

U.S. Department of the Interior
Bureau of Reclamation
Interior Region 7 - Upper Colorado Basin



Glen Canyon Dam Adaptive Management Program

Glen Canyon

Adaptive Management Work Group Meeting

Wednesday, February 12, 2020
9:30 a.m. – 5 p.m.

Thursday, February 13, 2020
8:30 a.m. – 3 p.m.

Meeting Location	Sleeping Room Information
<p>Hilton Garden Inn 7290 S Price Rd, Tempe, AZ 85283 Ballroom (480) 897-5100</p>	<p>Home2 Suites by Hilton Phoenix Tempe, Univ. Research Park 7200 S. Price Road Tempe, AZ 85283 Phone: 480-897-5100/5200 Direct: 480-897-5104</p> <p>Rate: \$146 + tax (14.27%) Check in time: 4 p.m. Check out time: 12 noon Cancellation Policy: 48 hours</p>

Intentionally left blank

ADMINISTRATIVE ITEMS

Intentionally left blank

Meeting Packet Order

Tabs	Documents
	Packet Cover/Meeting Information
Administrative Items	<ul style="list-style-type: none"> • Meeting Packet Order • Federal Register Notice • WebEx Participant Information • AMWG Ground Rules
AMWG Supporting Documents	<ul style="list-style-type: none"> • AMWG & TWG Committee Membership Lists • AMWG Charter • AMWG Operating Procedures
Meeting Agenda	<ul style="list-style-type: none"> • Agenda for February 12-13, 2020 Meeting
Draft Minutes & Action Items	<ul style="list-style-type: none"> • Final Draft Minutes from August 2019 Meeting • Action Item Tracking Report
Supplemental Materials	<ul style="list-style-type: none"> • Executive Order 13875 • Dr. Petty Memo – Program Guidance • Flow Ad Hoc Group Charge • TWP Process Document • LTEMP ROD Table 4 - Experimental Treatments

Federal Register Notice

Please see <https://www.usbr.gov/uc/progact/amp/amwg.html>

Meeting Information tab – February 12-13, 2020 meeting

Participant WebEx Information

Topic: AMWG – Day 1

Wednesday, February 12, 2020 – 9:30 am, Phoenix Time

Event Number: 900 491 499

Event Password: AMP4

Event Address:

<https://bor.webex.com/bor/j.php?MTID=m4c5017aba50997e72049d8c00b8dc14c>

Phone #: 877-932-7704

Passcode: 8410783



Topic: AMWG – Day 2

Thursday, February 13, 2020 – 8:30 am, Phoenix Time

Event Number: 909 461 558

Event Password: AMP4

Event Address:

<https://bor.webex.com/bor/j.php?MTID=ma7bec5ec8143a4011527fa6d0552d006>

Phone #: 877-932-7704

Passcode: 8410783

Glen Canyon Dam Adaptive Management Work Group

Ground Rules

- ✚ Arrive on time.
- ✚ Turn down cell phone ringer.
- ✚ Commit to FULL participation.
- ✚ Do homework before meeting begins.
- ✚ Take private and/or sidebar conversations outside.
- ✚ Wait to be recognized before speaking.
- ✚ Show respect for others.
- ✚ Be concise.
- ✚ Stick to the topic
- ✚ Save new business for the appointed time
- ✚ Help keep the meeting on schedule

AMWG SUPPORTING DOCUMENTS

Intentionally left blank

Glen Canyon Dam Adaptive Management Work Group

Committee Membership List

(Updated: 2/3/2020)

SECRETARY'S DESIGNEE	ALTERNATE SECRETARY'S DESIGNEE	Designed Federal Officer (will also serve in the absence of Dr. Petty)
Dr. Timothy "Tim" Petty Assistant Secretary for Water and Science Department of the Interior 1849 C Street NW Washington, DC 20240 T: 202-208-3024 Fax: 202-208-3324 EM: timothy_petty@ios.doi.gov		Brent Esplin Regional Director Upper Colorado Regional Office Bureau of Reclamation 125 S. State Street, Room 8100 Salt Lake City, UT 84138 T: 801-524-3604 F: 801-524-3855 EM: besplin@usbr.gov

Federal Agencies:

1-BUREAU OF RECLAMATION	
Daniel Picard (member) 125 S. State Street, Room 8100 Salt Lake City, UT 84138 T: 801-524-3602 F: 801-524-3855 EM: dpicard@usbr.gov	Kathleen Callister (alternate) 125 S. State Street, Room 8100 Salt Lake City, UT 84138 T: 801-524-3781 F: 801-524-3807 EM: kcallister@usbr.gov
2-BUREAU OF INDIAN AFFAIRS	
Charles "Chip" Lewis (member) Western Regional Office 2600 N. Central Avenue, 4 th Floor Phoenix, AZ 85004-3050 T: 602-379-6782 F: 602-379-3837 EM: charles.lewis@bia.gov	Garry J. Cantley (alternate) Western Regional Office 2600 N. Central Avenue, 4 th Floor Phoenix, AZ 85004-3050 T: 602-379-6750 x1257 F: 602-379-3837 EM: garry.cantley@bia.gov
3-NATIONAL PARK SERVICE (Grand Canyon National Park)	
VACANT	Jan Balsom (alternate) Grand Canyon National Park PO Box 129 Grand Canyon, AZ 86023 T: 928-638-7758 F: 928-638-7815 EM: jan_balsom@nps.gov

4-U.S. FISH AND WILDLIFE SERVICE	
VACANT	Kirk Young (alternate) Arizona Fish & Wildlife Conservation Office 2500 S. Pine Knoll Drive Flagstaff, AZ 86001 T: 928-556-2124 F: 928-556-2125 EM: kirk_young@fws.gov

Native American Tribes:

5-HUALAPAI TRIBE	
VACANT	Richard Powskey (alternate) Hualapai Tribal Council P.O. Box 179 Peach Springs, AZ 86434 T: 928-769-2267 F: 928-769-2532 EM: richard.powskey@hualapai-nsn.gov

6-HOPI TRIBE	
VACANT	VACANT

7-NAVAJO NATION		
VACANT	Alternate: Timothy C. Begay Navajo Cultural Specialist The Navajo Nation PO Box 7440 Window Rock, AZ 86515 Cell: 505-879-7268 EM: timothy_begay@yahoo.com	Alternate: Terilyn "Kim" Yazzie Fish Biologist Navajo Nation Dept. of Fish & Wildlife PO Box 7440 Window Rock, AZ 86515 Cell: 505-402-9098 Work: 928-871-7069 Nzd Fax: 505-960-6657 EM: kyazzie@nndfw.org

8-PUEBLO OF ZUNI	
VACANT	Carleton Bowekaty (alternate) PO Box 339 1203-B State Highway 53 Zuni, NM 87327 T: 505-782-7192 EM: Carleton.bowekaty@ashiwi.org

9-SOUTHERN PAIUTE CONSORTIUM	
VACANT	VACANT

10-SAN JUAN SOUTHERN PAIUTE TRIBE	
VACANT	

Seven Basin States:

11-ARIZONA	
<p>Clint Chandler (member) Arizona Department of Water Resources Water Planning and Permitting Division 1110 W. Washington Street, Suite 310 Phoenix, AZ 85007 T: 602-771-8412 F: 602-771-8681 EM: cchandler@azwater.gov</p>	<p>Vineetha Kartha (alternate) Arizona Department of Water Resources Colorado River Management Section 1110 W. Washington Street, Suite 310 Phoenix, AZ 85007 T: 602-771-8552 F: 602-771-8681 EM: vkartha@azwater.gov</p>

12-CALIFORNIA	
VACANT	VACANT

13-COLORADO	
<p>John H. McClow (member) Colorado Water Conservation Board Upper Gunnison River Water Conservancy District 210 West Spencer, Suite B Gunnison, CO 81230 T: 970-641-6065 F: 970-641-1162 EM: jmcclow@ugrwc.org</p>	VACANT

14-NEVADA	
VACANT	<p>Warren Turkett (alternate) Colorado River Commission of Nevada 555 E. Washington Avenue, Suite 3100 Las Vegas, NV 89101-1048 T: 702-486-2672 F: 702-486-2697 EM: wturkett@crc.nv.gov</p>

15-NEW MEXICO	
VACANT	VACANT

16-UTAH	
VACANT	VACANT

17-WYOMING	
Steven W. Wolff (member) Colorado River Coordinator, Interstate Streams Division State Engineer's Office 122 W. 25 th Street Cheyenne, WY 82002-0370 T: 307-777-1942 F: 307-777-5451 EM: steve.wolff@wyo.gov	VACANT

Environmental Groups:

18-GRAND CANYON WILDLANDS COUNCIL	
VACANT	VACANT

19-NATIONAL PARKS CONSERVATION ASSOCIATION	
VACANT	VACANT

Recreation Interests:

20-GRAND CANYON RIVER GUIDES	
David Brown (member) 219 8 th Avenue Salt Lake City, UT 84103 T: 801-694-1228 EM: dbrown@swca.com	VACANT
21-INTERNATIONAL FEDERATION OF FLY FISHERS / TROUT UNLIMITED	
John Jordan (member) 4510 E. Joshua Tree Lane Paradise Valley, AZ 85253 T: 602-840-4224 EM: jjordan1@cox.net	John Hamill (alternate) 1254 N. Fox Hill Road Flagstaff, AZ 86004 C: 928-606-4234 EM: hamilldstr50@msn.com

Federal Power Purchase Contractors:

22-COLORADO RIVER ENERGY DISTRIBUTORS ASSOCIATION (CREDA)	
Leslie James (member) 10429 S. 51 st Street, Suite 230 Phoenix, AZ 85044 T: 480-477-8646 F: 480-477-8647 EM: creda@creda.cc	VACANT
23-UTAH MUNICIPAL POWER AGENCY	
Clifford Barrett (member) 845 Lakeview Stansbury Park, UT 84074-1912 T: 435-882-0164 EM: cibarre@q.com	Kevin Garlick (alternate) Utah Municipal Power Agency (UMPA) 696 W. 100 S. Spanish Fork, UT 84660 T: 801-798-7849 EM: kevin@umpa.energy

Other Stakeholders:

24-ARIZONA GAME AND FISH DEPARTMENT	
Chris Cantrell (member) Chief, Fisheries Branch 5000 W. Carefree Highway Phoenix, AZ 85086-5000 T: 602-942-3000 F: EM: ccantrell@azgfd.gov	James deVos (alternate) Assistant Director, Wildlife Management Division 5000 W. Carefree Highway Phoenix AZ 85086-5000 T: 623-236-7302 EM: jdevos@azgfd.gov
25-DEPARTMENT OF ENERGY (DOE) – WESTERN AREA POWER ADMINISTRATION (WAPA)	
Steve Johnson (member) Western Area Power Administration 1800 S. Rio Grande Avenue Montrose, CO 81401 T: 970-252-3000 F: EM: johnsons@wapa.gov	Brian Sadler (alternate) Western Area Power Administration 299 S. Main Street, Suite 200 Salt Lake City, UT 84111 T: 801-524-5506 F: EM: sadler@wapa.gov

Intentionally left blank

**Glen Canyon Dam Adaptive Management Program
Glen Canyon Dam Technical Work Group
Membership List**

(Updated: 2/3/2020)

TWG Chairperson	TWG Vice Chairs
<p>Seth Shanahan (10/1/16) Senior Biologist Southern Nevada Water Authority 100 City Parkway, Suite 700 Las Vegas NV 89106 T: 702-822-3314 F: 702-822-3308 EM: seth.shanahan@snwa.com</p>	<p>Vineetha Kartha State of Arizona</p> <p>Lee Traynham Bureau of Reclamation</p>

Federal Agencies:

1-BUREAU OF RECLAMATION	
<p>Lee Traynham (member) U.S. Bureau of Reclamation 125 S. State Street, Room 8100 Salt Lake City UT 84138 T: 801-524-3752 F: 801-524-5499 EM: ltraynham@usbr.gov</p>	<p>VACANT U.S. Bureau of Reclamation 125 S. State Street, Room 8100 Salt Lake City UT 84138 T: 801-524-XXXX F: 801-524-3807 EM: @usbr.gov</p>

2-BUREAU OF INDIAN AFFAIRS	
<p>Charles "Chip" Lewis (member, 8/6/13) Western Regional Office 2600 N. Central Avenue, 4th Floor Phoenix AZ 85004-3050 T: 602-379-6782 F: 602-379-3837 EM: charles.lewis@bia.gov</p>	<p>Garry J. Cantley (alternate, 12/4/06) Western Regional Office 2600 N. Central Avenue, 4th Floor Phoenix AZ 85004-3050 T: 602-379-6750 x1257 F: 602-379-3837 EM: garry.cantley@bia.gov</p>

3-NATIONAL PARK SERVICE (Grand Canyon National Park)	
<p>Jan Balsom (member, 11/3/10) Senior Advisor, Stewardship & Tribal Programs Office of the Superintendent Grand Canyon National Park PO Box 129 (Street: 20 South Entrance Road) Grand Canyon AZ 86023 T: 928-638-7758 F: 928-638-7815 EM: jan_balsom@nps.gov</p>	<p>Brian Healy (alternate, 11/16/15) Fisheries Program Manager Grand Canyon National Park 1824 South Thompson Street, Suite 200 Flagstaff, AZ 86001 T: 928-638-7453 F: 928-638-7492 EM: Brian_Healy@nps.gov</p>

4-NATIONAL PARK SERVICE (Glen Canyon National Recreation Area)	
Ken Hyde (member, 8/17/16) Chief, Glen Canyon NRA, Rainbow Bridge NM PO Box 129 PO Box 1507, 691 Scenic View Drive Page AZ 86040 T: 928-606-6265 EM: ken_hyde@nps.gov	VACANT

5-U.S. FISH AND WILDLIFE SERVICE	
Kirk Young (member, 11/14/12) Arizona Fish & Wildlife Conservation Office 2500 S. Pine Knoll Drive Flagstaff AZ 86001 T: 928-556-2124 F: 928-556-2125 EM: kirk_young@fws.gov	Jessica Gwinn (alternate, 5/16/16) U.S. Fish and Wildlife Service Arizona Ecological Services Office 2321 W. Royal Palm Road, Suite 103 Phoenix AZ 85021 T: 602-242-0210 x249 EM: Jessica_gwinn@fws.gov

Native American Tribes:

6-HUALAPAI TRIBE	
VACANT	VACANT

7-HOPI TRIBE	
Jakob Maase Archeologist, Cultural Preservation Office The Hopi Tribe P.O. Box 123 Kykotsmovi, AZ 86039-0123 T: Jmaase1@ksu.edu	VACANT

8-NAVAJO NATION	
VACANT PO Box 7440 Window Rock AZ 86515 T: 928-871-XXXX F: 928-871-7886 Cell: EM:	Kim Yazzie (alternate, 8/24/17) Navajo Nation Dept of Fish & Wildlife Window Rock AZ T: 928-871-7152 Cell: 505-402-9098 NZD Fax: 928-871-7069 EM: kyazzie@nndfw.org

9-PUEBLO OF ZUNI	
Kurt Dongoske (member, 11/3/10) Director & Tribal Historic Preservation Officer Zuni Heritage & Historic Preservation Ofc. PO Box 1149 Zuni NM 87327 T: 505-782-4814 T: 928-289-9259 (AZ Ofc) EM: kdongoske@cableone.net	VACANT
10-SOUTHERN PAIUTE CONSORTIUM	
Charley Bullets (member, 11/3/10) Director, Southern Paiute Consortium HC 65 Box 2 Fredonia AZ 86022 T: 928-643-6278 F: 928-643-7260 EM: cbullets@kaibabpaiute-nsn.gov	Meghann Olson (alternate, 7/10/15) Kaibab Band of Paiute Indians HC 65 Box 2 Fredonia AZ 86022 T: 928-643-8314 F: 928-643-7260 EM: molson@kaibabpaiute-nsn.gov
11-SAN JUAN SOUTHERN PAIUTE TRIBE	
P.O. Box 2656 Tuba City, AZ 86002 T: 928-283-1066	

Seven Basin States:

12-ARIZONA	
Vineetha Kartha (member, 12/13/13) Arizona Department of Water Resources Water Planning and Permitting Division 1110 W. Washington Street, Suite 310 Phoenix AZ 85007 T: 602-771-8552 F: 602-771-8681 EM: vkartha@azwater.gov	Craig McGinnis (alternate, 1/31/19) Water Resources Specialist II Colorado River Management Arizona Department of Water Resources 1110 W. Washington Street, Suite 310 Phoenix AZ 85007 T: 602-771-0201 F: 602-771-8681 EM: cmcginns@azwater.gov
13-CALIFORNIA	
VACANT	Jessica Neuwerth (alternate, 7/7/15) Environmental Scientist Colorado River Board of California 770 Fairmont Avenue, Suite 100 Glendale AZ 91203-1035 T: 815-500-1625 x339 EM: jneuwerth@crb.ca.gov

14-COLORADO

Michelle Garrison (member, 12/18/19)
 Colorado Water Conservation Board
 1313 Sherman St., Rm. 721
 Denver, CO 80203
 303-866-3441 x3213
Michelle.garrison@state.co.us

D. Randolph Seaholm (alternate, 11/3/10)
 Colorado Water Conservation Board
 6085 Nile Circle
 Golden CO 80403
 T: 303-278-3064
 EM: seaholmdr@gmail.com

15-NEVADA

Seth Shanahan (10/1/16)
 Senior Biologist
 Southern Nevada Water Authority
 100 City Parkway, Suite 700
 Las Vegas NV 89106
 T: 702-822-3314 F: 702-822-3308
 EM: seth.shanahan@snwa.com

Peggy Roefer (alternate, 6/6/16)
 Natural Resource Analyst
 Colorado River Commission of Nevada
 555 E. Washington Avenue, Suite 3100
 Las Vegas NV 89101
 T: 702-486-2669
 EM: proefer@crc.nv.gov

16-NEW MEXICO

Paul Harms (member, 11/3/10)
 NM Interstate Stream Commission
 PO Box 25102
 Santa Fe NM 87504
 T: 505-827-1150 F: 505-827-6188
 EM: paul.harms@state.nm.us

Christina Noftsker
 NM Interstate Stream Commission
 PO Box 25102
 Santa Fe NM 87504
 T: 505-827-_____ F: 801-531-9705
 EM: christina.noftsker@state.nm.us

17-UTAH**VACANT****VACANT****18-WYOMING**

Steven W. Wolff (AMWG mem., 2/3/15)
 Colorado River Coordinator, Interstate
 Streams Division
 State Engineer's Office
 122 W. 25th Street
 Cheyenne WY 82002-0370
 T: 307-777-1942 F: 307-777-5451
 EM: steve.wolff@wyo.gov

Charlie Ferrantelli (alternate, 10/25/18)
 River Basin Coordinator
 State Engineer's Office – Interstate Streams Div
 122 W. 25th Street – Herschler Building 1E
 Cheyenne WY 82002
 T: 307-777-6151 F: 307-777-5451
 EM: charlie.ferrantelli@wyo.gov

Environmental Groups:

19-GRAND CANYON WILDLANDS COUNCIL	
Larry Stevens (member, 11/3/10) PO Box 1315 Flagstaff AZ 86002 Tel: 928-380-7724 EM: larry@springstewardship.org	Kelly Burke (alternate, 8/25/17) Executive Director PO Box 1315 Flagstaff AZ 86002 Tel: 928-606-7870 EM: gcwildlands@icloud.com

20-NATIONAL PARKS CONSERVATION ASSOCIATION	
Kevin Dahl (member, 8/20/14) NPCA, Southwest Region 738 N. 5 th Avenue, Suite 222 Tucson AZ 85705 T: 520-624-2014 C: 520-603-6430 EM: kdahl@npca.org	VACANT

Recreation Interests:

