EXHIBIT 109

National Fish and Wildlife Foundation
Walker Basin Restoration Program

DRI Decision Support Tool and WRID Leasing Program
Initial Discussion: Scenario Planning and Monitoring Components
convened by NFWF
Reno, Nevada
Desert Research Institute, CVRB Building Room 209

AGENDA

Introductions (10:00 - 10:30)
Purpose of the Meeting and Review of Agenda

DRI Decision Support Tool (10:30 – 12:00)

- Presentation of DST (DRI)
- Discussion
- Potential uses of DST for Planning and Monitoring Purposes (DRI)
- Discussion

Lunch (provided, 12:00 - 12:30)

Updates (12:30 – 1:00)

- 2010 updates of relevant work by various entities

Transfers and Water Monitoring (1:00 – 2:00)

- NFWF program of investments (NFWF)
- WRID Leasing Program
- Brainstorming of Transaction and Flow Monitoring Needs
- Discussion

National Fish and Wildlife Foundation
Walker Basin Restoration Program (WBRP)

Water Group Meeting
on the DRI Decision Support Tool (DST)
convened by NFWF
Desert Research Institute, Reno, Nevada
January 15,2010

Meeting Summary

Participants

- Steven Fulstone – WRID board member
- Ken Spooner - WRID manager
- Stephanie Byers - U.S. Fish and Wildlife Service
- Jim Thomas – DRI
- Joy Giffin – NFWF WBRP Associate Program Director
- Tim Minor – DRI – DST Team
- Kip Allander – USGS hydrologist
- Tom Lopes – USGS hydrologist
- Jim Shaw – USBWC Federal Watermaster
- Karen Peterson - USBWC attorney
- Andrew Purkey – NFWF Water Program Director
- Bill Bettenberg –Walker River Paiute Tribe (WRPT) attorney
- Peter Weisberg – UNR Researcher
- Norm Harry –WRPT Water Litigation Officer
- Chris Garner – DRI – DST Team
- Doug Boyle –DRI – DST Principal Investigator
- Gerry Emm – WRPT Fisheries Director
- David Yardas – NFWF Interim WBRP Director
- Wes Williams – WRPT General Counsel
- Bruce Aylward – Ecosystem Economics Director
- Erik Borgen – Ecosystem Economics Associate

Introductions and Agenda

Jim Thomas provided an introduction and welcome to DRI

Bruce Aylward reviewed agenda and meeting objectives

- present model and potential uses
- will go as long as needed and as slow as necessary for everyone to ask questions and understand the capabilities
- group discussion of where the model should go, how its should be further developed, what data should be added

Walker Basin Restoration Program

Andrew Purkey provided a brief overview of the WBRP, the NFWF Team and recent developments, including:

- NFWF has signed agreement with Reclamation to implement the Walker Basin restoration program
- NFWF received assignment of NSHE options package
- NFWF developing strategy to meet needs of legislation and community
- David Yardas now on staff as interim Program Director
- Joy Giffin on staff as local Assistant Program Director
- Consultant Roles
- Ecosystem Economics providing strategy assistance
- Mentor Law providing legal assistance
- Westwater Research providing water pricing expertise
- Additional consultants on options packages transitioning to NFWF from NSHE
- NFWF mentioned will be setting up local advisory council and initiating Conservation and Stewardship Fund
- Legislation calls for further research and the DST is one promising tool from the prior UNR/DRI research collaboration

Decision Support Tool (DST)

Doug Boyle, Chris Garner and Tim Minor presented the DST including their presentation from the desert terminal lakes conference, which comprised of a powerpoint presentation and a movie showing the model components on a digital elevation model of the basin. Doug utilized the movie, pausing frequently, as a tool to discuss the development of the model and elicit questions from the meeting participants.

In explaining the current state of the DST, Doug emphasized that the DST Team is actively seeking public review of the model and it is important to note that the team has run no scenarios through the model other than the historic timeframe.

The DST is actually three models: one model handling the supply of water (PRMS-Precipitation Runoff Modeling System), one handling the groundwater component (MODFLOW), and one handling the delivery and return of water (MODSIM). Output from PRMS is input into MODFLOW, and then MODFLOW results are input into MODSIM. Often, there are tweaks that need to be made necessitating that MODSIM results be fed back to MODFLOW, which in turn must then go back into MODSIM.

As Doug went through his presentation and fielded questions, gaps limitations and areas for improvement were discussed. The primary gaps and limitations concerned missing data. There were questions about accuracy of each of the underlying the models and in each case, the accuracy of the models are limited by

the data that the team has available to them. Below is a summary of some of the limitations noted during the discussion:

- There is a need to further calibrate the PRMS models
- Water going in and out of Topaz Reservoir is unknown so Topaz operations are difficult to model
- Groundwater data from Antelope and Brideport vallery were not available and so only Smith and Mason valleys have MODFLOW models
- the East Walker was not explicitly included in the model
- Storage and Decree water deliveries provided to the team are only at ditch level, not at farm level
- Flood water available only on annual basis, so flood water deliveries are not highly accurate
- The lack of integration of the MODFLOW and MODSIM models makes it difficult to simply run a scenario

The other primary limitation/gap is spatial. Originally the plan was for the DST to cover the entire Walker Basin, modeling water movement from the headwaters of the Walker River downstream to Walker Lake. The DST team decided to only model downstream to the Wabuska Gage once they determined that the USGS (via the same funding source as the UNR/DRI Walker Basin Project) was engaged in a similar modeling effort covering the river from the Wabuska Gage downstream to Walker Lake. The DST team and the USGS met to collaborate and determined that their models could be integrated upon completion.

Questions about the DST's capabilities arose. The DST team explained that it is setup as a tool for comparative analysis, meaning that they could run a scenario without a lease/purchase and then run it again with a lease/purchase and compare the results. Additionally there was discussion surrounding the "time step" of the DST and its implications on how the model could be used. Currently, the DST uses a monthly time step, so it is more suited for planning purposes. If the DST were to be used for operational purposes, a daily time step would be more appropriate; however, a daily time step would introduce even greater error because of the underlying data limitations.

Discussion on Next Steps on DST

The DST Team emphasized that they have yet to apply the model to answer a "what if" question. They felt it was inappropriate until there was a group of stakeholders to ask questions and guide the use of the DST. A discussion then ensued of how the groups in attendance could work with the DST team to (a) improve the model and (b) begin testing its use by asking questions of it. Many of the prior limitations of the model were discussed through the day and the DST Team agreed to write those up and provide an indication of what future improvements they could make under the continuation of the project.

The discussion then turned to what set of questions could be asked of the model so that the DST Team could proceed to use the model and develop their ability to run such comparisons and provide useful output information to stakeholders. The discussion led to the conclusion that at this point the model would be best run for some generic types of water transactions and not for specific acquisitions. It was also stressed that the model is just a tool that can help guide future decisions, not a tool that will make decisions. The group came with a number of initial comparisons for the team to work on:

- Do one ditch in each valley, Smith and Mason
    - Run for 100% of water rights in the ditch protected instream (results can be proportioned latter)
    - Run over whole 10 yrs
- Run for a high priority or low priority ditch (or water right if that is possible)
- Split ditch in half over course of a season (split season) with water on farm until July 1 or August 1 and then instream from then on; and the opposite (early season water instream and late season on farm)

The group agreed to meet again to discuss the DST Teams model improvements plan and to look at modeling results. The DST Team agreed that a meeting in two months was appropriate. A meeting was scheduled for March 11th.

USGS Update

As a prelude to potentially sharing some of their work at a future meeting, Kip Allender and Tom Lopes of USGS gave a brief update of their ongoing/proposed work on Walker. With respect to work below Wabuska, USGS is currently modeling how surface water delivered to Wabuska affects water balance down to the lake. They are using GSFLOW for integration – but also using PRMS and MODFLOW. GSFLOW doesn't do water rights but should be able to handle the changing conditions at Walker Lake. Status of the work is that the basic framework built; and they are working on calibration and then will integrate with GSFLOW. October 2011 is the target completion date.

With respect to the water budget/conceptual hydrograph work, Part 1 is complete and the report is available. Part 2 of water budget work is scheduled to start next month, and will involve moving up the basin and installing more gages

NOTE: Next meeting is March 11th: 10:00 to 2pm at DRI.

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada
Desert Research Institute, CVRB Building Room 209
March 11, 2010 - 10 am to 2 pm

AGENDA

10:00 – 10:15 Overview
- **Introductions**
- **Purpose of the Meeting and Review of Agenda**

10:15 – 11:00 Walker Basin Overview (USGS, Lopes/Allendar)
- **Presentation and discussion of USGS water balance research**
- **Presentation of gauging plan**

11:00 - 11:30 DST data inputs (DRI, Minor)
- **Review of GIS layers used for Hydrologic modeling**
- **Example for one location in Mason Valley**

11:30 – 12:00 Groundwater Modeling (DRI, Pohll)
- **Mason/Smith Valley MODFLOW**

12:00 – 12:30 Lunch (provided)

12:30 – 1:45 Model Scenarios (DRI, Boyle)
- **Simulating water transfers using MODFLOW**
- **Transferring Mason Valley water rights to Wabuska using MODSIM/MODFLOW**
- **Further model development (2010 – 2011)**

1:45 – 2:00 Wrap up

Walker River Basin Study

Summary of Findings

In Cooperation with the Bureau of Reclamation

USGS

Presentation Overview

- Basin Hydrology
  - Summary
- Water Budgets
  - Summary
  - Reports
- Walker Part II
  - Objectives
  - Data collection
  - Results

