

In The Matter Of:
*Oversight of the U.S. Army Corps of Engineers' Mgmt.
of the Spring 2019 Missouri River Basin Flooding*

SENATE FIELD HEARING
August 28, 2019



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2 MANAGEMENT OF THE SPRING 2019
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FIELD HEARING
BEFORE THE
SUBCOMMITTEE ON
SUPERFUND, WASTE MANAGEMENT, REGULATORY OVERSIGHT
OF THE
COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
ONE HUNDRED SIXTEENTH CONGRESS

* * * * *

Wednesday, August 28, 2019

2:00 p.m.

* * * * *

Held at:

North Sioux City City Hall
504 River Drive
North Sioux City, South Dakota

* * * * *

1 APPEARANCES:

2 Members of Congress:

3 MIKE ROUNDS
4 United States Senate - South Dakota

5 Federal Representatives:

6 BRIGADIER GENERAL PETER D. HELMLINGER, P.E.
7 Commander, Northwestern Division
8 U. S. Army Corps Of Engineers

9 JOHN REMUS
10 Chief, Missouri River Basin Water Management Division

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P-R-O-C-E-E-D-I-N-G-S

(2:00 p.m.)

OPENING REMARKS

SENATOR ROUNDS: Well, good afternoon. We'll call this Subcommittee Hearing to order.

Ladies and gentlemen, this spring, heavy rain and rapid snowmelt across the Midwest produced significant flooding along the Middle and Lower Missouri River Basin. The latest, August 1st, 2019, runoff projections from the Army Corps of Engineers expect 2019 to be the second-highest runoff year on record with almost 53 million acre-feet of runoff.

While the total impact and damage assessments are still being conducted, a USDA report has asserted that agricultural producers were not able to plant crops on more than 19.4 million acres in 2019, the most prevented plant acres reported since USDA's Farm Service Agency began releasing the report over a decade ago. We certainly hope there are not many more wet years quite as significant as this one; however, when wet years do occur, we need to have the ability to manage them.

Unfortunately, years like 2019 are becoming more frequent, near-record levels have occurred three out of the last nine years. During periods of extreme weather conditions, the Corps' management of the Missouri River plays

1 a critical role in mitigating damage. We believe this is
2 best achieved by recognizing trends, making accurate
3 projections, and reacting accordingly.

4 The Senate Environment and Public Works
5 Committee has the important responsibility to maintain
6 oversight of the U.S. Army Corps of Engineers' Civil Works
7 program, which includes management of the Missouri River
8 Basin. Today's Subcommittee Field Hearing is an opportunity
9 to hear directly from the leaders of the Army Corps'
10 Northwest Division on the decision-making process used to
11 manage waterflows along the Missouri River in light of the
12 flooding in 2019 in the middle Basin -- the middle portion of
13 the Basin.

14 The Corps of Engineers manages the
15 Missouri River Basin Mainstem Reservoir System which includes
16 six dams and reservoirs in Montana, North Dakota, and
17 South Dakota. These six reservoirs have a combined maximum
18 capacity of 72.4 million acre-feet in controls runoff, more
19 approximately, half of the Missouri River Basin.

20 The Corps of Engineers administers the system
21 with the guidance of the Missouri River Basin Mainstem
22 Reservoir System Master Water Control Manual, known as the
23 "Master Manual," which outlines how the Corps of Engineers
24 will operate the system to meet it's eight
25 congressionally-authorized purposes for managing the system.

1 These include flood control, navigation, water supply, water
2 quality control, irrigation, recreation, hydropower, and fish
3 and wildlife.

4 In order for the Corps to fulfill its
5 obligation of flood control, it is vital that they are
6 equipped with the proper tools and the authority to take
7 necessary action. Managing the system in accordance with
8 these eight congressionally-authorized purposes is always a
9 careful balance when incorporating the needs and concerns of
10 states in the Lower Missouri Basin with concerns of states in
11 the Upper Basin.

12 However, this year, states in the upper,
13 middle, and lower parts of the system are all asking similar
14 questions: Are we doing the best we can to manage the
15 storage capacity and water levels of the Missouri River
16 system; what do we need to do differently and how do we make
17 necessary changes to mitigate the damages in years of
18 historic runoff; what authorities need to be changed; and,
19 what are we doing that just doesn't make sense anymore when
20 considering that there is a trend of rising average runoff.

21 As we begin, I want to thank all of the
22 people, the good people of the Corps of Engineers, whose job
23 it is to operate the system and who are committed to the
24 protection of millions of people and billions of dollars in
25 property throughout the Missouri River Basin. They live

1 among us and in many cases are our friends and relatives and
2 neighbors. Thank you.

3 To those individuals, I just want to let you
4 know that the fact that we must ask these hard questions,
5 these should not cause any doubt that your fellow citizens
6 appreciate the hard work that you do every day.

7 As I get ready to turn it over to the
8 witnesses for testimony, I want to give a quick overview of
9 how this hearing will unfold. We will be receiving testimony
10 from Brigadier General Peter Helmlinger and Mr. John Remus.
11 And Johnny is the Chief of the Missouri River Basin Water
12 Management Division of the Army Corps of Engineers,
13 Northwestern Division. Now, then, we're going to move into
14 the questions and the answers. And, additionally, I would
15 just simply note that the microphones, as I understand them,
16 are on right now and that they will remain on, so you won't
17 have to look for any switches in this particular case.

18 Again, I want to thank General Helmlinger and
19 Mr. Remus for traveling to South Dakota to testify and to
20 participate in this hearing, and I look forward to a
21 productive discussion.

22 With that, General Helmlinger.

23 STATEMENT OF BRIGADIER GENERAL PETER D. HELMLINGER

24 U. S. ARMY CORPS OF ENGINEERS

25 BRIGADIER GENERAL HELMLINGER: Senator Rounds,

1 thank you for this opportunity to speak with you today about
2 the 2019 flooding along the Missouri River Basin.

3 And as you mentioned, I am Brigadier General
4 Peter Helmlinger, Commanding General for the Northwestern
5 Division, U.S. Army Corps of Engineers, and I'm joined by
6 Mr. John Remus, Chief of our Missouri River Water Management
7 Division.

8 Today we would like to discuss how the Corps
9 has operated in the Missouri River Mainstem Reservoir System
10 to reduce flooding during what has been an extremely
11 challenging year, and we also want to highlight our
12 three-phase recovery effort as we work to assess the damage
13 and provide initial repairs so that the Lower Basin's levee
14 systems -- return those levee systems to their original level
15 of protection and work with impacted states to identify
16 potential ways to improve flood-risk management along that
17 reach of the River for future events.

18 I would first like to acknowledge the
19 wide-spread devastation and serious impacts this spring's
20 Missouri River flooding has created for many people. The
21 flooding has displaced people in whole communities, damaged
22 infrastructure, and shut down commerce. Since the flooding
23 began in March, leaders from across the Corps and the
24 Administration have visited the region to understand the
25 scale of the damage and to assure everyone we will do

1 everything within our authorities to help them recover from
2 this tragedy.

3 The dam and levee systems worked as designed
4 and built. Unfortunately, this event was triggered by a very
5 powerful storm that hit mostly downstream of the Upper Basin
6 dams and we were largely denied the ability to control the
7 runoff. Mr. Remus will discuss the mechanics of the storm
8 and the resulting flood. But the runoff quickly overwhelmed
9 the design capacity of the levee systems in the Lower Basin,
10 resulting in extensive overtopping and breaches along the
11 entire system. As a result of the storm, 850 miles of levees
12 in Iowa, and Nebraska, Kansas, and Missouri were damaged. We
13 are working with states and the local levee sponsors to
14 repair the damage, but this will take time and your continued
15 support.

16 We have approved 64 project-information
17 reports thus far, enabling us to obtain funding for
18 engineering, design, and construction. Our running estimate
19 of the cost to repair damages to levees thus far is
20 approximately 1.1 billion dollars, as reflected in those 64
21 completed project-information report cost estimates. This
22 total will most certainly increase based on 30 more projected
23 projects, pending approval within the next few months.

24 As we move forward, however, we should not
25 simply repair the damaged levees to their pre-flood

1 conditions, which is all we are authorized to do. Instead,
2 we need to use this opportunity to prepare a holistic
3 assessment of what improvements to the Lower Basin levee
4 system are possible.

