wherever feasible. Adaptive management recognizes that knowledge about natural resource systems is uncertain. Therefore, some management actions are best conducted as experiments in a continuing attempt to reduce the risk arising from that uncertainty. The aim of such experimentation is to find a way to achieve the objectives as quickly as possible while avoiding inadvertent mistakes that could lead to unsatisfactory results. The complexity of natural system response to specific management actions requires an effective tool for data sharing and use wherein multiple field investigations may be queried, simultaneously at times, to best assist both scientists in evaluating hypotheses through structured assessments, and managers in developing management actions based on the best available science.

1.1.1. Access Among TRRP Partners

The ROD also established the Trinity Management Council (TMC) to guide the TRRP (implications of the ROD are described more specifically in Section 2.2). TMC member agencies (TRRP Partners) collaboratively conduct TRRP science and restoration activities. TRRP's Integrated Assessment Plan (IAP) points to the need for cross-discipline analyses in support of adaptive management. Together, these authorize and clarify needs for efficient data flow between Partners, in order to feed information into the adaptive management process and to conduct the cross-discipline analyses required for effective adaptive management on the Trinity River.

1.1.2. Access for Stakeholders and the Public

TRRP operates with authority and funding through the U.S. Department of Interior; therefore information produced by TRRP, including empirical data, are an asset of the public. TRRP includes a Federal Advisory Committee for “thoughtful involvement” of stakeholders, which requires efficient access to program informational products. TRRP program managers have supported pro-active release of data and other information to stakeholders and the public, primarily through posting final data to the public website at <http://trrp.net> and the Online Data Portal at <http://odp.trrp.net>. This pro-active release of data follows trends toward government accountability in recent decades and meets the transparency and open government initiatives by the U.S. federal government (see Appendix B), plus it is a benefit to the

public with regard to recreation and safety (e.g. flow release schedules are useful for planning activities such as rafting or fishing).

1.2. Data Stewardship

Management of data involves much more than organizing numbers into tables. Numbers gain meaning through understanding of what they represent, the protocols by which they were collected, the sampling design from which they came, and even the purpose for which they were collected. A full understanding of data from its origin to its disposal, including processes by which it is used, is the basis of *data stewardship*. Application of data stewardship clarifies needs and processes for data management and utility, ultimately leading to better efficiency for the development and use of information.

1.2.1. The Data Life Cycle

A common tool for clarification of data needs and processes is the Data Life Cycle (Figure 1). The Data Life Cycle models the process of planning a data collection effort, conducting the data collection, maintaining and accessing the data for analyses and reports, evaluating the need for further data, and finally depositing the data into an archive for potential future use.

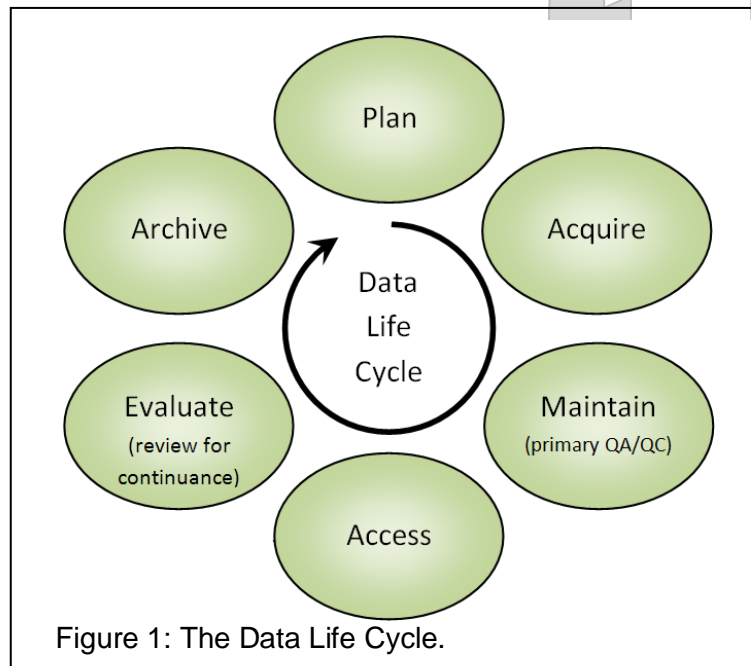


Figure 1: The Data Life Cycle.

Several variations in data life cycles can be found. The life cycle described here was developed by the U.S. Bureau of Land Management, which in following both business needs and legal mandates, has become a leader in the U.S. federal government with respect to data management. An alternative under development by the U.S. Bureau of Reclamation adds stages for analysis and for reporting. These two stages were added to ensure recognition of the role data plays in management decisions. The TRRP *Data Management and Utility Plan* recognizes those as separate activities that are described with the Adaptive Management Cycle, separate from the Data Life Cycle (see Section 1.3).

- **Plan.** Efficient programs do not collect unneeded data and should only acquire and maintain data to meet a program need. Planning for data collection involves identifying the needs for data and

evaluates the purpose, the appropriate level of detail, accuracy, precision, potential collection methodologies, and how the data should be evaluated. Good planning results in a clear understanding of exactly what data are needed and why.

- **Acquire (Collect Data).** Acquisition of data may either involve field work, or data may be obtained from an existing source. The quality and appropriateness of the data must be evaluated by specific acceptance criteria which should be documented in metadata. Data must be complete for the purposes at hand, including accessory data. For example, when data are collected with a GPS, accessory data on accuracy is often necessary, such as Positional Dilution of Precision (PDOP) and the number of satellites used in calculating the position. Good acquisition results in data that are relevant and applicable to the need.
- **Maintain (Manage Data).** Maintenance of data not only involves housing the data in well structured tables or databases, but also includes reviewing and documenting the data. Data review during this step may include conducting QA/QC procedures and administrative review toward future release of the data. Documentation may include completion of metadata to ensure proper interpretation of the data in the future. QA/QC and metadata are, however, not exclusive to this step; best application QA/QC starts with identifying procedures during the planning step, and similarly best development of metadata starts with documenting the planning step. Good data maintenance results in data that are understandable and useable in perpetuity.
- **Access.** Data need to be made efficiently accessible for the purpose or project for which they were collected. Accessibility for alternate projects should also be considered to support integrative science and adaptive management. However, consideration must be given to the appropriate scope of access as some data may be sensitive or proprietary, requiring access limitations. Good data access results in efficient and appropriate use of the data for analyses, reporting, and dissemination of information.
- **Evaluate (assess continued data need).** Evaluation of the data in terms of the data life cycle examines needs for continued acquisition and maintenance of data. Critical questions include: Do the data meet TRRP needs? Is there need for continued data collection? If continued collection is not needed, then should the existing data be maintained, or archived? Good evaluation of data clarifies needs for continued data collection.
- **Archive (long term storage).** Archiving of data in the U.S. federal government refers to submitting the data to the National Archives when no longer in use. However, it is rare in scientific endeavors for data to be no longer in use. For purposes of TRRP functions, this stage should involve a review of how the data have already been used. Metadata may be updated to include citations of reports that used the data. If analyses subsequent to initial data release have revealed issues of data quality or interpretation, these should be noted in the metadata. For TRRP, good archiving of data ensures that it can be accessed, understood, and properly used on a continual basis.

1.2.2. Quality Control and Quality Assurance (QA/QC)

Definitions of quality assurance and quality control vary, but the point is to reduce errors and avoid inappropriate use of data. For this document quality assurance (QA) is defined as the regularly applied

processes, for preventing the introduction of erroneous information to a dataset. Common QA processes may include double entry, data field limiters or validation scripts, and many other preventative techniques. Quality control (QC) is defined as a post-entry review, correction (when possible), and evaluation of data to understand accuracy and precision; QC may include some degree of preliminary analysis. Together, QA/QC maximize and document data quality. While many QA/QC procedures are conducted during the maintenance step of the data life cycle, QA/QC should be considered in all steps from planning for QA/QC procedures to ensuring their documentation when archiving data. Good QA/QC helps ensure that data may be properly applied and interpreted.

1.2.3. Metadata Development in the Data Life Cycle

The bulk of metadata development should occur within the *Maintain* step of the Data Life Cycle, to ensure data are properly documented as they enter the Access step. However, metadata are best developed throughout the cycle. Metadata includes the purpose of data collection, collection protocols, sampling designs, and assumptions which are addressed within the *Plan* and *Acquire* steps. Metadata also specifies accessibility which is derived from the *Access* and *Archive* steps. Metadata content and standards are later discussed in Section 3.2. Good metadata forms citable, rigorous documentation for future use and interpretation of data.

1.2.4. Data Package Concept

An organized dataset with proper metadata documentation is a product of the data life cycle: the Data Package.

A Data Package:

- Is an organized set of data;
- Has undergone QA/QC procedures;
- Has metadata documentation, including methods, sampling design, and attribute or field definitions (such metadata can provide the foundation for the 'methods' sections of future reports); and
- Is considered an entity of its own, citable in scientific and other documents.

Recognizing Data Packages as products of our work has several advantages:

- Data exist independent of project reports, improving use of the data for multiple purposes such as alternate projects and integrative analyses;
- Data Packages should precede project analysis and reporting, resulting in earlier availability of data for efficient adaptive management;
- Metadata can provide a more detailed documentation of a dataset than a project report typically does, and therefore are more appropriate for citations of datasets; and
- Data Packages form transportable products for convenient management and coordination among TRRP Partners and Staff.

The staff responsible for the creation of a Data Package is expected to provide the appropriate level of organization or refinement for use by others both within TRRP and for future researchers. Review will be

provided by TRRP's Science Coordinator and Data Steward. In general, detailed data is preferred over summarized data as it will provide more opportunity for statistical power in future analyses. Data Packages already present in the Online Data Portal (Section 1.5) may be used as examples.

Versioning of Data Packages may be needed either for datasets that are continually updated, or to acknowledge further understanding of datasets and revisions of datasets that may come as data are further analyzed.

1.3. Data in Adaptive Management

The ROD established TRRP as an adaptive management program. Adaptive management is a structured process for scientific testing of management actions and changing those actions based on the outcomes compared with anticipated and desired results. For TRRP, this means that field investigations aid in the assessment of sub-system response to management actions and integrative analyses aid in the assessment of systemic responses. These assessments then guide future management actions.

The basic Adaptive Management Cycle is similar to the Data Life Cycle, though it can also be envisioned as a multi-phase process as in the DOI Technical Guide to Adaptive Management. Further description is given in TRRP's Integrated Assessment Plan (IAP) and is anticipated in a future Adaptive Management Plan; we will only consider the basic Adaptive Management Cycle here.