USGS

Sierra Nevada Headwaters

USGS

Bridgeport Valley and Reservoir

USGS

Antelope Valley and Topaz Lake

USGS

Mason Valley

USGS

Wabuska Gage

USGS

Wabuska—Weber Reach

USGS

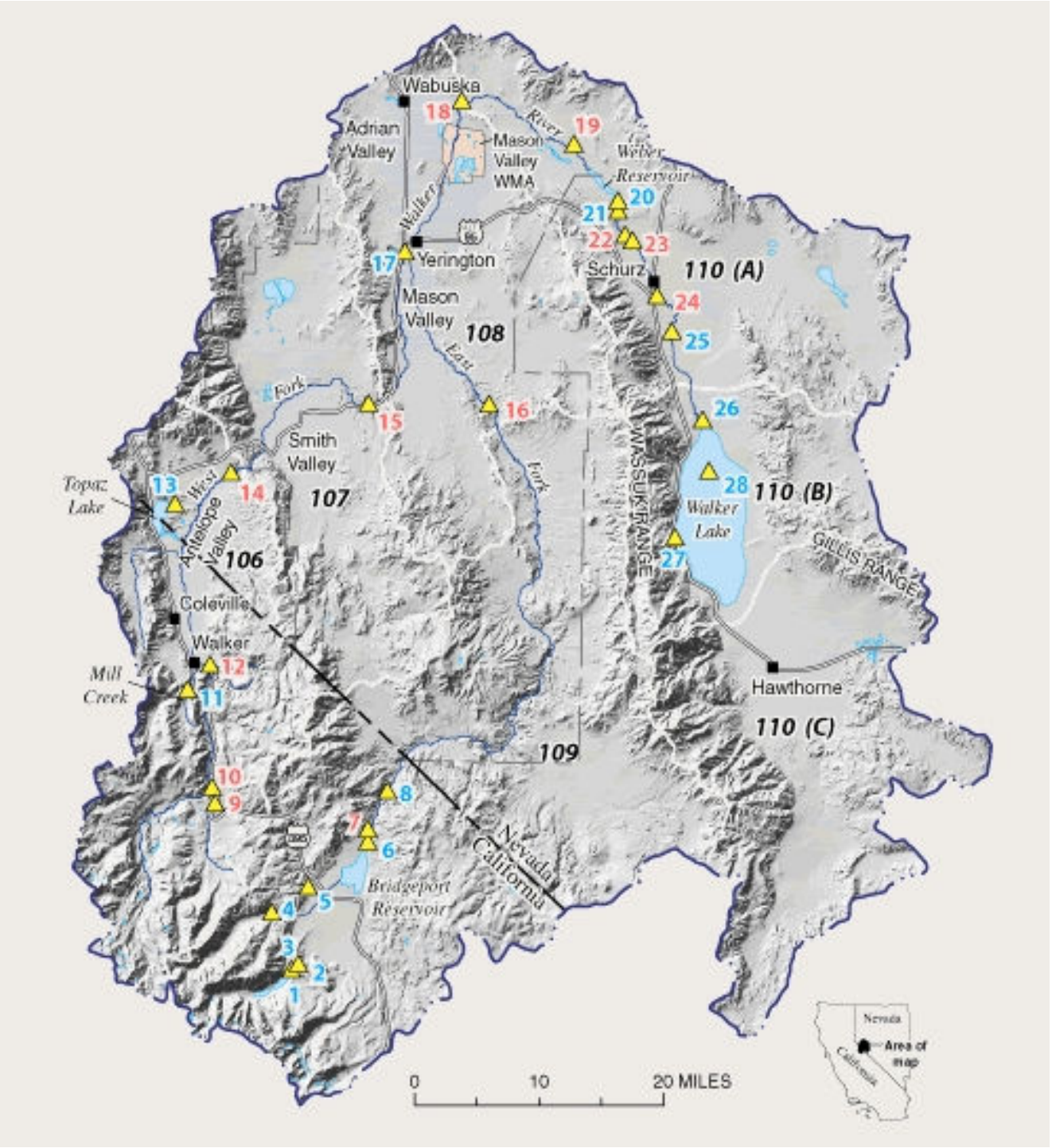
Weber Dam

USGS

Walker River at Walker Lake

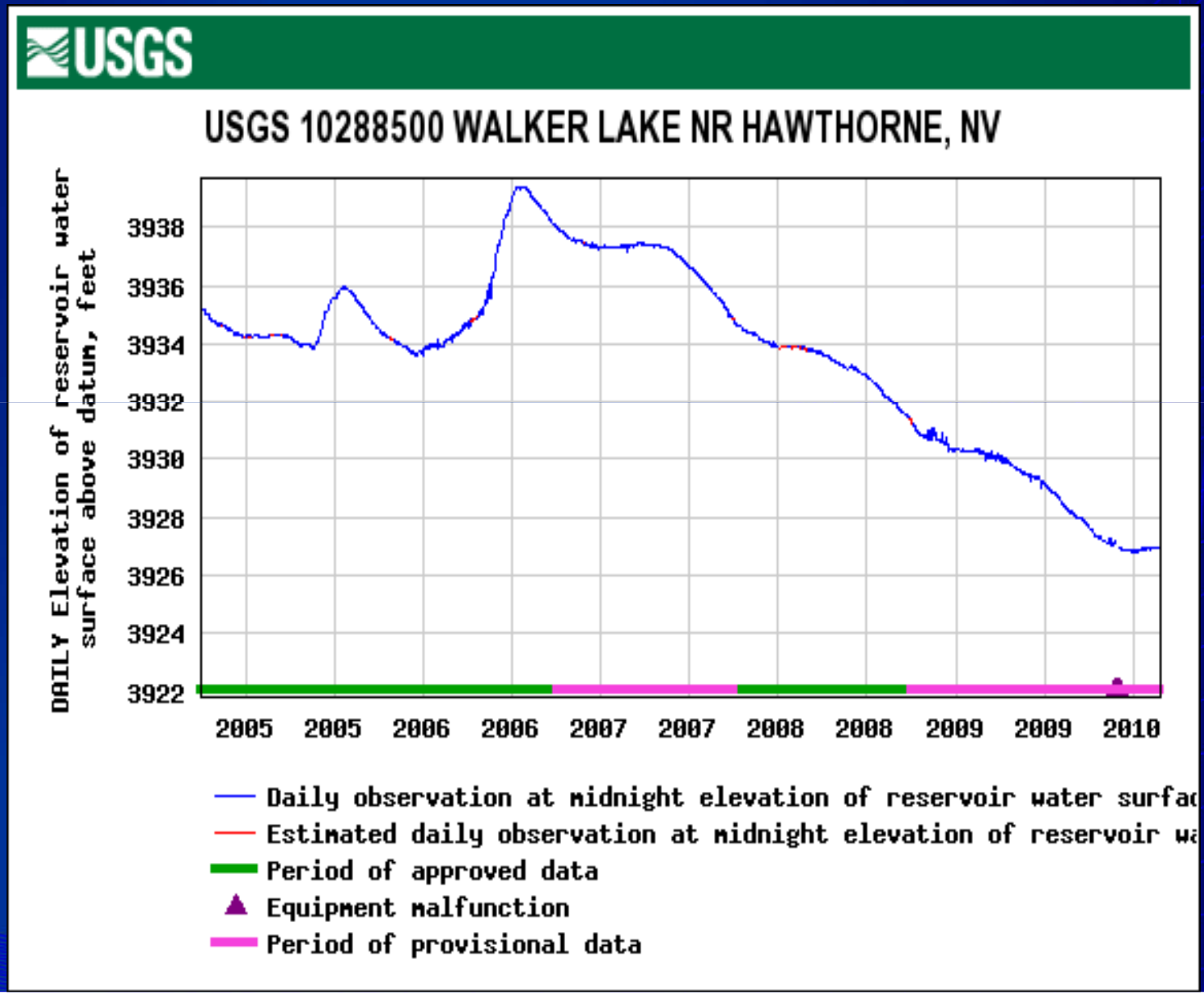
USGS

Stream and Lake gages



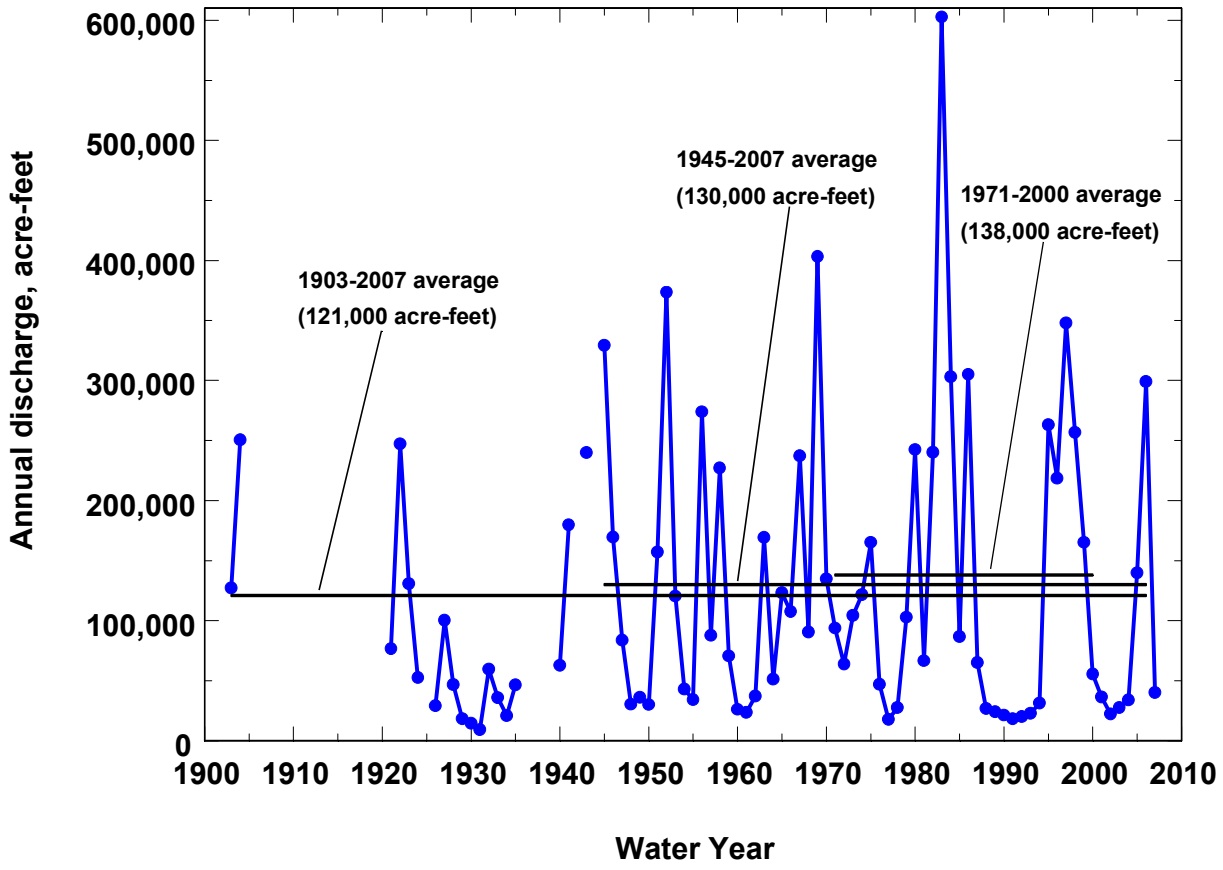