21-GRAND CANYON RIVER GUIDES	
Ben Reeder (member, 2/16/16) 6380 South 2300 East Holladay UT 84121 T: 801-860-1070 EM: benreeder@hotmail.com	David Brown (alternate, 7/14/16) 219 8 th Avenue Salt Lake City UT 84103 T: 801-694-1228 EM: dbrown@swca.com

22-INTERNATIONAL FEDERATION OF FLY FISHERS / TROUT UNLIMITED	
Jim Strogen (member, 12/11/17) Trout Unlimited 401 W. Christopher Point Payson AZ 85541 T: 480-242-2569 EM: jimstrog@gmail.com	Bill Persons (alternate, 11/21/17) Federation of Fly Fishers 14621 North 22 nd Lane Phoenix, AZ 85023 T: EM: bpersons51@gmail.com

Federal Power Purchase Contractors:

23-COLORADO RIVER ENERGY DISTRIBUTORS ASSOCIATION (CREDA)	
William E. Davis (member, 11/3/10) EcoPlan Associates, Inc. 701 W. Southern Avenue, Suite 203 Mesa AZ 85210 T: 480-733-6666 F: 480-733-0661 EM: wdavis@ecoplanaz.com	Leslie James (AMWG member, 11/3/10) 10429 S. 51 st Street, Suite 230 Phoenix AZ 85044 T: 480-477-8646 F: 480-477-8647 EM: creda@creda.cc

24-UTAH ASSOCIATED MUNICIPAL POWER SYSTEMS (UAMPS)	
Clifford Barrett (member, 11/3/10) 845 Lakeview Stansbury Park UT 84074-1912 T: 435-882-0164 EM: cibarre@q.com	VACANT

Other Stakeholders:

25-ARIZONA GAME AND FISH DEPARTMENT	
Ryan Mann (member, 11/21/16) Aquatic Research Program Manager Arizona Game and Fish Department 5000 W. Carefree Highway Phoenix AZ 85086 T: 623-236-7538 F: EM: rmann@azgfd.gov	Dave Rogowski, PhD (alternate, 7/7/15) Colorado River Fisheries Biologist Research Br. Arizona Game and Fish Department 506 N. Grant Street, Suite L Flagstaff AZ 86004 T: 928-226-7677 F: EM: drogowski@azgfd.gov

26-DEPARTMENT OF ENERGY (DOE) – WESTERN AREA POWER ADMINISTRATION (WAPA)	
Shane Capron (member, 6/4/12) 2000 Erie Street Bellingham AZ 98229 T: 720-799-3441 EM: capron@wapa.gov	Craig Ellsworth (alternate, 6/4/12) Fisheries Biologist WAPA, CRSP Management Center 150 Social Hall Avenue, Suite 300 T: 801-524-3344 EM: ellsworth@wapa.gov

**U.S. Department of the Interior
Bureau of Reclamation
Glen Canyon Dam Adaptive Management Work Group**

CHARTER

- 1. Committee's Official Designation.** Glen Canyon Dam Adaptive Management Work Group (AMWG).
- 2. Authority.** The Grand Canyon Protection Act (Act) of October 30, 1992, Public Law 102-575; Federal Advisory Committee Act (FACA), as amended, 5 U.S.C. Appendix 2.
- 3. Objectives and Scope of Activities.** The Glen Canyon Dam Adaptive Management Program (AMP) provides for monitoring the results of the operating criteria and plans adopted by the Secretary of the Interior (Secretary), and for research and studies to suggest appropriate changes to those plans and operating criteria.

The AMP includes the AMWG. The AMWG provides advice and recommendations to the Secretary relative to the operation of Glen Canyon Dam. The Secretary's Designee is the Assistant Secretary for Water and Science who serves as the Chair. The AMWG recommends suitable monitoring and research programs and makes recommendations to the Secretary. The AMWG may recommend research and monitoring proposals outside the Act which complement the AMP process, but such proposals will be funded separately, and shall not deter from the focus of the Act.

Under Section 1802(a) of the Act, "[t]he Secretary shall operate Glen Canyon Dam in accordance with the additional criteria and operating plans specified in Section 1804 [of the Act] and exercise other authorities under existing law in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including but not limited to, natural and cultural resources and visitor use." Under Section 1802(b) of the Act, "[t]he Secretary shall implement this section [of the Act] in a manner fully consistent with and subject to the Colorado River Compact, the Upper Colorado River Basin Compact, the Water Treaty of 1944 with Mexico, the decree of the Supreme Court in *Arizona v. California*, and the provisions of the Colorado River Storage Project Act of 1956 and the Colorado River Basin Project Act of 1968 that govern allocation, appropriation, development, and exportation of the waters of the Colorado River basin."

- 4. Description of Duties.** The duties or roles and functions of the AMWG are in an advisory capacity only. They are, as applicable, to:
 - a. Establish AMWG operating procedures.
 - b. Advise the Secretary in meeting environmental and cultural commitments including those contained in the Record of Decision for the Glen Canyon Dam Long-Term Experiment and Management Plan Final Environmental Impact Statement and subsequent related decisions.

- c. Recommend the framework for the AMP policy, goals, and direction.
- d. Recommend resource management objectives for development and implementation of a long-term monitoring plan, and any necessary research and studies required to determine the effect of the operation of Glen Canyon Dam on the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including but not limited to, natural and cultural resources, and visitor use.
- e. Review and provide input on the report identified in the Act to the Secretary, the Congress, and the Governors of the Colorado River Basin States. This annual report includes discussion on dam operations, the operation of the AMP, status of resources, and measures taken to protect, mitigate, and improve the resources defined in the Act.
- f. Annually review long-term monitoring data to provide advice on the status of resources and whether the AMP goals and objectives are being met.
- g. Review and provide input on all AMP activities undertaken to comply with applicable laws, including permitting requirements.

All current and future Executive Orders, Secretary's Orders, and Secretarial memos should be included for discussion and recommendation as they are released. At the conclusion of each meeting or shortly thereafter, provide a detailed recommendation report, including meeting minutes, to the DFO.

- 5. Agency or Official to Whom the Committee Reports.** The AMWG reports to the Secretary through the Secretary's Designee.
- 6. Support.** The logistical and support services for the meetings of the AMWG will be provided by the Bureau of Reclamation.
- 7. Estimated Annual Operating Costs and Staff Years.** The estimated annual operating costs associated with supporting the AMWG's functions are \$400,000, including all direct and indirect expenses. It is estimated that four FTE's will be required to support the AMWG.
- 8. Designated Federal Officer.** The DFO is the Bureau of Reclamation, Upper Colorado Region, Regional Director who is a full-time Federal employee appointed in accordance with Agency procedures. The DFO or alternate will approve or call all AMWG and subcommittee meetings, prepare and approve all meeting agendas, attend all AMWG and subcommittee meetings, adjourn any meetings when the DFO determines adjournment to be in the public interest and chair meetings when directed to do so by the Secretary.

9. Estimated Number and Frequency of Meetings. The AMWG is expected to meet approximately twice a year, and at such other times as designated by the DFO.

10. Duration. Continuing.

11. Termination. The AMWG will terminate 2 years from the date the charter is filed, unless prior to that date, it is renewed in accordance with the provisions of section 14 of the FACA. The AMWG will not meet or take any action without a valid current charter.

12. Membership and Designation. Members and alternate members of the AMWG appointed by the Secretary will be comprised of, but not limited to, the following:

a. Secretary's Designee, who will serve as Chairperson for the AMWG.

b. One representative each from the following entities:

- (1) The Secretary of Energy (Western Area Power Administration)
- (2) Arizona Game and Fish Department
- (3) Hopi Tribe
- (4) Hualapai Tribe
- (5) Navajo Nation
- (6) San Juan Southern Paiute Tribe
- (7) Southern Paiute Consortium
- (8) Pueblo of Zuni

c. One representative each from the Governors from the seven basin States:

- (1) Arizona
- (2) California
- (3) Colorado
- (4) Nevada
- (5) New Mexico
- (6) Utah
- (7) Wyoming

d. Representatives each from the general public as follows:

- (1) Two from environmental organizations
- (2) Two from the recreation industry
- (3) Two from contractors who purchase Federal power from Glen Canyon Powerplant

e. One representative from each of the following DOI agencies as ex-officio non-voting members:

- (1) Bureau of Reclamation

- (2) Bureau of Indian Affairs
- (3) U.S. Fish and Wildlife Service
- (4) National Park Service

Members will be appointed to the AMWG by the Secretary, with input and recommendations from the above-referenced agencies, States, tribes, contractors for Federal power from Glen Canyon Dam, environmental organizations, and other stakeholders. Each member may also recommend an alternate member for appointment by the Secretary. Members and alternates of the AMWG will be appointed for a 3-year term

Members of the AMWG serve without compensation, except that the DFO, in his or her sole discretion, may choose to allow compensation for the Technical Work Group subcommittee chairperson according to applicable authorities. While away from their homes or regular places of business, members engaged in AMWG or subcommittee business approved by the DFO may be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in Government service under section 5703 of title 5 of the United States Code.

A vacancy on the AMWG will be filled in the same manner in which the original appointment was made.

13. Ethics Responsibility.

- a. **Members Who Are Federal Employees.** Federal members who are appointed to the AMWG are appointed in their official capacity as Federal employees. This means that when these Federal employees act in their capacity as an AMWG member, they will be subject to the ethics statutes and regulations that apply to them as Federal employees, including the avoidance of conflict of interest.
- b. **Members Who Are Not Federal Employees.** AMWG or subcommittee members who are not Federal employees shall not participate in any AMWG or subcommittee deliberations or votes relating to a specific party matter before the Department or its bureaus and offices including a lease, license, permit, contract, grant, claim, agreement, or litigation in which the member or the entity the member represents has a direct financial interest.

14. Subcommittees. Subject to the DFO's approval, subcommittees may be formed for the purpose of compiling information or conducting research. However, such subcommittees must act only under the direction of the DFO and must report their recommendations to the full AMWG for consideration. Subcommittees must not provide advice or work products directly to the Agency. Subcommittees will meet as necessary to accomplish their assignments, subject to the approval of the DFO and the availability of resources.

15. Recordkeeping. The records of the AMWG, and formally and informally established subcommittees of the AMWG, shall be handled in accordance with General Records Schedule 6.2 or other approved Agency records disposition schedules. These records shall be available for inspection and copying, subject to the Freedom of Information Act, 5 U.S.C. 552.

C. 552.



Secretary of the Interior

9/19/19

Date Signed

SEP 19 2019

Date Filed

Intentionally Left Blank

February 9, 2011

GLEN CANYON DAM
ADAPTIVE MANAGEMENT WORK GROUP
OPERATING PROCEDURES

FOREWARD

The Grand Canyon Protection Act (Act) of October 30, 1992, (Public Law 102-575) directs the Secretary of the Interior (Secretary) to "establish and implement long-term monitoring programs and activities that will ensure that Glen Canyon Dam is operated in a manner consistent with that of section 1802" of the Act. "The monitoring programs and activities shall be established and implemented in consultation with the Secretary of Energy; the Governors of the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming; Indian tribes; and the general public, including representatives of academic and scientific communities, environmental organizations, the recreation industry, and contractors for the purchase of Federal power produced at Glen Canyon Dam." In order to comply with the consultation requirement of the Act, the Glen Canyon Dam EIS recommended formation of a Federal Advisory Committee. To fulfill this recommendation, the Glen Canyon Dam Adaptive Management Work Group (AMWG) was established. The AMWG Charter imposes the following criteria: (1) the AMWG shall operate under the Federal Advisory Committee Act (Public Law 92-463); (2) the Chairperson shall be designated by the Secretary; (3) the Secretary's Designee, shall also serve as the Designated Federal Official under the Federal Advisory Committee Act; (4) the Bureau of Reclamation will provide the necessary support in talking accurate minutes of each meeting; and (5) the AMWG shall continue in operation until terminated or renewed by the Secretary of the Interior under the Federal Advisory Committee Act.

OPERATION

1. Meetings. The AMWG is expected to meet semiannually. The Secretary's Designee may call additional meetings as deemed appropriate. A minimum of one meeting will be held annually. All meetings shall be announced by notice in the Federal Register and by news release to local newspapers.

Thirteen members must be present (either in person or on the telephone) at any meeting of the AMWG to constitute a quorum.

Robert's Rules of Order will be generally followed, except some flexibility will be allowed as needs dictate.

The Bureau of Reclamation is responsible for arranging meetings and for other duties associated with operation of the AMWG. They will arrange for meeting location, provide staff for the Designee, prepare minutes and Federal Register Notices, and other operational requirements of the AMWG.

Meetings of the AMWG will generally be held in Phoenix, Arizona, to allow for better travel accessibility for the members as well as provide greater opportunity for the public to attend. However, the Secretary's Designee may decide upon a different location as he/she deems appropriate.

The AMWG may make recommendations to the Secretary of the Interior in response to future legislation or appropriations that may affect or impact the Glen Canyon Dam Adaptive Management Program. This may be accomplished when an AMWG member requests to the Chair, an issue to be addressed either at a regular meeting of the AMWG, at a special meeting or during a conference call. AMWG members will discuss the issue and if appropriate, make recommendations on the issue to the Secretary of the Interior in a timely manner. When any other potentially controversial topics are identified by any AMWG member, they should notify the Chair so that this procedure can be implemented.

2. Chairperson. The Chairperson will be the Secretary's Designee, who will preside over the meetings of the AMWG. In the absence of the Chairperson, a senior level Interior representative will act as Chairperson for the AMWG. The Chairperson or designated alternate must be present before a meeting of the AMWG may convene. The Chairperson or his/her alternate is authorized to adjourn an AMWG meeting at any time.

The Secretary's Designee will also be responsible for sending a formal summary report after each Advisory Committee meeting directly to the Secretary of the Interior with copies of subject summary report to be provided to all AMWG members.

3. Members. Membership shall follow the guidelines in the AMWG Charter. Members of the AMWG will be designated by the Secretary of the Interior. They shall serve for a term of four years. Members may be re-designated to serve for more than one term.

4. Alternate Committee Members. Each AMWG member may designate an alternate to serve for the same term as the member. Alternates must be identified to the Chairperson in writing. Alternates must meet the same qualifications as the member. Alternates will have authority to participate in AMWG business, including quorum and voting privileges. A list of members and alternates shall be maintained and made available to AMWG members.

5. Agenda. At least 30 days prior to any meeting of the AMWG, a draft of the proposed agenda and related information will be sent to the group members. Members shall review the agenda and return comments and proposed agenda items to the Designee within two weeks of the agenda mailing date. The final agenda will be sent to the members 15 days prior to the meeting. The Secretary's Designee shall approve the agendas.

6. Voting. The maker of a motion must clearly and concisely state and explain his or her motion. Motions may be made verbally or submitted in writing in advance of the meeting. Notice of motions to be made by any member of the AMWG should be announced in the Federal Register and presented on the agenda. Any motions proposed by any member in meetings must be related to an agenda topic and will be considered only if a simple majority of members present agree to hear it. After a motion there should be presentations by staff followed by a discussion and a call for questions. The public will be given opportunity to comment during the question period as allowed by the Chairperson. Any member of the public, who has asked to address the AMWG, shall have a minimum of two minutes to comment. The Chairperson can limit the total time allowed to the public for comments. Comments shall address the motion and not be repetitive to presentations, group discussions or other comments previously presented. The motion must be fully documented for the minutes and restated clearly by the Chairperson before a vote is taken.

The group should attempt to seek consensus but, in the event that consensus is not possible, a vote should be taken. Voting shall be by verbal indication or by raised hand. Approval of a motion requires a 60 percent majority of members present and voting. The views of any dissenting member or minority group shall be briefly incorporated into the information transmitted to the Secretary along with the majority recommendation. In addition, at his/her discretion, the Secretary's Designee may ask any individual at the meeting for the rationale related to their vote. Voting shall occur only with the formal meetings of the group.

7. Minutes. Detailed minutes of each meeting will be kept. The minutes will contain a record of persons present and a description of pertinent matters discussed, conclusions reached, and actions taken on motions. Minutes shall be limited to approximately 5-15 pages. The corrections and adoption of the minutes will be by vote of the AMWG at the next subsequent meeting. The Secretary's Designee shall approve all minutes. The Bureau of Reclamation is responsible for recording and disseminating minutes to AMWG members, generally within two weeks of the subject meeting, but in no event longer than 30 days.

9. Public Involvement. No later than 15 days prior to each meeting of the AMWG, a notice will be published in the Federal Register. Meetings will be open to the public and advertised in local newspapers. Interested persons may appear in person, or file written statements to the AMWG. Public comments can be on any issue related to operation of the Glen Canyon Dam. A specific time for public comment will be identified in the agenda. Advance approval for oral participation may be prescribed and speaking time may be limited. Minutes of the AMWG meetings and copies of reports submitted to the AMWG will be maintained for public review at the Bureau of Reclamation's Upper Colorado Regional Office in Salt Lake City, Utah, and at the Library of Congress in Washington, D.C. They will also be posted to the Bureau of Reclamation web site www.uc.usbr.gov/amp).

10. Payment of Travel. While engaged in the performance of official business at AMWG and AMWG sub-group meetings (regular, ad hoc, and Protocol Evaluation Panel meetings) away from home or their regular places of business, all AMWG members or AMWG sub-group members shall, upon request, be reimbursed for travel expenses in accordance with current Federal Travel Regulations. Alternates representing the official committee member may also receive compensation for travel expenses.

11. Open/Closed Meetings. If any member proposes discussion of a sensitive issue felt to require a closed session, he or she should so state in a proposal submitted to AMWG members in sufficient time to include it in the agenda published in the Federal Register Notice announcing the next meeting. A closed executive session may be held during a regular meeting but should be used rarely. Any sensitive cultural issues will require consultation with Native Americans prior to meeting.

Telephone conference meetings must have a notice in the Federal Register 15 days prior to the call. There must be adequate opportunity for the general public to listen to the conference call.

The AMWG may conduct business outside of formal meetings through telephone polls conducted by the Chairperson or his/her designee. In emergency situations, telephone polls can be requested by the AMWG member to act on clearly defined written motions for AMWG approval. Following approval by the Chairperson, a telephone poll will be conducted within

seven working days. During a telephone poll, all members will be contacted and requested to vote. Approval of a motion requires 60 percent majority of all members voting. The Chairperson is responsible for documenting in writing how each member voted and distributing the record to all AMWG members.

12. Reports and Record Keeping. The Annual Report (AR) required by the Grand Canyon Protection Act shall be reviewed by the AMWG. The State of the Natural and Cultural Resources in the Colorado River Ecosystem report developed by the Grand Canyon Monitoring and Research Center will be attached to the AR and shall contain information on the condition of the resources impacted by the operation of Glen Canyon Dam. The AR shall be concise, containing critical resource issues and recommendations to the Secretary on future dam operations.

Bureau of Reclamation staff will supply GSA the required information to complete the summary report for Federal Advisory Committees.

13. Committee Expenses and Cost Accounting. An accounting of the expenses for operation of the AMWG shall be maintained by Reclamation. Expenses and other information will be submitted to GSA as required by FACA. Committee expenses are limited to approximately \$500,000 annually.

SUB-GROUPS

1. Formation. The AMWG may form sub-groups in order to facilitate the mission of the AMWG as identified in the Act and the AMWG Charter. Sub-groups will be formed for completion of specific tasks or for specified periods of time. Sub-group members will be named by the members of the AMWG for their own organization, or by the Secretary's Designee. Effort shall be made to keep sub-groups small. Sub-groups will be formed or dissolved by a vote of the AMWG.

2. Requirements. Sub-groups may choose their chairperson from among the AMWG named sub-group members. The chairperson of any sub-group may convene group meetings at his or her discretion. Sub-groups may develop their own operating procedures. One standing sub-group of the AMWG will be Glen Canyon Dam Technical Work Group (TWG). The TWG membership shall consist of one representative from each organization represented in the AMWG, with the exception that two members from the National Park Service representing the Grand Canyon National Park and the Glen Canyon Recreational Area, and one representative from the US Geological Survey. All sub-groups will elect their own officers. Names of all sub-group members will be announced to the AMWG at regular meetings and will be attached to the minutes. Sub-group members may designate alternates.