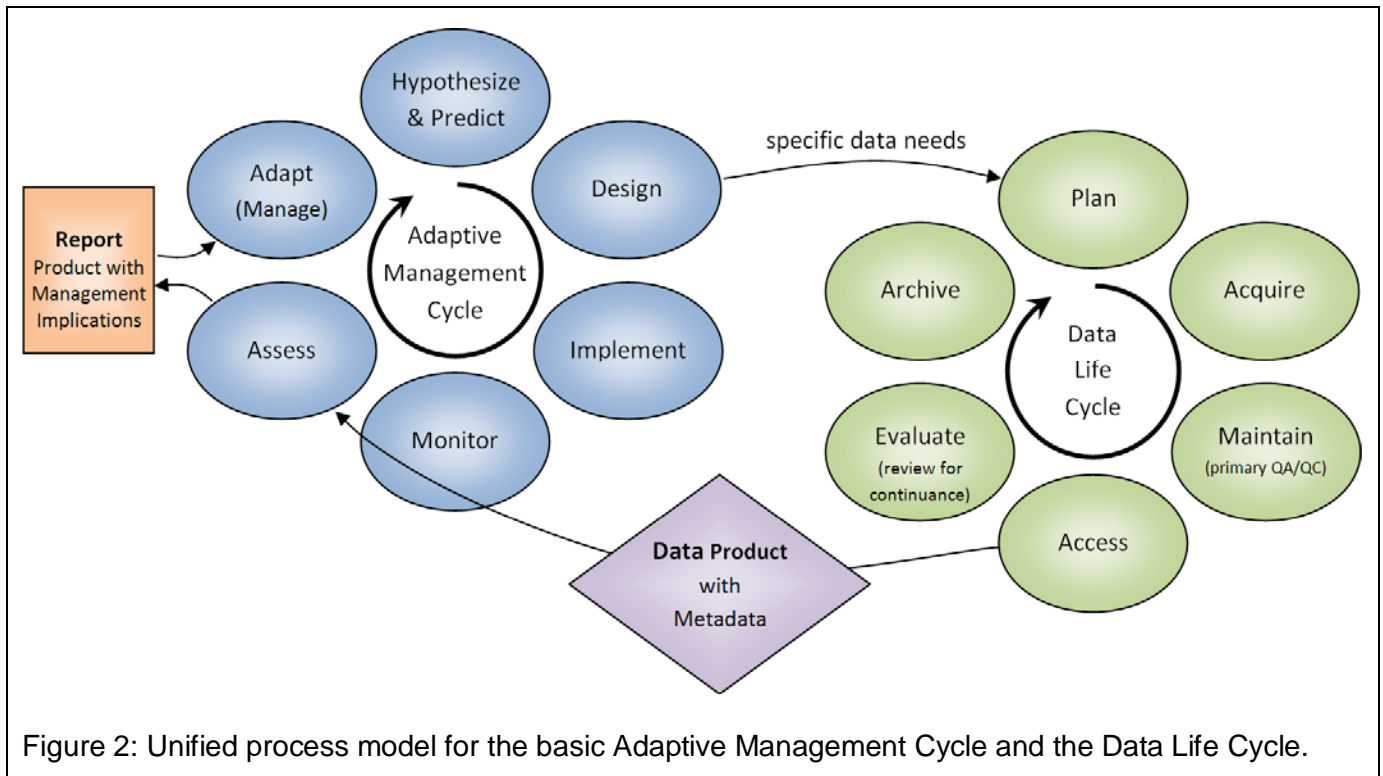
Interactions can be drawn between the two cycles (Figure 2). Within adaptive management, specific hypotheses and predictions lead to the design of assessments (step: Design). The design of an assessment may require one or more datasets. Good design of an assessment identifies *specific data needs* that initiate the Data Life Cycle with clear purpose and scope. The 'Implementation' stage within the Adaptive Management Cycle ideally occurs independently of the Data Life Cycle, thereby keeping data collection objective, relative to implementation of restoration actions. As the Data Life Cycle continues to the Access step, the Data Package is produced. This Data Package re-enters the Adaptive Management Cycle at the Monitor step, ready for subsequent analysis.

Applying this process model to TRRP functions, Program management including the TRRP Science Coordinator and the Interdisciplinary Team drive the adaptive management cycle, identifying questions, issues, and hypotheses for assessment. These assessments, or "investigations", are prioritized and developed into the TRRP work plan (see Section 1.3.2). Each investigation is then designed by one or more investigators who identify the specific data needs (sets of required data) that drive the Data Life Cycle.

This process model is intended as a simple conceptual model; in reality a single assessment may involve multiple Data Packages or even multiple analyses and reports. While this process model has been primarily discussed at the scale of a TRRP Investigation Plan, it is also scalable to multi-disciplinary integrative assessments or even to programmatic-level evaluation of success.

1.3.1. Products of Adaptive Management: Data and Reports

The unified process model for adaptive management and the Data Life Cycle (Figure 2) includes two distinct kinds of products: Data Packages and reports.



Data Packages are the output of the Data Life Cycle and an input to the Adaptive Management Cycle. Discussion of Data Packages as stand-alone, final products was detailed in 1.2.4.

Reports are an output of the Adaptive Management Cycle (along with management changes). Reports will frequently include methodology sections that may partially overlap metadata within Data Packages. However, reports are independent products that typically do not address protocols, QA/QC, or other data matters at the same level of detail as will be included in proper metadata. Instead, reports should cite Data Packages and their included metadata.

Identifying reports as a product of adaptive management rather than a product of data collection emphasizes the analyses and conclusions that support adaptive management. Report discussions and conclusions should explicitly include the relevant adaptive management questions, hypotheses, and conclusions. In some scientific literature, conclusions with particular relevance to management actions have been called out in a separate section of the paper with a heading such as 'Management Implications'.

1.3.2. Investigation Plans and the TRRP Work Plan

The TRRP develops an annual programmatic work plan composed of numerous Investigation Plans for the purpose of planning budgets and scheduling staff. The unified process model for adaptive management, data, and their products (Figure 2) should guide future Investigation Plan development, including the timely release of Data Packages. A database under development for establishing and tracking Investigation Plans will likely follow the figure closely.

Some Investigations use multiple sets of data that may be best delivered as multiple Data Packages. Investigations in-which some data require lengthy review for approval, should also consider delivery as multiple Data Packages to maximize efficiency. Alternatively, Data Packages with potentially sensitive data may be completed and distributed within TRRP, reserving public-release until properly approved. Investigations that include long-term monitoring should consider versioning to regularly provide updated Data Packages, perhaps on an annual basis.

1.4. Data Accessibility

Data accessibility is important both to meet obligations to stakeholders and the public, and to achieve efficient adaptive management within TRRP.

1.4.1. Raw and Preliminary Data

While finalized Data Packages may be preferable for restoration designs or other purposes, data in a preliminary state (or even as raw data) may often be useful. TRRP requires an effective procedure for sharing preliminary data.

This *Data Management and Utility Plan* recognizes three stages of data development (Figure 3). While a Final Data Package forms a complete, quality-controlled product with documentation to help with use, the two prior stages are incomplete and may require (a) that the recipient data user have additional special knowledge of the data and (b) that certain caveats be included with interpretation or even that certain interpretations are inappropriate.

In some cases, preliminary data have traditionally been shared readily within TRRP or even posted publicly. Data from stream gages funded by TRRP are a good example: these data are collected by the USGS remotely and automatically posted to publicly-accessible databases on the internet, flagged as 'preliminary' data. Additionally, the California Department of Fish and Game releases preliminary weir count data and the U.S. Fish and Wildlife Service provides preliminary information from redd and carcass surveys. For many datasets, however, data provided to the public should be quality controlled and reviewed for release as final data. Public sharing of non-final data is encouraged by this *Data Management and Utility Plan* as long as the TMC, Executive Director, and other administrators of TRRP are agreeable, and the data are clearly marked as to their preliminary status.

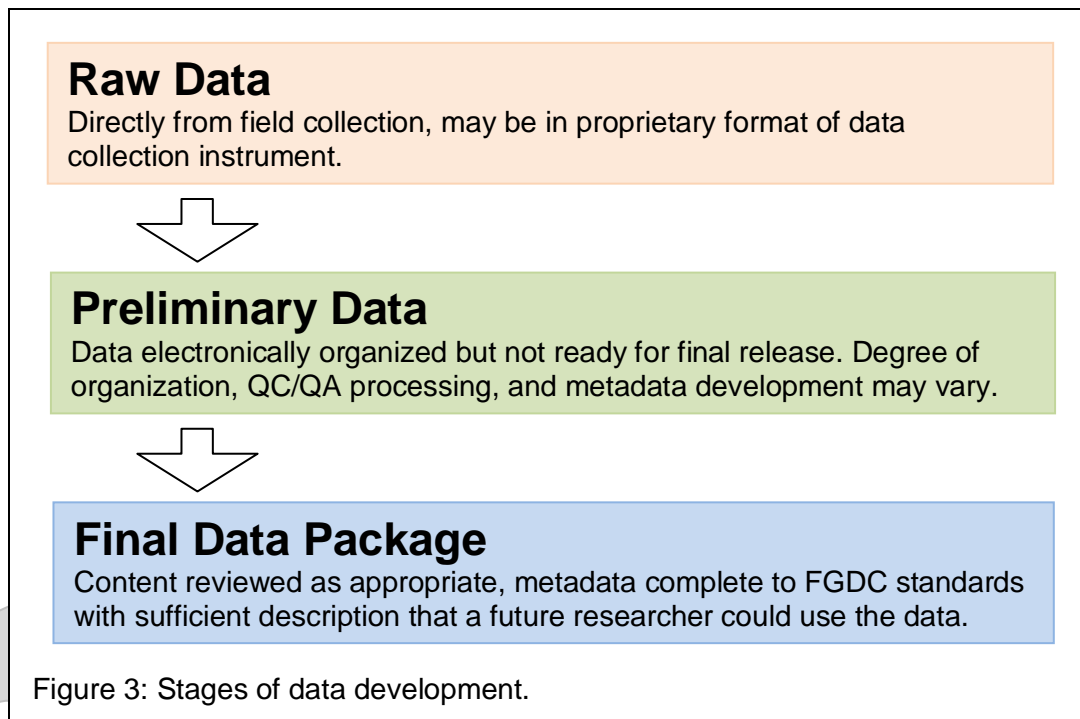
This plan also recognizes that there may be good reasons to be cautious with sharing preliminary data due to quality, interpretation, and other issues. The TRRP Staff responsible for a data collection (typically a project's *principal investigator*, or PI) have the option to invoke the TRRP Data Use Agreement (Appendix A). This agreement essentially provides a 'bill of rights' for both the data provider and the data recipient, outlining several professional courtesies and directing participants to the TRRP dispute resolution process if problems arise.