USGS

Continuous Real-Time Data



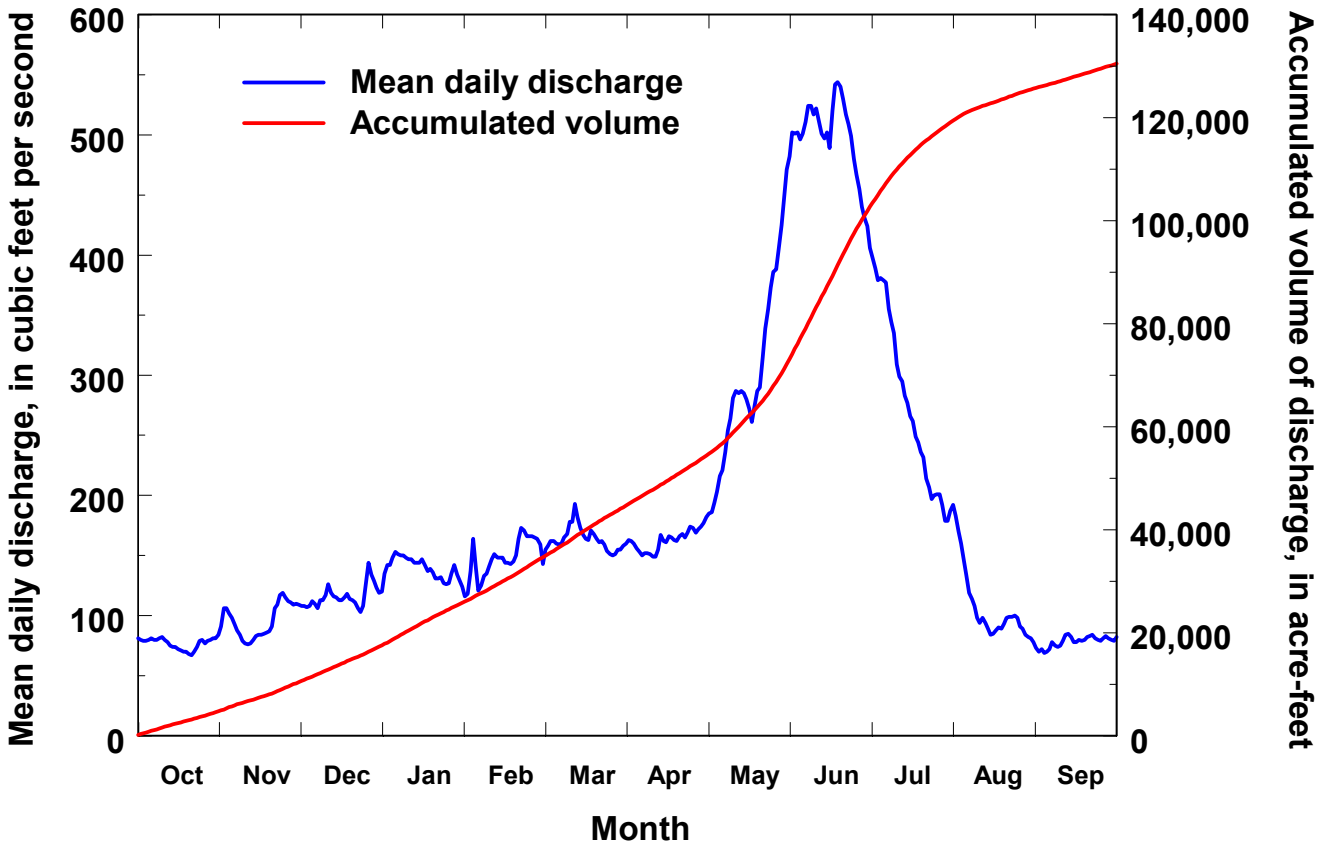
USGS

Variable Streamflow at Wabuska



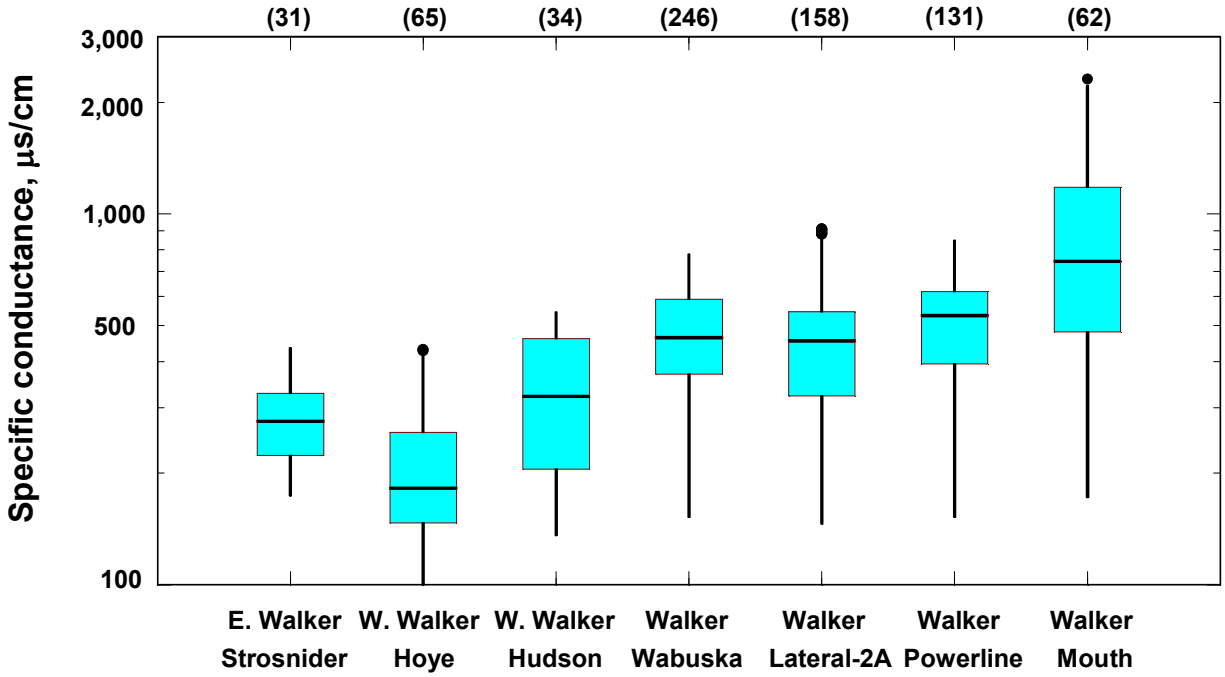
USGS

Mean Streamflow @ Wabuska



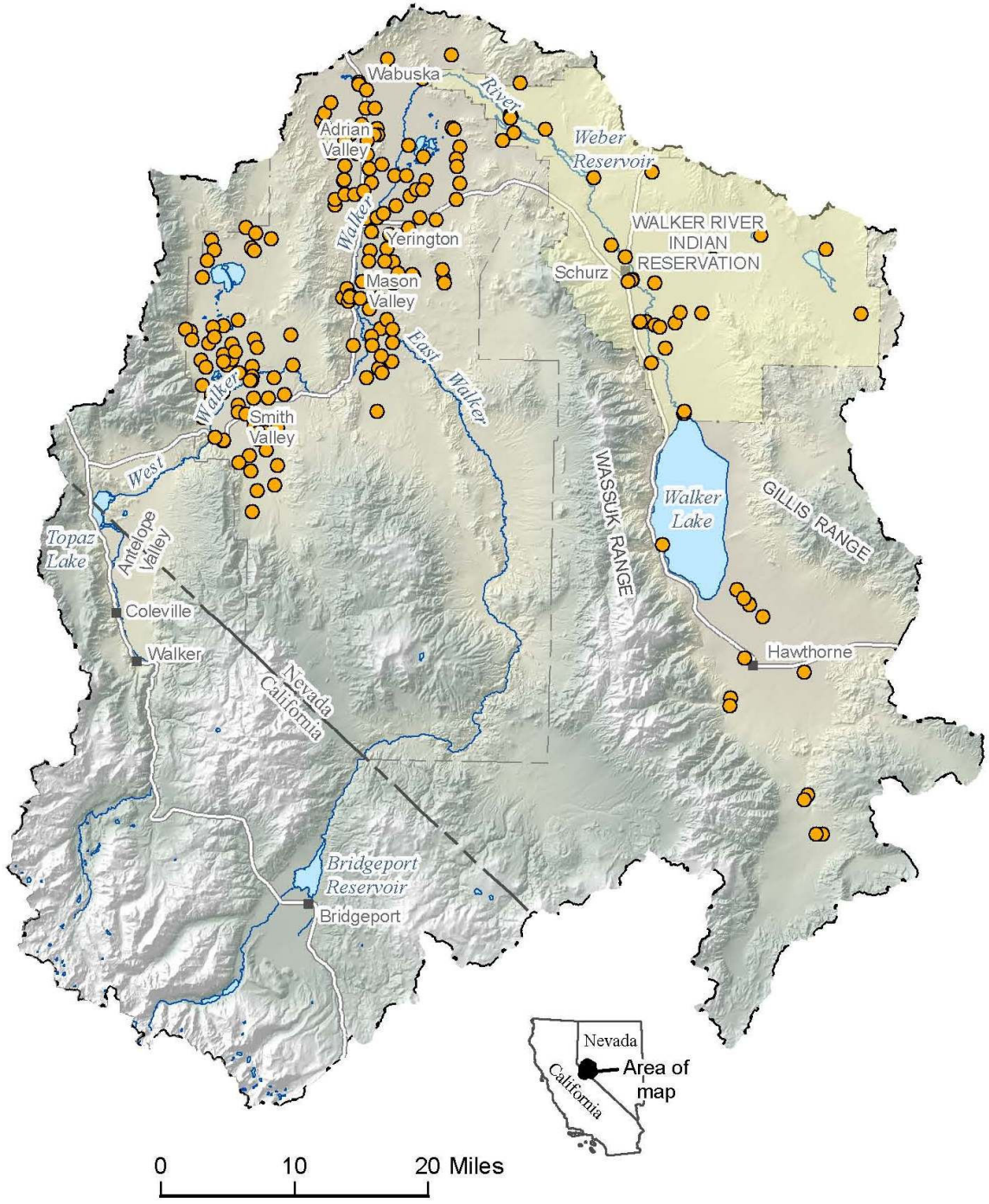
USGS

Stream Salinity
Smith Valley to Walker Lake

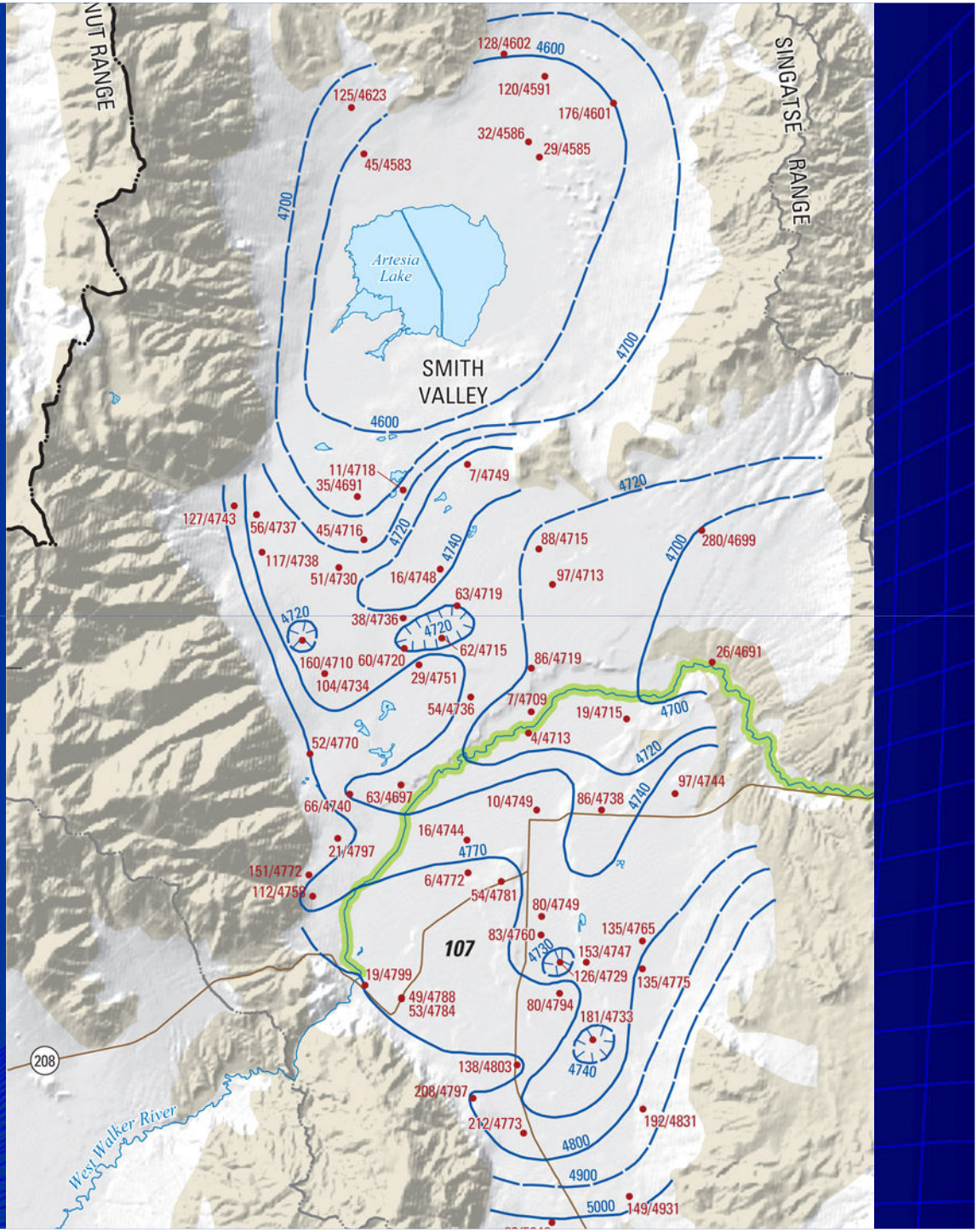


USGS

Wells