3. Charge. Sub-groups will receive their charges from the AMWG. Sub-groups will work only on issues assigned them by the AMWG. They will not be empowered to follow other issues on their own. They are encouraged to submit issues to the AMWG they feel worthy of consideration and discussion, but the AMWG must approve work on all new issues. The AMWG may require the sub-groups to develop plans and direct them to come to a consensus or majority opinion at their discretion. Sub-groups shall determine their own operating procedures, which must be reduced to writing and included with the AMWG and sub-group records.

4. Reporting. Sub-groups will report at least annually to the AMWG at the request of the Chairperson. Sub-groups shall report only to the AMWG. They shall provide information as necessary for preparing annual resource reports and other reports as required for the AMWG.
5. Ad Hoc Groups. Ad hoc groups may be created by the Secretary's Designee or as a subcomponent of a sub-group. These groups may meet to discuss assignments from the AMWG or sub-group. Ad hoc meetings will not require Federal Register notices. Minutes are recommended but not required. Ad hoc groups shall report to the AMWG or the main body of the sub-group, depending upon which gives the assignment.

Adopted by vote of the AMWG on February 9, 2011, in Phoenix, Arizona.

Approved: Armen J. Coste Aug. 19, 2011
Chairperson Date

Intentionally left blank

Meeting AGENDA

Intentionally Left Blank

**Glen Canyon Dam Adaptive Management Program
Adaptive Management Work Group Meeting, February 12-13, 2020**

Hilton Garden Inn, 7290 S Price Road, Tempe, AZ
Meeting Room: Ballroom

Wednesday, February 12, 2020

Day 1 Webinar Information:

<https://bor.webex.com/bor/j.php?MTID=m4c5017aba50997e72049d8c00b8dc14c>

Telephone: 877-932-7704 Passcode: 8410783

FINAL A G E N D A

START TIME ¹ (Duration)	Wednesday, February 12, 2020 Topic and Presenter and Purpose ²
9:30 (:45)	<p>Welcome and Administrative: Tim Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary's Designee</p> <ul style="list-style-type: none"> ▪ Introductions and Determination of Quorum (13 members) ▪ Approval of August 2019 Meeting Minutes ▪ Administrative Updates <ul style="list-style-type: none"> ○ Progress on Nominations and Reappointments ○ Action Item Tracking Report
10:15 (:30)	<p>Proposed Rule for Downlisting Humpback Chub: Tom Chart, Jessica Gwinn, and Kevin McAbee, U.S. Fish and Wildlife Service</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A and discussion (10 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To share information about the recently published 4(d) rule for the proposed downlisting of Humpback Chub.</p>
10:45 (:45)	<p>2020 GCDAMP Annual Reporting Meeting Update – Part 1: Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center</p> <ul style="list-style-type: none"> ▪ Presentation (30 minutes) ▪ Q&A and discussion (15 minutes) <p><u>Agenda item type:</u> Informational item <u>Purpose:</u> To provide information regarding project work completed in FY19 and to inform the development of the 2021-2023 triennial budget and work plan.</p>
11:30 (1:30)	LUNCH

START TIME ¹ (Duration)	Wednesday, February 12, 2020 Topic and Presenter and Purpose ²
1:00 (:30)	<p>Stakeholder’s Perspective—Colorado River Board of California: Jessica Neuwerth, Environmental Scientist, Colorado River Board of California</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A and discussion (10 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> Provide an introduction to the Colorado River Board of California, outlining the organization’s values, priorities, and major activities related to the Colorado River and the Glen Canyon Dam Adaptive Management Program.</p>
1:30 (:30)	<p>Overview of the Upper Colorado River Endangered Fish Recovery Program: Tom Chart, Director, Upper Colorado River Endangered Fish Recovery Program and Jessica Gwinn, Biologist, U.S. Fish and Wildlife Service</p> <ul style="list-style-type: none"> ▪ Presentation (15 minutes) ▪ Q&A and discussion (15 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To share information about the purpose, achievements, current workplan, and future of a complementary program in the Upper Colorado River Basin.</p>
2:00 (:45)	<p>2020 GCDAMP Annual Reporting Meeting Update – Part 2: Scott VanderKooi, Chief and Michael Moran, Deputy Chief, Grand Canyon Monitoring and Research Center</p> <ul style="list-style-type: none"> ▪ Presentation (30 minutes) ▪ Q&A and discussion (15 minutes) <p><u>Agenda item type:</u> Informational item <u>Purpose:</u> To provide information regarding project work completed in FY19 and to inform the development of the 2021-2023 triennial budget and work plan.</p>
2:45 (:15)	BREAK
3:00 (:30)	<p>Tribal Liaison Report: Theresa Pasqual, Tribal Liaison for the Glen Canyon Dam Adaptive Management Program</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A and discussion (10 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To report on the Tribal Liaisons’ activities and meetings as well as Tribal concerns, challenges, and accomplishments.</p>

START TIME ¹ (Duration)	Wednesday, February 12, 2020 Topic and Presenter and Purpose ²
3:30 (:30)	<p>Annual and Extraordinary Maintenance at Glen Canyon Dam: Robert Martin, Facility Manager, Glen Canyon Dam, Bureau of Reclamation</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A and discussion (10 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> Provide AMWG members with information and improve understanding of maintenance schedules at Glen Canyon Dam.</p>
4:00 (:45)	<p>Basin Hydrology and Operations: Heather Patno, Hydraulic Engineer, Bureau of Reclamation</p> <ul style="list-style-type: none"> ▪ Presentation (30 minutes) ▪ Q&A and discussion (15 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To increase understanding of water supply, forecasted hydrologic conditions, and projected reservoir conditions and operations for the current and upcoming water years</p>
4:45 (:15)	Public Comment
5:00	<p>ADJOURN FOR THE DAY</p> <ul style="list-style-type: none"> • Please fill out evaluation form if you will not return tomorrow.
5:30	<p>Social Hour at TRES Tempe at the Hilton Garden Inn (optional) Please come and socialize (no host) with your fellow AMWG members and other meeting attendees.</p>

¹ Every effort will be made to adhere to the schedule and agenda, but on occasion, for unforeseen reasons, some modifications may occur.

² Action may be by consensus or a vote; and either may be a recommendation to the Secretary of the Interior or feedback to presenter(s) or to subordinate groups.

**Glen Canyon Dam Adaptive Management Program
Adaptive Management Work Group Meeting, February 12-13, 2020**

Hilton Garden Inn, 7290 S Price Road, Tempe, AZ
Meeting Room: Ballroom

Thursday, February 13, 2019

Day 2 Webinar Information:

<https://bor.webex.com/bor/j.php?MTID=ma7bec5ec8143a4011527fa6d0552d006>

Telephone: 877-932-7704 Passcode: 8410783

FINAL A G E N D A

START TIME ¹ (Duration)	Thursday, February 13, 2020 Topic, Presenter, and Purpose ²
8:30 (:15)	<p>Welcome and Administrative: Tim Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary's Designee</p> <ul style="list-style-type: none"> ▪ Introductions and Determination of Quorum (13 members)
8:45 (:30)	<p>Stakeholder Updates (~5 minutes each):</p> <ul style="list-style-type: none"> ▪ ESA Update: Humpback chub and razorback sucker status (USFWS) ▪ Expanded Non-native Aquatic Species Management Plan EA (NPS) ▪ Lees Ferry Trout Fishery (AZGFD) ▪ Additional Items (all) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To share updates regarding current stakeholder activities on the Colorado River that are pertinent to the GCDAMP.</p>
9:15 (1:00)	<p>Long-Term Funding Considerations – Hydropower Revenues vs. Appropriations: Brian Sadler, Western Area Power Administration and Kathleen Callister, Bureau of Reclamation</p> <ul style="list-style-type: none"> ▪ Presentation (40 minutes) ▪ Q&A and discussion (20 minutes) <p><u>Agenda item type:</u> Informational item <u>Purpose:</u> To provide information regarding long-term funding uncertainties and important considerations for various potential funding sources.</p>
10:15 (:15)	BREAK

START TIME ¹ (Duration)	Thursday, February 13, 2020 Topic, Presenter, and Purpose ²
10:30 (:30)	<p>2020 GCDAMP Annual Reporting Meeting Update – Part 3: Michael Moran, Deputy Chief, Grand Canyon Monitoring and Research Center</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A and discussion (10 minutes) <p><u>Agenda item type:</u> Informational item <u>Purpose:</u> To provide information regarding project work completed in FY19 and to inform the development of the 2021-2023 triennial budget and work plan.</p>
11:00 (:30)	<p>Technical Work Group Chair Report: Seth Shanahan, Technical Work Group (TWG) Chair</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A, discussion (10 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To update AMWG members on the TWG meetings held October 2019 and January 2020, including the results of the 2019-2020 Knowledge Assessment.</p>
11:30 (1:30)	LUNCH
1:00 (1:00)	<p>FY2021-2023 Triennial Budget and Work Plan: Seth Shanahan, TWG Chair; Craig Ellsworth, TWG Budget Ad Hoc Group (BAHG) Chair; Lee Traynham, Bureau of Reclamation; Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center</p> <ul style="list-style-type: none"> ▪ Presentation (30 minutes) ▪ Q&A, discussion (30 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To discuss the BAHG process and seek AMWG initial input on the FY21-23 TWP.</p>
2:00 (:40)	<p>Potential Water Year 2020 Experiments: Lee Traynham, Bureau of Reclamation and Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center</p> <ul style="list-style-type: none"> ▪ Presentation (20 minutes) ▪ Q&A and discussion (20 minutes) <p><u>Agenda item type:</u> Information item <u>Purpose:</u> To update AMWG members on the process and possible LTEMP experiments that may be conducted in 2020.</p>
2:40 (:10)	Public Comment

START TIME ¹ (Duration)	Thursday, February 13, 2020 Topic, Presenter, and Purpose ²
2:50 (:10)	WRAP-UP: Tim Petty, Secretary's Designee <ul style="list-style-type: none"> ▪ Next AMWG meeting dates: <ul style="list-style-type: none"> ○ May 20, 2020 (webinar) ○ August 19-20, 2020 ○ January 20-22, 2021 (Annual Reporting Meeting)
3:00	ADJOURN <ul style="list-style-type: none"> • Please fill out the meeting evaluation sheet at your place.

¹ Every effort will be made to adhere to the schedule and agenda, but on occasion, for unforeseen reasons, some modifications may occur.

² Action may be by consensus or a vote; and either may be a recommendation to the Secretary of the Interior or feedback to presenter(s) or to subordinate groups.

DRAFT MINUTES & ACTION ITEMS

Intentionally left blank

Glen Canyon Dam Adaptive Management Work Group Meeting August 21-22, 2019

Wednesday, August 21, 2019

Start Time: 9:30 am

Conducting: Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior

Facilitator: Rafael Reyna & Alysse Lareger, EnviroSystems Management, Inc

Recorder: Lauren Johnston, Galileo Project, LLC

Items for Follow-up

- Reclamation will send FLAHG membership email to the AMWG email list.
- Seth will add to the October TWG meeting agenda a discussion on bringing tribal considerations early on into the process, possibly through the CRAHG or another AHG.
- Participants will email Seth and Peggy with interest in participating in the FLAHG, or with suggestions on an appropriate charge for the FLAHG.
- Participants will email Emily Omana Smith and Jessica Gwinn to participate in future TMF discussions.
- AMWG members without representation on the TWG should nominate a representative to the TWG.
- Tribes will meet with leadership to discuss participation funding.
- Participants will consider whether it makes sense to schedule the Fall 2020 AMWG [webinar-meeting](#) in the first week of September instead of August 19 & 20.
- Reclamation will include tribal representation at the November TWP meeting between Reclamation and GCMRC.

Motions

Motion to Approve Minutes from May 22, 2019 meeting

- Vineetha Kartha moved, Steve Wolff seconded, passed by consensus: To approve minutes from the May 22, 2019 AMWG Webinar, as distributed on Monday August 5, 2019.

Motion to Approve FY 2020 Budget

- Steve Wolff moved, Jan Balsom seconded, passed by consensus: The AMWG recommends for approval to the Secretary of Interior, the GCDAMP Fiscal Year 2020 budget summarized in the Bureau of Reclamation and Grand Canyon Monitoring and Research Center budget worksheets as presented at the June 11, 2019 TWG meeting.

Presentation and Discussion

Details of the summarized presentations are included in PowerPoints available on the AMWG website as noted in the sections below.

Welcome and Administrative

Presenters & Affiliation: Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary’s Designee

Introductions and Determination of Quorum

A quorum was reached with 16 stakeholders represented. Tim welcomed newly appointed and reappointed AMWG and TWG members.

Tim presented the following highlights of the DOI's reorganization:

- New field supervisors have been assigned by the Secretary for the 12 new regions. The field supervisor for the Upper Colorado River will be Alan Mikkelsen.
- The purpose for the reorganization is to make sure all bureaus within the department can communicate with each other and with the Secretary efficiently. The hope is that this reorganization will increase interaction between bureaus and provide a lead point of contact for all bureaus in each region. The number of regions has been brought down from 40 to 12. With the previous organizational structure bureaus all functioned differently and it was unwieldy for the Secretary to stay well informed on the happenings in each region. Creating the 12 regions facilitates the Secretary's ability to efficiently get information quickly.
- Secretary Bernhardt's Secretarial Order on the ESA came out in the past two weeks. Dr. Petty stated he is happy to discuss the nuances of that Order. The media and agencies have been having good interaction and discussion with the Department so far. It's been a two-year process looking at how the ESA is implemented. Especially with respect to Threatened species, the Order looks for a streamlined process to de-list them if criteria exist to warrant de-listing, including across other federal agencies. This impacts a lot of the science and research that happens in the Canyon.

Executive Order re: Federal Advisory Committees

The Secretary has been emphasizing ethics. FACA committees and their members must follow a set of ethics guidelines. Members of a FACA committee must follow these ethics guidelines as they conduct themselves. All DOI employees will be under review by ethics officers centralized within the Department.

There is an existing executive order to review all the 1000+ FACA committees. As the review is ongoing, the appointment and reappointment process is on hold.

Progress on Nominations and Reappointments

The appointments and reappointments made just prior to the March 2019 meeting are available in the meeting notes. There are five new appointments or reappointments. Daniel Picard remains the member for Reclamation. Kathleen Callister is the Reclamation member alternate. Eric Millis is the member for the State of Utah. Robert King is the alternate for the state of Utah. Richard Powskey has been approved as the alternate for the Hualapai Tribe. There are still several nominations in process.

Approval of May 22, 2019 Meeting Minutes

Secretary's Designee Dr. Timothy "Tim" Petty introduced the agenda item and asked if there was any objection to approval of the May 2019 webinar minutes as distributed. Vineetha Kartha moved to approve the minutes. Steve Wolff seconded the motion. Tim Petty asked for any objections. Hearing none, the minutes were approved and shall be added to the record.

Action Item Tracking Report

- AMWG will consider process for planning next 20 years of LTEMP. What is success? How do we know we are there? OPEN – Target completion date end of calendar year 2019.
 - Develop monitoring metrics – this effort is still in progress and will likely be an iterative process.
 - Streamline AMP documents in LTEMP ROD
 - The first step was to check in with current administration. One presentation after this from Dr. Petty will share further guidance he prepared and finalized this week.
 - Emily and Lee have been reaching out to AMWG participants to learn more about the process in an effort to avoid inadvertently omitting any important aspects of guidance from the past.
 - A next step is to develop the new TWP. Reclamation will be working with TWG to make sure ~~everyone is following the right guidance for developing the budget~~ development is consistent with Dr. Petty's guidance and with LTEMP goals and objectives. No new guidance materials are expected. Reclamation is looking to refine what's already in the LTEMP ROD and other guidance documents.
- Reclamation will send the temperature control paper to the AMWG when it is available. OPEN – target completion end of fiscal year 2019.
 - The Reclamation Technical Services Center is assessing the state of science for temperature control. The work is not yet finished. AMWG is concerned with downstream impacts of temperature control devices. Reclamation intends to hold a prize competition in 2020 to explore new temperature control devices.
- HFE assessments. CLOSED.
 - GCMRC did an assessment of past high flows, including power plant capacity flows. GCMRC presented their initial findings at the 2019 Annual Reporting Meeting. The next step is to identify experimental flow options. This has been referred to the TWG as an additional action item.
- Reclamation will send to the Secretary's Designee information on the \$95,000 in tribal support. OPEN – no due date set.
 - Tribes have requested an increase in funding support. This money comes from a budget separate from the power revenues budget. The money is collected from appropriated dollars from each DOI agency. Tribes have received the same dollar amount since 1999. Reclamation had conversations back in July to understand this request. Tribal representatives wanted to speak directly with leadership. This conversation will happen this week.
- AMWG Members are invited to contact Sarah Rinkevich if they have interest in attending this summer's Integrated GCDAMP Stakeholder River Trip. CLOSED.
 - The river trip took place this July. Updates are scheduled for this meeting.
- TWG will identify experimental flow options that would consider high valued resources of concern to the GCDAMP, fill critical data gaps, and reduce scientific uncertainty. OPEN.
 - There will be an update later this week.

The entire Action Item Tracking Sheet is included as [Attachment 1](#).

DOI Guidance and Action Items

Presenter & Affiliation: Dr. Timothy "Tim" Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary's Designee

Presentation Summary:

NewThe guidance was issued August 14, 2019 and distributed ~~last week~~ via email August 19, 2019. There have been two policy guidance memos in the past. This new guidance memo builds on the previous guidance memos; it does not supersede them. The memo gives an overview that builds on the LTEMP

EIS and ROD, and input from AMWG stakeholders. The memo serves as a reminder of the ROD outputs, and how they interact with interim guidelines and drought contingency plans. The overall goal is to frame the discussions here to explore operational flexibility for hydropower and power plant capacity flows that meet all of the given requirements as laid out in the LTEMP ROD, [LTEMP Scientific Monitoring Plan](#), [Science Plans, scientific monitoring framework](#), and [the three-year workplan and budget process](#).

The Secretary's Designee memo is included as [Attachment 2a](#). The Secretary's Designee memo presentation to the AMWG is included as [Attachment 2b](#).