5 Let me now explain our three-phase approach to
6 recovery. Our first phase one has been the initial response.
7 This includes activities related to: identifying and
8 enclosing critical levee breaches; and, then, to protect
9 vital infrastructure, population centers; and, to stop breach
10 flows so the River can return to its normal banks.

11 Omaha and Kansas City Districts began this
12 effort through aerial reconnaissance and data collection
13 almost immediately after the skies cleared in March. Since
14 then, we have closed massive breaches, some 1,000-foot wide
15 and up to 72-foot deep, in order to redirect the River into
16 its banks and to enable the evacuation of water from the land
17 side of those levees. To date, we have closed 13 major
18 breaches, which are -- and we are conducting engineering and
19 design on 29 levee sections. And we recently awarded
20 construction contracts for another two levees, that is:
21 Levee R-616, near Offutt Air Force Base, Nebraska; and the
22 North Bank Elkhorn River Levee near Pierce, Nebraska.

23 Our phase-two effort is focused on system
24 recovery. This largely consists of our efforts to fully
25 repair damaged levees in the Public Law 84-99 program and to

1 bring them back to their original level of protection, as
2 well as implement minor levee realignments where feasible.
3 We have already received numerous requests from levee
4 sponsors for such repairs.

5 Some additional levee systems will require
6 water levels to recede further before we can accurately
7 assess damages and complete engineering and design efforts
8 for those levees. Although rainfall in the Midwest is
9 causing waters to remain higher than average, field teams are
10 increasingly able to access damaged levees and refine their
11 assessments.

12 Our phase-three effort is our recovery efforts
13 focused on future actions and the challenges to reduce flood
14 risk long-term. The Corps has been meeting with state
15 partners in the Basin all summer to discuss developing
16 studies and products under planning assistance to states,
17 Flood Plain Management Services, Silver Jackets, and other
18 programs. These efforts are intended to help our regional
19 and local partners with their specific flood-risk management
20 data, technical, and planning needs in order to inform their
21 recovery efforts and give them the tools and knowledge to
22 help make their flood-risk management systems more resilient.

23 We are also discussing pursuing a more
24 comprehensive cost-shared feasibility study on the
25 Lower Mississippi River -- I just came from the

1 Mississippi River, please forgive me -- along the
2 Lower Missouri River that would evaluate both structural and
3 non-structural flood-risk management measures to reduce flood
4 risk and life-safety risks, increase system flood conveyance,
5 and improve system resilience.

6 The geographic scope of the feasibility study
7 would be the lower 735 miles of the Missouri River from
8 Sioux City, Iowa, to the mouth of the Missouri River and it's
9 tributaries. The study would not examine changes to the
10 Master Manual or other Corps Water Control Manuals and would
11 only be looking at flood-risk management measures with
12 minimal, if any, negative impacts in navigation and other
13 authorized purposes of the Missouri River projects. Such a
14 study is critical if we are to prepare for the next major
15 flood in this Basin.

16 And finally, I'd like to highlight the
17 importance of communication. Our communication with
18 partners, stakeholders, and the public was comprehensive and
19 wide-reaching before the March flood event, and became even
20 more robust as a result of the flood. Throughout the flood
21 event, the Corps took numerous actions to ensure effective
22 communication with those affected through a variety of forms.
23 Since March 14th, Omaha and Kansas City District Commanders
24 have personally engaged with stakeholders on a regular basis
25 including local, state, and tribal governments, as well as

1 with congressional interests, to provide updates on flood
2 conditions and recovery actions.

3 The Corps also began a daily update to call --
4 for these groups and the media starting March 15th. Daily
5 press releases also kept the public informed of changes in
6 risk forecast, including information on any changes and
7 releases from Gavins Point Dam. Social medial platforms,
8 including Facebook and Twitter, were also used to provide the
9 latest updates to the public. Stakeholder meetings,
10 informational briefings, and public postings continue today.
11 We understand our duties and obligations to communicate with
12 those who are impacted by our decisions and operations. We
13 will continue to evaluate how and when to maximize the
14 effectiveness of the information that we share.

15 Senator Rounds, thank you for the opportunity
16 to speak with you today. In closing, I would like to
17 emphasize our number one priority of the Corps in its
18 operations is life and public safety. Our current focus
19 remains to protect life and work with other federal agencies,
20 and state, and local authorities to help communities recover
21 from this flood and to improve the system to reduce flood
22 risk in the future. And sir, I look forward to your
23 questions.

24 SENATOR ROUNDS: Thank you.

25 Mr. Remus, did you have an opening statement

1 as well?

2 STATEMENT OF JOHN REMUS

3 U. S. ARMY CORPS OF ENGINEERS

4 MR. REMUS: I did, thank you.

5 Good afternoon, Senator Rounds, and thank you
6 for the opportunity to speak with you today. I am
7 John Remus, Chief of the Missouri River Basin Water
8 Management Division for the Northwestern Division,
9 U.S. Army Corps of Engineers. My staff and I are responsible
10 for regulating the Missouri River Mainstem Reservoir System.
11 As General Helmlinger said, I will discuss the conditions
12 that have led to the flooding and our operational responses
13 to these conditions.

14 However, first, I would like to explain, in
15 general, how the system was designed and is operating to
16 provide flood control for the Basin. The Corps operates the
17 system consistent with the aid-authorized purposes of flood
18 control, navigation, hydropower, water supply, water quality
19 control, irrigation, recreation, and fish and wildlife. The
20 system includes six large dams and reservoirs, and comprise
21 the largest reservoir system by storage volume in
22 North America.

23 While the system is quite large, it is
24 important to note that 98% of the system storage is upstream
25 of the Gavins Point Reservoir; therefore, the system cannot

1 capture and manage significant runoff that enters through the
2 River below the storage reservoirs. The Corps designed a
3 system to capture runoff from mountain and Plains' snowpack,
4 and rainfall in the Upper Basin that could otherwise, in the
5 absence of the reservoirs, result in flooding, and then
6 release that water gradually over the year. This provides
7 the maximum amount of flood-risk reduction while serving all
8 authorized purposes.

9 The Corps did not design, nor do we operate,
10 the system to carry over floodwater from one year to the
11 next. We operate the system in accordance with the
12 2018 Missouri River Master Water Control Manual, consistent
13 with the authorized purposes, while maintaining compliance
14 with all federal laws.

15 In large runoff years, such as 2019, or during
16 an extreme hydrological event, the flood-control objective
17 drives the Corps' operational decisions for the system.
18 During average or below average runoff years, the Corps
19 operates the system for flood control and to need flow
20 targets in the Lower River for other purposes, such as
21 navigation.

22 As of July 31st, 2019, the runoff in the
23 Upper Basin has been 45.3 million acre-feet, surpassing the
24 42.2 million acre-feet in 2018, making 2019 already the
25 third-highest runoff on record. The projected, as of August

1 1st, 2019, the projected runoff in the Upper Basin is
2 52.9 million acre-feet, which, if realized, would be the
3 second-highest runoff on record. Only the 2011 runoff of
4 61 million acre-feet would be greater.

5 My office uses a number of tools to inform our
6 operations and one of those tools is the "Short-Range
7 Reservoir Operation Forecast," that is more commonly referred
8 to as the "three-week forecast." The information contained
9 in the Three-Week Forecast include: average daily flows;
10 average daily -- excuse me, average daily inflows; average
11 daily releases; reservoir elevations; and, hydropower
12 generation for each of the six Mainstem projects; as well as
13 a forecasted total storage volume.

14 The three-week forecast is issued every
15 Wednesday, and more often if conditions require it. The
16 three-week forecast is developed based on the combination of
17 observed tributary flows, Missouri River flows, and the
18 long-range runoff forecast. The long-range runoff forecast
19 is updated at the beginning of each month, and more often if
20 needed, and is based on the current conditions and long-range
21 trends in the Missouri River Basin. The three-week forecast
22 is usually the tool to manage risk on a system-wide basis.