1.4.2. Sensitive Data

If public release of data places resources at-risk, then the data may be considered sensitive. These data will be retained within TRRP and DOI unless formally approval within DOI for posting publicly (e.g. archeological data or certain data on threatened or endangered species). Data products or other

information that are finalized but not approved for public use will still be accessible upon request within the TRRP Partnership.

Data or other information that reveals proprietary information may also be considered sensitive. One example is a report on topographic data that contains methodological information from the contractor that could be considered a trade secret. The contractor provided two versions of the report, one for TRRP-use only and an abbreviated version for public access.



The entity responsible for creating the data, whether contractor, partner agency, or principal investigator, is responsible for deciding if their Data Packages or reports contain sensitive information. Sensitivity needs to be clearly stated on title pages, in abstracts, and in metadata and should be verbally communicated to the TRRP Data Steward when products are transmitted to the TRRP Information Repository.

1.4.3. Final Public Data

To meet TRRP obligations to partners, stakeholders, and the public, and to follow principles of open government (see Appendix B), finalized Data Packages, reports, and other information not regarded as sensitive will be made publicly accessible in a timely manner through the Online Data Portal (ODP), a component of the TRRP Information Repository (Section 1.5). Safeguards against inappropriate release of data are provided through QA/QC, which may include preliminary analysis, combined with the responsibilities recommended in Section 2, plus approval requirements for sensitive data.

It is to the advantage of principal investigators to complete Data Packages quickly, both to ensure data quality for their Project analyses, and to reduce requests for preliminary data from other TRRP Staff.

1.4.4. Consolidated Data Packages

There are a number of datasets that are consolidated from data collections involving multiple TRRP Partners or multiple investigations. Some of these are time-series datasets, such as water temperature; others are consolidations of data from irregular points in time such as topographic cross sections and water surface elevations.

Careful coordination and version control is required. Each consolidated dataset must have an assigned coordinator. Assignment of coordinators will typically be made within disciplinary work groups. Specific responsibilities are assigned to Consolidated Dataset Coordinators (see Section 2.3).

The ODP will provide a convenient location for distributing the most recent version of a dataset; Data Packages may be replaced as newer versions become available. Older versions are not retained with replacement in the ODP, but older versions will be retained in the TRRP Archive.

1.5. TRRP Information Repository

TRRP Partners and Staff need access to information products to conduct work and for administrative purposes. Conducting TRRP work includes use of science-based adaptive management to address the questions of how to restore the river and for designing restoration construction projects. Administrative purposes include communication of TRRP activities to the public, stakeholders, and government officials. TRRP also has a fundamental responsibility to the public to show the products of its efforts, including Data Packages and reports. An organized information repository will benefit both restoration activities of TRRP and uphold responsibility to the public.

The repository will be for final information. The repository will have two components: (1) an easily accessed portal for cross-program, stakeholder, and public use, and (2) an archive with storage for backup of the portal, contract deliverables (as-delivered), and non-public information.

TRRP also has alternate venues for development of draft documents and datasets, including a SharePoint site hosted by DOI. It is important to segregate draft information from the TRRP Information Repository to ensure that non-public or preliminary information does not accidentally get placed in the repository and become interpreted as final information. Furthermore, these venues are inappropriate for use as part of the repository as much of their content is transitory and the risk of accidental deletion is high.

1.5.1. The TRRP Online Data Portal

The [Online Data Portal](#) is a web-based project under development that will provide convenient Program-wide access to TRRP information products. ODP development is guided by three driving purposes:

1. **Repository.** The ODP will be a flexible information repository with storage and search capabilities for Data Packages, reports, meeting minutes, and other information.
2. **Inter-agency access.** The ODP will enable access by all TRRP agencies and will become an enterprise-level information resource.

3. **Informing public and stakeholders.** The ODP (in conjunction with the trrp.net website) will provide an access point for stakeholders and the public to obtain information about TRRP and its activities.

As the ODP becomes more complete, all TRRP products (including both Data Packages and reports) will be deposited in the ODP unless there is a specific constraint against public release.

Some Partner agencies track the use of information they provide in order to demonstrate the value of their work. Capabilities for tracking data access in the ODP are scheduled for development in the near future.

1.5.2. TRRP Local Network Archive

The TRRP will maintain copies of all information products on a local file server in the TRRP Weaverville office to (a) insure against possible corruption or loss of data on the ODP, (b) maintain version control and history, and (c) store and maintain information that may not be publicly released. These archives are to include information as delivered under contracts and agreements, as well as final data products as used by TRRP (e.g. final aerial photography mosaics will be maintained both on the ODP and in the local archive, while the raw aerial photograph images will be maintained only in the local archive). Steps will be taken against accidental corruption or deletion of archived materials including restricted write-access and file backup with off-site storage (Section 3.4).

Section 2. DATA RESPONSIBILITIES FOR TRRP

2.1. Agency Contexts

A solid understanding of laws, policies, and other formal guidance that TRRP Partners work within provides a foundation upon which TRRP procedures may be enacted. Those of particular importance to the context that our agencies work within are briefly described in Appendix B, however the list is not exhaustive; omission does not imply that a law, policy, or other guidance does not apply.

2.2. The Record of Decision

By establishing TRRP as an adaptive management program guided by the Trinity Management Council, the U.S. Department of Interior's Record of Decision (ROD) supports a significant degree of collaboration and sharing of information products, including preliminary data, among TMC member agencies and supports providing finalized information products outwardly to stakeholders. Specifically, the ROD:

- **Established TRRP as an adaptive management program.** As discussed in Section 1, efficient adaptive management requires efficient access to data. Therefore, all agencies participating in TRRP adaptive management should work collaboratively on TRRP data and information gathering projects.
- **Established U.S. Department of Interior leadership.** The ROD is a U.S. Department of Interior (DOI) document and “the Secretary retains ultimate authority” over the program. The ROD delegates the Secretary’s authority to USBR and USFWS “as the Secretary’s representatives on the Trinity Management Council.” With respect to data management, this requires collaboration between USBR and USFWS in oversight to ensure that federal data requirements are met.
- **Established the Trinity Management Council.** The ROD established the Trinity Management Council (TMC) to guide implementation of management actions and adaptive management by TRRP. This involvement of the TMC in implementation and adaptive management suggests that the high degree of collaboration on TRRP data and information gathering projects should extend beyond DOI to all TMC member agencies.
- **Established the Trinity Adaptive Management Working Group.** The ROD established the Trinity Adaptive Management Working Group (TAMWG) by reference to page C-23 of the Final Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report. The TAMWG is a stakeholder group with the purpose of “thoughtful involvement” in the program, particularly with respect to adaptive management, and provides an opportunity for stakeholder input to the TMC. The TAMWG is formally chartered under the Federal Advisory Committee Act. To fulfill TAMWG involvement in TRRP, timely access to final data products and reports is necessary. Thus far TAMWG has not participated in development of products (project field work, analysis, report writing), so access to preliminary or draft information may best be handled on an as-needed basis.

2.3. Data Management Roles and Responsibilities

To achieve good management and use of data, TRRP Staff require an understanding of their roles and responsibilities. The roles and responsibilities discussed here are recommendations by the TRRP Data Team to Program managers and have broad support among TRRP Staff. Some are universal across TRRP Staff:

- follow procedures established in this *Data Management and Utility Plan* including any applications of the Data Use Agreement;
- provide a clear statement of intended use when requesting data;
- provide appropriate acknowledgement of data sources and data collectors;
- provide timely responses to questions about data, requests for data, and requests for reviews;
- read and understand metadata for Data Packages acquired from others;
- retain preliminary and non-public data within the Program (unless both the Principal Investigator and their managers approve public release of preliminary data);
- ensure appropriate approval for release of final data and information products including procedures or protocols developed by the TRRP Interdisciplinary Team or TRRP Science Coordinator; and
- ensure appropriate reviews for data interpretations and conclusions including review by the principal investigator responsible for collecting the data and point of contact for Data Packages.

2.3.1. U.S. Department of Interior

The DOI agencies, USBR and USFWS, are responsible for reviewing Data Packages created with funds from their agencies to ensure that they meet all requirements for federally funded data including DOI and FGDC standards (see Sections 3.1 and 3.2, plus Appendix B). For contracts or formal agreements, this responsibility will normally reside with the Contracting Office Representative (COR) and technical staff overseeing the contract. For TRRP Projects not performed under a formal contract or agreement, the principal investigator for the Project has this responsibility. TRRP Projects performed by non-DOI Partners with TRRP funding are presumably performed within some formalized contract or agreement; should a Project be performed otherwise, then USFWS will be responsible for Projects of a biological nature, while USBR will be responsible for Projects of a physical nature.

2.3.2. TRRP Partners contracting work outward

Any TRRP Partner that contracts work with TRRP funds is expected to ensure that the procedures of this *Data Management and Utility Plan* are followed by the contractor, including (but not limited to) legal and policy limitations on data distribution, preventing release of preliminary or otherwise non-public TRRP data, and application of Data Use Agreements. Contracting agencies are expected to provide contract deliverables to the TRRP Information Repository as products of TRRP activities.

2.3.3. Contractors

Contractors and their staff should be subject to all requirements of this plan with regards to TRRP activities, including preventing release of preliminary or otherwise non-public TRRP data and following

stipulations of any Data Sharing Agreements established for data furnished to the contractor. Contractors should be aware that the information products that they deliver are considered TRRP products and will typically be made available to partners, stakeholders, and the public according to this *Data Management and Utility Plan*.

2.3.4. Project Principal Investigator

The principal investigator (PI) of a TRRP Project is responsible for ensuring that Data Packages and other information products are complete with regards to data standards (see Section 3) and are released within a reasonable time period, preferably prior to the Project's analysis phase. Release includes submitting copies of all Data Packages and reports to the TRRP Data Steward, who will review the Data Package and may request changes to meet the intent of Data Packages as defined in Section 1.2.4. Future work planning of Projects will account for completion of Data Packages. If the PI receives a request for preliminary or non-public data, then the PI additionally takes on the role of Data Sharing Provider (below); the PI may delegate the role of Data Sharing Provider to a data manager or point of contact within the Project. The PI of a TRRP project is responsible to ensure that information products are released appropriately according to laws, policies, and TRRP business needs, and that sensitivity of any information is clearly indicated. For public release of final products, this may include an appropriate-level review.