Discussion/Q & A

- Steve Wolff mentioned that there is uncertainty in the budget for long term planning. The sources of funds are still uncertain. It's not known whether they will be appropriated or from hydropower revenues. Steve asked if there have been discussions about how to prioritize what gets addressed given this uncertainty. Dr. Petty answered that there are presentations on the budget later in this meeting. The three-year budget segment allows AMWG to look long term. Reclamation built flexibility into the memo to deal with funding uncertainty. Dr. Petty agreed that a longer-term look, say around 20 years, is needed. Future AMWG presentations will further feed into discussions on how to apply the guidance in [Dr. Petty's Reclamation's](#) memo.
- Melinda Arviso-Ciocco expressed interest in continuing the discussion on tribal participation from previous meetings. She asked where specifically tribal concerns are taken into consideration. Where will tribal collaboration and partnerships be taken into consideration? Tribes want to continue to work on how tribal considerations fit into the needs for maintaining dam releases, doing activities to comply with the ESA and NHPA, doing research and monitoring. Dr. Petty agreed it is a goal to implement that language into future guidance documents. Brent Esplin added that Reclamation is looking for opportunities to continue these discussions and to work with the tribes. Lee Traynham added that Reclamation also has the PA and Historic Preservation Plan for guidance on cultural and tribal resources.
- Dr. Petty added that the NHPA compliance is highlighted in the memo. Melinda replied that while NHPA is specific to Section 106, there is a broader general framework for where tribes are coming from in prior discussions, that tribes are also within the trust responsibility with self-determination. Being that tribes are not a minority and are involved as stakeholders, there is also that trust responsibility. Tribes have sovereign nation status. Melinda stated she thinks that is missing. Compliance is one thing. There is also the broader. That is what needs to be addressed.
- Kathy Callister pointed to the ROD section 6.5, and Secretarial order 3342 that asks Reclamation to form partnerships and collaborate with tribes. That's where Reclamation has flexibility.
- Daniel Picard added that for the AMWG, the ROD is very specific to the processes. Reclamation does recognize and understand and is committed to working with tribes in a much broader context. This is specific and limited and Reclamation doesn't want to necessarily limit itself in recognition and interaction that it needs and wants to have. Reclamation is committed to the AMWG process and reiterates here that it does recognize the broader trust responsibility.
- Peter Bungart stated that with the effects of climate change and long-term drought, besides a wet year last year; temperature rise and fluctuation in Lake Powell has caused nonnative species from Lake Mead into the Colorado River system. This is impacting sediment and impacts the Hualapai Tribe's socioeconomic situation. It is timely to consider collaboration between AMWG and the Lower Colorado River Multispecies Conservation Program, and direct more attention towards that, because that does impact the Grand Canyon Protection Act and other laws. Dr. Petty agreed and stated that in the detailed presentations for later today and tomorrow, these more detailed questions can be addressed.
- Kevin Dahl recalled that in the new guidance memo, Dr. Petty mentioned a desire to return the focus of the dam back to its original purpose for hydropower. [Kevin stated t](#)he original purpose of the dam was not hydropower. [However, h](#)Hydropower was included in the LTEMP as [a resource](#) consideration [and](#) the group has achieved a good balance. Kevin stated his opinion is that the group needs to go forward from the LTEMP and not look backward.

- Vineetha Kartha asked if there was an opportunity for changes to the guidance memo. Vineetha's legal counsel is reviewing the memo and wants to know how to bring any comments forward. Tim replied there is ongoing opportunity to bring comments forward. The memo includes items to consider for discussion. Reclamation is looking through reviewed past guidance memos to ensure continuity and incorporate key concepts as a whole. Brent added that while the guidance documents are new, Reclamation is still operating within the ROD. The ROD will always be there. Reclamation is not changing any of that guidance. The key part of the guidance is the ROD is "law of land."
- Vineetha clarified her concern is with regard to the drought contingency plan and the potential for the guidelines to be re-negotiated as early as next year. She just wants to be sure her counsel is okay with that.
- Chris Cantrell commented that moving forward with adaptive management is great. He wanted to mention what is not disclosed is the USFWS Coordination Act and the Colorado River Storage Project Act. Those are two key pieces in managing Colorado River and impacts to species on the Colorado River, including State Trust Species. AGFD would like that evaluation. A difference between the LTEMP and the Modified Low Fluctuating Flow (MLFF) is that there was a USFWS report on the MLFF, but there was not one for the LTEMP. Chris expects there will be more discussion on what species will be impacted. Dr. Petty replied that this might be a good area for relying on TWG for the future for expert analysis.
- Kelly Burke followed up with a reminder that it seemed in the memo there was a reference to GCPA with a focus on research and monitoring; however, there is a broader statement of protecting the downstream resources that is not being incorporated. Dr. Petty replied that this is part of the emphasis for looking at and incorporating past guidance. Reclamation is starting to look at what the group is learning, and then starting to incorporate that into the adaptive management and process in order to work together address impacts. If we aren't giving full attention to a resource, part of the goal of the AMWG is to get that on a list for consideration. There is the flexibility to do that.

Hydropower from a Regional Perspective

Presenter & Affiliation: Carl Monroe, Chief Operating Officer, Southwest Power Pool

Presentation Summary

AMWG had asked for a presentation on the position of hydropower from a regional energy perspective. Carl presented the functions of the Southwest Power Pool (SPP), the advantages of the Power Pool, and future considerations in developing energy generation and transmission. Carl's presentation is included as [Attachment 3](#).

Discussion/Q & A

- Kevin Dahl asked whether the Glen Canyon Dam could be used as power storage, and if it was used for that, how it might impact water allocation in the lower basin. Carl answered-specified that if the water is was pumped back up it could potentially be accounted for in a later allocation.
- John asked about the cost of pumping the water back up versus using it. Carl answered that the energy out of using it again is less than the energy used to pump the water back up. The efficiency issue would need to be accounted for by the cost of the energy. Carl added that this type of storage is too expensive for long term time frames, and it's not possible to store enough to meet long-term energy requirements.
- Leslie James reminded everyone that Carl Monroe is here to respond to David Nimkin's (NPCA) request for a presentation on where hydropower fits in a regional context. Carl added that WAPA is looking into some of the same technologies and resources as SPP. Circumstances are changing in the markets, and power providers are looking at different ways to add value for their customers.
- Kevin Garlick wondered how much control SPP has over hydropower in the system as a whole, and how SPP can control backing off of hydropower when other intermittent resources are available. Carl responded that SPP has control over what the hydro-owner gets into the market. It's a voluntary market, and SPP uses the cost provided by the hydro-owner to determine what gets into the market. What

WAPA has been exploring is finding flexibility within contracts with their customers to see how much flexibility they have. WAPA's flexibility is limited based on the impacts of using that flexibility. The hydro-suppliers in SPP do use dams as storage and generation and try to optimize the value of the water they use by determining when to use it. WAPA is more limited.

- Jan Balsom asked about the diversity and mix of power sources discussed and how Carl expects to see that shifting, and what storage capabilities exist for redistribution. Carl responded that SPP has seen a big shift over the last ten years, and a shift in renewables. SPP has seen a shift to wind because the cost of putting the wind into service and the subsequent wind energy is cheap and lowered by the wind energy Production Tax Credit (PTC). Utilities are investing in wind, and it's a great energy source. The PTCs start tailing off after next year, according to federal legislation. There's a focus on getting wind this year but less interest in the future. Producers are trying to get as much wind they can this year. Solar is becoming more interesting, and there is currently a compounding Investment Tax Credit that states if you build solar and a battery together, you get an even bigger tax cut. Solar is useful right now for peak use. SPP does expect a transition to more solar power on homes. Other power sources, including coal, natural gas, and nuclear, are being retired.
- Peter Bungart stated that in the west there is a lot of more public land and solar facilities are being placed on it. This has environmental and cultural issues. Peter asked how SPP deals with this impact. Carl replied that most land used for power generation within SPP is private, with the exception of land in North Dakota and Oklahoma, which is tribal. Utilities have to work with tribes on that. Carl didn't know off hand what the cost difference was and suspected there were more environmental and other limitations. There are endangered species to consider, for example. SPP only gets involved once the power generator wants to connect into the system.
- To Leslie James' comment, David Brown added that what David Nimkin (NPCA) was trying to get at were overall regional energy strategies. SPP is separate from where this facility operates. The idea is trying to get a regional context for understanding the Glen Canyon Dam facility. David requested a further presentation or input from someone who could add more information as to where this particular dam falls within regional energy.
- Carl stated his understanding is that this dam falls outside of California ISO and other activities. Carl suggested a future presentation of how the operations of this dam might be reflected into the California ISO market. Leslie James added that, amidst rapid change, there are ~~basically two energy and balance~~currently two energy imbalance options going on, EIS and EIM, of which California ISO is an EIM. Depending on where you are in the energy market there are a lot of different interests. SRP, Tucson Electric and Power, Public Service New Mexico has gone into EIM, WAPA is considering what to do, Bonneville Power Administration has been going through a process-oriented approach to look into going into the EIM. At some point this group could have someone come talk about markets in this region or across the country. There's a lot of complexity to the markets.
- Leslie added that each hydro facility is unique, and the way it's operated depends on who owns it, who operates it, what RODs are in place, what laws and regulations apply, etc. Members in CREDA all have a portion of the CRSP allocation, but all have other resources as well. These members are dealing with coal, wind, large and small nuclear, etc. CREDA would be glad to have a utility member come talk about resource planning and other requirements.
- Kurt Dongoske asked for insight into what SPP sees as the future for hydroelectric power in the transition to renewables. Intuitively hydroelectric power should be clean, but it emits a lot of greenhouse gases.
- Carl stated that part of SPP's responsibility is to plan 20-30 years in the future for transmission. Utilities do generation. Most people believe more renewables will become available. There's a lot of potential with solar energy. Hydro provides a benefit for maintaining reliability in the transmission system and provides a benefit for what SPP needs to control. Carl hasn't heard of whether people question whether or not hydropower is sustainable or renewable based on greenhouse gases.
- Leslie clarified that ~~Hydro looks at a life cycle resource assessment~~. Scientific Certification Systems looked at Glen Canyon Dam hydro in terms of a like cycle assessment. Every resource has an

environmental impact, but they're not always assessed in the same way. Leslie would be glad to share [that particular study, her learning resources on this subject.](#)

Basin Hydrology and Operations

Presenter & Affiliation: Heather Patno, Hydraulic Engineer, Bureau of Reclamation

Presentation Summary:

Reclamation has been central to the effort of modeling and forecasting with regard to water for drought contingency planning, per an Executive Order from last fall. Reclamation will continue working on the effort.

Snowpack this year is the second highest since the beginning of the drought in 2000. As of August 18, the system has hit peak storage and is starting to decrease. Lake Powell is at 145% of average unregulated inflow for the spring period from April-July. 2018 was the third driest year since Lake Powell started filling, and the fifth driest year in the last 100 years. The beginning of January 2019 started with dry forecasts; however, because of the amount of snow in the area, 2019 has seen the second highest water elevations since water year 2000. Blue Mesa has the highest percentage of unregulated inflow, and Navajo, which has been dry the last 15 years, is above average at 158%. The water projection for water year 2019 is currently at 13.54 maf, which is 125% of average. Reclamation has seen a swing in historic elevations at Lake Powell in water year 2019. Current conditions are similar to those in water year 2017 bringing storage up from the dry year in 2018.

August is a tier determination month. Lake Powell water year forecast for 2020 is currently 10.8 maf, which is 100% of average, and Blue Mesa is at 102% of average. Navajo, Flaming Gorge, and Fontenelle are drier because the Colorado River Forecast Center uses ensemble stream flow prediction for a median value. Because the median hydrology is skewed from average, the beginning of the water year numbers are drier. Reclamation used the August 24-month study projections for January 1 to determine the Lake Powell and Lake Mead operating tier. Reclamation is in the Upper Elevation Balancing Tier for min, max, and most probable operations in water year 2020. The most probable water year 2020 release is 8.23 million acre-feet (maf). The minimum probable water year 2020 release is 9.0 maf, under an April adjustment to balancing based on Lake Mead elevation on September 30, 2020, below 1,075 feet and in compliance with the Interim Guidelines Record of Decision. The maximum probable water year 2020 release is 13.49 maf, under an April adjustment to Equalization based on Lake Powell elevation on September 30, 2020, above the Equalization Tier elevation for 2020 of 3,657 feet.

Glen Canyon has eight powerplant units. The current maintenance schedule caused a change to capacity in acre feet per month. Reclamation worked with WAPA and their consultant to update the calculation method. Reclamation incorporated WAPA's forecasting algorithm into its scenarios and now show capacity into the future based on elevation. There is currently a disconnect between the new algorithm and what Reclamation is incorporating into the 24-month study. Reclamation expects to fix the issue to make it consistent with the 24-month study.

Reclamation originally expected transformer maintenance to take three to four months, but maintenance has been underway for about a year now. Six units will be available throughout water year 2020. Reclamation is coordinating with Glen Canyon to resolve the lack of required annual maintenance. Annual maintenance takes three to four months and will result in times when only four units are available. Reclamation hopes to have at least six units available at the beginning of November for an HFE. Problems with units going out in July caused bug flow patterns to be different than anticipated, but August is looking better for bug flows.

Further details of this presentation are included as [Attachment 4](#).

Discussion/Q & A

- Leslie James asked if the change in the maintenance table due to capacity values was just due to a change in math. Heather explained that Reclamation was using the current capability unit test at the dam to see how much power could be generated out of the current elevation. Now Reclamation is using empirical data from 2009 – 2015 to determine capacity at different elevations. We have the Mid-Term Operations Model going further for a better estimate of what those capacities would be further into the future than the 24-Month Study.
- Leslie followed up asking if there were higher capacity values predicted by the new versus the old model. Heather answered that it depends on the higher or lower elevations. In May, Reclamation was using the May capacity; however, the reservoir rose over 52 feet and was not providing an accurate reading of what those capacities would be in the future. Now, Reclamation has a better estimate at higher elevations or under significant changes in elevations.
- Clifford Barrett asked whether dry years were included in Reclamation's calculations and whether including those would change anything. Heather responded that the Colorado Basin River Forecast Center uses 35 years in its ensemble streamflow prediction model for forecasting, starting in 1981 and through 2015. When looking at, and comparing, averages, Reclamation uses the 1981 to 2010 period of averages because it is consistent with the National Weather Service 30-year period of record. Reclamation does include some of those drier years in the actual estimate of future conditions.
- Tim Petty asked how DCP with hydrology impact AMWG. Heather responded that for the Upper Basin, the elevation at which DCP starts to contribute is 3525, and Lake Powell is above that elevation. For the Upper Basin, DCP looks good.
- Chip Lewis asked how accurate the projections for most probable inflow are. Heather responded that the reason Reclamation looks at 10 and 90 and have 80% probability into the future is because probability of being most probable is limited this early in the season. Moisture conditions are unknown until Reclamation sees snow. Uncertainty continues into February and March 2020. Chip asked whether looking at past conditions could help. Heather responded that it would depend on the month one is looking at and stated she could present that information in the future.
- Chip asked what causes Reclamation to be comfortable with its commitment to release water based on predictions. Heather responded that Reclamation releases water, in one part, because in all three scenarios, the release pattern of 2 maf is the same in October, November, and December. Reclamation reevaluates the release pattern in January, during which time uncertainty is still high but gives Reclamation a better estimate. If Reclamation sees water drop between now and January, Reclamation would adjust the release. Peter Bungart thanked Heather for her response to Chip's question, as Peter had similar concerns.

Stakeholder's Perspective

Presenter & Affiliation: Charley Bullets, Southern Paiute Consortium, Kaibab Band of the Paiute Indians

Presentation Summary

There were 15 bands of Paiute prior to contact and there are now 11. Charley represents two bands, the Paiute Indian Tribe of Utah and Kaibab Paiute Tribe.

Current monitoring work is simple, and there is no long-term database or schematic for tribal monitoring. All tribes observe their surroundings. Now monitoring includes photo matching, transects for vegetation, and water quality. Paiute also monitor the rock writing, using DStretch Photography. Most monitoring is observation. There is a ten-year report available for those that are interested. There have been challenges to science and traditional knowledge incorporation. One concern is with an HFE, there are new beaches coming up at cultural sites.

Monitoring reports are provided to stakeholders to encourage continued funding. Trips alternate youth and adults each year. Charley's involvement with the AMWG today is a direct result of participating on a

youth monitoring trip in the 1990s. The trips are beneficial to supporting youth to come and learn about ancestral ties, and to practice and see oral stories.

With the science that goes on in the canyon, presenting at the Annual Reporting Meeting is important, because the open mindedness of the future generations of scientists will help with adaptive management.

Discussion/Q & A

- Leslie asked if the beach~~es~~-monitoring reports are available. Charley added that this year's report is available via email. There is a DVD available as well. Stakeholders should have this but if not, Charley has them available and can bring them to the next TWG meeting. Helen added that all reports are available on the GCDAMP wiki. Jan added that tribal videos were to be linked there as well. They're great teaching tools. Craig clarified further that on the tribal monitoring reports, there's a cultural page that those are all posted to. The wiki may be the only place. There are a lot of videos on there. Currently there is a Zuni video released to the general public.
- Jan asked how Charley goes about recruiting the next generation of monitors, for example into schools associated with the Paiute Consortium. How far outreaching can you go through the schools to gain interests in next generation? Charley stated that's already starting. One of the students Charley took out ten years ago is a biologist already and there are two more on the way. Charley encourages and wants to invite more "ologists".
- "Youth" is considered to be ages 15-22 for the participation purposes.
- Melinda Arviso-Ciocco asked if all Paiute bands participate. Charley replied that the Utah and Kaibab bands are the only ones signed on. San Juan were supposed to sign on but never did. They didn't participate so their money was taken away.
- Kathy asked what training or educational processes were in place prior to going down the river. Charley replied that there's a meet up at Lees Ferry to go through materials prior to the monitoring trip.

Experimental Riparian Vegetation Treatment

Presenter & Affiliation: Mike Kearsley, Wilderness Monitoring Coordinator, National Park Service

Presentation Summary

NPS implemented an experimental mitigation treatment to help control invasive plant species. The way LTEMP flows were planned has been leading to invasive species and the spread of exotics, which could lead to the long-term decline of native species. NPS has scheduled this pilot project work from 2018 to 2022. The 2019 river mission work included NPS, SWCC, AZCC, and Ancestral Lands crews. The goal was to mitigate for invasive encroachment and to treat for several exotics. Plots were designed and vegetation monitored before and after treatment. NPS plans to go out next May to observe the treatment impacts long term.

Additional details of this presentation are included as [Attachment 5](#).

Discussion/Q & A

- Jessica Neuwerth asked what kind of maintenance is needed for this work. Mike replied that over time this management will require less maintenance. This effort was a preliminary test.
- Peter Bungart asked where the vegetation goes. Mike replied that the group put the vegetation in the river. There is some chance the vegetation could reestablish downstream, but this is not likely.
- Kelly Burke asked if NPS has been able to compare what the beaches look like now with other camelthorn removals? Mike replied that previous work was organized to treat the vegetation where it was. There was no monitoring as part of that process. NPS does, however, want to come back to the sites treated with this effort.
- Melinda asked if there was any training for this project on the cultural sites that the group was working in and around. Melinda added she is aware the participants received insight into the archaeology but wasn't sure if they received any cultural sensitivity training. Mike responded that there was no cultural sensitivity training, but NPS did get feedback from crews that they would like to know more about this

and the areas they visit as a whole prior to going on the trip. Melinda added that this is a perfect example of some of the areas on the lack of funding. There were presentations on the river trip that emphasized sensitivity for the landscape and the plants and the vegetation and the riparian corridor down to the river. She expressed a desire to continue working on that.

- Mike clarified that the group did not go to any actual cultural sites, and that they were all above the areas where the group worked. Melinda further explained that she knows the archaeological sites were not disturbed, but that the idea that the entire area is a cultural landscape needs to be explained. It's intangible. Navajo and White River tribes have those questions as well.
- Peter Bungart asked if there were opportunities for other tribes to get involved that aren't involved in the ancestral lands group. Mike suggested talking to Jenn O'Neill. Mike explained it is convenient to work with an ancestral lands crews because NPS has agreements in place for a task order.
- Jan Balsom explained that this was a pilot project, based on what NPS is learning about the area. NPS used partnership money this year because there weren't other funds. NPS needs to work on the funding as it's an important component of how to move forward. NPS wants to know how to better integrate and engage with different communities, including getting youth and young adults to be part of these crews, and potentially establish these crews for use on future projects.

Fiscal Year 2020 Budget and Work Plan

Presenter & Affiliation: Seth Shanahan, Technical Work Group (TWG) Chair; Lee Traynham, Chief, Adaptive Management Group, Upper Colorado Region, Bureau of Reclamation; and Michael Moran, Acting Chief, Grand Canyon Monitoring and Research Center

Presentation Summary

TWG

The "Development of a Budget Recommendation from the TWG to the AMWG" presentation in [Attachment 6a](#).

In previous meetings the process for TWG to determine the recommended budget was approved. AMWG is currently operating under year three of the current budget. The TWG and BAHG consult on any recommended changes to the TWP using Section 2.7 criteria. Funding can be reallocated for a project if it meets a scientific requirement, an administrative need, or meets a new initiative. Craig Ellsworth is the new chair of the BAHG.

