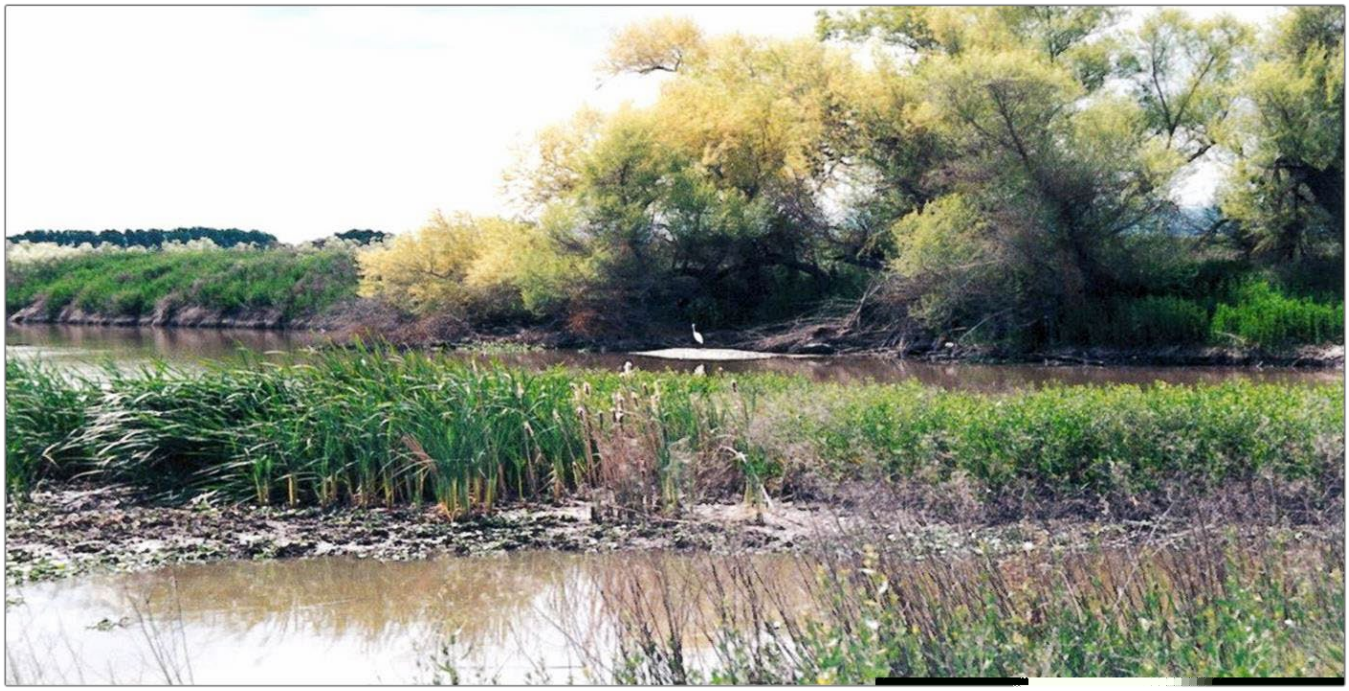
BUREAU OF RECLAMATION

Management Agency Agreement

Fiscal Year 2022 Annual Work Plan

October 1, 2021, to September 30, 2022
California-Great Basin Region



U.S. Department of the Interior

May 2021

SJR	San Joaquin River
SJVDA	San Joaquin Valley Drainage Authority
TMDL	Total Maximum Daily Load
TRT	Technical Research Team
USGS	United States Geological Survey
µS/cm	Micro Siemens Per Centimeter
WARMF	Watershed Analysis Risk Management Framework
WSID	West Stanislaus Irrigation District
WQOs	Water Quality Objectives

Purpose

Reclamation, in response to the passage of the "Water Supply, Reliability, and Environmental Improvement Act" (Public Law 108-361), which includes the California Bay-Delta Authority (CALFED), has initiated implementation of the Program to Meet Standards (PTMS). This program intends to provide greater flexibility in meeting existing water quality standards for the Central Valley Project. Reclamation currently utilizes the CALFED funding authorization for the PTMS, which includes the Real-Time Management Program (RTMP).