23 The flooding that has occurred and continues
24 to occur on the Lower Missouri is not the result of a single
25 event, but rather a series of events. I will briefly discuss

1 these events. In March, a bomb cyclone dumped two to four
2 inches of rain on top of a Plains' snowpack that contained
3 two to eight inches of snow water equivalent. Furthermore,
4 the soils in this area were very wet and frozen to depths
5 exceeding two feet. This combination of condition caused a
6 rapid snow melt and extreme runoff.

7 The runoff, primarily from the Niar- -- excuse
8 me, the Niangua River, require releases from Gavins Point Dam
9 to be increased to 100,000 cubic feet per second for a short
10 period of time to prevent overtopping the gates. The
11 tributary inflow from below the system caused levees
12 downstream of Omaha, Nebraska, to overtop and fail. During
13 this event, and for several days following this event,
14 releases from Fort Randall Dam were shut off completely in an
15 attempt to lessen the flooding downstream of the system.

16 The bomb cyclone also produced an additional
17 two to four inches of snow water equivalent in South Dakota
18 and North Dakota. In April, the Plains' snowpack began to
19 melt relatively rapidly, leading to rapidly rising pools at
20 Oahe and Fort Randall Reservoirs which required
21 higher-than-average releases from these projects.
22 Incremental inflows between Fort Randall and the Gavins Point
23 Dam remain high due to continued rainfall, primarily in the
24 Niangua River Basin. These circumstances required increased
25 system releases from Gavins Point.

1 In May, rainfall in South Dakota was 300 to
2 500% of average. Runoff into the Oahe and Fort Randall
3 Reservoirs was 500% and 950% of average, respectively. This
4 results -- resulted in the pools at Oahe and Fort Randall
5 entering their exclusive flood-control zones. The pools at
6 Oahe and Fort Randall remained in exclusive flood-control
7 zones for several weeks, and Oahe still remains near the
8 exclusive flood-control zone. These circumstances required
9 minimal releases from Fort Peck and Garrison Dams and
10 higher-than-average releases from Oahe and Fort Randall in
11 order to manage the pools without increasing flood risk
12 downstream or creating any dam safety concerns. System
13 releases reached 75,000 cfs in May.

14 In the Lower Basin, the rainfall in May was
15 widespread and above normal, particularly in Kansas which
16 experienced the wettest month on record. This precipitation,
17 combined with the sustained higher-than-average system
18 releases, led to flooding on the Missouri River from Blair,
19 Nebraska, to the mouth.

20 The mountain snowpack, which was nearly
21 average for the most part, melted in June. Above-average
22 precipitation in the Upper Basin added to the runoff. June
23 runoff in the Upper Basin was 160% of average, causing the
24 pools at Fort Peck and Garrison to enter their exclusive
25 flood-control zones. This, in turn, required the average

1 daily outflows from Fort Peck, Garrison, Oahe, and
2 Fort Randall to be increased. At the beginning of June, the
3 system releases were 75,000 cubic feet per second and were
4 reduced to 70,000 cubic feet per second as their incremental
5 flows from the Niangua River declined.

6 In the Lower Basin, the rainfall in June
7 continued to be above average. This precipitation, combined
8 with the sustained higher-than-average system releases, led
9 to the flooding on the Missouri River from the confluence of
10 the Platte River to the mouth.

11 The July runoff in the Upper Basin was 213% of
12 average. The Fort Peck and Garrison pools remained in their
13 exclusive flood-control zones for the entire month. The
14 system releases at Gavins Point were maintained at 70,000
15 cubic feet per second. The rain storms, particularly in
16 Kansas and Missouri, resulted in higher-than-average inflows
17 from tributaries.

18 For the first three weeks of August, runoff in
19 the Upper Basin has trended above the forecast. If this
20 trend continues, the system releases of 70,000 cubic feet per
21 second will need to be sustained well into September and
22 possibly longer in order to evacuate all the water currently
23 stored in the designated flood-control zones.

24 Due to extreme runoff in 2018 and 2019, our
25 operational decisions for the last 18 months have been driven

1 by life safety and loss-of-property concerns. During this
2 critical period, our principal and sole focus has been on the
3 flood-control purpose of the system. For example,
4 considerations related to the endangered species, the
5 endangered fish and birds in the Mainstem did not influence
6 our reservoir operations during this time.

7 I appreciate this opportunity to be here today
8 and look forward to answering your questions.

9 QUESTION-AND-ANSWER SESSION

10 SENATOR ROUNDS: Thank you, sir. I've got a
11 series of questions. Normally when we're in Washington,
12 we're limited, each member, to five minutes. And then, after
13 that, you go around until you're done and then you start over
14 again. These gentlemen aren't that fortunate today because
15 I'm the only one here and that means that I'm just going to
16 continue on for a while.

17 (Laughter.)

18 But to be -- I've got a couple formal
19 questions that I want to work my way through, then I'm going
20 to break it down and actually have a conversation with you
21 about how we make this thing better long-term.

22 General Helmlinger, you command the Division
23 and have oversight of the District that will field the
24 snowpack monitoring system in the Upper Missouri River Basin.
25 This capability was authorized in the 2014 Water Resources

1 Development Act. It's also known as the "WRDA" and has long
2 been a priority of mine.

3 I had language included in the 2016 WRDA, a
4 Bill that directed the U.S. Army Corps to be the lead agency
5 for coordinating the soil moisture and snowpack monitoring
6 network in the Upper Missouri River Basin. I was also able
7 to have an amendment included in the 2017 Senate Energy and
8 Water Appropriations Bill that would have provided the Corps
9 with \$2 million to begin implementation of the snowpack
10 monitoring program.

11 The snowpack monitoring system will provide
12 your water management team with more precise information on
13 the volume of water entering the system, which will enable
14 them to make better decisions on reservoir releases. This is
15 something that was recommended in the 2011 flood review and
16 will make the citizens of every state in the entire
17 Missouri River Basin safer and more secure. And by the way,
18 that was a Corps of Engineers' recommendation.

19 BRIGADIER GENERAL HELMLINGER: Uh-huh.

20 SENATOR ROUNDS: As I am sure you are aware, I
21 have been working very closely with Assistant Secretary of
22 the Army R. D. James to assure that lack of funding will not
23 be a factor in the implementation of the system over the next
24 two years.

25 John is smiling over there, I see.

1 (Laughter.)

2 SENATOR ROUNDS: Funding for the initial
3 procurement of the equipment was put in place months ago.
4 Major General Spellmon gave me his commitment to personally
5 review the plan at a hearing in March and this will be a
6 priority topic for my meeting with the Chief of Engineers
7 next month.

8 As the Commander of this area of operations,
9 though -- can you provide us with an update of where we
10 currently stand with respect to reaching the execution
11 milestones of implementing the system, and can you tell me
12 when we expect to install and be receiving data from the
13 snowpack monitoring system?

14 BRIGADIER GENERAL HELMLINGER: Yes, Senator.
15 So, first, let me thank you for championing this effort
16 because it is an important project that will improve our
17 ability to forecast runoff and, therefore, continue to ensure
18 the safety of the entire system.

19 As you recognize, Senator, when we first
20 received the authority, we did not have the appropriations
21 with it. But we now have funds supporting it and we're
22 currently developing our plan for implementation. My
23 District Commander, Colonel John Hudson, will be able to
24 brief you in detail in October on our -- once we complete our
25 detailed plan, as to the scope, the cost, and the schedule

1 for implementation.

2 But I'd like to share with what -- with you
3 now just the broad concept to implement that. So, we are
4 pursuing this in a three-phase effort. The first phase is
5 the quick win and what we can do soonest, and that's to add
6 additional sensors to the existing mesonet sites across the
7 region. They are across five different states. There are
8 180 exis- -- approximately 180 existing sites across the
9 region and -- that we -- our first plan is to add sensors to
10 those locations.

11 Our second phase, then, is to focus on the
12 Cheyenne River Basin, to install the snowpack and moisture
13 sensors along that Basin as a priority effort. Once we
14 finish with that Basin, we'll complete the rest of the
15 region.

16 The end state is to have these stations
17 installed -- five -- 600 hundred stations installed across
18 the region. The implementation time will take several years
19 to implement on that and I appreciate that you're championing
20 for funding for this.

21 But a lesson that we learned from New York is
22 we don't want to rush into this. We want to take the lessons
23 learned as we implement our first stations, so that we can
24 incorporate those into follow-on ones. But we'll brief you
25 again in October on our comprehensive plan for this.