This year the major discussions for the budget centered around questions of where the money would be coming from (appropriated dollars or power revenues) and how the potential changes in funding source may impact the Experimental Contingency Fund. Discussion continued about how to schedule it so it's in place when needed. The BAHG and TWG also discussed how to use any funds that may be lost instead of rolled over into the next FY funds.

TWG's third focus was to ensure that groups had the resources they needed in order to continue and address any unanticipated shortfalls or past cuts. TWG determined that it was necessary to recommend reserved capacity for experiments that may come up. Budget discussions will continue over time between TWG and BAHG to reassess needs.

Some sample ideas for additional studies for the experimental management fund include incentivized harvest [effectiveness payments](#), tribal projects, stock assessment work, eDNA studies, and temperature control investigations. The TWG budget motion has passed and now it's in the AMWG.

AMWG

The Fiscal Year 2020 proposed budget is presented in detail in the presentation in [Attachment 6b](#).

The current TWP was formally approved by the Secretary of the Interior.

The TWG is currently in the process of checking for changes or revisions needed for the budget in the new iteration. After that AMWG then makes a recommendation to the secretary. In 2019, AMWG is working under the appropriated budget. For 2020 Reclamation requested additional funds. The Energy and Water appropriations bill has not been finalized. There is a draft version in the house that would direct program to be funded by hydropower revenues.

The current proposed budget of \$11.36 million (20% to Reclamation, 80% GCMRC) is similar to the current TWP.

Reclamation is confident that 2020 funding will be passed in full, but it's not yet completed. Slide 6 of the budget presentation in [Attachment 6b](#) highlights funding differences based on appropriated vs. power revenue dollars.

Item C5, experimental management fund, is in place to respond to unpredictable real-time needs. It's based on what Reclamation thinks might be necessary and it's not always fully used. Historically there have been funds leftover. In the past these leftover funds have been moved to the native species conservation fund. The idea of the fund was to have a resource to conserve fish if needed. There was previously had \$1.7 million in that fund. In 2019 following the OMB directive, Reclamation preserved those dollars and did not spend them. The money is still there and will hopefully be available in year 2020. Reclamation will work with the TWG and BAHG to discuss how to use these dollars when they become available.

Cultural resource moneys are very similar to the current TWP. There is another contingency fund, D10, for NHPA compliance, which has been off of the table so far. As a note, Tribal participation is funded with appropriated dollars from each DOI agency.

GCMRC

Details of the projects included in the GCMRC budget recommendation are included in [Attachment 6c](#).

Project N is new for the new TWP and consists of hydropower monitoring and research. This is in response to a prior action item.

GCMRC expects to be in the new building by June 2021. For 2020 the overhead without the lease will be 16% with 3% pass through. Once the new building is in place, GCMRC overhead will increase to 26%.

A current list of recommended changes to the budget is included in slide 11 of [Attachment 6c](#). GCMRC is not anticipating a CPI increase this year. For the most part all projects should be receiving less funding, but this has been offset with delayed increase in overhead cost.

Fiscal Year 2020 Budget and Work Plan (continued)

Discussion/Q & A

- Helen Fairley clarified that nobody at GCMRC got a raise, but rather the increase in funding for salaries allowed GCMRC personnel more time to spend on the GCDAMP work.
- Melinda Arviso-Ciocco mentioned that the socioeconomic budget is \$243,000, used for a single study. The entire participation budget for five tribes is \$475,000. Socioeconomics is almost half of that. This is a huge disparity. Kurt Dongoske agreed with this point.
- Jan Balsom added that Melinda's comment brings to light the problem AMWG has been discussing about the difficulty of shifting priorities. What Jan observes is GCMRC putting whatever funds they have into other projects. This process doesn't allow for an opportunity to make shifts in resource allocation priorities. There are a couple of tribal projects that exist but are not being addressed. AMWG can always do more science, but maybe the group needs to shift priorities. Jan stated that as AMWG starts building the 2023 budget it should start making serious shifts.
- Kelly Burke seconded Jan's comments. What might be helpful is to review the context of how these funds became available and why tribal projects are still not funded this year.

- Vineetha pointed out that the socioeconomic monitoring and research project that Melinda previously referenced is a project to explore tribal perspectives and resource values.
- Mike expanded that the project isn't entirely devoted to that. Another part of that project is the applied decision analysis. Each project has multiple elements or individual work tasks.
- Melinda addressed Vineetha's point stating it is worth understanding which projects are coming from Reclamation as tribal projects. There is a difference in tribal-proposed projects and the GCMRC socioeconomic project. Lucas Bair (USGS-GCMRC) has a permit to talk to tribal communities, but his project was not developed by a tribe and wasn't submitted as a proposal from Navajo Nation. That's the bottom of line of what was discussed yesterday at the federal family meeting, the disconnect with the proposal budgets and TWP, versus actual projects that are coming from tribes. In this specific case, tribes are helping Lucas because he got all of his permits to do the study, but it's not a Navajo project. The tribal chapters are now requesting to know how this project will help the Navajo. The Navajo internal review board process is strenuous, and tribes are wanting to know how this project will be beneficial. That's a disconnect that we have here coming from representing Navajo Nation and seeing how these budgets are carried out.
- Leslie James pointed out that the two elements of Project J came up through the SEAHG. At the time the SEAHG was looking at areas that weren't being addressed, for instance cultural, recreational, and hydropower. Tribal representatives participate in the SEAHG. This group has stated they felt there was a lack of tribal perspectives. The group then came up with surveys to try to bring those perspectives in. Leslie suggested maybe it would help if Lucas Bair (GCMRC) could provide the split between J1 and J2. Michael stated GCMRC can provide the budgeting detail to show this split.
- Kurt Dongoske stated that Pueblo of Zuni have met twice with Lucas and colleagues from Montana. He feels the problem with this study is that it is framed in capitalistic values. As Leslie was saying, it offers trade off analysis. The Pueblo of Zuni feel that if they participate in trade off analysis it would be used against them. The other question the Pueblo of Zuni have is what the group does not understand about "sacred". There is no trade off with sacred.
- Peter Bungart stated he has previously worked with Lucas. Hualapai have participated in a focus group and provided feedback to Lucas, which he then used to modify the survey. There were a lot of questions that dealt with economic implications for trade-offs. Peter worked with Lucas to work on questions that focus on tribal values. Peter feels the study was designed to address that part first. Peter added that Lucas will be coming up at the end of next month to spend a couple of days with other groups.
- Melinda Arviso-Ciocco stated she worked with Lucas on the questionnaires as well and is worried Hualapai will not like the end product. Melinda's understanding is that the template is from the national survey that was given to everyone at some point. That's why it can't be geared to tribes.
- Peter Bungart added that tribes don't look at the resources from the lens of trade-offs. Tribes consider things more holistically. He feels this will likely be born out once the surveys are completed. That's part of what we learn by doing the survey.
- Brian Sadler stated that for the past 30 or so years power revenues have been used to fund the AMWG and it's worked well, but the group is in a different paradigm. Two intersecting factors are an increase in program costs and a decrease in funding. It doesn't make financial sense to be sustainable in the future. The OMB directive further complicates this sustainability. The draft language for 2020 only secures funding for one year. There is risk to funding in future years. It could mean funding environmental programs and giving cash to OMB. It is important for Reclamation and WAPA to get funding for the next ten years.
- Steve Wolff added that federal funding is tenuous and different sources of funding have different rules. Steve recommended considering how to prioritize programs in light of these factors as AMWG plans the next TWP. WAPA and Reclamation are starting those talks. Steve hopes these groups can consider priorities with the AMWG and the Upper Basin together because the funding is all connected.

- Brent Esplin added that Reclamation is trying to figure out future funding. His group is looking at a combination of power revenues and appropriations. Reclamation does need to reassess and set priorities, while recognizing that Congress ultimately decides what to do.
- Vineetha Kartha asked for clarification on Steve's question, wondering if because it's a three-year plan, does it make sense to rethink the three-year budget and go on an annual basis until there is a solution. Because of funding it seems prudent to have certainty on funding sources. Steve clarified he thinks the three-year funding is good, but the group still needs to prioritize legally what needs to be done with the given funds. The group needs to have a plan for different levels of funding. Dr. Petty added that part of the ongoing discussion is working through parts and priorities to figure out a big part of why this group is together. We need to continue to work together. For those participants who want to get more involved, these discussions can happen within the BAHG.
- The purpose of this group discussion is to get a recommendation through AMWG to send the recommendation to the Secretary. To pass the budget, the AMWG will strive for consensus.
- Steve Wolff moved, Jan Balsom seconded, passed by consensus: The AMWG recommends for approval to the Secretary of Interior, the GCDAMP Fiscal Year 2020 budget summarized in the Bureau of Reclamation and Grand Canyon Monitoring and Research Center budget worksheets as presented at the June 11, 2019 TWG meeting.

Triennial Budget and Work Plan 2021-2023

Presenter & Affiliation: Seth Shanahan, Southern Nevada Water Authority, TWG Chair

Presentation Summary

Details of this presentation are included as [Attachment 7](#) to these notes.

TWG's process for starting the new 2021-2023 TWP starts in January 2020 and proceeds as follows:

- January – annual reporting meeting for TWG (may need to consider a meeting longer than three days).
- February – GCMRC meets with tribes and DOI agencies.
- March – initial TWP is developed.
- April - TWG meeting with a draft TWP.
- May – second draft & third drafts of TWP developed.
- June – TWG meets & provides comment on GCMRC/Reclamation TWP.
- July – final draft TWP sent to AMWG for review.
- August – AMWG meets to discuss and approve budget recommendation to Secretary.
- September – Secretary reviews budget.
- October – FY 1 begins under TWP guidance.

Discussion/Q & A

- The Annual Reporting Meeting is scheduled for January 13-15 [sic] in Phoenix, AZ. The overall schedule is somewhat flexible. Leslie James requested that the focus of this meeting be on key questions that this group will need to look at in terms of priorities. David Brown stated the meeting is long and takes a lot of time. He requested TWG work to make the meeting easily digestible and planned out on the front end.
- Kelly Burke requested creating an ad-hoc group focused on how to address bridging tribal projects with how the whole plan gets developed and carry that through this process. Lee Traynham replied that the Cultural AHG is another forum for that discussion. Kelly suggested that having it tied to the budget process might be very useful. Kelly asked if tribes were able to participate in the early meeting between GCMRC and DOI. Lee stated there is an open invitation for tribes to attend that meeting. Seth added

that the CRAHG had been used as a forum for Kelly's suggested discussions in the past, but maybe the process could be smoother.

- Melinda Arviso-Ciocco pointed out that this discussion brings up the past conversation about tribal collaboration and partnership. NHPA Section 106 compliance is one small part. Melinda insisted that the trust responsibility here is vital, and Chip Lewis at the BIA has a role to play in this process by assisting tribal representatives. Melinda stated she would like to be part of following through with collaboration and partnerships in management decision-making.
- Brent Esplin asked tribal representatives how they propose getting more involved in the process. Leslie James added that in the past the CRAHG looked at proposed projects and proposed their own projects as they happened, then fed those recommendations into the BAHG. Melinda clarified her understanding was that the CRAHG was more for the PA but could now be revived. Seth added that Kurt Dongoske had initially proposed to suspend the CRAHG, and that this is a tribal conversation. If tribes want to include a wider audience, then that is fine too. Charley expressed his support for bringing back the CRAHG. Brent concluded the CRAHG could be brought back and its charge expanded. Melinda supported this idea, stating further that Reclamation hasn't followed up with tribes on issues since July, and having a voice through CRAHG and not simply through the TWG would be helpful.
- Peter Bungart stated his understanding of the CRAHG was it was used during the LTEMP and then dissolved. Peter expressed his support for reestablishing the CRAHG, at least for the purpose of developing projects for the TWP. What happens again after that would remain to be seen, and whether there are non-tribal members. Anything that's cultural would have tribal involvement. When we look at cultural resources, there may be projects that are cultural in nature, i.e. supporting native versus nonnative fish, and suitable for discussion.
- Kelly refocused the discussion by stating her intention in bringing up tribal concerns in the budget process was to create a series of bridges in tribal projects and interests. She asserted that AMWG has used these committees in the past, but the issues keep coming up. There needs to be a better way. Seth responded that there are ongoing meetings between tribes and Reclamation already. Lee Traynham added that Reclamation believes generally more dialogue and more communication is necessary. Reclamation started that with a July meeting. Looking forward, Bill Chada has a list of touch points for at least once every month for now until the end of the TWP process. Reclamation is also considering working through other mechanisms, including phone calls or additional meetings. Jakob Maase expressed his support for additional communication mechanisms.
- Jan Balsom noted that CRAHG was suspended because it was committed to the PA, but it became frustrating working through the BAHG and not seeing any of CRAHG's proposals moving forward. It would be a valuable opportunity if there is commitment in this group to reengage from that subgroup. Starting those discussions early would be an appropriate place to do it. Peter Bungart added that another benefit of having tribal and non-tribal partners would be to address any pitfalls sooner rather than later or redirect processes that are unworkable early on.
- Seth stated that someone would need to lead the CRAHG.
- Melinda requested to be a part of the meeting in November with Reclamation and GCMRC. Reclamation committed to tribal participation at that meeting. Melinda further requested a full-time tribal liaison.
- Dr. Petty finalized the discussion by stating the tribes need to come together to identify a leader and a process to move forward. This is a consensus group, and Dr. Petty wants to be sure the group stays within the parameters of its charge.

Public Comment

Discussion/Q & A

- No public comments received.

Dr. Petty closed the meeting at 4:46 pm.

Thursday, August 22, 2019

Start Time: 8:30 am

Conducting: Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior

Facilitator: Rafael Reyna & Alysse Lerager, EnviroSystems Management, Inc

Recorder: Lauren Johnston, Galileo Project, LLC

Welcome and Administrative

Presenters & Affiliation: Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary’s Designee

Presentation Summary

Dr. Petty welcomed everyone and attendees introduced themselves. A quorum was reached with 16 stakeholders represented.

Stakeholder Updates

Presenters & Affiliation: Kirk Young, US Fish and Wildlife Service; Ken Hyde, National Park Service; Rob Billerbeck, National Park Service, Colorado River Coordinator; Chris Cantrell, AZ Game and Fish Department; Rod Smith, DOI Solicitor’s Office.

Presentation Summary & Questions

Endangered species

USFWS wrote SSAs for both the Humpback Chub and Rainbow Trout. USFWS is developing a draft rule to recommend downlisting and a 4d rule for both species, but no timeline for completion is currently available. The public will have a chance for review during the 45-day public review period.

NPS Nonnative Species EA

NPS is working to complete the PA between SHPO and Tribes, which will hopefully be completed by September 6, 2019. The FONSI paperwork is prepared and will, after the PA, be routed through the agency and the Department. Once the FONSI is signed NPS will start planning the incentivized harvest and start planning how to use the other approved tools. NPS did pump water out of the Slough to try to reduce green sunfish but they are back. NPS plans to pump out the Slough and remove green sunfish again in September. NPS has seen indications that brown trout numbers continue to increase. NPS will provide a green sunfish update early in the HFE planning process.

Dr. Petty asked NPS to provide context for the EA as it relates to the LTEMP. Rob answered that the EA was started because NPS noticed an uptick in green sunfish and brown trout and wanted to explore additional tools beyond the LTEMP to manage these and other nonnative species in NPS units. NPS initiated this process and developed a tiered management approach to address concerns related to management-intensive tools. NPS hopes this approach helps address, in particular, tribal concerns on intensive species management.

John Jordan recalled that at the time the EA started there was direction from DOI to move at an accelerated process. The original timing is about a year behind now, but in the document there were time sensitive cut off dates related to trout management controls. John would like assurance those will be shifting along with the final ROD timing. Rob replied that NPS set thresholds for tools and time periods and is intending to give full timelines. NPS had to bump back some timelines. It really all depends on what happens with the resource. Unless something shifts dramatically NPS fully intends to start the incentivized harvest. NPS wants to work with AGFD on this. NPS is excited to get started with incentivized harvest and evaluate it with GCMRC.

AGFD Rainbow Trout Stocking

AGFD has stocked 6500 rainbow trout into the walk in area of Lees Ferry. Five hundred were stocked last year in November and 6,000 were stocked this year. They are PIT tagged. There is a reader at 30 mile for the PIT tags. AGFD also implemented a persistence study with 100 sonic-tagged rainbow trout. For the most part the fish stay around where they were stocked. Out of the hundred sonic-tagged fish, it appears that there are only a handful left. The creel study will look at catch rates and determine our influence, satisfaction and catch. AGFD hosted a free fishing day clinic with the tribes. Local anglers offered to pay for annual licenses for youth that attended. Ten to fifteen youth attended and received the license. AGFD got positive feedback about the engagement and is considering doing it more frequently.

AGFD has compliance for stocking through the end of this year. All indications are that the fishery is recovering on its own. AGFD's whole intent is to make it thrive. There are no continuous stocking plans in place. AGFD does want to do longer term stocking compliance in case of issues or threats, i.e. dissolved oxygen. AGFD is studying the best ways to stock.

John Jordan thanked AGFD for this action and everyone who supported it. Chris Cantrell thanked all partnerships that made it possible.

Current Guidance Memo for DCP Implementation in the Upcoming Negotiations for Interim guidelines

In 2007, there were plans for shortages based on what Reclamation knew at the time. However, based on water levels and runoff the risk of shortage seemed unacceptably high. Drought Contingency Planning (DCP) is one way to abate this shortage. Commissioner Burman led this charge. The results of this push are public law 116-14 and agreements for a DCP. The DCP agreements were signed on May 20 at Hoover Dam. For the Upper Basin there are additional options for how state-based water conservation programs might work and how the water can then be added to federal storage. There is a process in place to keep an eye on lake levels at Powell. There is a process in place for folks to talk to get water from upper CRSP facilities and down into Powell. There is a similar conservation focus in the Lower Basin. There are more tools there to get level of Lake Mead propped up.

The next step is to implement these DCPs and learn from them. The 2007 guidelines expire in 2026. No later than the end of 2020, DOI needs to start an evaluation of what to do after 2026 on a macro level. This includes how to schedule releases. While this is in play all stakeholders need to be mindful of interactions between the Upper and Lower Basins.

Leslie James requested additional information on the FLAHG. This is an agenda item for later in the day and can be discussed then.

Dr. Petty requested that participants let Lee know if there are any action items from these topics today.

2019 Integrated Stakeholder River Trip

Presenter & Affiliation: Theresa Pasqual, Joint Tribal Liaison for the Glen Canyon Dam Adaptive Management Program

Presentation Summary

The River trip began on July 24 with networking discussions in Flagstaff and lasted for nine days. The trip down the river required work as a collective. This form of interaction is critical to this program on the AMWG. Theresa posed the following question to all participants, whose answers are included below:

How do you plan to use these experiences on the river in your work in this group?

Brent Esplin stated that altering conditions between Glen Canyon Dam and the Hoover Dam is inevitable but wanted to know more about how to mitigate these impacts. It was helpful to talk directly with stakeholders with different perspectives and their alternatives for mitigation. Brent stated is overall message from the trip was that Reclamation and AMWG have to look at areas where there is flexibility,

and potentially create more flexibility, to meet national critical needs but also address the other stakeholders' concerns.

Melinda Arviso-Ciocco recalled that each time she goes down the river is a new experience. She appreciates comments around the needed flexibility, creativity, and openness needed within agencies, tribes, and nations to manage the resources as a fluid environment. Melinda took home new oral histories from other tribal members, including Richard Begay, and ideas for recommendations for AMWG and tribal communities surrounding the river.

Jan Balsom helped facilitate conversations on the trip, and stated every trip is unique and the river and canyon impact everyone who interacts with it. This is crucial to understanding the flexibility in the system.

Kevin Garlick stated that the trip helped widen his view of the whole system and his interests in it. His interest started as simply power generation and costs but have moved to include other perspectives. Kevin expressed his appreciation for being able to participate in the trip and emphasized the importance of flexibility within operations.