The Central Valley Regional Water Quality Control Board's (CV Water Board) Salt and Boron Total Maximum Daily Load (TMDL) for the Lower San Joaquin River (LSJR) was approved and placed into effect on July 28, 2006. In response to the Salt and Boron TMDL, Reclamation drafted a memorandum entitled "Actions to Address the Salinity and Boron TMDL Issues for the Lower San Joaquin River" on July 9, 2008 and updated it in November 2010 (Action Plan). Reclamation subsequently entered into a management agency agreement (MAA) with the CV Water Board on December 22, 2008. The Action Plan was created to accompany the MAA and provide details of Reclamation planned activities to comply with the TMDL-based water quality control plan objectives. Figure 1 shows seven TMDL subareas for salt load management in the LSJR Basin.

A Reclamation compliance plan and a compliance report were prepared in May 2010 to provide the methodology used for the activities described in the Reclamation Action Plan. These documents contain information regarding the technical analysis, computation, and methodology utilized for each Reclamation activity. The 2008 MAA was updated in December 2014. It is consistent with Reclamation's focus on developing the basic infrastructure that supports the RTMP for the LSJR. The annual work plan continues the work that was initiated in the Reclamation Action Plan and summarizes annual planned activities to be conducted by Reclamation in conjunction with each element outlined in the MAA. This Work Plan includes support of Phase 3 and Phase 4 activities listed in the RTMP Framework document, approved by the CV Water Board in December 2014.

The primary purpose of the CV Water Board–approved RTMP is to implement salinity management activities to meet seasonal quantitative salinity objectives at Vernalis, Crows Landing, and Maze Road Bridge[1]. The Basin Plan amendment, establishing the Crows Landing compliance monitoring station, was undertaken to protect beneficial uses, including irrigation supply in the LSJR from the

[1] An amendment to the Water Quality Control Plan for the Sacramento and San Joaquin River Basins was adopted by the CV Water Board on 6/9/17, approved by the State Water Resources Control Board on 1/9/18, by Office of Administrative Law on 4/19/18, and by USEPA on 12/17/18. The amendment established new water quality objectives (WQOs) for the San Joaquin River, Reach 83 (from the mouth of the Merced River to Airport Way Bridge) of 1,550 microsiemens per centimeter (µS/cm) during most years, and 2,470 µS/cm during extended dry periods. During extended dry periods a maximum annual average of 2,200 µS/cm will apply. The amendment also includes a performance goal of 1,350 µS/cm. The existing WQOs of 700 µS/cm (April to August) and 1,000 µS/cm (September to March) will remain in effect. Crows Landing and Maze Road Bridge are the two compliance points for the new WQOs. For the purposes of the RTMP, forecast efforts will focus on meeting the new WQOs at Crows Landing and Maze Road together with the WQOs at Airport Way Bridge near Vernalis.

mouth of the Merced River to Airport Way Bridge near Vernalis. The U.S. Environmental Protection Agency (USEPA) approved the Basin Plan amendment on December 17, 2018. The amendment went into effect in January 2020. The RTMP is also designed to encourage export of surface-water salt loads in accordance with the provisions in the Basin Plan during times of high river assimilative capacity for salt, to reduce reliance on the New Melones Reservoir for dilution flows to the LSJR, and to establish an organizational approach for the continuing development, implementation, and coordination of the RTMP.