2.3.5. Consolidated Dataset Coordinator

Consolidated dataset coordinators are responsible for maintaining a particular dataset, including the incorporation of new data from across the TRRP Partnership, review of QA/QC, development of metadata, version control of products; and appropriate distribution of the data. Version control includes submitting major versions to the TRRP Data Steward for storage in the TRRP repository and ensuring that end-users of the dataset are (1) made aware of new versions; (2) have access to the newest version, and (3) are discouraged from creating their own versions that may complicate future data merging or confuse analyses of the data (this may require adding customization of data formats for end-user requests).

2.3.6. Data Sharing Provider

A Data Sharing Provider is a principal investigator of a TRRP Project/Investigation (or their designee) who provides preliminary or non-public data to a TRRP Partner, Staff, or other person outside of their Project for TRRP business. The provider is responsible to ensure data are not shared outside of legal or policy limits. When presented with a request for preliminary or non-public data, the provider is responsible for responding in a reasonable length of time, and for invoking a Data Use Agreement if desired (Appendix A). If a Data Use Agreement is invoked, then the data provider is responsible for upholding the agreement. Guidelines on data sharing are included in Appendix D.

2.3.7. Data Sharing Recipient

A Data Sharing Recipient is a TRRP Partner, Staff, or other person who receives data from another TRRP project for TRRP business. Recipients are responsible to use the data in a professional manner, following any reasonable stipulations made by the data provider, and avoiding unnecessary questions to the provider. If the data provider invokes the Data Use Agreement, then the recipient is to complete the

agreement form and abide by all aspects of the agreement. Guidelines on data sharing are included in Appendix D.

2.3.8. TRRP Data Steward

The TRRP Data Steward coordinates data management and use by the Program, and manages the TRRP Information Repositories. More specifically:

- Manages final information products in TRRP Information Repository, including posting of Data Packages, reports, and other products to the ODP, plus management of products, contract deliverables, and non-public information in the TRRP Weaverville office archives;
- Assists TRRP Staff with data coordination, management, or other needs within reason (note that the Data Steward is not expected to be a data manager *within* TRRP Projects);
- Advises TRRP Staff on matters of data policy or law, or assists Staff with finding the appropriate advisor for an issue;
- Tracks the application of Data Use Agreements and provides advice on their use;
- Develops and maintains a data coordination database, to be coupled with TRRP's work planning process, that will indicate the who, what, where, and when of data collection activities across the TRRP Partnership;
- For consolidated Data Packages lacking an assigned coordinator, the TRRP Data Steward provides basic coordination of the Data Package within reason *and as time allows* (however, TRRP work groups are expected to assign an appropriate coordinator); and
- As time allows, the TRRP Data Steward will add non-TRRP information products about the Trinity River, and TRRP products produced prior to this plan, to the TRRP Information Repository (or lead/coordinate efforts to develop such information) including the development of Data Packages with metadata.

2.3.9. TRRP Science Coordinator

The Science Coordinator is responsible for encouraging realistic work planning with timely release of products and responses to requests for preliminary or non-public data. The Science Coordinator may advise on the application of Data Use Agreements and is responsible for implementing the dispute resolution process, should the need arise.

2.3.10. TRRP Managers

TRRP managers, including the Executive Director, TMC representatives, and supervisory staff of TRRP Partners, should uphold the processes and responsibilities in this *Data Management and Utility Plan* including adherence to the plan by their staff.

Section 3. TRRP STANDARDS

Use of data standards increases the value of data by improving consistency of data over time, compatibility between projects, and reliability of use through documentation. This section outlines standards for TRRP data and information products. Some standards external to TRRP may apply (e.g. FGDC metadata standards). External standards are acknowledged here where convenient, but primary focus is given to TRRP needs for standards where external standards do not exist.

3.1. Data Standards

Broad standards for data and reports are provided in Appendix C, written such that they may be used for contracting documents. This establishes a preferred set of file formats, geospatial data projections, and report contents. TRRP Projects conducted outside of contracting and agreement mechanisms will also follow these standards.

At present, TRRP has no formal data standards for specific data products; TRRP's discipline-specific work groups and Data Team are encouraged to formalize standards in the future. However, there have been a number of efforts that provide some degree of informal standards. For example:

- **Consolidated Data Packages.** Simply by consolidating data from multiple sources into a single Data Package, such as is done with the Cross Sections Database, data must be standardized. Future data collections are then encouraged to follow the standard as well.
- **Salmonid Outmigration.** TRRP's salmonid outmigration project recently underwent an external review. Recommendations made by the review and now in use by the outmigration project effectively constitute a set of data standards.

The U.S. Department of Interior has issued a document on data standardization procedures (briefly described in Appendix B). This addresses how standards will be developed within DOI, but focuses on high priority datasets of national or regional scope; it is unlikely that many datasets in use by TRRP will be included in this standardization process. However, since TRRP operates under authority of DOI, the concepts of the DOI document will be followed when possible.

In lieu of formal data standards, the DOI agencies and the PIs of TRRP Projects collecting data are responsible for the data and other information products. Investigation PIs are encouraged to be as explicit as possible on data standards they have developed in writing investigation plans. Any data standards implemented must be documented in metadata included with Data Packages (see Section 3.2). DOI agencies will review products to ensure they meet U.S. Federal requirements.

3.2. Accessory Information (Metadata)

Often described as “data about data”, the purpose of metadata is to provide ample documentation so that data use and interpretation is not compromised by staff turnover or project hand-offs, even if there is a substantial temporal gap. Good metadata provides assurance that the public investment in a dataset is secure for use by future generations.

To ensure future usability, metadata is required for the completion of Data Packages for TRRP repository. End users of the ODP searching for data will actually be searching metadata files attached to the Data Packages. TRRP Staff will be required to submit metadata in XML format files that are not imbedded in databases (see Appendix D, Metadata). Metadata created with the tools available in ArcMap are natively stored in XML, however some data formats such as File Geodatabases store the XML internally such that XML metadata files must be exported. A variety of other metadata tools exist (see <http://www.fgdc.gov/metadata/geospatial-metadata-tools>); the TRRP Weaverville Office is using the Metadata Enterprise Resource Management Aid (MERMAid) created by NOAA for its primary metadata tool.

3.2.1. FGDC Metadata Standards

OMB Circular A-16 (see Appendix B) authorized the Federal Geographic Data Committee (FGDC) to develop a required set of information for all geospatial data collected by, or funded by, the U.S. Federal government. These are the metadata that people are most familiar with.

It is frequently argued that all data have a geospatial component and thus FGDC metadata requirements apply. For example, adult return data tables for the Trinity River are geospatial in that they refer to the Trinity River watershed. FGDC required metadata will form a component of the metadata required for the TRRP repository.

Security information is included in FGDC metadata and when data are approved for public release, the approval process and staff position that provided approval should be noted.

The point of contact given for the Data Package should be the TRRP Staff who is responsible for the data; however the Program or the TRRP Data Steward may be listed as the distributor.

FGDC requirements reasonably capture the “who” and “when” of a dataset, but are unfortunately weak on “how”.

3.2.2. Sampling Design, Collection Protocols, QA/QC, and Assumptions in Metadata

Properly capturing the “how” of a dataset requires documentation of sampling design and collection protocols (methods). Quality Control / Quality Assurance (QA/QC – see Section 1.2.2) are post-collection protocols applied to the data and therefore must be documented similarly to collection protocols.

Assumptions and caveats made with respect to interpreting the data should be documented to ensure they are conveyed for future use of the data. Understanding of these is vital for data interpretation and their documentation in metadata will be required for TRRP Data Packages. Since XML files are limited in their capability of including maps or diagrams, and since some design or protocol information may come from copyrighted materials, XML metadata files are allowed to provide brief narrative descriptions with properly cited references to documents that more thoroughly describe those designs or protocols.

However, there must be reasonable certainty that the referenced documents will be accessible in the future either through the ODP or by other means.

3.3. Other Information

“Data” is often used to refer to numerical quantification for scientific analysis or monitoring. However, data may be used in a broader sense to refer to any observational or verifiable information. The transition

of photography to electronic digital forms has helped people to intuitively understand that photographs are data. However, documents, specimens, and even historical descriptions may be considered to be data.

3.3.1. Reports, Presentations, Meeting Materials, and Other Documents

Reports, presentations, meeting agendas and minutes, and other documents may be considered data in a broad sense and provide useful information to retain in the TRRP information repository. These will not require metadata for inclusion in the TRRP repository. However, a small set of standards for documents would be useful.

Reports should meet standards specified in the TRRP Generalized Information Standards (Appendix C). These include a title page that specifies title, author, date, agency or organization, funding source, and place of publication; plus a *brief* abstract of the project and results with a 2-3 paragraph limit. Abstracts will be used as 'descriptions' in the ODP, the primary field used for searching the document library. Final documents are required to be in PDF format. Although the archival PDF/A format will not be required, all PDF files should have fonts embedded. Scanned documents should display page images with searchable text.

As noted in Section 1.3.1, reports should explicitly include the relevant questions, hypotheses, and conclusions. Conclusions with particular relevance to management actions should be called out in a separate section with a heading such as 'Management Implications'. These management implications should include suggestions to (a) stop a management action because it is no longer needed or is ineffective, (b) keep a management action the same, or (c) modify a management action (this should include specific recommendations as to how to modify the management action). Reports should also specify any data or information gaps identified by the investigation.

3.3.2. Photography

Large numbers of photographs are taken by staff across the TRRP Partnership. Photography can be loosely placed into 3 categories:

- **General Photography.** DOI policy requires that all photographs collected by, or for, DOI agencies include credits for the name of the photographer and their office (online at http://elips.doi.gov/app_DM/act_getfiles.cfm?relnum=3266). For example:
 - "Eric Peterson, U.S. Department of Interior, Bureau of Reclamation, Trinity River Restoration Program" or
 - "Scott Kennedy, California Department of Water Resources, under agreement with the U.S. Department of Interior, Fish and Wildlife Service, Trinity River Restoration Program."

Digital photographs typically include metadata stored within the file format. Camera parameters are typically included in the EXIF data (EXchangeable Image Format); while narrative information such as captions and credits are in IPTC data (International Press Telecommunications Council). EXIF data include date and time, so camera settings must be current in order to report correct information on when the photograph was taken. Photographer credits should be stored within IPTC data fields, which are accessible in most modern image cataloging software.

- **Photomonitoring Projects.** TRRP presently has one formal Photomonitoring project plus several informal activities using photos to document changes over time. In addition to the requirements of general photography, rigorous photomonitoring projects must document each photo with location, date, time, bearing, camera model, and lens focal length.
- **Aerial Photography.** Aerial photographs provide a systematic documentation of river conditions and TRRP actions and therefore are regarded more as standard datasets than photography. Aerial photographs are typically collected by a contractor required to provide both raw images and imagery products with high-accuracy rectification and FGDC compliant metadata. Storage of raw imagery requires large storage capacity and will therefore be maintained in the TRRP Archive, while the mosaicked imagery products frequently used throughout TRRP will be included in the ODP.