Michael Moran had only previously been down the river for a work trip and was happy to see several areas he had heard about but never experienced. He expressed his gratitude for deep and thoughtful conversations along the river.

Peggy Roefer presented what she learned about the tribes and tribal perspectives associated with the Grand Canyon. The details of Peggy's presentation are included as Attachment 8a, to these notes. Additional photographs shared by Craig McGinnis are included in Attachment 8b.

Discussion/Q & A

- See discussion, Q & A in the following section.

Joint Tribal Liaison Report

Presenters & Affiliation: Sarah Rinkevich and Theresa Pasqual, Joint Tribal Liaisons for the Glen Canyon Dam Adaptive Management Program

Presentation Summary

Tribal representatives requested a meeting on their own. There are a number of issues on the budget and in the TWP that impact tribal budgets and colleagues. Some of the issues that came up in the discussion was the need for increased funding and participation.

In July 2019 Reclamation spoke with the tribes to talk about cultural resources management. Tribal representatives and Sarah and Theresa also attended. The following topics were discussed:

- What meaningful consultation is, and the difference between consultation and collaboration. There is a legal requirement by federal agencies to do consultation, but tribes want to review what that looks like. The consultation is a series of conversations. This goes into the definition of collaboration. Federal agencies need to engage in consultation but want to do that in a spirit of collaboration. This is a challenge because of complexity of consultation that occurs, and the complexity of history between consulting parties.
- Western Science versus resource stewardship and the conflict of values that occurs. These include the challenges of trying to understand one another and the different priorities each group has. Priorities, and where conflict arises that can be avoided. Reclamation did a great job of covering program funding and what reporting requirements need to be covered before funds are distributed to tribal programs. Sometimes there is a disconnect between accounting between tribes and Reclamation. Communication needs to occur at all levels to ensure everyone is on the same page and can be effective and efficient.

- Budget Section D updates, issues and concerns, and planning for the new TWP. Tribes are hopeful that these discussions will help tribal communities be more proactive and less reactive.

Theresa added the following information regarding the river trip:

The nine-day river trip, with participants representing Hualapai, Paiute, Zuni, Navajo, and Hopi, and other federal and state agencies. Topics covered included indigenous perspectives, humpback chub, issues at the confluence, cultural versus western values, vegetation, riparian areas, rehabilitation of some areas, endangered and invasive species in the context of wildlife and insects. WAPA shared values and goals of their organizations. Discussions also centered on HFEs, hydrology, and sediment. With a budget of \$40,000, the trip inspired AMWG member participation and understanding and produced an official debrief for management.

An outline of this presentation is included as [Attachment 9](#).

Discussion/Q & A

- Participants appreciate Councilman Kucate's participation and his insight into how everything is linked. This allowed the group to work on strategies for tangible and intangible resource management. He brought the knowledge to the river trip.
- Arden Kucate from Hopi stated that tribes recognize who holds the power in decision making. All the tribes can do is appeal to participants' heartstrings to understand how these places are important. The tribal hope is that sharing cultural perspectives will help people understand and change perspectives.
- Tribal liaisons have a unique challenge of working with tribes, management, and other stakeholders. This is a learning environment for the liaisons as well. The product of that work is continued cooperation with tribes. There are times when the conversation becomes difficult and need to be facilitated. The liaisons appreciate everyone working together.
- Sarah will be leaving as of October 1. Started in November 2012. She is grateful for the opportunity and will be continuing her work with the USFWS on traditional ecological knowledge and endangered species. Sarah expressed interest in tribal youth programs.
- Dr. Petty added that the Office of Water and Science will review Sarah's position to see how it and the Joint Tribal Liaisons program will move forward. It is part-time and funded out of the Department of the Interior.

Potential Water Year 2020 Experiments

Presenters & Affiliation: Emily Omana Smith, Biologist, Bureau of Reclamation

Presentation Summary

Reclamation strives to include effective communication and consultation in implementing experiments with a goal to meet various resource goals under an adaptive management system. Potential experiments for Fall include a regular Fall HFE (up to 96 hours) or an extended Fall HFE (97-192 hours). Potential experiments for Spring-Fall 2020 include a Spring HFE, a Proactive Spring HFE (limited to 24 hours at first, then up to 250 hours), a Trout Management Flow, a Macroinvertebrate flow, a Fall HFE, or an extended Fall HFE. There can be no Spring HFE in the same year as an extended Fall HFE. There can be no proactive Spring HFE in the same year as a sediment-driven Spring HFE.

Sediment modeling will begin soon after the AMWG meeting, and any Fall HFE would be possibly implemented in October to November. Although there are units down within the dam, capacity in CFS runs around 20,000 – 21,000 during the times Reclamation could consider HFEs. This, plus about 15,000 cfs from the bypass tubes give the potential for ~35,000 cfs release.

Bug flows were implemented in 2018 and 2019. Positive results were reported by GCMRC in 2018, and we will hear more about preliminary 2019 results later in Mike Moran's talk, GCMRC has advocated for a three-year experimental cycle.

Stakeholders have been concerned whether we know enough to implement a TMF should one be recommended. In the summer of 2019 DOI technical representatives were consulted on what compliance is available and what information needs are regarding TMFs. Reclamation's next step is to initiate formal consultation with Tribes, then reach out to a broader stakeholder group. Jessica Gwinn and Emily are working on facilitating the discussions and plan to have the next discussion on September 24. Interested persons are invited reach out to Jess or Emily to participate.

Spring Power Plant Capacity flows are another potential action. The maximum non-experimental flow release is 25,000 cfs per LTEMP ROD.

Details of when each experiment will be decided, implemented, and how it might be triggered, are included in the presentation in [Attachment 10](#).

Discussion/Q & A

- No discussion or questions received.

TWG Chair Report

Presenter & Affiliation: Seth Shanahan, Southern Nevada Water Authority, TWG Chair

Presentation Summary

Details of Seth's presentation are included in the presentation at [Attachment 11](#).

Seth corrected his prior statement and clarified that the Annual Reporting Meeting and the TWG meeting to follow take place on January 12-14.

TWG focuses on the same issues as the TWG and has seen several similar presentations, and feeds recommendations to AMWG. In the June meeting TWG reviewed the Knowledge Assessment process and how it can be used to measure potential future experiments and environmental management actions. These discussions are ongoing.

TWG discussed Powerplant capacity flows but did not discuss other experimental flow concepts due to the length of discussion of the capacity flows. This discussion included expert input from GCMRC staff. TWG wants to continue a conversation on other experimental flow concepts through the Flow Ad Hoc Group. This is all still in the planning stages. Peggy Roefer has volunteered to be the chair of the FLAHG. Seth has distributed a draft charge for the FLAHG, but it is still in review. The draft charge items are listed below.

- Develop spring hydrographs that might benefit LTEMP biological resources
- Comply with existing rules
- Evaluate, using the knowledge assessment, outcomes to the biological resources and food base.
- More charges envisioned; i.e. additional work is envisioned for the future. We can then look at all of the other resources that weren't considered in this first place.

Seth invited meeting attendees to email Peggy and Seth with any edits to the draft charge or with interest in participating in the FLAHG.

Discussion/Q & A

- Brian Sadler commented that the two-step process of considering first biological and then other resources might preclude working towards win-win projects. Brian added he is struggling to think about how TWG would look at all resources at the same time to find win-wins. Brian's second question was how the FLAHG would operate with the technical team that Reclamation oversees in making the budget. Seth replied that the hope is to construct the hydrographs with everyone in the room, and with some internal trade-off analysis already completed. Seth stated he is open to working this out and looking at how to get these trade-offs in quantitative terms.
- Emily Omana Smith added that the idea of doing a powerplant capacity flow is rooted in that that type of flow is within normal operations, up to 25,000 CFS. Lee Traynham added that the FLAHG it's a

special setup to consider this idea that was not part of LTEMP. This new process was created out of a need for looking at how powerplant flows could be used, and what additional work is needed to use them properly. Once the FLAHG group comes back with consensus, that's when Reclamation will then move over to a formal LTEMP process.

- John replied he is encouraged by this change and considering other resources in designing the flows. Seth added that TWG needs experts on these resources to develop this process, and then AMWG will take the result and make decisions.
- John wondered if more direction from DOI was needed to enforce TWG's ability to ask agencies to look at these options and allow TWG to coordinate on the level needed. Seth replied that GCMRC has already offered to look at this issue, and Lee stated that the guidance to consider power management flows is explicit in the memo. It's a priority for Reclamation.
- Seth further added that TWG does not think about policy decisions. TWG considers technical aspects. ~~TWF-TWG~~ is sensitive to having conversations that might add policy pressure.
- Jan Balsom commented that NPS is invested in this and specialists are engaged. This work is relevant to the Grand Canyon Protection Act which impacts GLCA and GRCA.
- Kelly Burke noted that it would be also important to look at other impacts of power capacity flows in impacting a real Spring HFE. Seth responded that it's premature to have that conversation on a technical level. Lee added that it's Reclamation's first priority to implement a Spring HFE due to sediment or proactive trigger. Reclamation has a better understanding now that the Spring HFE is less likely than initially thought. Reclamation still wants to test it with this surrogate idea. This is the best option backup plan. Kelly agreed but added that GCWC does not want to see a power capacity flow reduce the possibility of a Spring HFE.
- John Hamill added that Larry Stevens (GCWC) pushed this issue to address concerns about the apparent correlation between fall HFEs and the growth of BT populations in Lees Ferry. John's group still thinks it's a viable hypothesis that something in the Fall promotes spawning success. Doing HFEs exacerbates the problem of BT. The other reason Larry pushed this is that Spring Flows are the norm for floods in the Colorado River System. Spring HFEs were added as a possibility because of the potential for a good biological impact. As written initially these HFEs could only be triggered with sediment. The group is now learning that a sediment triggered Spring HFE is not likely. Further, the prospect of a 24-hour HFE for equalization shows no biological consideration. There's a lot of thought that needs to go into appropriate timing and duration of a potential Spring HFE to get a biological benefit. John supports looking at Power Plant Capacity flows but there may be other adjustments, such as the accounting period, that could be adjusted to allow for more Spring HFEs. So, if it turns out that BT are really being helped by Fall HFEs, we can adjust for that. John asked that the focus not be centered narrowly just around capacity flows, but also consider biological concerns to maximize benefits. John's hope was that there are options to adjust the LTEMP to do what science suggests.
- David Brown requested an extension for FLAHG participation. The deadline is changed to two weeks from this Friday.
- David Brown agreed with John Hamill's points. There are issues with the accounting period and the likelihood of a Spring HFE. This issue needs to be considered in the realm of adaptive management and shouldn't be limited to stay within a box.
- Rob Billerbeck recalled that LTEMP did consider alternatives and Spring HFEs were fully considered. Alternatives, including a more naturally patterned alternative, were dismissed due to negative impacts to resources. Remember that LTEMP took five years of analysis. This analysis needs to be reconsidered with fresh eyes and flexibility but also with an appreciation for why certain ideas have been dismissed.
- Jessica Neuwerth also mentioned that stakeholders worked many years refining alternatives, analyzed many different points, and established guardrails. Jessica would like to see AMWG fully explore what's in the guardrails prior to moving beyond them. Parameters are established for a reason. Exploring flexibility within parameters is a great start.

- Vineetha Kartha mentioned that there is a Biological Opinion that looks at impacts of equalization flows. The proposed powerplant capacity flows are part of operations and not an experiment. These flows are management actions and cannot use the bypass tubes. It's important to note the distinction.
- John Jordan requested to be invited to the TMF discussions. Emily Omana Smith formally extended an invitation to recreational fishing. The federal family approach in the beginning was to get a handle on compliance. The September meeting is for all folks that may be interested.
- Peter Bungart asked if any of the flows has the potential to impact Hualapai tribes down in the Western Grand Canyon. Hualapai would like to be more involved in those discussions to make sure those impacts are considered. Several parties noted they did not receive the solicitation for further FLAHG discussions and would like to be involved. Seth committed to sending the email to the AMWG list. Lee Traynham encouraged AMWG members to nominate a TWG representative.
- David Brown pointed out that the message he received was that Fall HFEs do not offer a lot of beach building. There was a lot of analysis that went into that, but that's not the result of the HFE. Michael Moran countered that photographs show some sandbars show improvement, and there is initial gain followed by erosion. There is also evidence of incremental sandbar increase over time. Jan Balsom added that she has observed increase in a lot of places, and the and that increases are cumulative over time. This may be reflected in thickness of the bars and not necessarily their outward size. Melinda added that on the Navajo side of the river there were definitely new areas and change.
- Chris Cantrell supported the FLAHG idea as a good forum for TMF and HFE discussions and will reserve opposition to those flows until the FLAHG has time to consider options. Emily encouraged Chris to participate in the TMF discussions and planning.
- Kelly Burke reminded the group that LTEMP is still an adaptive management program, testing a hypothesis that LTEMP is based on. The group needs to engage new learning moving forward
- Leslie stated that this conversation underscores the need for monitoring metrics and objectives. At the AMWG a year ago, Jayne Harkins recommended is monitoring metrics and objectives be developed. Seth encouraged participants to come up with their ideal objectives and metrics to share with AMWG.
- Dr. Petty added that different agencies and bureaus have their own guidelines. Adaptive management means being able to explore options within the range provided by these guidelines, but not all groups have flexibility in the same areas. There needs to be flexibility and creativity within given parameters. Reclamation also needs to know what each stakeholder's goals are to make sure AMWG knows what it's looking for and how to measure it, and then how Reclamation can apply that to decision-making. This group is fully engaged in this process, unlike some other basins, and that's a positive thing.

GCMRC Science Updates

Presenter & Affiliation: Michael Moran, Acting Chief, GCMRC

Presentation Summary

Details for each project presented at the meeting are included in [Attachment 12](#). Michael noted the USGS-GCMRC website is available for additional details, and scientists are available to take phone calls for more information.

Project A highlights: Streamflow, Sediment Transport, and Water quality - Currently there is not enough sand to trigger an HFE, however this could change prior to closing the accounting window.

Project B highlights: Sandbar and Sediment Storage - Photo evidence shows good sand building right after the HFE. In the long term, results are variable, but the most change is seen in the larger sandbars. Most gain from a Fall HFE is lost by February of the next year. Erosion makes it difficult to maintain these gains.

Project C highlights: Riparian Vegetation and Monitoring - Vegetation Monitoring Protocol was published in 2018. Methods published are applicable in other systems. Data from *Durning et al 2017*, showing estimates of vegetation data, are being used in several analyses.

Project D highlights: Monitoring Effects of Dam Operations on Archaeological Sites – Dune field storage increases cumulatively as a result of HFEs. Wind then deposits more sand. Removing vegetation may supply more available sand for dunes and sandbars. GCMRC is monitoring this at several vegetation removal sites.

Project F highlights: Aquatic Invertebrate Ecology – This project includes Citizen science light traps for midges and caddisflies. The observed increase in capture rate is potentially due to the Bug Flows. Sticky trap data from 2018 midge emergence showed a large increase. There is also higher emergence on the weekends when comparing week/weekend flows. Bug flows are currently ongoing. The bug flows for this year have weekend flows 750 CFS higher than during the weekday lows.

Project G highlights: HBC Population Demographics - HBC population appears stable in 2018; average adults and subadults are increasing in the LCR. The subadult population is still above the trigger level for more management actions. The decreasing number of 0+ year fishes could signal a future decrease in adults. When translocated above Chute Falls and LCR, HBC do better. There appears to be an increase in HBC population below LCR.

Project H highlights: Salmonid Research and Monitoring - Population and condition factor in trout appear to be stable. The lower 2017 population and condition factors in the JCM reach improved in 2018. The Catch rate is above one fish per minute in Lees Ferry. Smaller fish are starting to recruit into the older population as of 2018. At Lees Ferry the BT CPUE has gone up. More sampling is scheduled for later this year. As of 2019, BT populations are not producing as many smaller fish as in 2016.

Project I Highlights: Warm Water Native and Non-Native Fish - There are a lot of channel catfish in the Little Colorado River. The population is likely very large. Most of the fish are large adults. The impacts of this is not very well understood. GCMRC is trying to determine how piscivorous these fish are.

Project J highlights: Socioeconomic Resource Values- The Navajo surveys are completed, and the Hualapai surveys should be completed in September. The Applied Decision Analysis portion of this study tries to analyze risk versus actions that we take, for example modeling management actions towards RBT in response to HBC numbers. GCMRC is currently applying this to efficacy of TMFs.

Project K Highlights: Geospatial Science and Technology – GCMRC is developing a new database and IT capacity for modeling, including cloud storage data, and an internet of things pilot project. This is using modern cell phone technology to have sensors connect to cell phones in order to get data in real time and to manage and communicate with data and sensors, respectively.

The new GCMRC website is at usgs.gov/centers/sbsc/gcmrc.

Discussion/Q & A

- There is no progress on Project N to report so it is not included. Lucas Bair has started some of it, but it is still preliminary. Lucas is considering how different energy uses affect the total carbon emissions, etc. Leslie asserted that ~~the SEAHG was not aware of this project, this should be tied to this program.~~
- Brian Sadler asked if the BT increases should be concerning. Michael replied that modeling based on the raw data has not been completed. He is not a fish biologist and should not speculate. Kirk Young added that USFWS is aware of the increase and is monitoring it. Trout levels aren't as high as in 2014 but right now it hasn't shown its effect in HBC populations. Yakulic's research on how RBT effects HBC seemed to show a temperature component. USFWS is looking into that.
- John Hamill asked if there were any more translocations of HBC into tributaries planned for this year. Jan Balsom updated that there are plans for translocations Havasu Creeks and Bright Angel Creeks within NPS jurisdiction. Kirk Young added that there are plans for additional translocations in the LCR. Groups are working together to look at the positives of that. So far there appears to be a net benefit of moving fish.
- Peter Bungart asked if the channel catfish in LCR are a threat to HBC recruitment and, if so, if there was a plan of action in place.

- Michael stated that he discussed this with David Ward, who was concerned about this impact. HBC numbers seem to be good in the LCR right now but that could change. David is doing lab work to determine how piscivorous they are, and they appear to be quite piscivorous. Kirk added that channel catfish have been known in the LCR for 40 years. They are undoubtedly eating chub. It could be, if HBC aren't habitat limited in another way, that if the population of channel catfish is reduced, the HBC population could increase.
- David Brown pointed out that the latest data for sediment indicated that in February the gains from the HFEs disappeared. Michael stipulated that more data will be collected over the next sandbar monitoring trip in September.

Final thoughts and Public Comment

Presentation Summary

- Peter Bungart asked if River Trips would continue. Lee Traynham replied in the affirmative. Brent Esplin encouraged participation in the river trips and to keep tribal perspectives in mind.
- Lynn Hamilton asked if past guidance memos were captured anywhere. Craig Ellsworth noted they are on the wiki, linked on the page titled "DOI Direction". Lynn followed up with thanks for maintaining the wiki, especially in light of FACA committee review.
- Lynn mentioned that Peter Bungart and Loretta Jackson will be speaking tomorrow night at the Klein Library at NAU. Their talks will focus on the Hualapai Tribe and its ties to the Grand Canyon. Klein library will be recording the talks. Lynn offered to share the video link with AMWG.

Wrap-Up

Presenter & Affiliation: Dr. Timothy "Tim" Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary's Designee

Important dates:

- February 12 & 13, 2020 – AMWG in-person meeting.
- May 20, 2020 - Webinar
- August 19-10, 2020 AMWG in-person meeting. Note: this is first week of school. Reclamation is looking for feedback from interested folks on whether it would be easier to have the meeting on September 3-4, 2020. Please consider sharing your preference with AMWG.