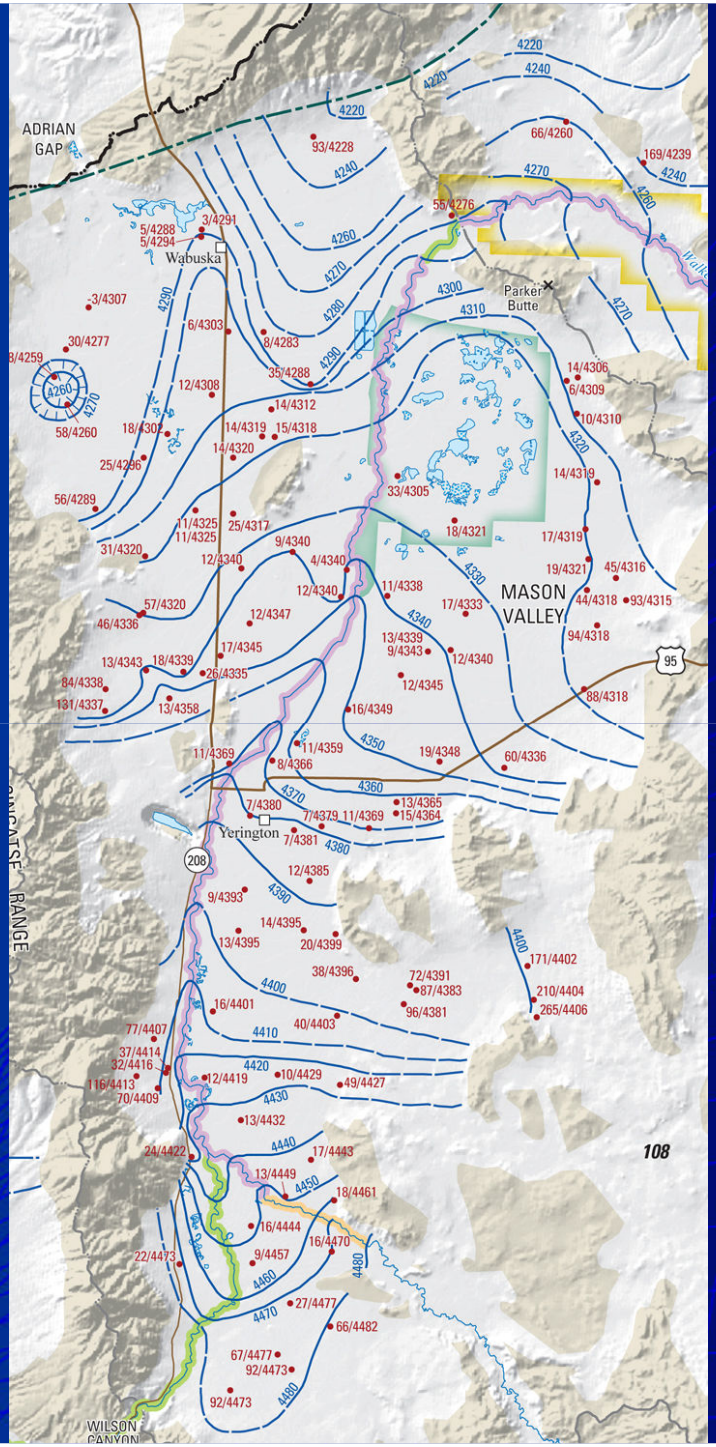

Wabuska
Adrian Valley
Walker River
Weber Reservoir
Yerington
Walker
Mason Valley
WALKER RIVER INDIAN RESERVATION
Schurz
East Walker
Smith Valley
West Walker
WASSUK RANGE
Walker Lake
GILLIS RANGE
Topaz Lake
Antelope Valley
Coleville
Walker
Hawthorne
Nevada
California
Bridgeport Reservoir
Bridgeport
Nevada
California
Area of map
0
10
20 Miles