1 SENATOR ROUNDS: Well, I know that the
2 equipment is being tested at this point at South Dakota State
3 University and I -- and so I know that we're moving forward
4 with the project, but I just -- it leads into my next
5 question a little bit, and I think we're talking about the
6 same approach. But there's a maxim in the Army that says
7 that you should be working smarter, not harder. And I think
8 that's an appropriate thing to be looking at here, where --
9 the Corps of Engineers in this particular issue, as well.

10 I've been told that there is a great
11 opportunity to leverage the existing monitoring stations
12 operated by universities in the Upper Missouri River Basin.
13 And I'm not sure if that's the same grouping that you're
14 referring to, but I'm very happy to hear, if that is the
15 case, that you are pursuing that at this time. I also
16 understand that they would -- that they are capable of being
17 upgraded to meet the standards that we would need in this
18 particular case.

19 I just want to make sure that if that is the
20 case, whether it's this -- is this the same system that I'm
21 referring to that's operated by the university system that
22 you're referring to as well?

23 BRIGADIER GENERAL HELMLINGER: If Mr. Remus
24 can assist me in this.

25 MR. REMUS: Yes, Senator, the State mesonets

1 -- South Dakota has a mesonet, Nebraska does, North Dakota
2 has the same thing. It's not called a "mesonet." They have
3 -- they are basically soil-moisture monitors on sites.

4 SENATOR ROUNDS: Right.

5 MR. REMUS: We plan to upgrade the
6 soil-moisture monitoring where needed and then add to the
7 snowpack to those sites. And the -- we're going to count
8 very heavily on the universities to help us there.

9 The South Dakota State report is finalized and
10 we do have that final report in, which really -- the testing
11 of the equipment is over. Now we know what we need -- what's
12 the best equipment to get. So, that's the next phase is
13 getting that equipment. The difficulty with that is that
14 this isn't something you go to RadioShack and buy. This is
15 some fairly sophisticated equipment. There is just, you
16 know, the supply issue there. So, that's going to be the
17 initial limiting factor there.

18 And as General Helmlinger said, we've
19 consulted the state of New York. We put in a snowpack and
20 soil-moisture monitoring. They were very similar to what
21 we've come up with. And their lesson learned was: Do it;
22 learn what you need to learn and keep going; don't try and do
23 it all in one year -- because they put it in all in one year.
24 Their costs went way up, and then they went back and redid
25 it. So we're --

1 SENATOR ROUNDS: Well, I'm pleased -- it does
2 sound -- and my understanding is that this is the same system
3 that I'm referring to. It also sounds to me, though, that
4 one of the issues would have been if we were not using that
5 separate system that's already installed out there as
6 locations, we may very well have had a geographical placement
7 problem that we now can, basically, look at perhaps being not
8 a problem in terms of a slow-down, what's regarding to
9 finding and getting permission to place. And some of those
10 have already been placed. And now this is a matter of
11 upgrading and getting these up to the systems' capability
12 that we need in order to get these appropriate measurements
13 completed. Is that correct?

14 MR. REMUS: That's correct. And as
15 General Helmlinger said, there's approximately 180 mesonet
16 sites over five states in the Upper Basin. We don't know if
17 all of those 180, plus or minus, sites are going to be
18 adequate for snowpack monitoring. So, we're still -- we're
19 going through evaluating those. We think that most of them
20 will be. So, it gives us a good start while we get the
21 process in place for acquiring other areas. So, it's -- it
22 -- I don't want to say it jumpstarts, but it gives us a
23 little bit of a head start here while we're learning some of
24 the other things we need to learn.

25 SENATOR ROUNDS: Well, just for the benefit,

1 we've had a mountain-pack measuring system up and operational
2 for years. And it has been consistent and it does a very
3 good job of allowing the Corps to give them a measure of what
4 their mountain snowpack has been.

5 But in most recent years, the Plains' snowpack
6 has been a significant part of the challenge. And one,
7 because in many cases it occurs and changes rapidly in the
8 spring of the year, which is when most of our moisture is
9 received. But it limits their ability right now to be able
10 to determine how quick or how much there is for Plains'
11 snowpack to add to the mountain snowpack melt.

12 And what we've been trying to do now for a
13 number of years is, is to get this implemented. And I'm very
14 pleased to hear that we -- that this is in a position to be
15 expedited with the use of the existing, already installed
16 system that needs to be upgraded. And that we may very well
17 not have to work our way through trying to find additional
18 locations, in terms of where those 180 sites that might be
19 available for us here, that would significantly reduce the
20 amount of trouble in trying to find new geographical
21 locations to install these Plains' sites. Is that a fair
22 statement?

23 MR. REMUS: It'll give us a head start on
24 that, sir.

25 SENATOR ROUNDS: Okay.

1 MR. REMUS: I do want to -- on the other half
2 of your question, how soon will we be getting data? When we
3 install a site, we're going to be getting data from that site
4 the next day. So, as we install these this fall and into the
5 winter, we should be seeing data from those the next day.
6 The National Oceanic and Atmospheric Administration has
7 already agreed to manage the database for us, so.

8 SENATOR ROUNDS: Very good.

9 And General Helmlinger, historical average
10 runoff into the Missouri River system, based on 120 years of
11 recorded data, is, as testimony has already indicated, just
12 over 25 million acre-feet. However, over the past ten years,
13 the average runoff into the Missouri River system is
14 33.5 million acre-feet, and this does not include 2019 which
15 projects to be the second-highest-year runoff ever recorded
16 and more than doubles the average annual runoff.

17 Yet in March of this year, your projected
18 total runoff was 28.4 million acre-feet for the year. As of
19 August 1st, the total runoff was already
20 52.9 million acre-feet, which is 186% over your March
21 estimate. And this is not a new trend. In 2011, the Corps
22 projected 29.8 million acre-feet of runoff, yet the actual
23 total runoff was 61 million acre-feet, 145% over the March
24 estimate. Last year, those numbers were 29 million acre-feet
25 projected and 42 million acre-feet actual, 145% over.

1 And I've got some charts up here (indicating.)
2 and I just want to point out, these are -- just in terms of
3 these wet years, the difference between what you're
4 projecting, then, maybe versus -- what, this is the third one
5 over, the one closest to me, showing the annual runoff --
6 over -- above Sioux City in terms of the projections versus
7 the actuals. In your estimation, are there improvements that
8 can be made to your method for predicting runoff and can
9 those changes be made today, or will they require an update
10 to the Master Manual?

11 And Mr. Remus, I know that you follow this
12 regularly. Your three-week projections are typically
13 released once a week and tend to be the most accurate in the
14 first few days after the projection, naturally. How
15 difficult would it be to put out those projections more often
16 and would it be worthwhile to do? And to what extent are the
17 three-week forecasts, in an effort to provide transparency in
18 decision making, compare to being methods of producing the
19 decisions with regard to waterflow, or are they the same
20 thing?

21 General Helmlinger?

22 BRIGADIER GENERAL HELMLINGER: Well, Senator,
23 so I'll begin. And the water events in the Midwest are
24 becoming more frequent and intense. The National Weather
25 Service has documented it.

1 We do incorporate each year's weather pattern
2 into our total running record of 128 years -- 121 years that
3 -- and we compare -- and so we adjust our new average
4 baseline every year based on that. But we are making
5 incremental improvements every year as we get more data on
6 there.

7 One of our other improvements will be, as
8 you've alluded to, is the installation of the soil moisture
9 and snowpack monitoring. We'll get more timely data on that.
10 But for more detailed feedback on our projections, I have to
11 turn to Mr. Remus.

12 MR. REMUS: I just have to start with we don't
13 -- when we develop our annual runoff forecast beginning in
14 December, we look at the conditions in the Basin, what we
15 call "water on the ground," that's snow; what we know about
16 the mountain snowpack; what we know about the Plains'
17 snowpack; soil conditions. And we look at the Climate
18 Prediction Center's long-range -- I don't want to call it a
19 "forecast." It's their outlook as far as is it going to
20 trend toward a wetter or a dryer three months or is it equal
21 chances, is what they call the we-don't-really-know-type
22 situation. And that's how we build our runoff forecast.