3.3.3. Specimens

Biological specimens, including fish scales and genetic tissue samples, are collected under several TRRP projects. Additionally, there is potential for specimen collections of plants, invertebrates, and even whole-organism specimens of fish, frogs or other vertebrates.

Biological specimens collected on TRRP projects should be entered into datasets that will become Data Packages in the TRRP Repository. Specimens should additionally be placed in an appropriate university or museum collection and the location must be reported in the metadata of the Data Packages.

3.4. Backup and Archive

Backup systems are designed to allow recovery of the *current state* of a file system in the event of catastrophic data loss. Backups should be made frequently and maintained off-site, ensuring that they are available even in the event of office destruction, say by fire.

Additionally, information should be archived to avoid losses of older content. Backup systems are not well designed for recovering prior versions of files that might have been accidentally modified or deleted. Archiving may involve procedures such as versioning files that are in progress to ensure that older versions are accessible. Archiving also requires cautious file management to prevent accidental losses.

Data Packages, Reports, contract deliverables, and other final products in the TRRP Information Repository will be both backed up and archived following the procedure in Appendix D. It is strongly suggested that all TRRP Partner offices follow similar procedures for their local information including draft or preliminary information products.

APPENDIX A: TRRP DATA USE AGREEMENT

The Trinity River Restoration Program (TRRP) is a collaborative program among multiple Federal, State, Tribal, and local government agencies working together to benefit the fisheries of the Trinity River through actions outlined by the 2000 Record of Decision that include flow scheduling, site rehabilitation, and sediment management. Planning and implementation of these actions requires use a broad range of datasets.

To maximize the results of TRRP actions, while maintaining efficiency of actions in both time and cost, it will be necessary to exchange recently collected data between agencies, including non-final and other non-public data from monitoring and other projects being conducted on the Trinity River. Sharing and use of such data shall follow the procedures and requirements specified in TRRP's Data Management and Use Plan. This Data Use Agreement is not required for sharing non-final or non-public data within TRRP, but may be requested for any reason by the TRRP staff responsible for the requested data (typically the principal investigator of the TRRP project collecting the data). This agreement establishes conditions upon the sharing of the requested data. Sharing of non-final or non-public data as per this agreement is strictly internal to the TRRP partnership, as defined by agency membership on the TMC; this agreement does not volunteer data to be released for external use or access. Data may be provided to a contractor on TRRP business if the data recipient specifies in this agreement that the contractor needs access and the data recipient notifies the contractor that they must abide by both this agreement and the TRRP Data Management and Use Plan. Copies of the completed agreement must be submitted to the TRRP Data Steward and TRRP Science Coordinator for sake of tracking agreements.

Non-final or non-public data that have little concern for use and interpretation, or that have been shared readily between TRRP agencies in the past (e.g. rehabilitation site 50% designs), may continue to be shared independent of this agreement with consent of TRRP managers.

Definitions

Data provider: the staff member or members of a TRRP agency, who is/are primarily responsible for the data of interest; typically the principal investigator of a TRRP project.

Data recipient: the staff member of a TRRP agency, who is requesting preliminary data from the data provider.

Agreement

Responsibilities of the Data Provider

1. **Initiating agreement.** When the data provider receives a request for data (formally or informally), the data provider may choose to require this data use agreement. The data provider shall promptly inform the data recipient of the need for the agreement.
2. **Timeliness.** Upon receiving a completed agreement, the data provider shall provide the data in a timely manner. The data provider shall also inform the TRRP Data Steward (whom is responsible for tracking Data Use Agreements) that the data have been provided.
3. **Questions on use.** The data provider will respond to questions from the data recipient within reason on data use and interpretation. The data provider is not obligated to provide training on data use.
4. **Consultation on results.** The data provider shall provide consultation with data recipient on interpretations and conclusions in a reasonable and timely manner for meeting reasonable project timelines of the data recipient.
5. **Dispute resolution.** The data provider agrees to use the TRRP dispute resolution process for any disputes with the data recipient over interpretations, conclusions, or other aspects of data use and this agreement. The data provider acknowledges that the TRRP dispute resolution process may conclude that the dispute cannot be resolved at present and that only future investigation will clarify the issue.

Responsibilities of the Data Recipient

1. **Initiating agreement.** The data recipient is responsible for completing information required in this agreement, then submitting the agreement to the data provider, plus copies to the TRRP Data Steward and the TRRP Science Coordinator.
2. **Data access.** The data recipient shall recognize that data received are for use by TRRP staff and contractors, until properly finalized and released by the data provider. The data recipient shall retain data within the data recipient's agency, project, or discipline within TRRP, as specified in the submitted agreement. If contractors are to have access to the data received, then the data recipient shall notify said contractors that use of the data is bound to this agreement and the TRRP Data Management and Use Plan.
3. **Scope of use.** The data recipient shall inform the data provider in writing of the scope of intended uses of the data and the personnel or agencies to be involved. Should additional uses of the data by the data recipient arise after the data are received, then the data recipient shall inform the data provider in a timely manner.
4. **Consultation on results.** The data recipient shall consult with the data provider on interpretations and conclusions drawn from the data prior to release of results outside of TRRP either by written reports or oral presentations. This consultation is to provide an opportunity for the data provider to clarify or correct data uses and to comment on derived interpretations and conclusions; it does not require that the data provider approve of interpretations or conclusions.
5. **Dispute resolution.** The data recipient agrees to use the TRRP dispute resolution process for any disputes with the data provider over interpretations, conclusions, or other aspects of the data use and this agreement *prior* to any release of the interpretations or conclusions outside of TRRP by written reports or oral presentations. The data recipient acknowledges that the TRRP dispute resolution process may conclude that the dispute cannot be resolved at present and that only future investigation will clarify the issue.
6. **Data ownership.** Data collected with public funding are legally owned by the public. However, the staff members who collect, process, maintain, and analyze a particular dataset often feel a sense of ownership of the data. The data recipient shall respect the data provider's involvement with the data and appropriately recognize the data provider as the data source in reports or presentations that use the data.

Disclaimer

Data use and access must abide by U.S. and California State laws, plus the procedures, standards, and responsibilities specified by the TRRP Data Management and Use Plan. All data are subject to revision.

Data Recipient Contact Information

Name: _____ Date: _____

Agency/Company: _____

Address: _____

Phone: () _____ E-mail: _____ Date Needed: _____

Describe in detail why the data are needed and the scope of data use. Be as specific as possible.

Specify who will have access to the data.

Special Instructions or Notes.

Requested Format (CSV text, MS Excel, MS Word, ESRI ArcGIS, etc.)

In signing this Data Use Agreement, the data recipient commits to follow the stipulations of the agreement.

Data Recipient: Print Name

Signature

Date

For Data Provider Use Only

Completed by: _____ Date: _____

Phone: () _____ E-mail: _____

Notes for recipient:

APPENDIX B: ANNOTATED LIST OF RELEVANT LAWS, POLICIES, AND SIMILAR GUIDANCE

U. S. Laws

The following U.S. Laws may be of particular relevance to TRRP information management and use:

- **Data Quality Act.** Section 515 of the Consolidated Appropriations Act, 2001 (Pub.L. 106-554), also known as the Data Quality Act or Information Quality Act. The purpose of the act is “for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies.” It requires that data are properly documented with regards to the source, accuracy, timing and other metadata as well as assumptions and limitations for data interpretation.
- **Freedom of Information Act (FOIA).** FOIA is an “access statute” that allows the public to request copies of government records including data. Federal agencies must respond to all requests and explain any FOIA exemptions used to withhold information.
- **Privacy Act.** The Privacy Act (5 U.S.C. 552a), enacted in 1974, established controls over what personal information the Federal government collects and how it uses or discloses that information. The Privacy Act has four basic objectives that the DOI is committed to fulfilling to the greatest extent possible:
 - To restrict disclosure of personally identifiable records maintained by agencies;
 - To grant individuals increased rights of access to agency records maintained on them;
 - To grant individuals the right to seek amendment of agency records maintained on themselves upon a showing that the records are not accurate, relevant, timely, or complete; and
 - To establish a code of "fair information practices" that requires agencies to comply with statutory norms for collection, maintenance, and dissemination of records.
- **Proprietary Information.** A variety of laws ranging from copyright to the Economic Espionage Act protect intellectual property rights. Any data purchased or licensed by an agency may be proprietary and therefore not available for sharing. This may include data that are publicly available but have value-added information or organization. Proprietary information should be kept and maintained by the agency within TRRP that has paid for the use of the information.

Executive Orders, Circulars, and Other Guidance

The following executive orders from the U.S. President, memoranda and circulars from the Office of Management and Budget (OMB), and other guidance may be of particular relevance to TRRP information management and use:

- **OMB Circular A-16, establishing the Federal Geographic Data Committee (FGDC).** OMB Circular A-16 established the National Spatial Data Infrastructure (NSDI) and the Federal Geographic Data Committee (FGDC). The FGDC is authorized to establish standards for “federal activities that involve ... any spatially referenced statistical data” (Policy 6.b.). It has been argued that effectively all data are spatial as they refer to some location or region, therefore FGDC standards apply to all federally funded data collection efforts. Stakeholders are able to participate in FGDC activities and standards are developed in consultation with state, local and tribal governments as well as private industry and professional organizations. The FGDC standards that are most frequently discussed are those relevant to metadata, including a required set of data fields.

More information can be found at <http://www.fgdc.gov/standards/>.

- **OMB Circular A-130 (Revised): Management of Federal Information Resources.** The policy section of this circular (8) includes several statements supportive of inter-agency and inter-governmental collaboration, including:
 - 8a(c) “Consider the effects of their actions on State and local governments and ensure consultation with those governments as appropriate;”
 - 8a(d) “Seek to satisfy new information needs through interagency or intergovernmental sharing of information, or through commercial sources, where appropriate, before creating or collecting new information;”

And is supportive of program repositories:

- 8a(j) “Record, preserve, and make accessible sufficient information to ensure the management and accountability of agency programs, and to protect the legal and financial rights of the Federal Government;”
- 8a(k) “Incorporate records management and archival functions into the design, development, and implementation of information systems;”
 - 8a(k)1 “Provide for public access to records where required or appropriate.”
- 8e “Agencies have a responsibility to provide information to the public consistent with their missions.”
- 8e6c “Establish and maintain inventories of all agency information dissemination products;”

But also includes cautions, including:

- 8a(g) “Protect government information commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information;”

Online at http://www.whitehouse.gov/omb/circulars_a130_a130trans4

- **Executive Order on Transparency and Open Government, plus the Open Government Directive.** Issued January 21, 2009, this establishes a foundation for information release and for collaborations, including:

- “Executive departments and agencies should harness new technologies to put information about their operations and decisions online and readily available to the public.”
- “Executive departments and agencies should use innovative tools, methods, and systems to cooperate among themselves, across all levels of Government, and with nonprofit organizations, businesses, and individuals in the private sector.”