Smith Valley Groundwater



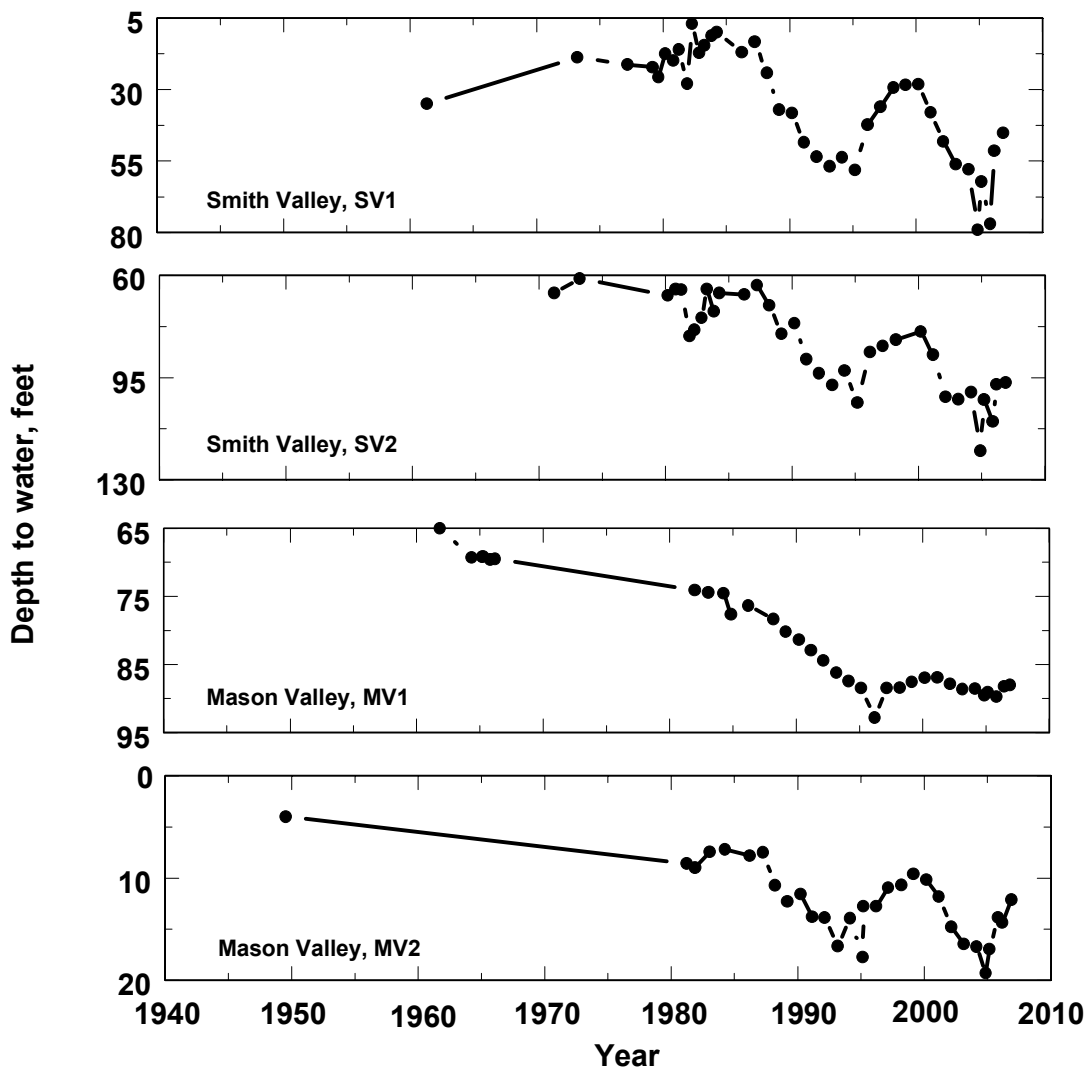
USGS

Mason Valley Groundwater



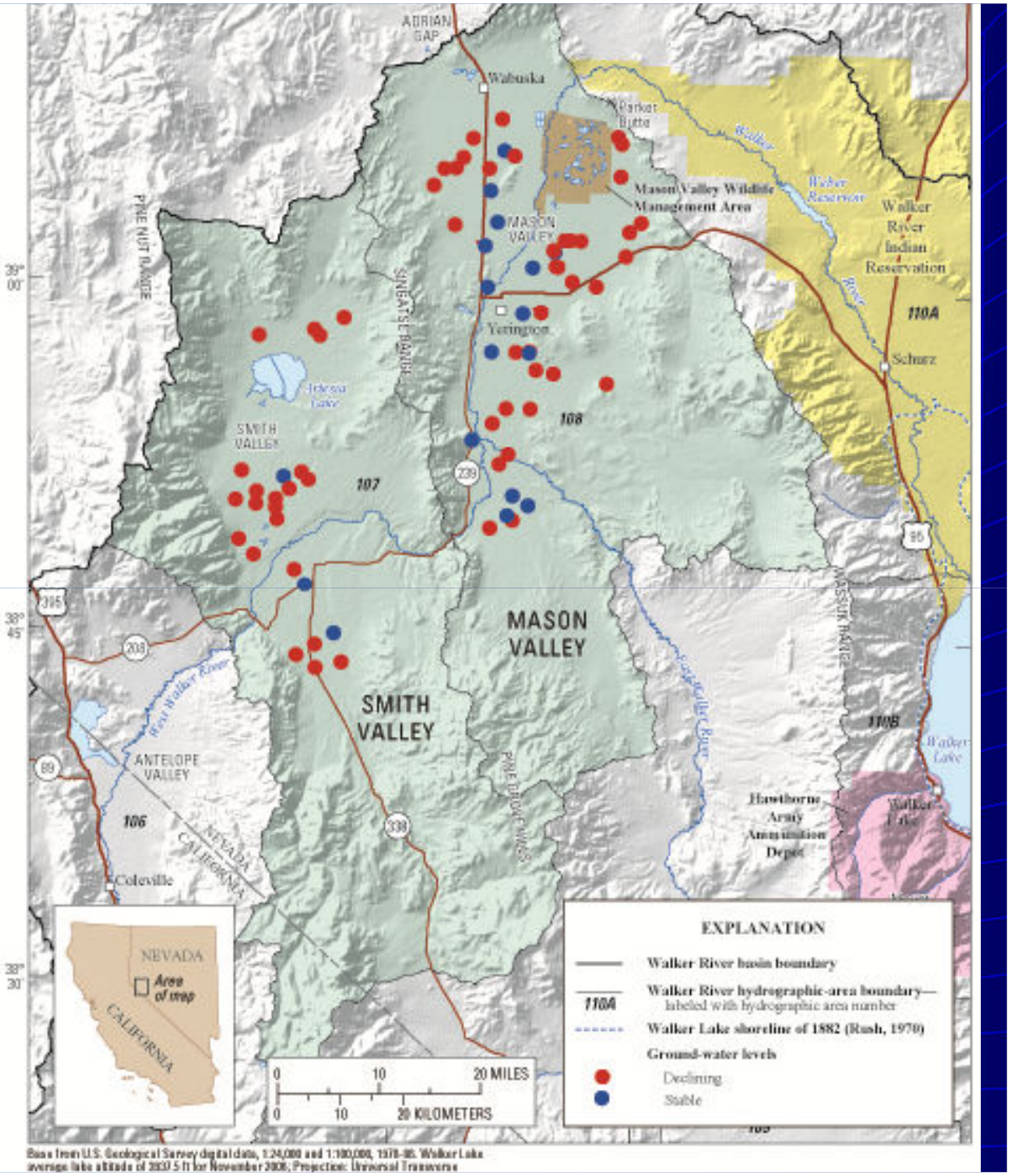
USGS

Declining Water Levels
Smith and Mason Valleys



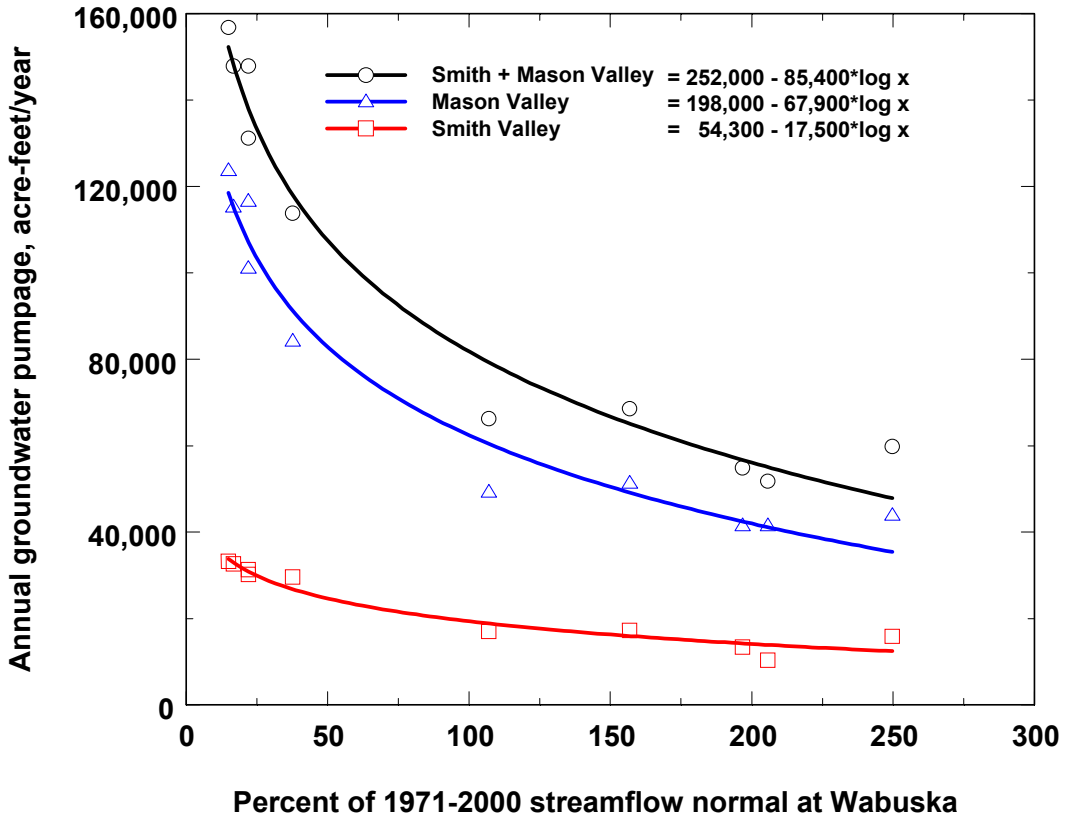
USGS

Mostly Declining Water Levels



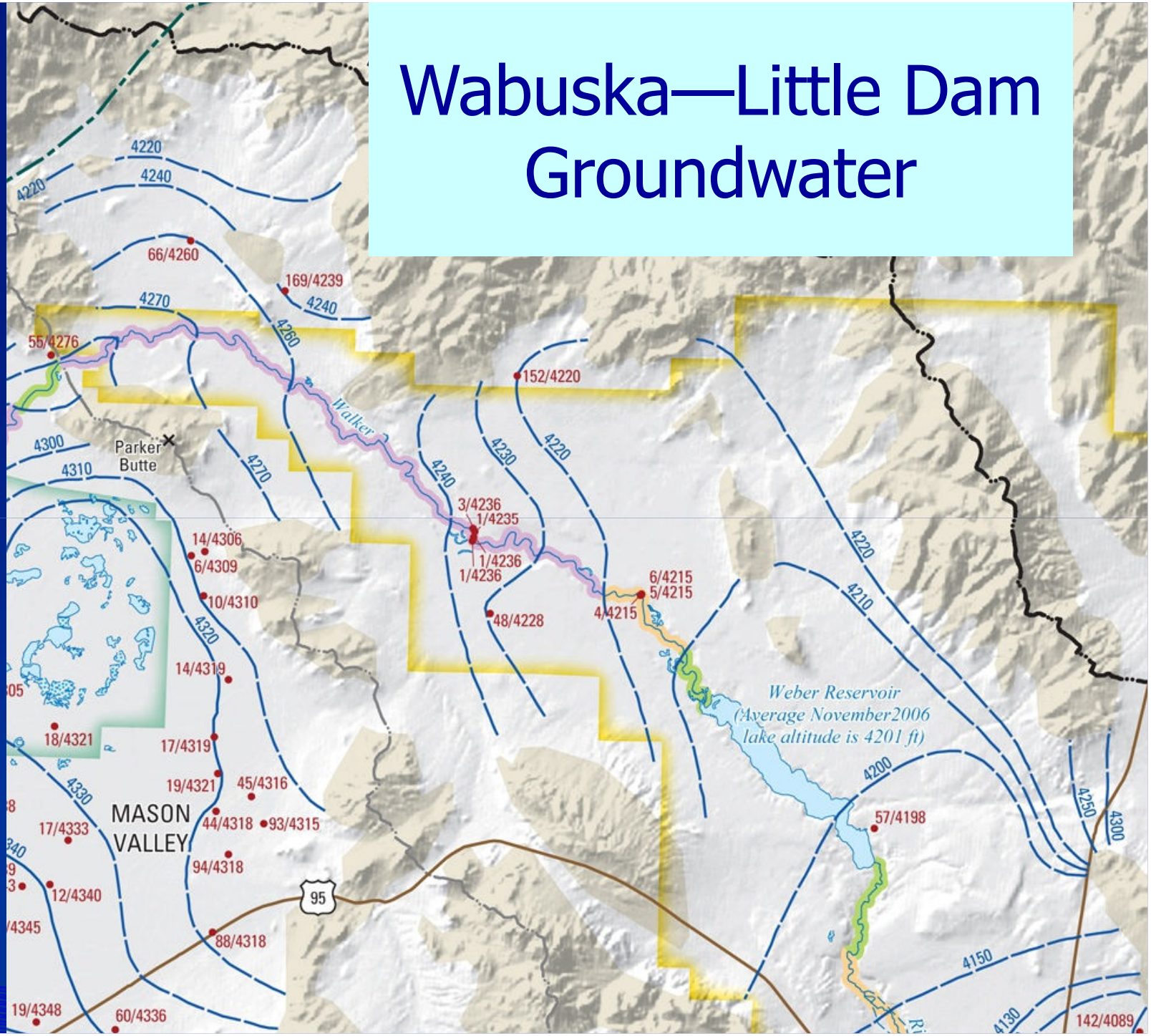
USGS