23 We don't, you know, try to fit it to some
24 average or some curve. We go with our conditions there. And
25 we'll -- just to -- an example of that: This year our March

1 runoff forecast was 28.4 million acre-feet, which is, you
2 know, about 3 million acre-feet above normal. And that was
3 based on the fact that it -- on March 1st, the Plains'
4 snowpack was about average. The bomb cyclone added quite a
5 bit of water there, the mountain snowpack was about average,
6 and we had wet soil conditions. So, we figured in the
7 long-range outlook was equal chances: Maybe it's dry; maybe
8 it's wet. We don't know. So, that's how we build our runoff
9 forecast on April -- or excuse me, March 1st this year. It
10 wasn't -- we only say, well, does it average a little more, a
11 little less. We look at actually -- the conditions on the
12 ground.

13 SENATOR ROUNDS: Let me just, because I
14 -- there's part of this which I don't understand yet, because
15 it -- with -- and this is General Helmlinger, in your letter
16 to Stakeholders and Concerned Citizens that accompanied the
17 2018-2019 Annual Operating Plan to explain that the
18 Operating Manual creates guidelines by applying the
19 Master Manual to, and I quote this, "... computer simulations
20 of the reservoir system regulation assuming five
21 statistically derived inflow scenarios based on an analysis
22 of water supply records from 1898 to 2011." Now, this is in
23 2018.

24 Data show that average runoff into the system
25 in the years, these scenarios, but disregarding years 2012

1 through 2018, 13% higher than the average runoff into the
2 system. Additionally, if you look at the runoff just from
3 the past ten years, runoff average is, over that time, is
4 33.5 million acre-feet, 25% above the historically average.

5 Why does the Corps project -- or, do they use
6 projections that disregard runoffs totals that we accumulate
7 after the 2012 year from their analysis? And additionally,
8 why doesn't the Corps use trending runoff averages?

9 And General, --

10 BRIGADIER GENERAL HELMLINGER: Yeah.

11 SENATOR ROUNDS: -- if you want John to answer
12 that, that's fine.

13 MR. REMUS: The -- we use the what -- as
14 the sys- -- the process I explained to you and then to
15 bracket that with what would be an upper quartile or an upper
16 decile, or a lower quartile or lower decile runoff year, and
17 that's where we use the statistical averages to move -- once
18 we develop our annual runoff projection, our forecast, then
19 we use statistics to say, well, you know, statistically, an
20 upper decile would add this many million acre-feet or so.
21 That's how we --

22 SENATOR ROUNDS: Sir, are you telling me
23 that you are taking into account from 2012 to 20- -- no?

24 MR. REMUS: Now, I'm getting to that.

25 SENATOR ROUNDS: Okay.

1 MR. REMUS: Okay? The reason why we
2 ended at 2012 is there's a -- the Bureau of Reclamation
3 develops what we call "holdouts." So, basically, it's
4 irrigation diversion. So it's a depletion from the
5 reservoirs or from the runoff in the system. They only
6 update that every -- about every 10 years, so they're due to
7 do that again in 2020. So, that's why we really don't have
8 any -- and because we have to use those same statistics from
9 the Bureau in our holdouts.

10 We don't -- you know, just because 2019 is
11 going to be a very large runoff year, that doesn't mean 2020
12 will be a large runoff year.

13 SENATOR ROUNDS: Well, that's what I want to
14 -- I want to get into this a little bit.

15 MR. REMUS: Because I -- let -- 2011 was the
16 record and 2012 was a drought.

17 SENATOR ROUNDS: Yeah.

18 MR. REMUS: So we --

19 SENATOR ROUNDS: But let's look at this just a
20 little bit because I want to go into the fact that, you know,
21 most of the -- well, let's just -- take a look at the trends
22 that have occurred, and I'm going to point out beginning with
23 my slide, the farthest one away from you, the "Annual Runoff
24 Above Sioux City, [Iowa]." The blue -- I mean, these come
25 out -- this is a Corps' chart. The blues are where we have

1 above average, the browns are where it's below average.

2 There's a consistency to the inconsistency.

3 There's wet periods, and then they move into a
4 dry period, and then back into a wet. Now, granted, it is
5 cyclical. There's a clear cyclical. I -- we've broke it
6 down right next to it and I've handed out, I think, charts of
7 the annual runoff. This is above Sioux City, Iowa. How come
8 1898 to 2019?

9 And I'm just going to work through this
10 because I think this is worth looking at. From 1898 to 1929,
11 the average was 27.53. From 1930 to 1941, dry period,
12 average 15.64. From 1942 to 1953, wet year, 27.25 was the
13 average runoff. From 1954 to '61, down to 18.33, dry year.
14 Up again to the next trend.

15 From 1962 to 1986, 27.46, above average. And
16 then right back down to 17.81 on 1987 to 1992. And then
17 back, turned around again, now we have a trend from '93 to
18 '99; we're at 34.20 million acre-feet that have been
19 received. And then right beginning in 2000, we go down for
20 seven years in drought cycle. And then coming back up again
21 in 2008 to 2019, we're back up to 34.46.

22 What I'm pointing out is, is there is a
23 consistency to these trending years. And, yet, we always
24 move if we're in dry years, we assume back to average. And
25 in wet years, we still assume back to average when we start

1 out, even if the trend is moving wetter or if the trend is
2 moving dryer.

3 And it would appear to me that it would give
4 you a lot bigger tool chest if you could, rather than always
5 assuming average, which it appears that you do when you begin
6 your forecast, if you could make the assumption that we are
7 in a wet cycle. Or if we are in a drought -- what, because I
8 think the same formula or the same approach should work
9 whether you're talking a dry year or a wet year. There's
10 going to be a time period in which we're going to have a
11 drought appear. When that drought comes, we don't want
12 everybody saying, gee, everything is always assumed wetter.

13 But if there is a change in there -- because
14 right now when you're average, there's only a couple times
15 that you're actually correct in your estimates and that's
16 during the change in the cycle, up or down. But is there a
17 reason or is there a possibility that in this day and age
18 with more and more resources available to us, that we can
19 actually begin trending earlier in the year whether we need
20 to be releasing amounts of water from the reservoirs earlier
21 at a higher rate, and during dry years, recognizing that in
22 order to conserve that water for a long-term purpose,
23 upstream and downstream, that we release a lower amount
24 during those dry years. I'm just asking the quest- --

25 MR. REMUS: Can you explain what you mean by

1 "trending to average"?

2 SENATOR ROUNDS: Yes. My understanding right
3 now is, is that -- and I can go all the way back I -- when I
4 was working with this governor, we had discussions about the
5 fact that we had droughts in South Dakota. And there was a
6 time period in which out of our reservoir systems where we
7 had -- the Missouri River was actually back, in some case,
8 into its original -- into the original banks of the
9 Missouri River, particularly up in the Fort Yates area in
10 North Dakota.

11 During that time period, we chased water. We
12 had water reservoirs or we had water intakes for the
13 Cheyenne River Indian Reservation and so forth. And we
14 actually had to extend down in -- deeper into the Mainstem of
15 the Missouri because the water levels were being depleted
16 because at that point we were still pushing water out, not at
17 a normal rate, but it took us an extended period of time
18 before we started to reduce because we had lower levels than
19 anticipated as average.

20 But during that same time period, we were
21 pushing out more water than what was coming in over an
22 extended period of time. In doing so, we put a lot of folks
23 in the Upper Basin at risk. At the same time, during times
24 of wet periods, now we have an average that we appear to be
25 using to start out with each year, but we're not recognizing

1 early on that there is significant snowpack. In fact, this
2 year we had multiple conversations with the offices where
3 folks on the ground up in the Upper levels were saying, "We
4 got lots of snowpack. We got lots of moisture up here. Why
5 aren't we at least starting to release some water because
6 we've got a huge amount that we're going to be storing up
7 here."

8 And yet it appeared that we weren't in a
9 position to be able to respond and average that water out, so
10 that you don't end up with an increase in the amount of water
11 coming down from the Missouri River at a time, in which it
12 sure would have been nice if we could have slowed down the
13 release during a time of very high water coming in from the
14 Platte and other locations.