Meeting Adjourned at 2:16 pm

Meeting Attendees–Wednesday, August 21, 2019

AMWG Members, Alternates, and Leadership

Melinda Arviso-Ciocco, Navajo Nation
Jan Balsom, NPS-GRCA
Clifford Barrett, UAMPS (webinar)
Eric Bobelu, Pueblo of Zuni
David Brown, GCRG
Kathleen Callister, Reclamation
Chris Cantrell, AGFD
Brent Esplin, Reclamation and Designated
Federal Official
Kevin Garlick, UAMPS
John Hamill, IFFF/Trout Unlimited
Leslie James, CREDA

John Jordan, IFFF/Trout Unlimited
Vineetha Kartha, ADWR
Chip Lewis, BIA
Eric Millis, UDWR
Timothy Petty, DOI and Secretary's Designee
Daniel Picard, Reclamation
Brian Sadler, WAPA
Warren Turkett, Colorado River Commission of
Nevada (webinar)
Steve Wolff, State of Wyoming
Kirk Young, USFWS (phone)

USGS/GCMRC Staff

Lucas Bair (webinar)
Laura Durning (webinar)
Helen Fairley
Paul Davidson (webinar)

Ted Kennedy
David Lytle
Michael Moran
J Sankey (webinar)

Bureau of Reclamation Staff

Tara Ashby
Chuck Bench
Bill Chada
Kathleen Callister
Emily Omana Smith

Heather Patno
Alex Pivarnik
Shana Tighi (webinar)
Lee Traynham
Christopher Watt

Interested Persons

Rodney Bailey, WAPA
Rob Billerbeck, NPS- Colorado River
Coordinator
Rachel Bryant, WAPA
Charley Bullets, Southern Paiute Consortium
Peter Bungart, Hualapai Tribe
Kelly Burke, GCWC
Danielle Carmon, NPS-GRCA
Winkie Crook, Hualapai Tribe
Kevin Dahl, NPCA
Kurt Dongoske, Pueblo of Zuni
Craig Ellsworth, WAPA
Jessica Gwinn, USFWS
Lynn Hamilton, Grand Canyon River Guides
Michelle Garrison, Colorado Water
Conservation Board
Jeff Humphrey, USFWS
Ken Hyde, NPS-GRCA
Lauren Johnston, Galileo Project, LLC
(notetaker)

Arden Kucate, Pueblo of Zuni
Alyse Lareger, EnviroSystems Management,
Inc (Facilitator)
Sarah Larson, Upper Colorado River
Commission
Kenneth Mayer, Colorado River Commission of
Nevada
Jakob Maase, Hopi Tribe
Scott McGettigan, UDWR
Craig McGinnis, ADWR
Carl Munroe, Southwest Power Pool
Jessica Neuwerth, Colorado River Board of
California
Peggy Roefer, Colorado River Commission of
Nevada
Dave Rogowski, AGFD
Theresa Pasqual, Joint Tribal Liaison
Bill Persons, Trout Unlimited
Rafael Reyna, EnviroSystems Management, Inc
(Facilitator)

Sarah Rinkevich, DOI Water and Science, Joint
Tribal Liaison
Peggy Roefer, State of Colorado
Melissa Sevigny, KNAU
Woody Smeck, NPS-GRCA

Rod Smith, DOI Solicitor's Office
Seth Shanahan, SNWA
Billy Shott, NPS-GRCA
Erik Skie, Colorado Water Conservation Board

Webinar Attendees

David Braun, Sound Science
Paul Harms, State of New Mexico
Ryan Mann, AGFD
Tim Pierce, KCPW
Shana Tighi, Reclamation
Warren Turkett, Colorado River Commission of
Nevada

Linda Whetton, public
Eric Witkoski, Colorado River Commission of
Nevada
Jeffrey Woner, KRSaline

Meeting Attendees, Thursday, August 22, 2019

AMWG Members, Alternates, and Leadership

Melinda Arviso-Ciocco, Navajo Nation
Jan Balsom, NPS-GRCA
Eric Bobelu, Pueblo of Zuni
David Brown, GCRG
Kathleen Callister, Reclamation
Chris Cantrell, AGFD
Brent Esplin, Reclamation and Designated
Federal Official
Kevin Garlick, UAMPS

Leslie James, CREDA
John Jordan, IFFF/Trout Unlimited
Vineetha Kartha, State of Arizona
Chip Lewis, BIA
Timothy Petty, DOI and Secretary's Designee
Daniel Picard, Reclamation
Brian Sadler, WAPA
Steve Wolff, State of Wyoming
Kirk Young, US

USGS/GCMRC Staff

Lucas Bair (webinar)
Helen Fairley
Tom Gushue
Ted Kennedy
David Lytle

Michael Moran
Jeffrey Muehlbauer

Bureau of Reclamation Staff

Tara Ashby
Bill Chada
Emily Omana Smith

Alex Pivarnik
Lee Traynham
Christopher Watt

Interested Persons

Rodney Bailey, WAPA
Rob Billerbeck, NPS- Colorado River
Coordinator
Rachel Bryant, WAPA
Charley Bullets, Southern Paiute Consortium
Kelly Burke, GCWC
Winkie Crook, Hualapai Tribe
Kevin Dahl, NPCA
Michelle Garrison, Colorado Water
Conservation Board
Jessica Gwinn, USFWS
Jeff Humphrey, USFWS
Lauren Johnston, Galileo Project, LLC
(notetaker)
Alysse Lareger, EnviroSystems Management,
Inc (Facilitator)
Jakob Maase, Hopi Tribe

Craig McGinnis, ADWR
Jessica Neuwerth, Colorado River Board of
California
Bill Persons, Recreational Anglers
Rafael Reyna, EnviroSystems Management, Inc
(Facilitator)
Sarah Rinkevich, DOI Water and Science and
Joint Tribal Liaison
Peggy Roefer, Colorado River Commission of
Nevada
David Rogowski, AGFD
Melissa Sevigny, KNAU
Seth Shanahan, SNWA
Billy Shott, NPS-GRCA
Erik Skie, Colorado Water Conservation Board
Michael Yeatts, Public

Webinar Attendees

Lucas Bair, USGS-GCMRC
Clifford Barrett, UAMPS
David Braun, Sound Science
Kurt Dongoske, Hopi Tribe

Paul Harms, State of New Mexico
Ryan Mann, AGFD
Lisa Meyer, WAPA

Abbreviations

ADWR – Arizona Dept. of Water Resources	GCDAMP - Glen Canyon Dam Adaptive Management Program
AF – Acre Feet	GCES – Glen Canyon Environmental Studies
AGFD – Arizona Game and Fish Department	GCMRC – Grand Canyon Monitoring & Research Center
AIF – Agenda Information Form	GCNP – Grand Canyon National Park
AMP – Adaptive Management Program	GCNRA – Glen Canyon National Recreation Area
AMWG – Adaptive Management Work Group	GCPA – Grand Canyon Protection Act
AOP – Annual Operating Plan	GCRG – Grand Canyon River Guides
ARM – Annual Reporting Meeting	GCWC – Grand Canyon Wildlands Council
ASMR – Age-Structure Mark Recapture	GLCA – Glen Canyon National Recreation Area
ASWS – Assistant Secretary of Water and Science (DOI)	GRCA – Grand Canyon National Park
AGFD – Arizona Game and Fish Department	GSF – Green Sunfish
BA – Biological Assessment	HBC – Humpback Chub (endangered native fish)
BAHG – Budget Ad Hoc Group	HFE – High Flow Experiment
BCOM – Biological Conservation Measure	HMF – Habitat Maintenance Flow
BE – Biological Evaluation	HPP – Historic Preservation Plan
BHBF – Beach/Habitat-Building Flow	IG – Interim Guidelines
BHMF – Beach/Habitat Maintenance Flow	INs – Information Needs
BIA – Bureau of Indian Affairs	IFFF – International Federation of Fly Fishers
BO – Biological Opinion	KA – Knowledge Assessment (workshop)
BOR – Bureau of Reclamation	KAS – Kanab Ambersnail (endangered native snail)
BT – Brown Trout	LCR – Little Colorado River
BWP – Budget and Work Plan	LCRMCP – Lower Colorado River Multi-Species Conservation Program
CAHG – Charter Ad Hoc Group	LTEMP – Long-Term Experimental and Management Plan
CAP – Central Arizona Project	LTEP – Long Term Experimental Plan
CESU – Cooperative Ecosystems Studies Unit	MA – Management Action
CFMP – Comprehensive Fisheries Management Plan	MAF – Million Acre Feet
cfs – cubic feet per second	MATA – Multi-Attribute Trade-Off Analysis
CMINS – Core Monitoring Information Needs	MLFF – Modified Low Fluctuating Flow
CMP – Core Monitoring Plan	MO – Management Objective
CPI – Consumer Price Index	MRP – Monitoring and Research Plan
CRAHG – Cultural Resources Ad Hoc Group	NAU – Northern Arizona University (Flagstaff, AZ)
CRBC – Colorado River Board of California	NEPA – National Environmental Policy Act
CRCN – Colorado River Commission of Nevada	NHPA – National Historic Preservation Act
CRE – Colorado River Ecosystem	NNFC – Non-native Fish Control
CREDA – Colorado River Energy Distributors Assn.	NOI – Notice of Intent
CRSP – Colorado River Storage Project	NPCA – National Parks Conservation Association
CWCB – Colorado Water Conservation Board	NPS – National Park Service
DAHG – Desired Future Conditions Ad Hoc Group	NRC – National Research Council
DASA – Data Acquisition, Storage, and Analysis	O&M – Operations & Maintenance (Reclamation Funding)
DBMS – Data Base Management System	PA – Programmatic Agreement
DFO – Designated Federal Officer	PBR – Paria to Badger Creek Reach
DOE – Department of Energy	PEP – Protocol Evaluation Panel
DOI – Department of the Interior	POAHG – Public Outreach Ad Hoc Group
DOIIF – Department of the Interior Federal Family	Powerplant Capacity = 31,000 cfs
EA – Environmental Assessment	R&D – Research and Development
EIS – Environmental Impact Statement	RBT – Rainbow Trout
ESA – Endangered Species Act	Reclamation – United States Bureau of Reclamation
FACA – Federal Advisory Committee Act	RFP – Request for Proposal
FEIS – Final Environmental Impact Statement	RINs – Research Information Needs
FRN – Federal Register Notice	ROD Record of Decision
FTE – Full Time Employee	
FWS – United States Fish & Wildlife Service	
FY – Fiscal Year (October 1 – September 30)	
GCD – Glen Canyon Dam	

Glen Canyon Dam Adaptive Management Program: AMWG Meeting, August 22-23, 2018

RPA – Reasonable and Prudent Alternative
SA – Science Advisors
SAEC – Science Advisors Executive Coordinator
Secretary – Secretary of the Interior
SCORE – State of the Colorado River Ecosystem
SHPO – State Historic Preservation Office
SOW – Statement of Work
SSQs – Strategic Science Questions
SWCA - Steven W. Carothers Associates
TCD – Temperature Control Device
TCP – Traditional Cultural Property
TEK – Traditional Ecological Knowledge
TES – Threatened and Endangered Species

TMC – Taxa of Management Concern
TMF – Trout Management Flows
TWG – GCDAMP Technical Work Group
UAMPS – Utah Associated Municipal Power Systems
UCRC – Upper Colorado River Commission
UDWR – Utah Division of Water Resources
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration
WY – Water Year

**GLEN CANYON DAM ADAPTIVE MANAGEMENT WORK GROUP
ACTION ITEM TRACKING REPORT**

Note: Items marked “Closed” will be removed from the next iteration of the report.

ITEM No. / DATE	ACTION ITEM	ASSIGNED TO / DUE DATE	STATUS
Item 2017.Sep.01	<p>At its next meeting, AMWG will consider a process for planning for the next 20 years of LTEMP.</p> <p><u>February 2018 update:</u> This will be addressed through the development of monitoring metrics and by the streamlining of GCDAMP guiding documents as described in the LTEMP ROD.</p> <p><u>August 2018 update:</u> DOI will be working on this over the next year with input from the AMWG with the target to complete the process by the end of 2019. This action item will remain open until the entire process is completed.</p> <p><u>March 2019 update:</u> Personnel transitions in the program office and the government shutdown have impacted progress on this item. A more detailed update will be provided at the May webinar. This action item will remain open until the entire process is completed.</p> <p><u>May 2019 Update:</u> Planning for the next 20 years of LTEMP is a high priority for Reclamation, and, now that the Adaptive Management Group Chief position has been filled, Reclamation intends to make substantive progress on this issue this fiscal year (by September 30, 2019).</p> <p><u>August 2019 Update:</u> This action item will move forward as directed and informed by the Guidance Memo issued by the Secretary’s Designee in August 2019.</p> <p><u>February 2020 Update:</u> Information and experience from the 2019-2020 Knowledge Assessment and from development of the 2021-2023 TWP will inform this action. Additional emphasis is on assembling critical elements including program staff (e.g. biologist, archeologist, tribal liaison), facilitator, and Science Advisor to support this effort.</p>	Lee Traynham / target of end of calendar year 2019	Open

ITEM No. / DATE	ACTION ITEM	ASSIGNED To / DUE DATE	STATUS
Item 2018.Sep.01	<p>BOR will send the temperature control paper to the AMWG when it is available.</p> <p><u>March 2019 update:</u> The Technical Services Center at Reclamation is working to document the current state of practice on temperature control devices, identifying needs and research gaps, developing partnerships, identifying subject matter experts, and then recommending future actions, which could potentially include a prize competition.</p> <p><u>May 2019 update:</u> The temperature control paper should be sent to AMWG by the end of the fiscal year (by September 30, 2019).</p> <p><u>August 2019 update:</u> The Technical Services Center at Reclamation has confirmed that the temperature control paper will be available for distribution by the end of fiscal year 2019. The TSC intends to host a prize competition on temperature control in fiscal year 2020.</p> <p><u>February 2020 update:</u> Reclamation's Technical Services Center finalized the paper titled "Review of Temperature Control Options for Reservoir Release Flows" in January 2020. The paper was distributed to AMWG and TWG members via email on February 6, 2020 and is available on the AMWG website.</p>	Lee Traynham / when available	Closed
Item 2019.Mar.03	<p>Reclamation will send to the Secretary's Designee information on the \$95,000 in tribal support.</p> <p><u>May 2019 update:</u> Reclamation will send to the Secretary's Designee information on the \$95,000 in tribal support in the coming weeks and this issue will be reported on during the August AMWG meeting.</p> <p><u>August 2019 update:</u> This conversation is ongoing. Reclamation, NPS, and GCMRC met with Tribal Representatives in July. The AMWG Tribal Representatives requested the opportunity to address Dr. Petty directly during the August AMWG meeting. This item will remain open until a determination is reached.</p> <p><u>February 2020 update:</u> Reclamation has provided to the Secretary's Designee relevant information including responses submitted by Tribal Representatives, historic documentation, cost estimates, and an outline of current budgets and accounting. This conversation is ongoing.</p>	Reclamation / none	Open

ITEM No. / DATE	ACTION ITEM	ASSIGNED To / DUE DATE	STATUS
Item 2019.May.22	<p>It was suggested that the TWG take up consideration of the remaining “HFE Assessment” action item, which reads, “A next step would be for GCMRC to identify experimental flow options that would consider high valued resources of concern to the GCDAMP..., fill critical data gaps, and reduce scientific uncertainties.” The AMWG did not object to the remaining action item passing from GCMRC to the TWG.</p> <p><u>May 2019 update:</u> Participants remarked that the action item had been included in the draft June TWG meeting agenda. TWG Vice Chair, Vineetha Kartha, clarified that a report on this item would be included in the TWG Chair’s report at the August AMWG meeting.</p> <p><u>August 2019 update:</u> TWG Chair, Seth Shanahan will provide an update during the August AMWG meeting.</p> <p><u>February 2020 update:</u> The TWG Chair recently established a new Flow Ad Hoc Group (FLAHG) in accordance with TWG operating procedures and with input from the TWG. The FLAHG will be moving forward under the leadership of Ms. Peggy Roefer. In accordance with the FLAHG charge, the TWG and GCMRC will report their conclusions to the AMWG in May 2020.</p>	TWG Chair / May 2020 AMWG Meeting	Open

SUPPLEMENTAL MATERIALS

Intentionally left blank



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

AUG 14 2019

MEMORANDUM

To: Brent Esplin, Designated Federal Officer, Bureau of Reclamation
Regional Director, Upper Colorado Region
Kathleen Callister, Resources Management Division Manager, Bureau of Reclamation
Upper Colorado Region
Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center (GCMRC)
U.S. Geological Survey (USGS)

From: Timothy R. Petty, Ph.D.
Secretary's Designee
Assistant Secretary for Water and Science

Subject: Glen Canyon Dam Adaptive Management Program Guidance

The Colorado River faces many challenges in the coming years, especially with an ongoing drought now in its 19th year. As such, it is important that the Glen Canyon Dam Adaptive Management Program (GCDAMP) is managed in such a way as to ensure consistency with the Grand Canyon Protection Act (GCPA) and the priorities of the Secretary of the Interior, and in accordance with the Law of the Colorado River and the Glen Canyon Dam Long Term Experimental and Management Plan (LTEMP) Record of Decision (ROD) and Final Environmental Impact Statement (FEIS).

The GCDAMP plays a central role in ensuring compliance with multiple laws associated with the operation of Glen Canyon Dam. It provides a process for cooperative integration of dam operations, downstream resource protection and management, and monitoring and research. Under the GCPA, Reclamation and GCMRC conduct research and monitoring and consult with specific stakeholders on that research and monitoring. The Adaptive Management Working Group (AMWG), a Federal Advisory Committee, is the vehicle through which Reclamation accomplishes this consultation. The AMWG also makes recommendations to the Secretary per the LTEMP ROD.

LTEMP Implementation

The primary guiding documents for the GCDAMP will continue to be the LTEMP FEIS and ROD, which provide the framework for adaptively managing Glen Canyon Dam operations and management actions associated with downstream resources through 2037. This program guidance document will help ensure continuity and continued successes within the GCDAMP under the current administration and in the years to come. The priorities identified in the LTEMP ROD for the GCDAMP are as follows:

- Management and Experimental Actions
- Mitigation and Environmental Commitments
- Research and Monitoring

In addition, the Department of the Interior (Interior) has recently prioritized the responsible development and production of renewable energy on federal lands. To this end, I encourage the GCDAMP to work within the LTEMP framework to seek ways to improve the value of the hydropower resource. This work may include continued engagement with Project N of the GCDAMP Fiscal Years (FY) 2018-20 Triennial Workplan (TWP) and with interested AMWG stakeholders regarding the current science and policy regarding dam operations.

Updating Guidance Documents

I direct Reclamation, USGS, and other Interior agencies to work with the AMWG to update the GCDAMP guiding documents to reflect and be fully consistent with the priorities outlined in the LTEMP FEIS Section 1.4 and emphasized in Section 6.1(c) of the LTEMP ROD. These guiding documents include the GCDAMP strategic plan, vision, mission, and charter.

With the challenges faced in FY 2018 regarding funding for the GCDAMP and the need to ensure appropriations are requested through the federal budget process, Interior supports continuing with the three-year workplan and budget process. The current FY 2018-20 GCDAMP TWP and budget process demonstrated that it can improve program efficiency by reducing the time and effort spent on annually developing a workplan and budget. The GCDAMP should continue to review the TWP annually to ensure it meets the priorities and goals of the GCPA and GCDAMP.

The development of the TWP and budget for FY 2021-23 will commence in late FY 2019 and continue through FY 2020. Its development should include consultation with members of AMWG, who will recommend to the Secretary whether they support the planned projects and funding. Reclamation and GCMRC will take the lead in drafting the FY 2021-23 TWP. The TWP and budget should focus on compliance priorities including:

- Maintaining dam releases consistent with applicable laws;
- Activities associated with the Endangered Species Act;
- Actions necessary for compliance with the National Historic Preservation Act; and
- Research and monitoring as required by the Grand Canyon Protection Act.