Pumpage Increases in Dry Years
Smith and Mason Valleys



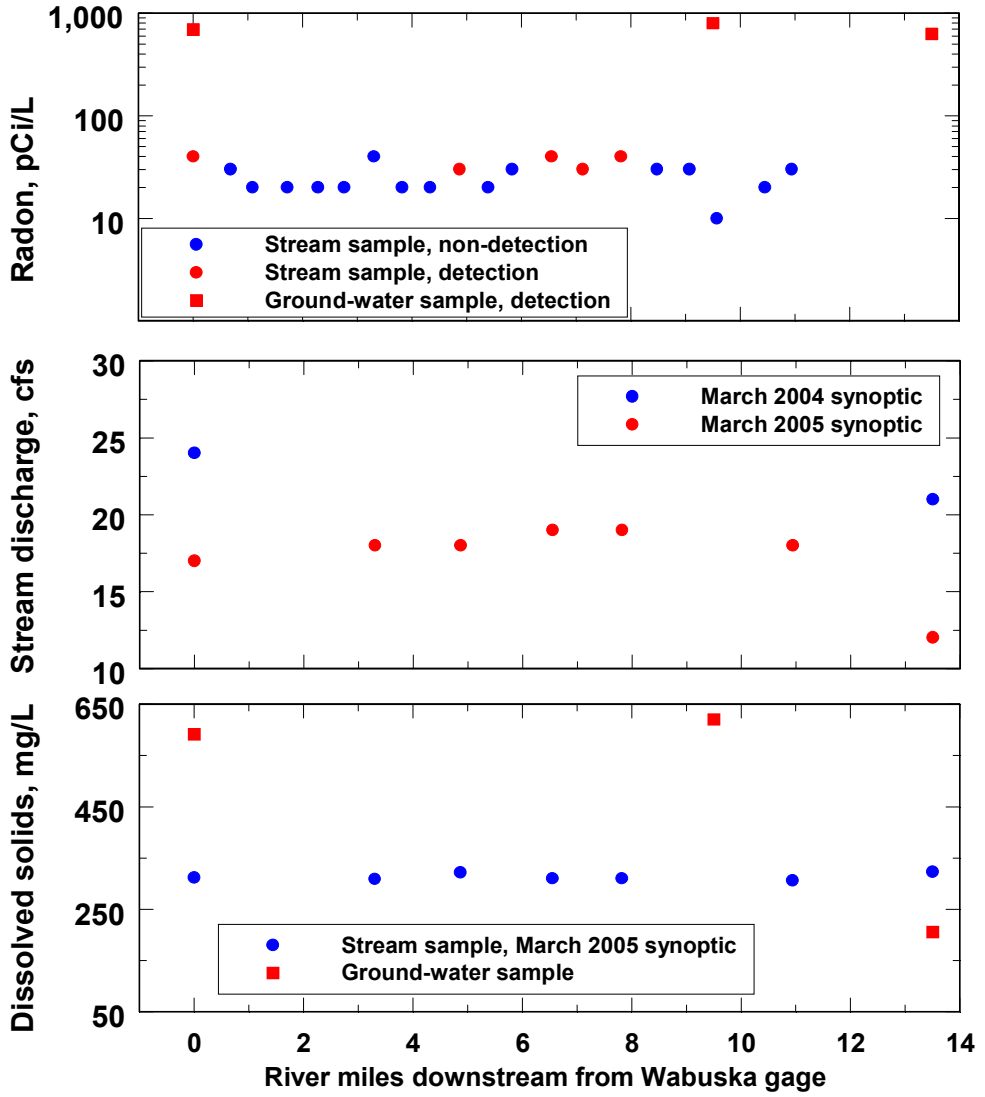
USGS

Wabuska—Little Dam Groundwater



USGS

Wabuska—Cow Camp
Little Stream Infiltration



USGS

Lake Sediments = Little Infiltration

USGS

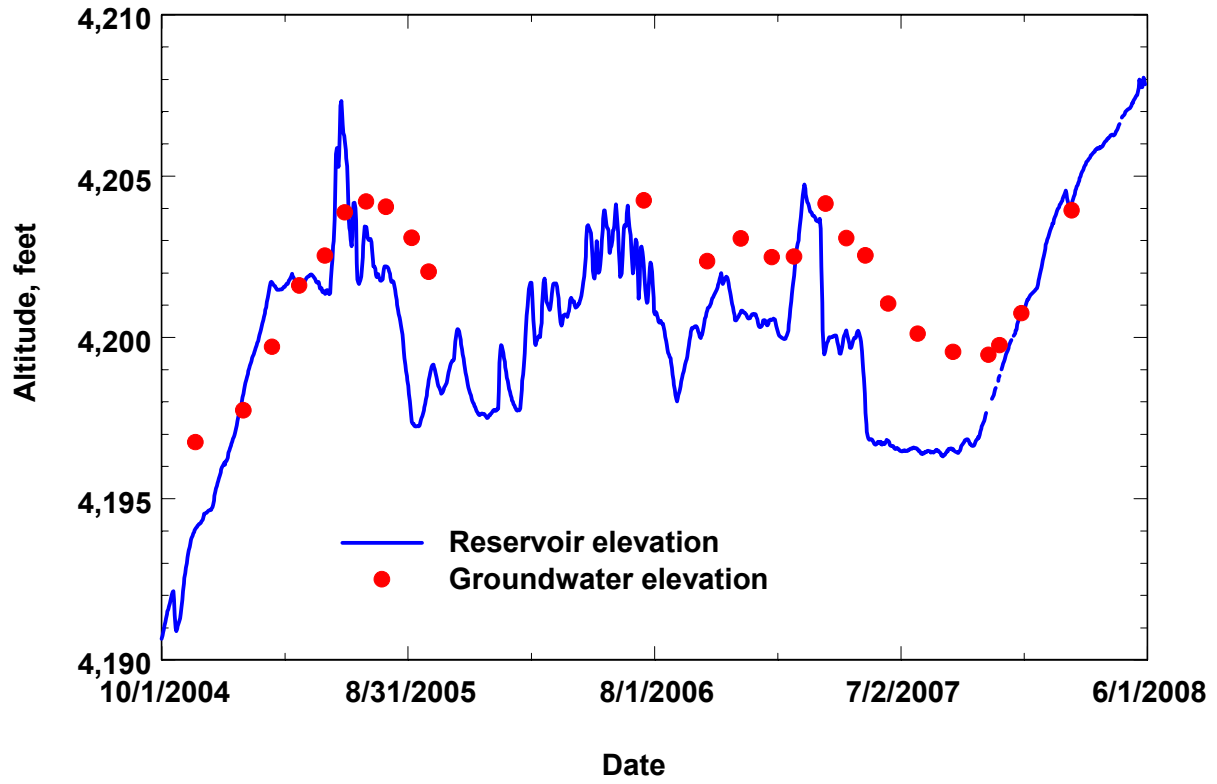
Wabuska—Weber Reach

USGS

Cow Camp Groundwater Seep