15 MR. REMUS: Are you -- so you're talking about
16 more of the stor- -- the water we have stored?

17 SENATOR ROUNDS: Yeah.

18 MR. REMUS: Okay. All right. Thank you.

19 SENATOR ROUNDS: Because that's really the
20 only tool that you have. And let's face it, the bomb cyclone
21 that hit this time around where the vast majority of it
22 impacted Gavins Point and below, Gavins Point is really not a
23 flood-control device. It's a mon- -- I mean, it's a
24 regulating device, but it doesn't have storage capacity in
25 it. Whatever comes into it really has to come out of it.

1 And everything down below that, the
2 flood-control devices you've got, the levees and dikes and so
3 forth that you have, they can control some. But when you
4 were as impacted as you were this particular year, you really
5 don't have a lot of tools available to you, other than what
6 you could stop from coming through from the Upper Mainstem
7 -- the reservoirs.

8 If that -- if those reservoirs would have had
9 perhaps just a slightly less amount in, recognizing that
10 we're in a wet sequence, there may very well have been a time
11 there in which you could have retained more for a period of
12 time or, if you started early enough, released a higher
13 percentage rate coming through during this wet-cycle period
14 so that you didn't have larger amounts coming through during
15 a time in which you have the, for lack of a better term, the
16 "oh, crap" moment when we have the bomb cyclone. And this
17 year, I recognize, clearly, you had more water down there
18 than you could ever handle with the limited amount of
19 capacity in the Gavins Point reservoir system itself. It
20 just simply isn't there.

21 But most certainly to be able to slow down
22 into, as we say, "meter that water out," what I -- it seems
23 to me would have been very helpful in the locations down
24 below, and particularly in the Omaha area, if we could have
25 slowed down some of the releases coming out -- for a longer

1 period of time. And I just want your thoughts in terms of
2 being able to look at, rather than average amounts, actually
3 trending those a little bit earlier in the year that it's
4 occurring.

5 MR. REMUS: Well, as you know,
6 Senator Rounds, no matter how warm the winter gets in Pierre,
7 South Dakota, you get ice on the river below Oahe Dam.

8 SENATOR ROUNDS: Yeah.

9 MR. REMUS: And ice below Oahe, ice in
10 the Bismarck-Mandan area, it really limits our ability to
11 evacuate storage in the wintertime. We -- if we push it and
12 right up to the limit, we can maybe get 25,000 cubic feet per
13 second out of Garrison or Oahe. But that's running at
14 awfully close to the limit where we are risking ice jams,
15 which then you're not releasing anything and you're flooding
16 people in the time when it's going to put water in their
17 front yard or their home and freeze.

18 So, we really can't -- and we really can't
19 begin to overdraft or do preemptive releases until the ice is
20 gone, which is usually around the first of March in the
21 Pierre, Fort Pierre area; in the middle of March up in
22 Bismarck and which --

23 SENATOR ROUNDS: Let me ask a question on
24 that, though, because --

25 MR. REMUS: Yep. Okay.

1 SENATOR ROUNDS: When does ice form on
2 the Upper -- what do you use for your ice dates for -- in the
3 Upper Basins?

4 MR. REMUS: In the Bismarck-Mandan area,
5 it generally is the second week in December. Now this last
6 year, December was a warm month all over the Basin. We had
7 80-degrees days in December. So, but they still had ice
8 there and it did freeze over eventually.

9 So, what we really -- if you -- you can't
10 count on a warm December or a warm February. So, we have to
11 plan to have the system down to maybe a million extra feet
12 because that's what we can get out of the --

13 SENATOR ROUNDS: Yeah.

14 MR. REMUS: -- with the ice. So, we really
15 need to know if we're going to start overdrafting that. We
16 need to really kind of know that in July, really.
17 Particularly last year because we had a very high runoff. If
18 we were going to plan for 52.9 million acre-feet this year,
19 we would have to have known that very early to make it
20 around, so.

21 SENATOR ROUNDS: But, the -- and I won't
22 belabor the point. But the reason why I ask the question,
23 you do have a certain amount in which you most certainly do
24 let out, whether it's 5,000 cubic feet or 7,000 or 9,000 or
25 12,000. But whatever that is, that's the amount you need to

1 maintain during that ice period.

2 But if you know that in the later part of
3 December, that might very well be 5,000 more or 7,000 more
4 for that same time period because your ice is going to form
5 on whatever you do put out. That's my question.

6 MR. REMUS: The ice will probably not form.
7 It's really on how much you could freeze in. And we try to
8 freeze in at higher stages and we just can't get it to freeze
9 in, particularly in the Bismarck-Mandan area, about 25,000.
10 And a little bit has to do with the backwater effect from
11 Lake Oahe and Bismarck and Lake Sharpe in the Pierre,
12 Fort Pierre area.

13 SENATOR ROUNDS: Very good. Look, thank you,
14 and I do appreciate that. I -- just a couple more questions
15 that I've got on this that I kind of wanted to work my way
16 through. And that is, is with regard to the infrastructure
17 down below, the folks in the room here today, I think, have
18 concerns about some of the infrastructure and how you're
19 going to work this.

20 And General Helmlinger, you discussed this a
21 little bit with regard to the three-phase approach that you
22 want to do. But I want to work my way through this a little
23 bit.

24 And I just want to begin with talking about
25 Public Law 84-99. In your professional military judgment,

1 what do you need to get us out of this continual loop where
2 the Corps rebuilds at the same standard after every
3 significant flood even though you know that the improvements
4 should be made to the system? Are the constraints that
5 Public Law 84-99 place on rebuilding too restrictive to
6 permit an innovative reconstruction effort? Do you need
7 additional authorities? Should any existing authorities be
8 changed? How much does the federal cost share and
9 requirement from, we're at 86, slow down the pace of
10 producing reports and engineering analysis that might be
11 integrated into contracts that very well could provide a more
12 resilient system?

13 And are there commonsense improvements that
14 you could add to designs right now with -- that would exceed
15 -- you know, that would help exceed -- that would not exceed
16 the constraints of the law or the policy that Congress would
17 have to help you with? In other words, where are we going
18 with -- you've seen it this year where you had a bomb cyclone
19 hit. It inundated some of those areas. If you were to do
20 them today, you would do them differently if you were
21 starting from scratch? Is there a restraint within the law
22 that limits your ability? And is there something that
23 Congress needs to do? Or is this the case of we're doing the
24 best we can, and until such time as we have all phases ready
25 to go, and there's really not much we can do?

1 BRIGADIER GENERAL HELMLINGER: Senator, that's
2 an excellent question. And first let me address that
3 Public Law 84-99 and emphasize that it is an expeditionary
4 tool to rebuild after disaster strikes. And it's a very
5 useful tool used on many situations. There are some areas
6 where it's cumbersome on that. One area that was recently
7 lifted on that was the flexibility that was given through
8 WRDA 2016, Section 1176, which allows for non-federal
9 sponsors to pay for betterments on what repairs.

10 And that there are examples where a rebuilding
11 main- -- rebuilding to the preexisting conditions may not be
12 the preferred alternative for the non-federal sponsor. And
13 this now gives them an opportunity to pay for the difference
14 between what the federal government would pay and what they
15 are willing to pay, and (indiscernible.) the protections
16 required.

17 This, I think, this was driven off of some of
18 the repairs that were necessary in Puerto Rico where, very
19 fragile, and the structure was repaired and we invested a lot
20 of money to repair what was there, but what was there was
21 fragile to begin with. So, if you could put a little bit
22 more money into it for a more robust and resilient design,
23 you won't have to spend money twice on the same repairs.
24 But, so, first I'd say, we've been given a very flexible and
25 useful tool with Section 1176 on that.

1 One authority that I would recommend as
2 useful, which does not exist right now, is the authority for
3 reimbursement of -- by -- reimbursement of non-federal
4 sponsors for the federal share of rebuilding when we know
5 that that non-federal sponsor has the financial and technical
6 abilities to do the repairs themselves. We have -- at this
7 incident alone, we had some non-federal sponsors that had the
8 funding, had the technical know-how to -- and the capability
9 to get to work right away to restore their levees. But
10 because of --

11 SENATOR ROUNDS: Are you talking in this case
12 counties or municipalities or other public entities?

13 BRIGADIER GENERAL HELMLINGER: Yes, sir, other
14 public entities there that -- but we have to wait for the
15 federal -- for our funds to come online so the federal
16 government can do the work. But it would be -- -- it would,
17 I believe, effective -- it would be more efficient and faster
18 if the -- this work had met all of our criterias, only we
19 didn't have the federal funds on-hand, that they could
20 accomplish the work and that we would reimbursement them for
21 our federal share afterwards.