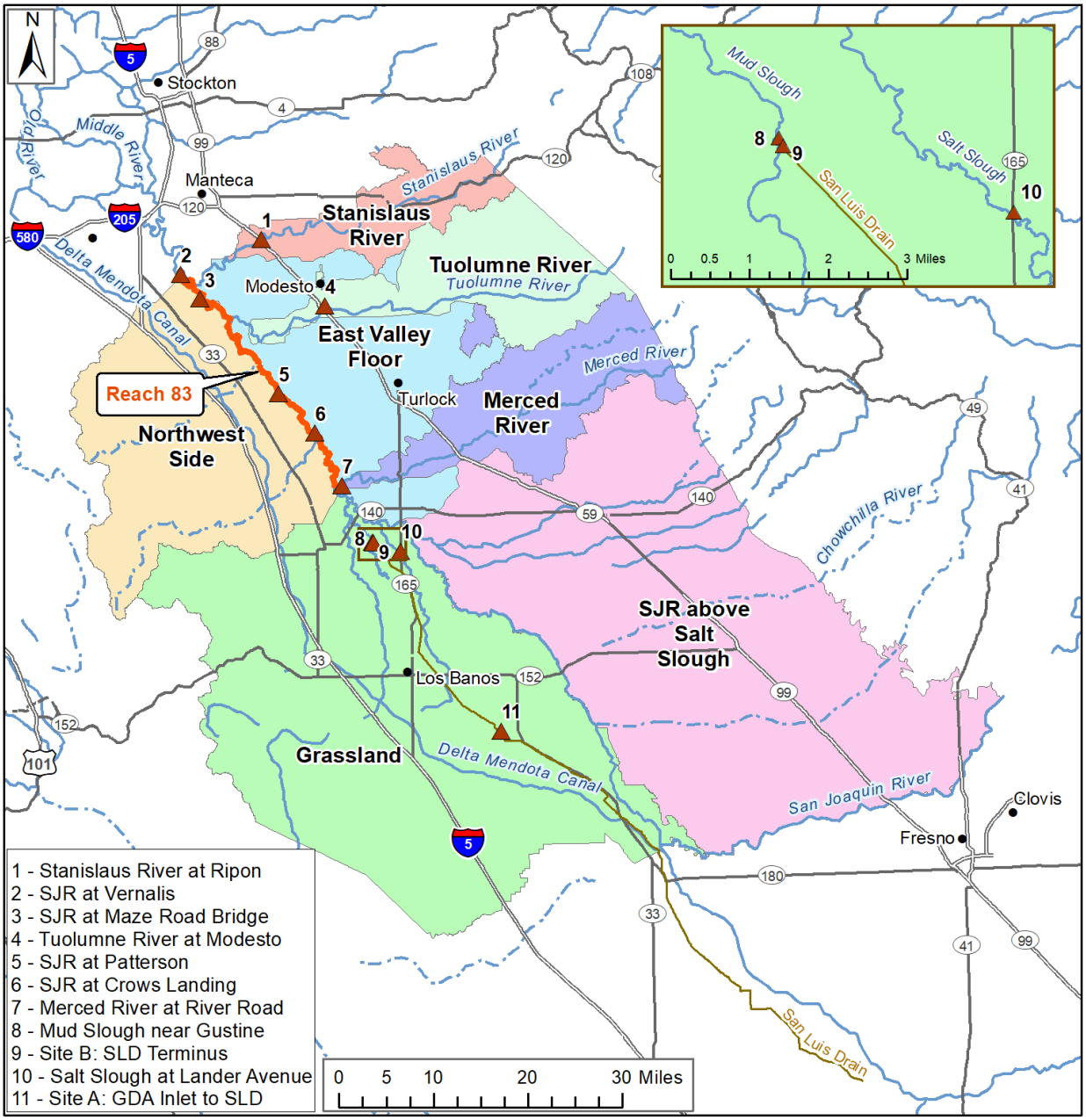


Figure 1. TMDL Subareas for Salt Load Management in the LSJR Basin.

Reclamation has no role in recommending stakeholder drainage release schedules and salinity management practices within the Basin. Rather Reclamation's primary role is developing decision

support tools to provide forecasts of salinity in the San Joaquin River at Maze Road, Crows Landing, and Vernalis compliance monitoring locations. Salinity forecasts will extend two-weeks into the future, which was suggested as a good compromise between model predictive uncertainty and stakeholders' ability to undertake timely actions during periods of potential 30-day running average salinity exceedance.