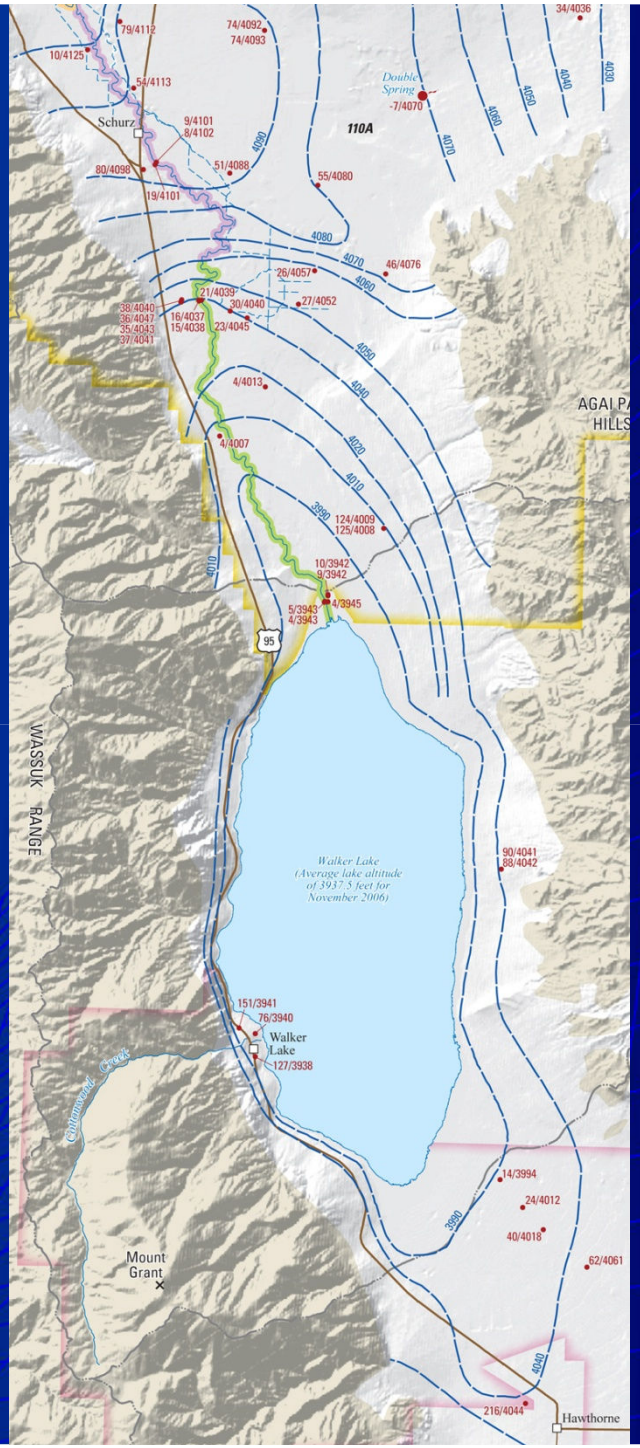
USGS

Groundwater at Weber Reservoir

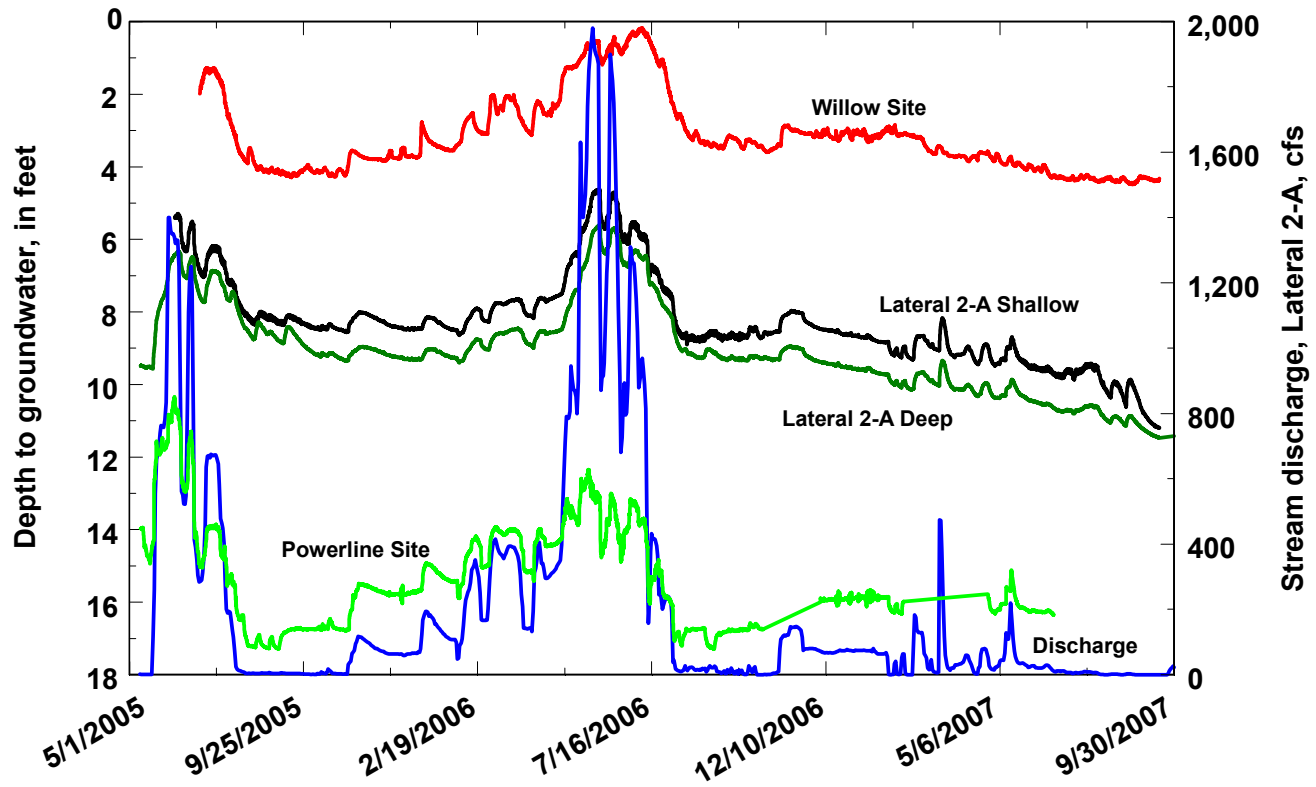


USGS

Little Dam—Walker Lake Groundwater

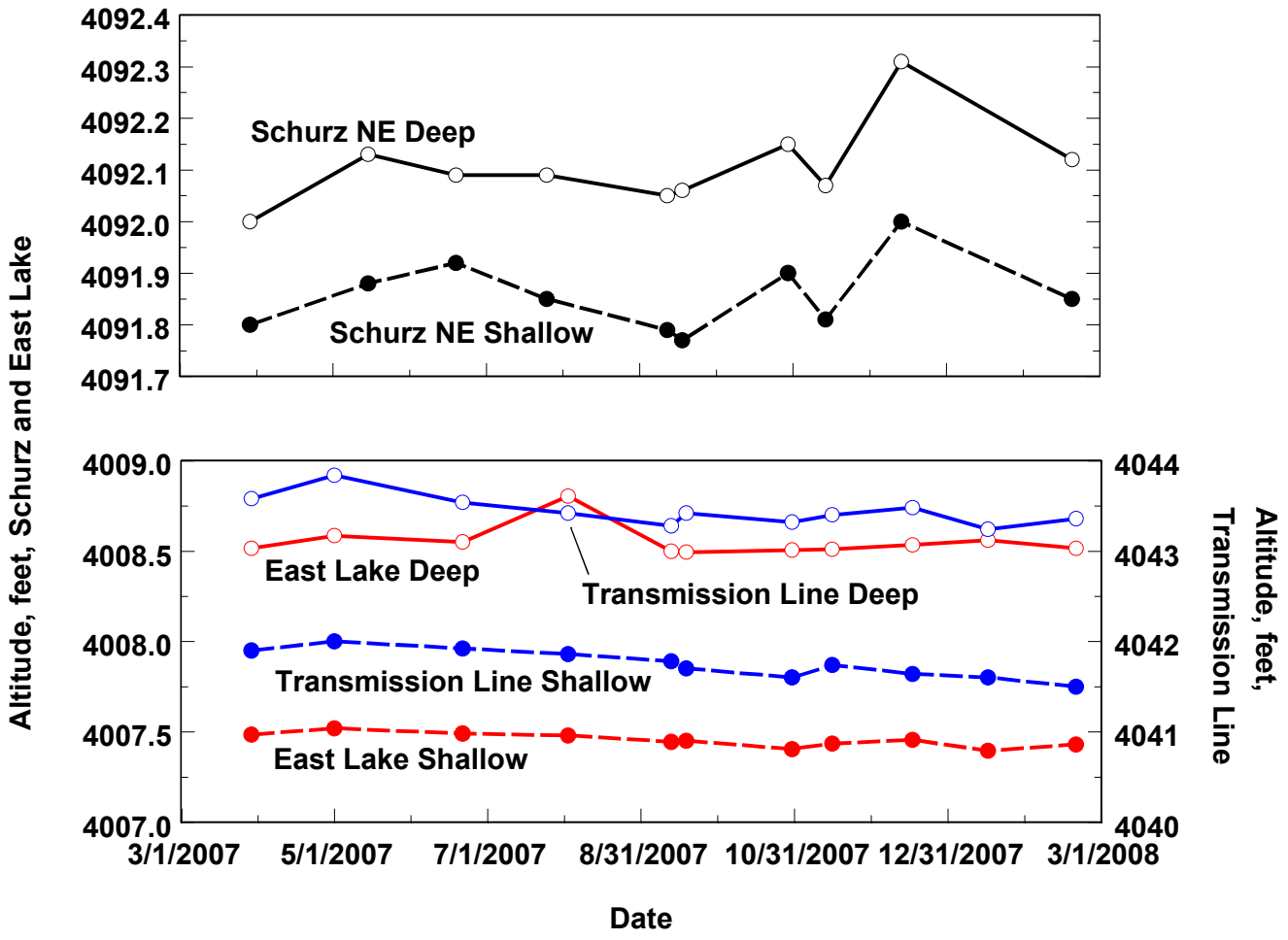


Groundwater and Streamflow



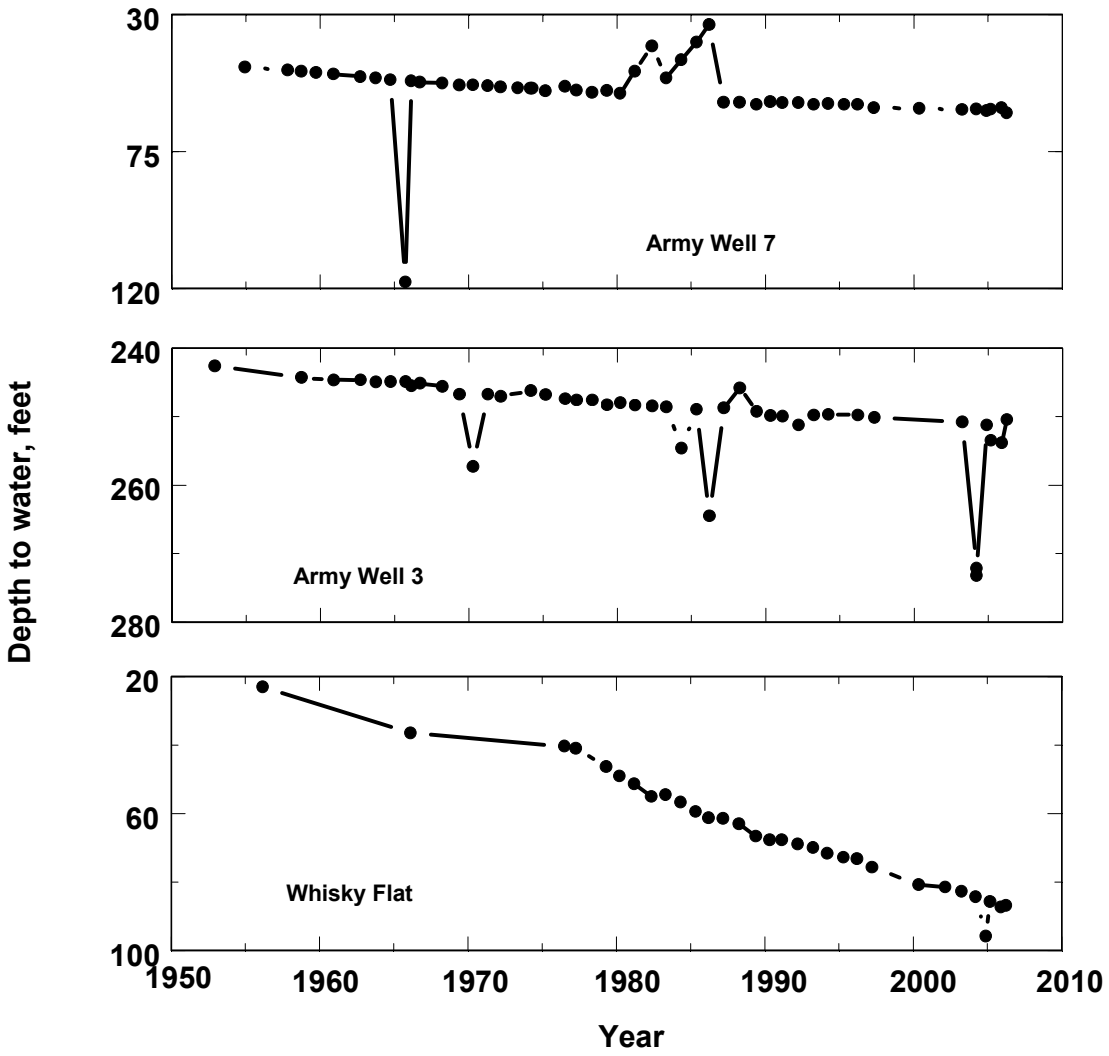
USGS

Upward Gradient
Double Spring and Lake



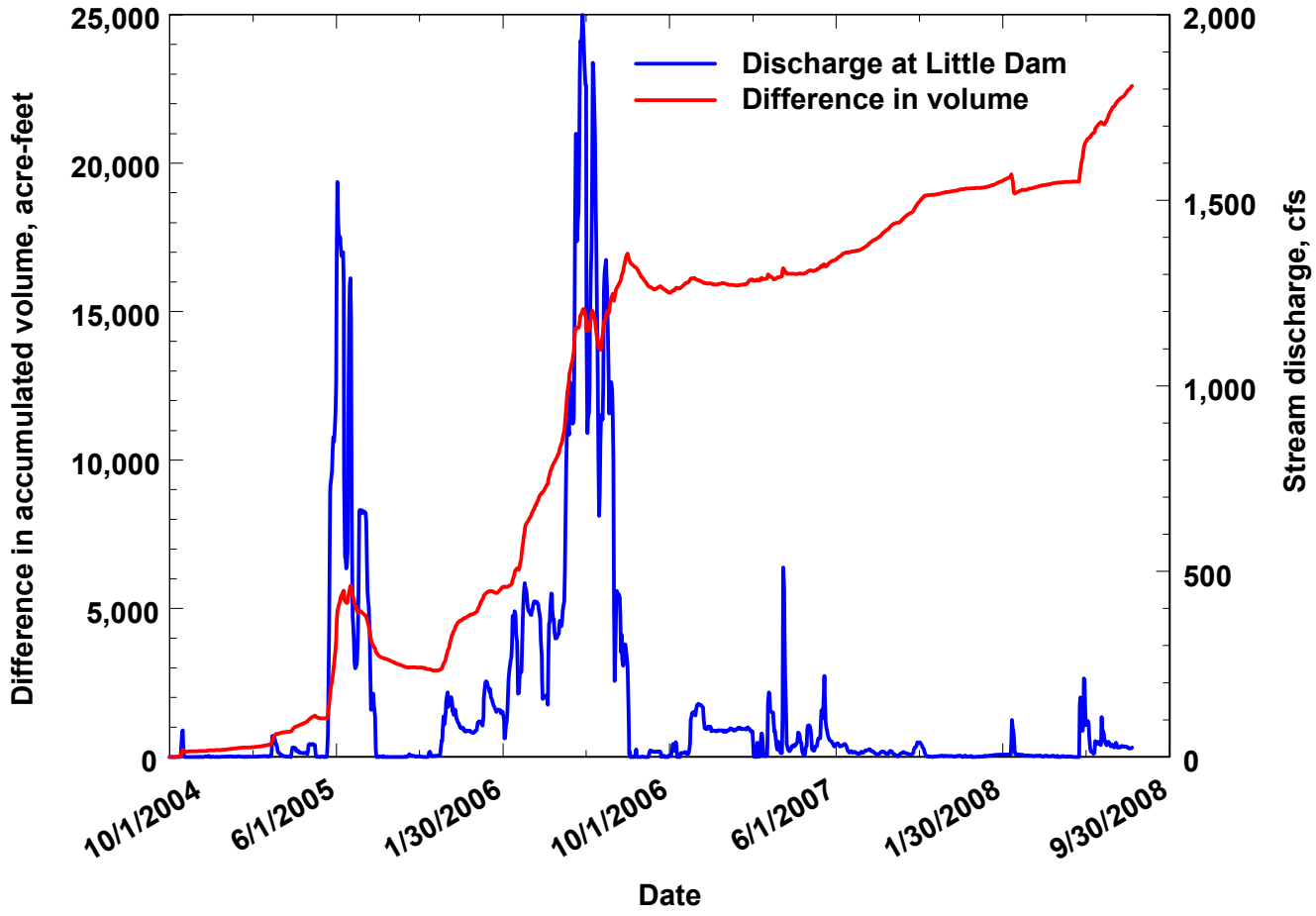