22 SENATOR ROUNDS: Let me ask this. With regard
23 to where the levees are and the protections that are in place
24 right now in the Middle Basin areas, areas where literally
25 the only protection has been the building of these levees and

1 so forth, would it -- are there areas right now, and I know
2 that you've indicated -- first of all, you've needed to do
3 some remedial work on those today. Does that limit, then,
4 your ability to go back in and analyze or do the studies that
5 would suggest different placement is, perhaps, not
6 appropriate today? Do you have the tools and resources to
7 reevaluate the location of those? And is there -- can you
8 talk a little about what the public discussions are that go
9 on prior to a decision along that line being made?

10 BRIGADIER GENERAL HELMLINGER: So, Senator, we
11 have the authority to do minor realignments on levees where
12 it makes sense. You may have one case where you had a large
13 scour hole that was -- that covered a long length and we may
14 -- it may be a shorter distance to rebuild a new levee behind
15 that scour hole so you don't have to fill that back in with
16 material. And in doing that, you -- we're actually improving
17 the conveyance of the river because we're putting more
18 distance between the two sides of the river and the levees or
19 the banks that may be there. So that's an example of a minor
20 improvement.

21 But I believe, you know, what you're alleging
22 to is if we needed to do a larger realignment on that. We
23 don't have that authority or ability right now to do that.
24 Where possible, in our three-phase implementation on here,
25 we're trying to eliminate redundant work. If we can

1 accomplish something in phase one that won't have to be
2 redone or realigned in phase two or in our long-term plan, we
3 want to expedite those decisions so that we can get to the
4 long-term solution up front.

5 But we are pressed against a clock and that
6 clock is next year's flood season. So we want to work with
7 our partners here to make sure that we've got a minimum of
8 10- to 25-year flood protection for next season so that we're
9 prepared. And due to the timeliness of the situation, we're
10 not really able to get into that.

11 Further, I want to talk about one of the
12 cautions of PL 84-99 and prompt rebuilding is where it may
13 seem intuitive to make a broader change on that. We really
14 need time to do our due diligence and study the second- and
15 third-order effects of that.

16 SENATOR ROUNDS: And that's part of why I
17 wanted to it bring up because it seems to me that if I was a
18 landowner or someone living along this part of the River, I'd
19 be concerned that, number one, if the flood control systems
20 that are in place right now are not adequate, I may very well
21 have had property damage.

22 BRIGADIER GENERAL HELMLINGER: Uh-huh.

23 SENATOR ROUNDS: But second of all, if I live
24 along this River and I have property along this River, I
25 would be concerned about whether or not I may lose some of my

1 property based upon a new recommendation. It seems to me,
2 and I'm not sure whether you're prepared to discuss this or
3 not, but could you speak to the process used and the amount
4 of public advisory that occurs should one of these types of
5 studies occur and recommendations coming through, what type
6 of advanced notice and input would the public have for those
7 types of modifications?

8 BRIGADIER GENERAL HELMLINGER: Well, and
9 Senator, so, the -- first, we want to gain consensus from all
10 of the impacted states and their non-federal sponsors that a
11 Lower Basin flood-risk management study is necessary. I do
12 believe it is necessary, as have been demonstrated during the
13 floods in '93 and 2011 and this year, that the system simply
14 does not have the capacity to carry the waters that enters
15 the system just from the tributaries of the Lower Basin.

16 So, we need to do something different than
17 simply rebuild the system that we have now. What that
18 "something different" looks like, I can't speak to details
19 on. I can speak to the generalities on the structural, which
20 is levee rebuilding or realignment, and non-structural
21 measures such as raising -- building heights or moving
22 structures outside of the flood plain would be.

23 If we were to do that, we would certainly do
24 the whole series of public meetings and consultation to get
25 the plan right, and where we would want to work with willing

1 individuals that were ready to sell land to improve the flood
2 plain. And we know that there would be individuals that were
3 against that. So, that's where we'd go through our
4 deliberate planning process to make sure that we come up with
5 the most acceptable plan possible.

6 SENATOR ROUNDS: Thank you.

7 Mr. Remus, I'm just going to finish with just
8 a couple of questions and just a conversation, if we could.

9 This year I think you found yourself in a
10 really tough predicament in that you had huge amounts of
11 water coming through a system that started out with a bomb
12 cyclone that clearly really impacted a lot of people down
13 below the reservoir system. And I think you found yourself
14 in a position trying to explain why you didn't really have
15 the tools available to you to fix that. And this is an area
16 that you live. And so, I -- and at the same time, trying to
17 explain that without the tools available to you from the
18 Mainstem Dams because this occurred below the Mainstem Dams
19 primarily, that there wasn't a lot that the Corps could do.

20 And, yet, at the same time, I know that my
21 office and other offices were making contact with your office
22 about what you were going to be doing to try to respond to an
23 increasing amount of precipitation and water moving into the
24 Upper Mainstem Dams that, eventually, it's all going to come
25 through this system.

1 I live on the Missouri River. I have multiple
2 points and friends who make contact with me every day. I,
3 personally, check the reservoir systems up and down every
4 single day in how many cubic feet per second you're averaging
5 out, what the water levels are on every single reservoir, how
6 much or how -- how much it's going up or how much it's going
7 down, and the total amount of flood capacity you are using.
8 I think right now it's 10.3 million acre-feet as of this
9 afternoon, or as of this morning.

10 But as I watch this, I would commend you in
11 that with the tools that you had, I think your team has done
12 a very good job managing -- using the tools of the
13 Upper Mainstem Dams, you've done a very good job of keeping
14 -- not a single one of them has been run to the point where
15 you've had to run one over the top, or that you've had to
16 release items outside of using the traditional capacity of
17 the power plants unless they've been down for repair, such as
18 what will happen next week on the Oahe units. But that's
19 been good because that meant that folks upstream from here
20 have seen very, very high levels, but they have been
21 manageable levels down and throughout this.

22 But in December and in January and in
23 February, I think our office continued to make contact and
24 ask whether or not there was capacity available to look at
25 higher releases because we could see, that in case it

1 actually rained in the Upper Basin in the spring of the year,
2 that you could might very well be in trouble. Even without
3 that bomb cyclone hitting, we were going to have an excess
4 capacity of water in the Upper Basin.

5 What I'm looking for is within the
6 Master Manual, within the operating constraints that you
7 have, isn't there some way to be able to look at these very
8 clear trends, where we have wet trends that are continuing to
9 occur and until such time as it actually stops and moves into
10 that drought cycle, which we will have again some day, isn't
11 there some way to be able to, with the tools that you got, to
12 be able to trend some of that out so that you're not sitting
13 within inches of going over the top of Peck and Garrison and
14 Oahe hoping that it doesn't rain in April, May, and June?

15 MR. REMUS: Well, first of all, we don't ever
16 hope that it doesn't rain in April, May, or June. We know
17 it's going to rain in April, May, or June. I don't think
18 we've ever had a year where it never rains there. And that
19 we factor in, like I said earlier, we look at the Climate
20 Prediction Center's long-range outlook. I don't want to call
21 it a "forecast" because they don't really forecast anything.
22 They just kind of look at what they think it's going to be:
23 wetter, dryer, and so on and so forth.

24 So, we factor that into our forecast. And
25 then every month we develop what we call "a storage check."

1 And in that, we look at all the water that we know is in the
2 Basin, water we have in storage, and what we think our runoff
3 will be based on the conditions, as I've explained earlier.

4 And then we kind of settle -- okay, what do we
5 need to be releasing from the system? That gives us a
6 release from Gavins Point Dam for them. You know, and, of
7 course, that will always change through the year. And if we
8 are projecting of a wetter year, we will release more water
9 out of that beginning as soon as we can start getting it out
10 of the reservoirs in North and South Dakota. Once we have
11 the release from Gavins Point Dam, then we say, okay, where
12 does it -- where do we have to take that out of the system?
13 How do we get it from Fort Peck to Gavins Point? And that's
14 what we use the three-week forecast for.