Online at http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/

The OMB subsequently issued a memorandum to all executive departments and agencies on the Open Government Directive, which describes open government based on transparency, participation, and collaboration. On the subject of collaboration it states, “Collaboration improves the effectiveness of Government by encouraging partnerships and cooperation within the Federal Government, across levels of government, and between the Government and private institutions.” The memorandum provides requirements of executive departments and agencies including:

- “To increase accountability, promote informed participation by the public, and create economic opportunity, each agency shall take prompt steps to expand access to information by making it available online in open formats.”

Online at http://www.whitehouse.gov/sites/default/files/omb/assets/memoranda_2010/m10-06.pdf

- **Memorandum on Freedom of Information Act.** Although the focus of this Executive Order is on the administration of the Freedom of Information Act, there are several statements that can be interpreted more broadly, including:
 - “Government should not keep information confidential merely because public officials might be embarrassed by disclosure, because errors and failures might be revealed, or because of speculative or abstract fears.”
 - “All agencies should adopt a presumption in favor of disclosure [...] The presumption of disclosure also means that agencies should take affirmative steps to make information public. They should not wait for specific requests from the public. All agencies should use modern technology to inform citizens about what is known and done by their Government. Disclosure should be timely.”

Online at http://www.whitehouse.gov/the_press_office/FreedomofInformationAct/

U. S. Department of the Interior Policies

The U.S. Department of Interior (DOI) and its agencies have the following policies that may be of particular relevance to TRRP information management and use:

- **Department of the Interior Open Government Plan (version 1.1, June 25, 2010).** This document establishes structure within DOI to support the Executive Order on Transparency and Open Government and the subsequent OMB Open Government Directive. This document focuses on a limited set of “high-value datasets” with typically national coverage and reiterates the intent of the Open Government Directive.

Online at <http://www.doi.gov/open/index.cfm>.

- **Departmental Manual 375 DM 1, Data Resources Management.** Of particular note:
 - 1.1 (A) “Data shall be managed as a resource that supports the range of mission and functional areas across the Department.”
 - 1.9 (G) “Protect the data resource from deliberate, unintentional or unauthorized alteration, destruction and/or inappropriate disclosure or use [...]”

Online at http://elips.doi.gov/app_DM/act_getfiles.cfm?relnum=3713.

- **Department of the Interior Data Standardization Procedures.** With the context of ensuring data compatibility, this document lists “facilitate interoperability among separate DOI agencies” as its first objective and “promote data sharing” as its second. The document establishes procedures for approving and changing standards for datasets.
- **Central Valley Project Improvement Act Program.** Authority to implement the Trinity River Restoration Program derives from both the 1984 Trinity River Basin Fish and Wildlife Management Act and the Central Valley Project Improvement Act (CVPIA). The program operating to fulfill the CVPIA (primarily USBR, but also includes USFWS activities) is concurrently developing a Data Management Plan, which may have authority over some TRRP data activities. TRRP funding also comes through CVPIA in part, with most CVPIA funds used toward restoration implementation actions rather than science and monitoring. The CVPIA Data Management Plan will apply to those actions funded through CVPIA. It is likely that the TRRP *Data Management and Utility Plan* will be highly compatible with the CVPIA plan.

Bureau of Reclamation

- **Authority for Data Release.** Within the executive branch of the U.S. Federal government, authority for actions resides at high levels and is delegated downward as needed and appropriate. Although there is little written guidance, authority to release certain information is considered to be at a higher level in Reclamation than project and program offices such as TRRP. There is no specific listing of the types of information that require higher-levels of approval, but examples typically include datasets with some degree of sensitivity, which warrants additional review of the data’s validity (e.g. cultural resources or occurrence of species listed as threatened or endangered under the Endangered Species Act). In general, the more ‘sensitive’ the issue that the data address, the more likely that a high-level authorization is required in order to ensure a high degree of scientific integrity.
- **DRAFT Policy, Stewardship of Bureau of Reclamation Mission-Critical Resources Data.** This DRAFT policy builds on the DOI *Departmental Manual 375 DM 1, Data Resources Management*, to establish structure for rigorous data management and data coordination *within* Reclamation that may require a more formal delivery of data products upward through Reclamation. It also requires development of a Data Acquisition and Management Plan for each mission-critical dataset; these DAMPs align closely with the TRRP work planning process, so any requirements of writing DAMPs within TRRP should easily be met by our work plan proposals.

Fish and Wildlife Service

- No policies or other guidance have been identified by the USFWS.

Other Federal Agencies

At present, the National Marine Fisheries Service (NMFS) does not contribute original data collections to the TRRP. NMFS does occasionally provide Biological Opinions and similar reports; after finalization, these may be included in the TRRP information repository. No other issues of data management and utility for NMFS participation in TRRP have been identified.

The U.S. Department of Agriculture, Forest Service, participates at a variety of levels within TRRP, but does not presently lead projects with TRRP funding; data and reports contributed by the Forest Service are provided voluntarily to TRRP. While these data may become included in the TRRP Information Repository, they are not within the scope of the TRRP *Data Management and Utility Plan*.

California State Law

- **California State Constitution (Article 1, Section 1).** The state constitution identifies privacy as an inalienable right. The implications of this constitutional right are similar to the Federal Privacy Act.
- **California Public Records Act (CPRA).** The CPRA (California Government Code 6250-6276.48) is similar to the Freedom of Information Act, providing for public access to non-exempt governmental information and applies to both state and local governments.

California Resources Agency Policies

- No policies or other guidance have been identified by the Resources Agency.

Trinity County

No laws, policies, or other guidance have been identified by Trinity County.

Tribal Law

No laws, policies, or other guidance have been identified by the Hoopa Valley Tribe nor the Yurok Tribe.

APPENDIX C: TRRP GENERALIZED INFORMATION STANDARDS

The following provides basic standards for TRRP data, reports, and related information products. The text is written such that it can be copied into contract documents.

TRRP Data and Documentation Requirements

These requirements address data (quantitative and qualitative information including tables, databases, geospatial layers, photographs, biological specimens, and the like) and documentation (project reports and the like). The requirements set forth here are to enable the U.S. Department of Interior (DOI; including the Bureau of Reclamation and the Fish and Wildlife Service) and the Weaverville TRRP office to comply with the Data Quality Act (Section 515 of the Consolidated Appropriations Act, 2001), standards set forth by the Federal Geographic Data Committee, and additional laws or policies. As per the Trinity River Restoration Program Data Management and Utility Plan (available from <http://odp.trrp.net>), all contracts, formal agreements, internal projects, or other activities conducted with TRRP funding shall adhere to the requirements set forth here.

All data and documentation products, including contract deliverables, shall be submitted to the TRRP Information Repositories via the TRRP Data Steward.

Data and documentation received from contractors and other funding recipients shall, at DOI discretion, be subject to inspection prior to acceptance. DOI will notify the Recipient/Contractor of any rejected data or documentation within 60 days, to be corrected and returned to DOI within 90 days from the rejection notification date. DOI will make payment to the Recipient/Contractor upon final acceptance of the metadata. Metadata received from the Recipient/Contractor shall be delivered in the same delivered package as the data. The Recipient/Contractor is hereby advised that deliverables including reports, data, and metadata may be posted publicly unless a specific reason to restrict the information is identified and clearly marked in the deliverable.

For any questions on these requirements, please contact the TRRP Data Steward (Eric Peterson, ebpeterson@usbr.gov, 530-623-1810).

TRRP Report and Documentation Format Requirements

All electronic documentation (i.e. – final reports, appendices, documentation of analysis) shall be provided with a minimum of the below specified fields, to be included on the document(s) title page:

- Title
- Author
- Date (year, month, and day)
- Agency/Organization
- Place of Publication
- funding source (including contract or agreement number)
- Abstract/Brief Summary (2-3 paragraph limit)

All final documents shall be in Adobe Acrobat PDF format, with embedded fonts, and enabled saving, printing, content copying and extraction privileges. The archival PDF/A format is accepted, but not required. All figures, images, and tables shall be clearly labeled. All maps shall include a north arrow, scale information, and reference to a location. All supporting data (including photography) shall be supplied in digital format (Excel, Access, ArcGIS 9.3, etc.) as per data requirements given below. All work involving field-forms should include a blank copy of the field form.

TRRP Imagery Requirements

As per DOI policy, all photographs retained for TRRP purposes shall include credits for the photographer and their agency, department, bureau, or office. If possible, these should be stored in the EXIF/IPTC data that is imbedded in most electronic image formats and can be viewed or edited in most modern image cataloging software. Additional data is typically imbedded automatically by digital cameras including date and time; digital cameras must be correctly set or dates shall be corrected prior to delivery of the files.

Photographs used for photomonitoring over time shall additionally be attributed with location, date, time, bearing, camera model, and lens focal length.

Deliveries of aerial photography for mapping purposes shall include raw frame images and a photo index of aircraft location and orientation.

TRRP Specimen Collection Requirements

Projects collecting specimens (biological, geological, etc.) shall provide an index of collections curated that identifies collection number, collection date, and location. Deposition of specimens into a university or museum collection must also be noted.

TRRP Data Requirements

Completed data products including contract deliverables shall be provided as *data packages* ready for submission to TRRP's Online Data Portal (<http://odp.trrp.net>). A *data package* is an organized dataset with complete metadata. When multiple data packages are provided simultaneously, each must be organized into a separate folder or compressed into a single ZIP file.