Activities that concern annual release volumes from Glen Canyon Dam—including discussion of Drought Contingency Planning and new negotiations of the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead—will be underway in FY 2019 or in the coming years. The GCDAMP and AMWG guidance documents discussed here should consider any implications of these ongoing discussions.

The LTEMP Scientific Monitoring Plan will continue to provide a framework for the scientific support needed to complete the monitoring and experimentation specified in the LTEMP FEIS

and ROD. This plan will help ensure that long-term monitoring and research activities are aligned with the LTEMP FEIS and ROD and the GCDAMP decision making process. In accordance with the LTEMP ROD, the Science Plan will be reviewed every three years and may be updated as needed. The next review will occur in conjunction with the start of the next TWP development process in early FY 2020. Also, in accordance with the LTEMP ROD, specific details concerning the means to collect, analyze, and report information required to support development of recommendations by the AMWG and decision making by Interior will be included in the TWP.

It is also important that the GCDAMP develops and implements monitoring metrics for the resource goals and objectives defined in the LTEMP ROD. Interior directs the AMWG to develop recommendations for these monitoring metrics to assist Interior in their development. The recommended metrics should build on existing LTEMP conservation measures, environmental and recreational goals, and other easily identifiable goals. As the process continues, additional goals can be developed.

Future research proposed and undertaken by the GCDAMP should be tied directly to LTEMP resource goals and objectives and continue to be focused on providing the best available science such that decision making is science-based and continues to work towards ensuring benefits to as many resources downstream of the dam as possible. This should be done in a collaborative process involving AMWG and TWG members, the Science Advisors Program, and ad hoc groups as needed. Several areas to consider as identified by the GCDAMP partners include:

- Evaluation of the threat posed by invasive non-native species.
- Exploring vegetation management to benefit high value recreational beaches and protect vulnerable archaeological sites.
- Considering impacts to hydropower as part of the development of a LTEMP experiments and study plans.

Operating Criteria and Operational Flexibility

The LTEMP ROD provides guidance for hourly, daily, and monthly releases (see, for example, Table 3, p. B-4). In accordance with the LTEMP ROD Attachment B Section 1.2 (Page B-7), I encourage Reclamation to continue to utilize operational flexibility at Glen Canyon Dam in response to varying hydrological and other resource-related conditions. As warranted, Reclamation, in consultation with Western Area Power Administration (WAPA), should continue to make adjustments to hourly, daily, and monthly release volumes within the water year in response to operational, resource-related, and hydropower-related issues.

In response to stakeholder input at recent AMWG meetings, the feasibility of conducting Spring High Flow Experiments (HFE), along with modeling for improvements and efficiencies that benefit resources including natural, cultural, recreational, and hydropower should be explored. As a potential starting point, I encourage you to consider opportunities to conduct higher spring releases within power plant capacity, along with spring HFEs that may be triggered under the current LTEMP Protocol.

Conclusion

This guidance is not meant to be all encompassing or to preclude additional scientific investigations that can improve the resources downstream of Glen Canyon Dam that are consistent with the LTEMP. The GCDAMP should seek ways to continuously improve the program, including searching for efficiencies and improvements and listening to the States, Tribes, and other program stakeholders.

The GCDAMP and AMWG are vital to ensuring Interior's responsibilities under the GCPA and the LTEMP ROD, and I greatly appreciate Reclamation, USGS, other Interior bureaus, and our external partners' dedication to ensuring Glen Canyon Dam is operated in a manner that protects, mitigates impacts to, and improves downstream resources.

Message distributed to the TWG via email on December 20, 2019:

In addition, TWG Chair, Seth Shanahan, recently established a new Flow Ad Hoc Group (FLAHG) in accordance with TWG operating procedures and with input from the TWG. The FLAHG will be moving forward under the leadership of Ms. Peggy Roefer with the following charge:

FLAHG Charge

In accordance with direction provided by the AMWG at its August 18, 2018 meeting, and the Secretary Designees August 14, 2019 guidance to BOR and GCMRC, the FLAHG is charged with working with GCMRC to evaluate opportunities for conducting higher spring releases that may benefit high value resources of concern to the GCDAMP (recreational beaches, aquatic food base, rainbow trout fishery, hydropower, humpback chub and other native fish, cultural resources, and vegetation), fill critical data gaps, and reduce scientific uncertainties. As a starting point, the FLAHG shall consider the benefits of and opportunities for conducting higher spring releases within power plant capacity. The FLAHG and GCMRC will report their initial findings to the TWG in April 2020 so that the TWG and GCMRC can report their conclusions to the AMWG in May 2020.

The FLAHG is also charged with working with GCMRC to develop and propose a project element in the FY 2021-2023 Triennial Budget and Work Plan to identify other spring high flow options that may be allowed under the current LTEMP ROD (as determined by DOI) that may benefit high valued resources of concern to the GCDAMP (defined above), fill critical data gaps, and reduce scientific uncertainties.

**Approximate Timelines for the Development and Implementation of the TWP (Table 1) and
Criteria for Review and Revisions (Section 2.7)**

March 6, 2019

Passed by Consensus by the AMWG

Table 1. Approximate timelines for the development and implementation of the TWP. Dates shown are estimated targets. Dates are shown which implement the 2021-23 TWP for reference.*

Month	Year-1 (2020) (development of TWP)	Year-2 (2021)
December (year prior)	GCMRC and Reclamation produces annual project reports document for GCDAMP review.	
January	Annual reporting meeting and information synthesis (2 days) followed by 1-day TWG meeting to review budget and provide initial guidance to GCMRC and Reclamation. TWG reviews progress in addressing Information Needs and research accomplishments.	Annual reporting meeting (1-2 days) followed by 1-day TWG meeting with a primary emphasis on reporting results/findings/scientific advances on previous work plan.
February	GCMRC meets with tribes and DOI agencies. GCMRC follow-up with BAHG on priorities and areas of emphasis on TWP. GCMRC meets with cooperators to develop projects. AMWG meeting to discuss initial priorities. DOI and Federal family input.	
March	GCMRC and Reclamation will develop an initial TWP based on DOI priorities and input from scientists, the TWG, and DOI/DOE family. Initial TWP presented to DOI and Secretary's Designee.	
April	GCMRC meets with tribes and DOI agencies. April TWG meeting to consider draft TWP, including anticipated funding sources. Unresolved issues or conflicting priorities will be resolved by DOI in consultation with the DOI Family. GCMRC begins development of second draft TWP.	BAHG and TWG considers potential changes to the Fiscal Year 2 TWP based on criteria in section 2.7.
May	GCMRC and Reclamation provide a second draft TWP to the BAHG, Science Advisors, DOI agencies, and tribes for their review and comment. GCMRC meets with tribes, BAHG, to get input on TWP. GCMRC develops third draft of TWP.	
June	GCMRC and Reclamation finish third draft for review. TWG meets to provide input on the draft GCMRC and Reclamation TWP and provide a recommendation to the AMWG.	TWG recommends Fiscal Year 2 (2022) budget of TWP to AMWG.
July	GCMRC and Reclamation provide a final draft TWP to the AMWG for their review.	
August	AMWG meets to provide input on the GCMRC and Reclamation draft TWP and provide a recommendation to the SOI.	AMWG recommends Fiscal Year 2 (2022) budget of TWP to SOI.
September	SOI reviews the budget and work plan recommendation from AMWG.	
October 1	Fiscal Year 1 begins under the TWP guidance.	Fiscal Year 2 begins under the TWP guidance.
November 1	Consumer Price Index becomes available.	
Late November	Science and management meeting with DOI and cooperators.	Science and management meeting with DOI and cooperators.
December	Budget is finalized. USGS produces GCMRC annual project reports document for prior year work.	GCMRC produces annual project reports document.

Table 1 (continued). Approximate timelines for the development and implementation of the TWP. Dates shown are estimated targets. Dates in parentheses are shown which implement the 2021-23 TWP cycle for reference.

Month	Year-3 (2022)	Year-4 (2023)
January	Annual reporting meeting and information synthesis (2 days) followed by 1-day TWG meeting to review initial results and findings of TWP. Potential TWP changes may be identified.	Process starts again under year 1.
February	BAHG/agencies/tribes meetings to consider mid-work plan adjustments to TWP, February through March.	
March		
April	Consider mid-work plan adjustments at TWG meeting. BAHG and TWG considers potential changes to the Fiscal Year 3 TWP based on criteria in section 2.7.	
May		
June	TWG considers and recommends mid-work plan adjustments to TWP and a recommendation for Fiscal Year 3 (2023) budget.	
July		
August	AMWG meets and considers mid-work plan adjustments to TWP recommended by TWG and recommends Fiscal Year 3 (2023) budget to the SOI.	
September		
October 1	Fiscal Year 3 begins under the TWP guidance.	
November 1	Consumer Price Index becomes available.	
Late November	Science and management meeting with DOI and cooperators. New TWP development meeting within DOI.	
December	USGS produces GCMRC annual project reports document for prior year work.	

* Table 1 calendar years have been updated to reflect development of the 2021-2023 Triennial Work Plan.

2.7 Criteria for Review and Revisions of the Budget and Work Plan

In order for the TWP process to be successful in reducing the administrative burden on the GCMRC, Reclamation, and the GCDAMP, it must have clear criteria for making changes to the budget and work plan. Revisions of the year two budget are intended to be limited to unexpected changes due to a scientific requirement or merit, or administrative needs. Year three changes may be more substantive according to the guidelines below. The individual steps of the process, including roughly when meetings should occur and their objectives, are provided in Table 1. The burden of an appropriate rationale for proposing a change falls upon the proposer to make a persuasive argument to the TWG and AMWG. The following criteria will be used by GCMRC, Reclamation, and TWG in making recommendations to AMWG on changes to the budget and work plan:

- **Scientific requirement or merit:** New information gained during the implementation of monitoring and research projects may result in a need to alter methods, scope, or timelines in the work plan or substantially alter or eliminate a project. This is a science need based on the experience of implementing an already approved project. This does not represent a shifting priority (e.g., policy change), but a scientific learning process which results in needed modifications to carry out the goals of the Program.
- **Administrative needs:** Administrative, policy, or programmatic changes may occur within the time-frame of an approved TWP. Examples might include the mitigation of an impact resulting from ESA, NHPA, or tribal consultation, a change in the “overhead” charges of a federal or state agency, a significant reduction of the balance of available funds, or a failure to secure permits.. As soon as an administrative event occurs that affects the TWP, GCMRC (or relevant agency – such as DOI) will notify the TWG.
- **New initiatives:** New initiatives may be brought up for discussion by members during BAHG or TWG budget discussions (see Table 1) for consideration by Reclamation and GCMRC. These new initiatives may need to be considered by the GCDAMP Program Manager prior to requesting either GCMRC or Reclamation to develop a proposal for mid-work plan consideration. If DOI determines it is beyond the scope of a mid-work plan change, then the initiative could be considered during the development of the next work plan. Given that the budget will likely be fully accounted for, direction on funding source within the current budget will be required for discussion with the GCDAMP Program Manager. Revisions must comply with the Budget Principles (see Section 2.1).

TABLE 4 Implementation Criteria for Experimental Treatments of Alternative D

Experimental Treatment	Trigger ^a and Primary Objective	Replicates	Duration	Annual Implementation Considerations ^b	Long-Term Off-Ramp Conditions ^c	Action if Successful
<i>Sediment-Related Experiments^d</i>						
Spring HFE up to 45,000 cfs in Mar. or Apr.	Trigger: Sufficient Paria River sediment input in spring accounting period (Dec.–Jun.) to achieve a positive sand mass balance in Marble Canyon with implementation of an HFE Objective: Rebuild sandbars	Not conducted during first 2 years of LTEMP, otherwise implement in each year triggered, dependent on resource condition and response	≤96 hr	Potential short-term unacceptable impacts on resources listed in Section 1.3; unacceptable cumulative effects of sequential HFEs; sediment-triggered spring HFEs will not occur in the same water year as an extended-duration (>96 hr) fall HFE	Sediment-triggered spring HFEs are not effective in building sandbars; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered and existing resource conditions allow
Proactive spring HFE up to 45,000 cfs (Apr., May, or Jun.)	Trigger: High-volume year with planned equalization releases (≥10 maf) Objective: Protect sand supply from equalization releases	Not conducted during first 2 years of LTEMP, otherwise implement in each year triggered, dependent on resource condition and response	First test 24 hr; subsequent tests could be shorter, but not longer, depending on results of first tests	Potential short-term unacceptable impacts on resources listed in Section 1.3; unacceptable cumulative effects of sequential HFEs; will not be implemented in the same water year as a sediment-triggered spring HFE or extended-duration fall HFE	Proactive spring HFEs are not effective in building sandbars; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered and existing resource conditions allow

B-10

TABLE 4 (Cont.)

Experimental Treatment	Trigger ^a and Primary Objective	Replicates	Duration	Annual Implementation Considerations ^b	Long-Term Off-Ramp Conditions ^c	Action if Successful
<i>Sediment-Related Experiments (Cont.)</i>						
Fall HFE ≤96 hr up to 45,000 cfs in Oct. or Nov.	Trigger: Sufficient Paria River sediment input in fall accounting period (Jul.–Nov.) to achieve a positive sand mass balance in Marble Canyon with implementation of an HFE Objective: Rebuild sandbars	Implement in each year triggered, dependent on resource condition and response	≤96 hr	Potential short-term unacceptable impacts on resources listed in Section 1.3; unacceptable cumulative effects of sequential HFEs	This type of fall HFE is not effective in building sandbars; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered and existing resource conditions allow
Fall HFEs longer than 96-hr duration up to 45,000 cfs in Oct. or Nov.	Trigger: Sufficient Paria River sediment input in fall accounting period (Jul.–Nov.) to achieve a positive sand mass balance in Marble Canyon with implementation of an HFE longer than a 96-hr, up to 45,000-cfs flow Objective: Rebuild sandbars	Implement in each year triggered; limited to total of four tests in LTEMP period	Up to 250 hr depending on availability of sand duration of first test not to exceed 192 hr	Potential short-term unacceptable impacts on resources listed in Section 1.3; unacceptable cumulative effects of sequential HFEs	Extended-duration fall HFEs are not effective in building sandbars; resulting sandbars are no bigger than those created by shorter-duration HFEs; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered and existing resource conditions allow

B-11

TABLE 4 (Cont.)

Experimental Treatment	Trigger ^a and Primary Objective	Replicates	Duration	Annual Implementation Considerations ^b	Long-Term Off-Ramp Conditions ^c	Action if Successful
<i>Aquatic Resource-Related Experiments^e</i>						
Trout management flows	Trigger: Predicted high trout recruitment in the Glen Canyon reach Objective: Test efficacy of flow regime on trout numbers and survival of humpback chub	Implement as needed when triggered after consultation with Tribes; test may be conducted early in the 20-year period even if not triggered by high trout recruitment ^f	Implemented in as many as 4 months (May–Aug.)	Potential short-term unacceptable impacts on resources listed in Section 1.3	TMFs have little or no effect on trout recruitment after at least three tests; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment triggered by predicted high trout recruitment in Glen Canyon, taking into consideration Tribal concerns
Tier 1: Expanded translocation of humpback chub in the Little Colorado River	Trigger: Number of adult or subadult humpback chub in the Little Colorado River reach below Tier 1 triggers Objective: Increase number of adult and subadult humpback chub	Implement in each year triggered unless determined ineffective	As needed	Potential short-term unacceptable impacts on resources listed in Section 1.3	Expanded translocation has little or no effect on increasing the number of adult or subadult humpback chub; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered and existing resource conditions allow
Tier 1: Implement head-start program for larval humpback chub	Trigger: Number of adult or subadult humpback chub in the Little Colorado River reach below Tier 1 triggers Objective: Increase number of adult and subadult humpback chub	Implement in each year triggered unless determined ineffective	As needed	Potential short-term unacceptable impacts on resources listed in Section 1.3	Head-start program has little or no effect on increasing the number of adult or subadult humpback chub; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered and existing resource conditions allow

B-12

TABLE 4 (Cont.)

Experimental Treatment	Trigger ^a and Primary Objective	Replicates	Duration	Annual Implementation Considerations ^b	Long-Term Off-Ramp Conditions ^c	Action if Successful
<i>Aquatic Resource-Related Experiments (Cont.)</i>						
Tier 2: Mechanical removal of nonnative fish in Little Colorado River reach	Trigger: Tier 1 actions ineffective; humpback chub numbers in Little Colorado River below Tier 2 triggers Objective: Increase number of adult and subadult humpback chub	Implement in each year triggered unless determined ineffective after consultation with Tribes	Monthly removal trips (Feb.–Jul.) until “predator index” or adult humpback chub reach acceptable levels (see Appendix O)	Potential short-term unacceptable impacts on resources listed in Section 1.3	Mechanical removal has little or no effect on reducing predator index in the Little Colorado River reach; no population-level benefit on humpback chub; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment when triggered, taking into consideration Tribal concerns
Low summer flows (minimum daily mean 5,000 to 8,000 cfs) to target $\geq 14^{\circ}\text{C}$ at Little Colorado River confluence	Trigger: Initial experiment: in the second 10 years of the LTEMP period, when target temperature of $\geq 14^{\circ}\text{C}$ can be achieved only with low summer flow Objective: Increase humpback chub growth	Subsequent experimental use if: (1) initial test was successful, (2) humpback chub population concerns warrant their use, (3) water temperature appears to be limiting recruitment, and (4) target temperature of $\geq 14^{\circ}\text{C}$ could be achieved only with low summer flow	3 months (Jul.–Sep.)	Potential short-term unacceptable impacts on resources listed in Section 1.3	Low summer flows do not increase growth and recruitment of humpback chub; increase in warmwater nonnative species or trout at the Little Colorado River; long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed; or sufficient warming does not occur as predicted	Implement as adaptive treatment when conditions allow

B-13

TABLE 4 (Cont.)

Experimental Treatment	Trigger ^a and Primary Objective	Replicates	Duration	Annual Implementation Considerations ^b	Long-Term Off-Ramp Conditions ^c	Action if Successful
<i>Aquatic Resource-Related Experiments (Cont.)</i>						
Macroinvertebrate production flows	Trigger: None Objective: Improve food base productivity and abundance or diversity of mayflies, stoneflies, and caddisflies	Target two to three replicates	Up to 4 months (May–Aug.) ^g	Potential short-term unacceptable impacts on resources listed in Section 1.3; coordinate planning with other experiments to avoid confounding conditions or results	Steady weekend flows have little or no benefit on food base, trout fishery, or native fish; increase in warmwater nonnative species or trout at the Little Colorado River; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment in target months when conditions allow
<i>Riparian Vegetation Experiments</i>						
Non-flow vegetation treatments	Trigger: None Objective: Improve vegetation conditions at key sites	Not applicable	20 years if successful pilot phase	Potential short-term unacceptable impacts on resources listed in Section 1.3	Control and replanting techniques are not effective or practical; or long-term unacceptable adverse impacts on the resources listed in Section 1.3 are observed	Implement as adaptive treatment if invasive species can be reduced and native species increased

B-14

^a Triggers will be modified as needed during the 20-year LTEMP period in an adaptive manner through processes including ESA consultation and based on the best available science utilizing the experimental framework for each alternative.

^b Annual determination by the DOI. Any implementation will consider resource condition assessments and resource concerns using the annual processes described in Sections 1.3 and 1.4.

^c Suspension of experiment if the DOI determines effects cannot be mitigated.

^d Details of implementation of sediment experiments are presented in Section 2.1.

^e Details of implementation of aquatic resource experiments are presented in Section 2.2.

^f The decision to conduct TMFs in a given year will consider the resource conditions, as specified in Section 1.3, and will also involve considerations regarding the efficacy of the test based on those resource conditions.

^g The duration and other characteristics of experimental macroinvertebrate production flows could be adjusted based on the results of initial experiments.