15 And you're right, it's good for a couple of
16 days and, then, depending on what happens -- and what we do
17 use that for is if -- and then I'll give you the example: In
18 April, when the Plains' snowpack started to come off very
19 quickly and the pools of Oahe and Fort Randall rose very
20 quickly, we were saying, okay, what do we need to be doing at
21 Fort Peck and Garrison to help manage this? You know, you
22 have to -- and we cut flows back to minimum out of those.
23 So, that's what we can do in our system. Can --

24 SENATOR ROUNDS: And you hardly got Fort Peck
25 over 15,000, if you even got it over 15,000.

1 MR. REMUS: Well, we even, later in the even-
2 -- now it's running at 15,000 now.

3 Now, can we say, okay, we're in a dry cycle so
4 maybe we should release more, try to get more out in
5 December, January, and February --

6 SENATOR ROUNDS: You mean a wet cycle.

7 MR. REMUS: Or a wet cycle.

8 SENATOR ROUNDS: Wet cycle, yeah.

9 MR. REMUS: Yes, I'm sorry.

10 SENATOR ROUNDS: No.

11 MR. REMUS: I'm just hoping, I guess.

12 Again, we are kind of limited, physically, as
13 to what we can take out. And we, you know, we generally
14 planned it, move to evacuate a million acre-feet in those
15 three months. In some years we get a million out and some
16 years we can get a little more out, but it's not really
17 significant.

18 And in this year, just on where the rain off
19 -- or where the runoff came from and how fast, it really
20 would not have made a difference in our system releases, as
21 we got that -- you know, but up until March 15th, the Plains'
22 snowpack, although we had pockets of very heavy snow, we
23 didn't really have overall that much Plains' -- or an
24 above-average Plains' snowpack.

25 The bomb cyclone dumped another two to four

1 inches of water over most of South Dakota and most of
2 southern North Dakota, which by that time it was, you know --
3 we were in a reactionary mode.

4 SENATOR ROUNDS: Well --

5 MR. REMUS: I'd actually read -- so, was there
6 something in the Master Manual? We can look at that and
7 release more water. If we're going to start, you know, doing
8 a trends' analysis and not operating on an annual cycle, that
9 would require a change to the Master -- to the Water Control
10 Plan.

11 SENATOR ROUNDS: But on an annual cycle, you
12 could look at where the trends are moving.

13 MR. REMUS: We could look at what our runoff
14 forecast is and we -- if we have a wet Basin, we generally
15 predict more water and we can release more if we can get it
16 out under the ice.

17 SENATOR ROUNDS: I think I should stop while
18 I'm ahead. Look, that's what I'm looking for. I just think
19 that when we're trending this and we're -- there's an
20 "average" and then there's a "trend." And I think if we're
21 averaging it over the life cycle of this system, what we're
22 finding is, is that we're -- we go either wet or we go dry,
23 but we don't seem to take into account that we're wet and
24 we're in a wet cycle versus dry and we're in a dry cycle.
25 And I just think that's worthwhile in looking at the trending

1 that's the capability now with the new abilities that we're
2 going to have, to be able to look at what our snowpacks are
3 and so forth.

4 And I understand that the ice does play a role
5 in it, but it appears to me that we actually were able to
6 increase by several thousand cubic feet per second beginning
7 fairly early in the year for this year. And I would -- we
8 were in touch with your office on March 8th, March 20th,
9 March 28th, and April 10th of this year suggesting that we
10 get those up faster than what we did.

11 MR. REMUS: And we did that this year and last
12 year --

13 SENATOR ROUNDS: Yeah.

14 MR. REMUS: - when we saw that we -- the
15 storage check gives us -- basically, it sets targets
16 downstream in Omaha, Nebraska City, and Kansas City and
17 there's a floor and a ceiling to those. And we can manage to
18 the minimum or we can manage to the maximum. We always try
19 to manage, or at least last year and this year, to get to
20 that maximum.

21 So, we knew we were going to have an above
22 average. We didn't know it was going to be
23 53 million acre-feet, but we did know that and we released
24 toward the top of that ceiling early on as much as we could.
25 But we did have a lot of constraints downstream.

1 SENATOR ROUNDS: Very good.

2 Gentlemen, is there anything that we have not
3 touched on that you wanted to address today?

4 BRIGADIER GENERAL HELMLINGER: Senator, I
5 would just say that I appreciate the support from Congress
6 and from our non-federal sponsors, that as we work together
7 to restore the levees here.

8 One thing we will need in the future is
9 sufficient appropriation to continue our restoration work,
10 our phase two effort.

11 And then, perhaps more importantly, is our
12 long-term phase three that we need continued support from all
13 of our non-federal sponsors, as well as Congress, to
14 implement our Lower Basin flood-risk management study, with
15 the understanding that we're focusing just on the Lower Basin
16 and its tributaries, so that we can improve the capacity or
17 conveyance of water through that because it's clear now, as
18 was demonstrated, that we have insufficient capacity to carry
19 water safely through the Lower Missouri River.

20 SENATOR ROUNDS: And John?

21 MR. REMUS: I just want to thank you for
22 allowing us to come here today. And thank you for your
23 engagement in our Basin operations.

24 SENATOR ROUNDS: I think there are days you
25 don't appreciate that engagement.

1 (Laughter.)

2 MR. REMUS: No, and I -- no, I do. It's a --
3 and I want to thank you. I don't think I got a chance to
4 thank you for springing a meeting in Pierre, and getting it
5 rescheduled, and getting us a place. I want to thank you for
6 that because the weather kind of prevented that. But your --
7 you and your staff really helped us out there, so thank you.

8 SENATOR ROUNDS: Thank you.

9 And General Helmlinger, I know that as you
10 folks work through the Chairs and you, you know, coming in
11 and out, you rely on the folks that are there doing the
12 day-to-day work, such as John is doing and --

13 John, how many years have you been working now
14 with the Corps of Engineers doing this type of work?

15 MR. REMUS: I've been working for the Corps of
16 Engineers 34 years, but this is my -- I just had my second
17 anniversary in this particular job.

18 SENATOR ROUNDS: Yeah. But before that, you
19 were working in Omaha doing --

20 MR. REMUS: Water --

21 SENATOR ROUNDS: Water --

22 MR. REMUS: Water resources engineering in the
23 Missouri River Basin.

24 SENATOR ROUNDS: It takes a while to get to
25 the point of being able to do it. I presume you've already

1 got other people that you're beginning to train to work
2 through this process as well.

3 MR. REMUS: Are you hinting at something?

4 SENATOR ROUNDS: No, not yet.

5 (Laughter.)

6 SENATOR ROUNDS: It's just when you guys come
7 in as rookies, it takes us some time to get you up to speed.
8 That's all.

9 MR. REMUS: I have a very good staff, yes.

10 CLOSING REMARKS

11 SENATOR ROUNDS: Very good. Look, thank you.
12 And once again, I said this earlier and I mean it, you are
13 neighbors and friends, and you live in -- you live with this
14 River as well. And it is appreciated, the work that you do,
15 even in times in which sometimes you don't have all the tools
16 necessary to be able to protect all the property and the
17 livelihoods down here that you want to. And part of our
18 responsibility is to make sure that you have as many of those
19 tools available to you as we can possibly get to you and that
20 the management tools are also available to you as well.

21 Now, if there are no more questions and I --
22 or comments that we want to make today -- and I do not have
23 the other members with me today. Other members may very well
24 want to submit questions for the record and that will be
25 allowed for the next two weeks as well.

1 I want to thank General Helmlinger, and
2 Mr. Remus, and the Corps of Engineers for traveling and
3 taking part in this hearing and for their hard work and
4 dedication in managing the Missouri River Basin. Your
5 thoughtful participation in this conversation as to how we
6 can improve the management of the system is an important step
7 to protecting homes and businesses and communities along the
8 Missouri River.

9 Again, I want to thank everybody for your time
10 today and for traveling to South Dakota to take part in this
11 hearing.

12 And with that, this hearing is closed.

13 (Proceedings concluded at 3:15 p.m.)

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