Data Formats

All data shall be formats accessible by the Weaverville TRRP office staff with standard computers and software (Windows based PC with Microsoft Excel, Microsoft Access, ArcGIS, or AutoCAD) unless otherwise specifically agreed upon by Weaverville TRRP office staff or the TRRP Data Team. These include:

- XLS (MS Excel spreadsheets)
- CSV (Comma Separated Value tables)
- MDB or ACCDB (MS Access database)
- JPEG, PNG, or TIFF (for photos and other images)

- ESRI Shapefile
- ArcGIS File Geodatabase
- ArcGIS Layer Package
- ArcGIS Personal Geodatabase
- GeoTIFF
- XYZ (space delimited text format commonly used for final LiDAR data)
- LAS (ASPRS standard for LiDAR data)
- AutoCAD DWG, include as appropriate
 - breaklines within DWG files
 - points additionally as CSV or NEZD file (northing, easting, elevation, and description)

Media

Data and documentation may be transmitted to the TRRP Information Repository electronically or on electronic media. The information provider must receive confirmation that the information was received in useable condition before delivery may be assumed to be complete. Allowable electronic media must be readable by a standard, contemporary Microsoft Windows based computer and include:

- CD
- DVD
- USB drive

Metadata

Metadata are the primary documentation of a dataset and are intended to enable proper use of a dataset by future researches. Metadata are legally required in accordance with OMB A-16, with standards set by the Federal Geographic Data Committee (FGDC; www.fgdc.gov/nsdi/nsdi.html). **TRRP extends metadata requirements to include all data products; requires that metadata provide sufficient documentation for future data use; and requires that metadata are submitted in standard XML format.** A list of minimum content is below. Citations of external documentation of protocols, designs, or procedures may be used if future access to those documents can be assured (e.g. the document is already in the TRRP Information Repository or a copy is included with the delivery). Metadata will be reviewed to ensure that TRRP requirements are met.

Minimum content for metadata:

1. FGDC standards
2. Data collection protocol, methods, or standard operating procedure;
3. Sampling strategy and design;
4. Data storage and formatting structure including fieldname definitions and other necessary information for reasonable interpretation of the data;
5. Units and accuracy;
6. Linkage structure for relational databases.

Metadata tools are provided within ArcGIS. Alternate metadata development tools may be better for developing complete metadata (e.g. <http://www.ncddc.noaa.gov/metadata-standards/mermaid/>). A blank

metadata template is also available at <http://odp.trrp.net> (search for “metadata template”), which may be edited in a text editor, but caution must be exercised that the XML formatting is not corrupted.

Datum and Projection

Datum and projection information shall be stored with geospatial data such that opening the data within ArcGIS automatically acquires the correct datum and projection. Geospatial data shall be submitted in the following datums and projections, unless otherwise specifically agreed upon by Weaverville TRRP office staff or the TRRP Data Team:

- Horizontal Datum:
 - North American Datum 1983 (NAD83)
- Vertical Datum:
 - North American Vertical Datum (NAVD88),
 - or Geoid 2009
- Horizontal projection:
 - Geographic Coordinate System (unprojected latitude and longitude in decimal degrees)
 - or Universal Transverse Mercator (UTM) projection for zone 10, northern hemisphere (units in meters)
 - or California State Plane, zone 1 (units in U.S. Standard Feet).

Accuracy

Geospatial accuracy shall be specified in supporting documents including metadata. Accuracy documentation must include both the source of geospatial measurements (e.g. GPS receiver with processing level) and a clear measure of accuracy (for 95% of measurements, if possible). Be aware that Root-Mean-Square-Error (RMSE) statistics indicate an average accuracy *not* appropriate for a 95% certainty. Typical levels of GPS processing and corresponding accuracy are provided in the following table; accuracy statistics such as Garmin’s “Estimated Positional Error” provided by cheaper GPS units are often inappropriate for the accuracy measurements required here. GPS receivers must be properly configured to provide output in the correct projection and datum.

GPS & processing level	Accuracy (95% of measures are within...)
Recreational grade GPS (e.g. Garmin)	15 meters
Recreational grade GPS with WAAS correction	5 meters
Mapping grade GPS with differential correction	1-3 meters
Survey Grade GPS with differential correction	< 1 meter
Real-Time Kinnematic GPS with proper base station support and processing	~ 2.5 cm

The U.S. National Map Accuracy Standards (<http://rockyweb.cr.usgs.gov/nmpstds/nmas.html>) provide guidance for converting accuracy to map scale. These may be interpreted to the following table:

Accuracy (90% of points are within...)	Map Scale
0.85 meters	1:1000
4.23 meters	1:5000
10.2 meters	1:12,000
12.2 meters	1:24,000
50.8 meters	1:100,000
127 meters	1:250,000
254 meters	1:500,000

Security/Privacy

Data deliveries shall include full disclosure regarding any security or privacy concerns of all data that is delivered to TRRP/DOI. This will be clearly noted during delivery and documented in the metadata in accordance with the Federal Geographic Data Committee Standard Content Standards.

APPENDIX D: STANDARD OPERATING PROCEDURES

This appendix provides a series of brief standard operating procedures (SOPs) to act as convenient guidelines on specific topics. For an equivalent brief on data formatting or standards, see Appendix C, TRRP Generalized Information Standards.

Metadata

The basic point to metadata is to document a set of data such that it can be used by future researchers independently of the current researchers who developed the data. In other words, metadata ensure that data use and interpretation is not compromised by staff turnover or project hand-offs, even if there is a substantial temporal gap. Good metadata provides assurance that the public investment in a dataset is secure for use by future generations.

People are most familiar with the FGDC Metadata Standards. FGDC requirements reasonably capture the “who” and “when” of a dataset, but are unfortunately weak on “how”. In addition to FGDC requirements, TRRP expects that metadata will include documentation of sampling design, collection protocols (methods), and assumptions or caveats required for interpretation. Quality Assurance / Quality Control (QA/QC) are protocols applied to the data and thus must be documented similarly to collection protocols. Citations and links to external protocol documents are accepted as long as there is good assurance that the external documents will be available permanently (perhaps included with the Data Package). Metadata should also capture any relevant security information including data approvals and the person or position providing approval.

TRRP will require metadata for all data products. The data product combined with the metadata will be stored as Data Packages in the TRRP Information Repository. Those stored in the Online Data Portal (ODP) will use the metadata file for data searches. Therefore, metadata will be required to conform to standard metadata XML format.

An XML metadata template is available at <http://odp.trrp.net/Library/Details.aspx?document=1304>; this may be edited in a standard text editor such as Notepad (Microsoft Word 2007 is also capable of editing XML files). However, metadata software or other tools are recommended to ensure that the XML is properly formatted (XML is a hierarchical format and must retain the proper tags before and after each piece of information) and that all FGDC required fields are complete (this template uses the FGDC standard profile; other profiles may be appropriate for your data, such as the Biological Profile).

A variety of metadata tools exist (see <http://www.fgdc.gov/metadata/geospatial-metadata-tools>). The TRRP Weaverville Office is using the Metadata Enterprise Resource Management Aid (MERMAid) created by NOAA for its primary metadata tool. MERMAid is a bit daunting the first time, but once understood, provides a good vehicle for developing metadata quickly. For GIS data, typical workflow should start with exporting a draft XML file from ArcGIS (which will automatically include the geospatial projection and similar details), then import the file into MERMAid and complete all other fields.

The XML template was created using MERMAid in about one hour (all text between <tags> had to be entered). Bounding coordinates are for the 40-mile reach of the mainstem Trinity River below Lewiston Dam in decimal degrees.

QA/QC

Quality Assurance (QA) is the process, or set of processes, for preventing the introduction of erroneous information to a dataset. Quality Control (QC) is a post-entry review, correction (when possible), and evaluation of data to understand accuracy and precision. Together, QA/QC maximize and document data quality.

While many QA/QC procedures are conducted during the maintenance step of the data life cycle, QA/QC should be considered in all steps from planning for QA/QC procedures to ensuring their documentation when archiving data. Good QA/QC helps ensure that data may be properly applied and interpreted.

Selected best practices for QA:

- **Staff** - use appropriately skilled staff.
- **Equipment** - use appropriate equipment, calibrate as needed.
- **Double entry** – enter data twice and look for discrepancies to reduce typographical errors.
- **Data field limiters** – some database software such as Microsoft Access and ESRI ArcGIS allow minimum and maximum values to be specified in the database design, so that if a value outside that range is entered, the user will be notified of an error.
- **Validation scripts** – most database software can interact with some sort of scripting language (such as Microsoft Access and Visual BASIC for Applications – VBA). Scripts may be customized for specific purposes to review or analyze data either during input or afterward.
- **GPS** – consider processing level, measures such as the number of satellites used in a solution, and statistics such as the Positional Dilution of Precision (PDOP).
- **Human eye** – review to make sure that the data make sense. This should include review by the staff that collected the data.

Selected best practices for QC:

- **Preliminary Analyses** – Preliminary review of data to seek outliers, identify skewed distributions, or preview other potential challenges.
- **Human eye** – review to make sure that the data make sense. This should include review by the staff that are expected to analyze the data.
- **Accuracy and Precision** – Conduct accuracy and precision analyses where possible and to ensure data are appropriate to needs.

Data Sharing

For sake of efficient adaptive management, data must be accessible between TRRP Partners. By establishing TRRP as a multi-agency program through the TMC, the ROD effectively authorizes a high degree of collaboration. While we work for a variety of agencies, when doing that work with TRRP funds, we are all working for one Program.

- **Final Data.** Final data are a product of TRRP investigations just as are reports. Data are expected to be organized into Data Packages including an XML metadata file and submitted to the TRRP Information Repository via the TRRP Data Steward. This should occur prior to the analysis and reporting phase of an investigation both to aid the data management within the investigation, and to maximize the multi-purposing of data for TRRP adaptive management.
- **Preliminary Data.** Preliminary data should flow easily and efficiently within the Program. All Program partners funded by TRRP are expected to adhere to the TRRP *Data Management and Utility Plan*, including Partner staff, contractors, volunteers or anyone else using TRRP funds (staff overseeing contracts must ensure that contractors know they must adhere to the plan). This plan clarifies responsibilities of TRRP Staff and requires us all to behave professionally on data matters. This includes:
 - not releasing another's preliminary data
 - obtaining proper review of preliminary data interpretations (typically includes review by the data provider)
 - responding to data requests and related questions in a reasonable time
 - not overloading staff with excessive requests or questions about preliminary data

Nothing in the *Data Management and Utility Plan* prevents public release of preliminary data, such as the datasets already regularly released in a preliminary state (e.g. stream gages, weir counts, redd surveys), so long as the TMC and TRRP Executive Director approve.

Requests for preliminary data within the program may be fulfilled informally with complete assurance of responsibilities stated in the *Data Management and Utility Plan*. Data providers may additionally invoke the TRRP Data Use Agreement for any reason (perhaps simple tracking of requests, or to ensure clarity of responsibilities). Note, however, that all responsibilities specified in the agreement are already covered within the Data Management and Utility Plan, therefore all people working with TRRP funds are expected to abide by these responsibilities whether under a formal Data Use Agreement or not.

Backup and Archive

Backing-up information differs from archiving information. Backup systems are designed to allow recovery of the *current state* of a file system in the event of catastrophic data loss. Backups should be made frequently and maintained off-site, so that they are available even in the event of office destruction, say by fire. Backup systems are not well designed for recovering a prior version of a file that might have been accidentally modified. Backing up large file systems requires an enormous storage capacity; therefore, backup media are often reused after some period. Once the modified version is backed-up, the prior version may no longer be available.