In addition to its commitment to the real-time salinity management program, Reclamation performs a variety of salinity management activities within the San Joaquin watershed, such as the Grassland Bypass Project (GBP) which sunset on December 31, 2019; the WaterSMART Grant Program; the New Melones Plan of Operations; and the Westside Regional Drainage Plan.

.

Reclamation Staff Resources

Table 1 lists Reclamation staff resources utilized in the salt and boron control program on the LSJR.

Table 1. Reclamation Staff Involved in the RTMP

Name	Role
Jobaid Kabir	Project Management
Vacant Position	Regional Water Quality Coordinator
Jun Wang	WARMF Modeler
James Lu	Regression Modeler
Junaid As-Salek	Contracting Support

Fiscal Year (FY) 2022 Goals and Objectives

All the activities and technical support planned for FY 2022 are intended to provide resources, information, and support to LSJR stakeholders who wish to participate in the RTMP.

Table 2. Reclamation Goals

FY 2022 Goals
Goal 1. Provide funding for maintaining and improving forecasting tools • Contract with Systech Water Resources, Inc. • Cooperative Ecosystem Studies Unit (CESU) agreement with University of California at Merced for technical expert services from Dr. Nigel Quinn • Funding United Stated Geological Survey (USGS) for maintaining five monitoring stations
Goal 2. Maintain forecasting tools and methods • Continue to assess WARMF and Regression model accuracy in forecasting flow and salinity. • Work with stakeholders to improve access to their flow and salinity data that may enhance WARMF forecasting
Goal 3. Provide flow and salinity forecasts • Using the WARMF and Regression models, provide 14-day forecasts of flow and salinity at Vernalis, Maze Road, and Crows Landing compliance monitoring stations
Goal 4: Coordinate with stakeholders • Hold stakeholders' meetings in conjunction with San Joaquin RTMP Steering Committee meetings • Encourage continued participation of East Valley Floor stakeholders
Goal 5: Provide technical support • When requested, provide technical support to stakeholders for implementing real-time drainage data quality assurance • When requested, provide technical support to stakeholders for flow and water quality monitoring. • When requested, provide stakeholder support in writing grant proposals for enhancing RTMP
Goal 6: Maintain monitoring stations • Provide technical support and/or funding for managed wetland real-time water quality implementation activities and coordinated actions with State and Federal refuges
Goal 7: Participate in Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) • Continue to participate in CV-SALTS

Detailed Description of FY 2022 Goals for the RTMP

Goal 1. Provide funding for maintaining and improving forecasting tools

Reclamation intends to continue funding Systech Water Resources, Inc., University of California at Merced, and Grassland Water District (GWD) during FY 2022. Systech Water Resources, Inc. will continue to provide technical support in maintaining and improving the WARMF model, which includes keeping the model updated with current hydrology and watershed data. University of California at Merced will provide technical expert Dr. Nigel Quinn, who will continue to work closely with stakeholders for the successful implementation of the RTMP. The GWD will continue to monitor and furnish data to Reclamation for maintaining and upgrading the WARMF model.

Reclamation will fund the USGS to main five monitoring stations in the San Joaquin River Basin. The stations are:

1. 11261500 - SAN JOAQUIN R FREMONT FORD CA
2. 11273400- SAN JOAQUIN R ABOVE NEWMAN CA
3. 11274550 - SAN JOAQUIN R NR CROWS LANDING CA
4. 11262900 - MUD SLOUGH NR GUSTINE CA
5. 11261100 - SALT SLOUGH A HWY 165 NR STEVINSON CA

In addition, the USGS is developing a workplan and funding proposal to upgrade the Mud and Salt Slough stations with acoustic Doppler transducer technology. This upgrade will improve the accuracy of flow measurement and eliminate backwater episodes where high flows in the San Joaquin reduce discharges into the River while artificially increasing stage in both Sloughs. This results in elevated estimated flow that must be corrected in the data record after the event. The new acoustic Doppler transducers will incur the same annual expense once installed.

Goal 2. Maintain forecasting tools and methods

Using the WARMF and Regression models, Reclamation will produce14-day forecasts of flow and salinity at Vernalis, Maze Road and Crows Landing compliance monitoring stations. While WARMF forecasts will be produced weekly, Regression model forecasts will be provided daily. In addition, Reclamation will assess WARMF and Regression models forecasting accuracy by comparing its performance with actual flow and salinity. Reclamation will develop an automated method for data retrieval from various sources. This will significantly improve the efficiency of the model performance while reducing the risk of human error. Reclamation will work with stakeholders to improve access to their flow and salinity data, which may improve WARMF forecasting.

Goal 3: Provide flow and salinity forecasts

Since FY 2018 Reclamation has used the RFC flow forecasts in WARMF and Regression modeling.

Using the WARMF and Regression models, Reclamation will continue to produce 14-day forecasts of flow and salinity at Vernalis, Maze Road, and Crows Landing compliance monitoring stations. While WARMF forecasts will be produced weekly, Regression forecasts will be provided daily.

Regression flow and salinity forecasts will be posted on the Reclamation website daily, while WARMF flow and salinity forecasts will be available to stakeholders upon request.

Goal 4: Coordinate with stakeholders

Reclamation has been conducting informational meetings jointly with the San Joaquin Valley Drainage Authority (SJVDA) and the RTMP Steering Committee to solicit feedback on Reclamation tool-building activities and help guide the SJVDA's own decision support activities that will include forecasting model development. Starting in FY 2020, Reclamation holds quarterly stakeholder meetings in collaboration with SJVDA and the RTMP Steering Committee. Reclamation will continue to hold these stakeholder meetings during FY2022. During these meetings Reclamation will brief stakeholders on the progress it made during the previous quarter and inform them of planned activities for the upcoming quarter. Reclamation will also encourage continued participation of East Valley Floor stakeholders in the RTMP and will encourage all stakeholders to actively utilize flow and salinity forecasts posted online daily and weekly using the Regression and WARMF models respectively for meeting PTMP goals.

Goal 5: Provide technical support

There is a need for real-time data quality assurance prior to data processing for the WARMF model. When requested, Reclamation will provide technical support to stakeholders for implementing real-time drainage data quality assurance, monitoring flow and water quality monitoring, and writing grant proposals for enhancing RTMP.

Goal 6: Maintain monitoring stations

Reclamation has supported operations and maintenance of monitoring stations by the GWD for the past decade. During FY 2022 Reclamation will continue to provide funding to the GWD for maintaining the monitoring stations needed for WARMF forecasting.

Goal 7: Participate in CV-SALTS

During FY 2022 Reclamation will continue to participate in the CV-SALTS stakeholder group as a member of the Executive Committee and the LSJR Committee. Continued coordination with the CV Water Board staff will be necessary during the implementation of newly adopted water quality objectives (WQOs) for the LSJR, and other Basin Plan amendments.

Funding and Status of the Monitoring Program

Funding amounts listed in Table 3 are subject to allocation by Congress and are to be considered estimates until allocations have been completed. The PTMS allocation is utilized to fund Reclamation activities directly related to salinity in the SJR. The WaterSMART Program also provides salinity management benefits to the SJR and accordingly is listed in Table 3.

The USGS will continue operation and maintenance of Mud Slough, Salt Slough, Crows Landing, Newman, and Fremont Ford monitoring stations needed for WARMF forecasting.

Table 3. FY 2022 Proposed Reclamation Funding

No.	Funding Program	FY	FY 2022 Allocation
I.	Systech Water Resources Inc. for providing WARMF technical support	2019-2022	$750,000
	GWD	2017-2022	
	University of California at Merced CESU agreement	Annually	
	Reclamation Staff Resources	Annually	
II.	WaterSMART Program	2022	TBD

Monitoring stations are located on the LSJR and on the west side of the SJR Basin, as reported in the 2014 SJR RTMP Framework Document. These stations are directly supported by Reclamation and the SJVDA. Their current status and Reclamation's roles are listed in Table 4.