Archiving provides assurance of long-term storage for particular datasets. Archiving may involve procedures such as versioning files that are in progress to ensure that older versions are accessible. Archiving also requires cautious file management to prevent accidental losses.

The following procedure will be used for the TRRP Information Repository and is recommended for use within all TRRP Partner offices (adapted as appropriate). An office's backup and archive plan should be written and available to all office staff to ensure continuity in the event of staff absence or turnover.

- The local network archive consists of a set of folders on the network file server. Archive folder names are entirely in capital letters and are read-only for all regular accounts including the primary account for the TRRP Data Steward. Only a special account used by the TRRP Data Steward specifically for managing the archive has write access (plus Reclamation IT staff in the Redding area).
- The Repository will retain archives of contract deliverables, submitted Data Packages, and submitted reports. Organized raw data files from in-office data collections and other information where retention of versions is of value will also be archived. An additional copy of data organized for regular use will also be retained; when these data are significantly revised, prior versions will be retained.
 - In some cases of local data development, such as with GIS layers for Environmental Site Limits and Site Designs, a file geodatabase is maintained in which any time an edit is made, the prior feature dataset is first copied and the name is appended with the current date. Edits are made to this new copy. Then the data are exported to a copy for regular use that appends the filename with 'current' rather than the date. GIS project files may then always open the 'current' file to display the latest version, while older versions are retained and distinctly dated.
 - Restricted data (e.g. the Realty database) are archived in encrypted ZIP files. The password for these is stored in DataArchiveConsiderations.xlsx within the TRRP Data Steward's user folder, which can only be accessed by the Data Steward or by Reclamation IT staff.
- Finalized public Data Packages will additionally be made available through the Online Data Portal.
- Reclamation IT makes nightly backups of the network drives to tape on-site. Tapes are removed approximately weekly to be kept off-site at a Reclamation office in the Redding area.

APPENDIX E: GLOSSARY WITH ACRONYMS

AEAM = Adaptive Environmental Assessment and Management (avoided in this document in favor of “adaptive management”).

AM = Adaptive management.

Adaptive Management – A process in which management ideas are (a) tested through scientific methodologies and (b) modified based upon the results. See “Adaptive Management Cycle”.

Adaptive Management Cycle – A business process model for conducting adaptive management. The cycle as used in this document starts with “Hypothesize and Predict”, then goes on to “Design”, “Implement”, “Monitor”, “Assess”, “Adapt”, then cycles back to the beginning.

Business Process Model – A diagram that illustrates how an organization conducts an activity, typically drawn in a flow-chart style.

CA DFG = California Department of Fish and Game. CA DFG is a department within the California Resources Agency, which has membership on the TMC.

CA DWR = California Department of Water Resources. CA DWR is a department within the California Resources Agency, which has membership on the TMC.

Consolidated Data Package – a Data Package formed from multiple data collections across TRRP project or agencies. Consolidated Data Packages tend to accumulate data over time and thus require a high degree of coordination for assimilating new data and maintaining version control for use of the data across TRRP. The task of coordination should be assigned to a Data Coordinator who has good knowledge of the data. CPRA = California Public Records Act.

CVPIA = Central Valley Project Improvement Act. The acronym is typically used to refer to a program within DOI that implements the act. The program is primarily composed of the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service.

DAMP = Data Acquisition and Management Plan. DAMPs may soon be required under USBR policy for certain high-priority datasets. However, TRRP work planning may adequately cover any DAMP requirements.

Data Coordinator – A person assigned responsibility for coordinating a dataset that is derived from multiple projects or multiple agencies.

Data Life Cycle – A business process model for conducting Data Stewardship. The cycle as used in this document starts with “Plan” then goes on to “Acquire”, “Maintain”, “Access”, “Evaluate”, then “Archive”.

Data Package – A product of the Data Life Cycle and an input to the Adaptive Management Cycle. A Data Package consists of an organized set of data, documented with metadata. The data in a Data Package typically have undergone QA/QC procedures. Documentation via metadata is expected to provide a complete representation of the data enabling appropriate use and interpretation by future researchers.

Data Product – Any data collected for program purposes should be considered a product of the program. Products should be organized and documented for future use, preferably as a Data Package.

Data Steward – Any person who has responsibility for a set of data over multiple steps of the Data Life Cycle (more than simply data entry). Many TRRP Staff can be described as Data Stewards for the data on which they regularly work. In contrast, the staff position of 'TRRP Data Steward' has responsibilities that focus on programmatic coordination of data efforts and maintenance of the TRRP Information Repository.

Data Team – A task-oriented TRRP work group charged with solving data related issues within TRRP. The primary task of the Data Team has been developing this Data Management and Utility Plan and ensuring that TRRP Partner perspectives are accommodated. .

Data Use Agreement – A formalization of the interactions between staff who have requested preliminary data and the staff providing the data (see Appendix A).

DOI = The U.S. Department of Interior.

DMP = Data Management Plan.

Enterprise – Referring to something usable across a dispersed group; with regards to TRRP, “enterprise-wide” would refer to covering the entire TRRP Partnership.

FGDC = Federal Geographic Data Committee. FGDC was authorized under an OMB circular to establish minimum metadata requirements for Federal agencies.

FOIA = Freedom of Information Act.

HVT = The Hoopa Valley Tribe, which has membership on the TMC.

HVTFD = The Hoopa Valley Tribal Fisheries Department.

IAP = Integrated Assessment Plan.

IHAP = Integrated Habitat Assessment Project. A multifaceted project within TRRP.

Integrated Assessment Plan – A planning document developed by TRRP to guide adaptive management in the program, particularly with respect to needed information and assessments. The IAP was completed in 2009 and is widely used as a basis for developing TRRP projects, although it has never been formally approved by the TMC.

Integrated Information Management System (IIMS) – A predecessor to the ODP, IIMS sought to assemble a range of datasets within a common database framework to ensure cohesive data management and to foster integrated assessments.

Metadata – documentation of a set of data that (ideally) provides all information for external or future researchers to correctly use and interpret the data.

Multi-purposing – preparing data or information products to be used in more than one project or assessment.

NMFS = National Marine Fisheries Service, a part of the National Oceanic and Atmospheric Administration, an agency with the Department of Commerce, and has membership on the TMC.

NOAA = National Oceanic and Atmospheric Administration; see NMFS.

- NSDI – National Spatial Data Infrastructure, established along with the FGDC in 1990 by OMB Circular A-16.
- OMB = Office of Management and Budget. OMB is an Executive office within the White House, which often issues circulars to guide activities within executive departments of the U.S. Federal government.
- Online Data Portal (ODP) – An information repository on the internet (<http://odp.trrp.net>) being developed by TRRP. The ODP is founded on the prior IIMS project, but is managed primarily as a repository of TRRP information products with accessibility across the TRRP Partnership and to stakeholders and the public.
- PII = Personal identity information. Access to PII maintained by the U.S. Federal government is restricted under the Privacy Act. The California Public Records Act has similar restrictions.
- Preliminary Data – Data that have not completed development and review, and therefore have not been properly released for broader use. For ‘sensitive’ data, review may include obtaining formal approval for release of the data.
- Principal Investigator (PI) – A TRRP Staff member who is in charge of a TRRP project.
- Project – A specific activity within TRRP, typically defined under the TRRP work planning process.
- Proprietary – Refers to information that is limited from public access due to copyright, licensing, trade secret, or similar legal constraints.
- Protocol – A specific, document methodology for obtaining data.
- Quality Assurance (QA) - The process, or set of processes, for correcting or removing erroneous information from a dataset.
- Quality Control (QC) - An evaluation of data to understand accuracy and precision, and to verify that the data are appropriate to the need.
- Raw Data – Data in proprietary formats of data logging devices or in hardcopy on field data sheets. Compare with Rough and Preliminary Data.
- Record of Decision (ROD) – The DOI document, signed by the Secretary in 2000, which established the current TRRP, TMC, and TAMWG.
- Repository – A location for information storage that maintains data integrity and versioning.
- Restricted Data – Data that are of limited accessibility due to legal constraints, such as the database used by the TRRP Weaverville Office to coordinate land access, which contains PII. Compare with “Sensitive Data”.
- Rough Data – Data that have been transferred from proprietary data-logger formats or hardcopy field datasheets to a format for data management, but still lacking of QA/QC and metadata.
- Sampling Design – An explicit description of the sampling strategy with specific locations, with sufficient information to convey the statistical sampling needs and expectations of a project. For example, generalized randomized tessellation stratification (GRTS) is a sampling strategy, while proper documentation of the sampling design would also include a list or map of the actual sites

sampled, preferably some indication of why the sampling size was chosen as appropriate, and explanation of any locations reaches omitted from the scope of GRTS sampling.

Sensitive Data – Data that require a level of approval within DOI above TRRP before release to the public. These data may be circulated within the TRRP Partnership under authority of the ROD, although caution must be exercised to ensure that they are not accidentally released prior to formal approval. For TRRP, only data with specific locations of Threatened or Endangered Species are likely to be “sensitive”. Compare with “Restricted Data”.

Stakeholder – A person, business, or agency with an interest in the TRRP and its actions. Typically the term stakeholder is used in TRRP specifically for those with membership in the TAMWG.

TAMWG = Trinity Adaptive Management Working Group. The TAMWG was established by the ROD, under the Federal Advisory Committee Act, as a stakeholder group that advises on TRRP activities.

TMC = Trinity Management Council. The TMC was established by the ROD to guide TRRP actions. In many ways, the TMC functions similar to a Board of Directors. The TMC is composed of eight voting member agency representatives plus a non-voting representative from the TAMWG.

TRRP – The Trinity River Restoration Program, in its current form as established by the U.S. Department of Interior, Record of Decision, 2000.

TRRP Partner – An agency with voting membership in the TMC.

TRRP Staff – A staff person working for a TRRP Partner and utilizing TRRP budgeted funding.

TRRP Weaverville Office – The primary office of TRRP, located in Weaverville, CA.

USBR – The U.S. Bureau of Reclamation, an agency with the U.S. Department of Interior and has membership on the TMC.

USFS – The U.S. Forest Service, an agency within the U.S. Department of Agriculture, which has membership on the TMC.

USFWS – The U.S. Fish and Wildlife Service, an agency within the U.S. Department of Interior, and has membership on the TMC.

Work Plan – A TRRP project proposal that documents the need for an activity that includes data collection and methods to be used, along with the required staff and funding.

YT – The Yurok Tribe, which has membership on the TMC.

YTFP – The Yurok Tribal Fisheries Program.