Table 4. Status of Monitoring Stations

San Joaquin River Stations	Status
SJR at Lander Avenue	Active. Operated by California Department of Water Resources (DWR.) Reporting data to CDEC.
SJR at Fremont Ford	Active. Operated by USGS funded by Reclamation. Reports data to NWIS/CDEC.
SJR at Newman	Active. Operated by USGS funded by Reclamation. Reports data to NWIS/CDEC.
SJR near Crows Landing	Active. Operated by USGS funded by Reclamation. Reports data to NWIS/CDEC.

San Joaquin River Stations	**Status**
SJR at Maze Road bridge	Active. Operated by DWR. Reporting data to CDEC.
Westside Drainage Stations	**Status**
Salt Slough at Highway 165 (near Stevenson)	Active. Operated by USGS funded by Reclamation. Reports data to National Water Information System (NWIS)/ California Data Exchange Center (CDEC).
Mud Slough near Gustine	Active. Operated by USGS funded by Reclamation. Reports data to NWIS/CDEC.
Orestimba Creek near River Road, Crows Landing	Inactive. Site abandoned by USGS.
San Luis Drain at Outlet	Active. Operated by SJVDA, Not reported in CDEC.
Los Banos Creek at Highway 140	Active (operated by GWD reported to GWD HydroMetCloud web portal).
Marshall-Spanish-Moran Drains	Active – telemetry and sonde upgraded (operated by SJVDA).
Ramona Lake	Inactive – telemetry and sonde upgraded (operated by SJVDA).
Westley Wasteway	Active – telemetry and sonde upgraded (operated by SJVDA).
Del Puerto Creek	Site moved to USGS site 11274630. Lat. 37.487, Long. 121.208.
Hospital Creek	Active – telemetry and sonde upgraded (operated by SJVDA).
Ingram Creek	Active – telemetry and sonde upgraded (operated by SJVDA).
Diversion Monitoring Stations	**Status**
Patterson Irrigation District	Reporting weekly via e-mail bulletin for use in forecasting
West Stanislaus Irrigation District	Reporting weekly via e-mail bulletin for use in forecasting

References

State Water Board D-1641. Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley Project and the State Water Project in the Southern Delta; and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project. State Water Resources Control Board, March 15, 2000.

CV Water Board 2004a. Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Salt and Boron Discharges into the Lower San Joaquin River Draft Final Staff Report Appendix 1: Technical TMDL Report, Regional Water Quality Control Board Central Valley Region, July 4, 2004.

CV Water Board 2017. Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins to add Electrical Conductivity Water Quality Objectives in the San Joaquin River Between the Mouth of the Merced River and the Airport Way Bridge Near Vernalis. Regional Water Quality Control Board Central Valley Region, June 9, 2017.

Basin Plan. 1994 Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins, Fourth Edition, California Regional Water Quality Control Board Central Valley Region, updated April 2016.

Reclamation Action Plan 2008. Reclamation's Salinity Management Plan, Actions to Address the Salinity and Boron Total Maximum Daily Load Issues for the Lower San Joaquin River, July 2008 (Updated in November 2010).

Compliance Plan 2010. Compliance Monitoring and Evaluation Plan in Compliance with the "Management Agency Agreement between the Central Valley Regional Water Quality Control Board and the Bureau of Reclamation" executed on December 22, 2008; May 2010.

Compliance Report 2010. Compliance Monitoring and Evaluation Report, FY 2000 to Present in Compliance with the "Management Agency Agreement Between the Central Valley Regional Water Quality Control Board and the Bureau of Reclamation" executed on December 22, 2008; May 2010.

Management Agency Agreement, 2008 and 2014. Management Agency Agreement Between the Central Valley Regional Water Quality Control Board and the United States Bureau of Reclamation, Mid-Pacific Region. A Cooperative Means of Implementing Relevant Provisions of the Regional Water Board's Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins – 4th Edition, executed in December 2008 and updated in December 2014.