USGS

Declining Water Levels
Hawthorne Area



USGS

Little Dam—Lateral 2-A
Most Stream Infiltration

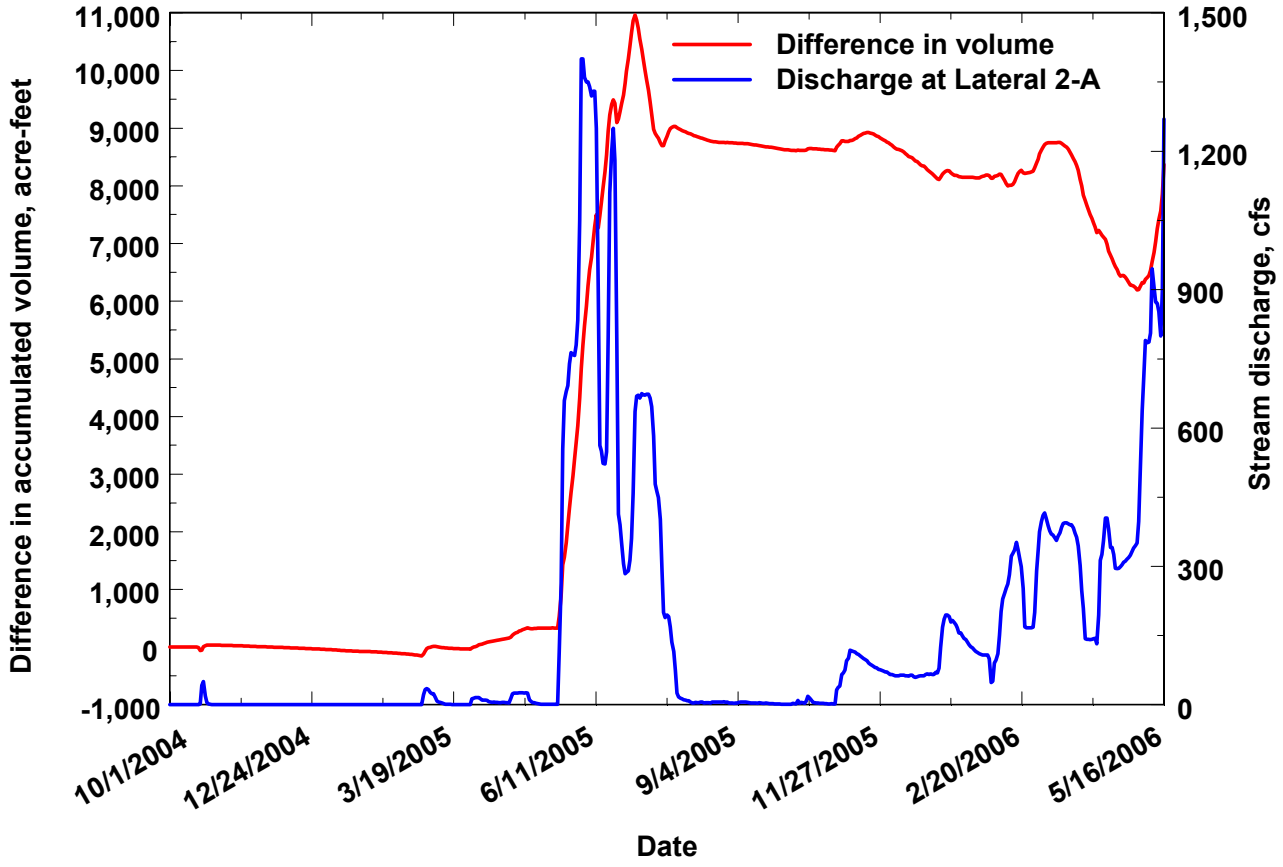


USGS

Fluvial and Lake Sediments Schurz Area

USGS

Lateral 2-A—Near Mouth
Stream Infiltration Limited

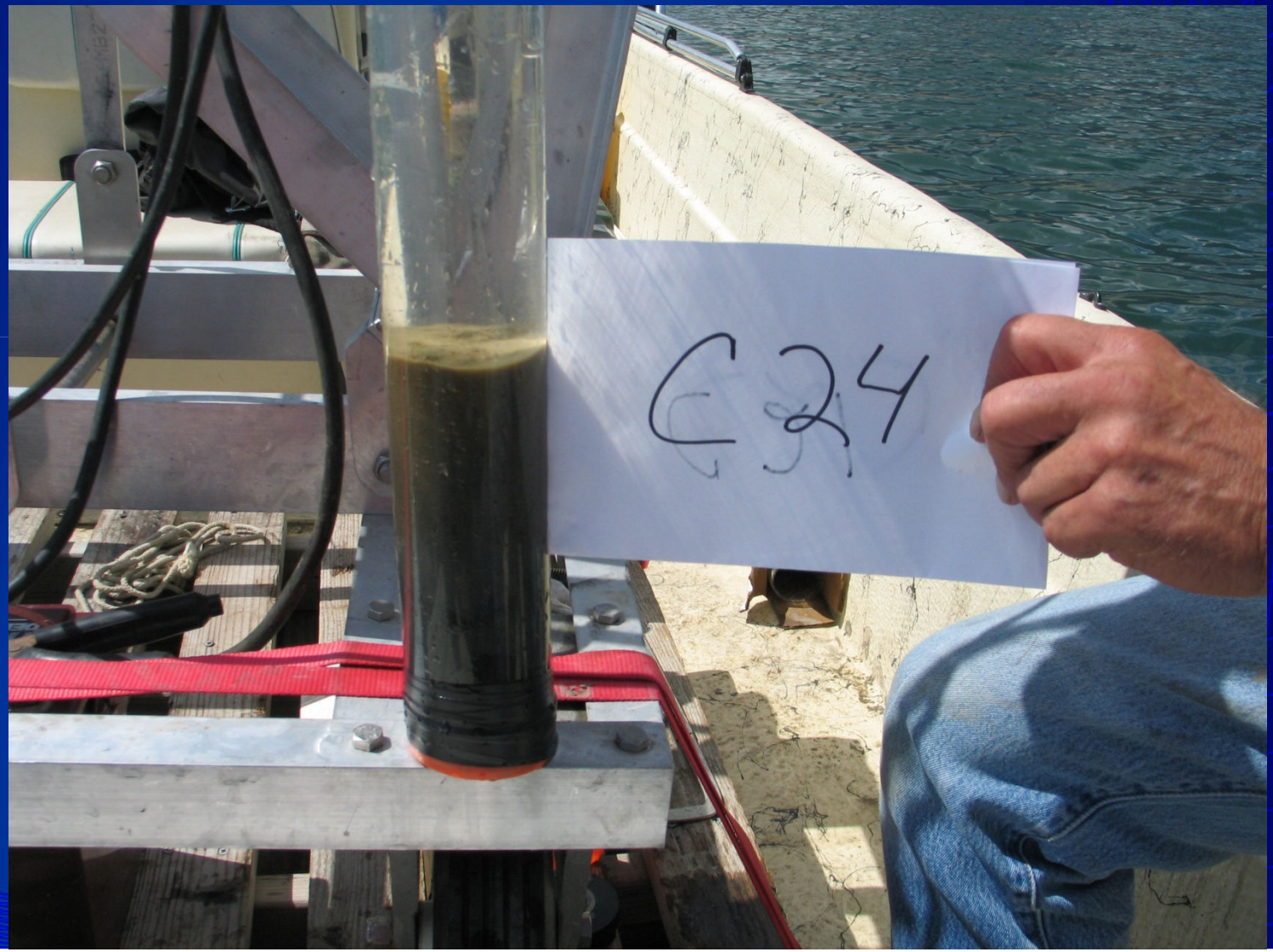


USGS

In Search of GW Discharge

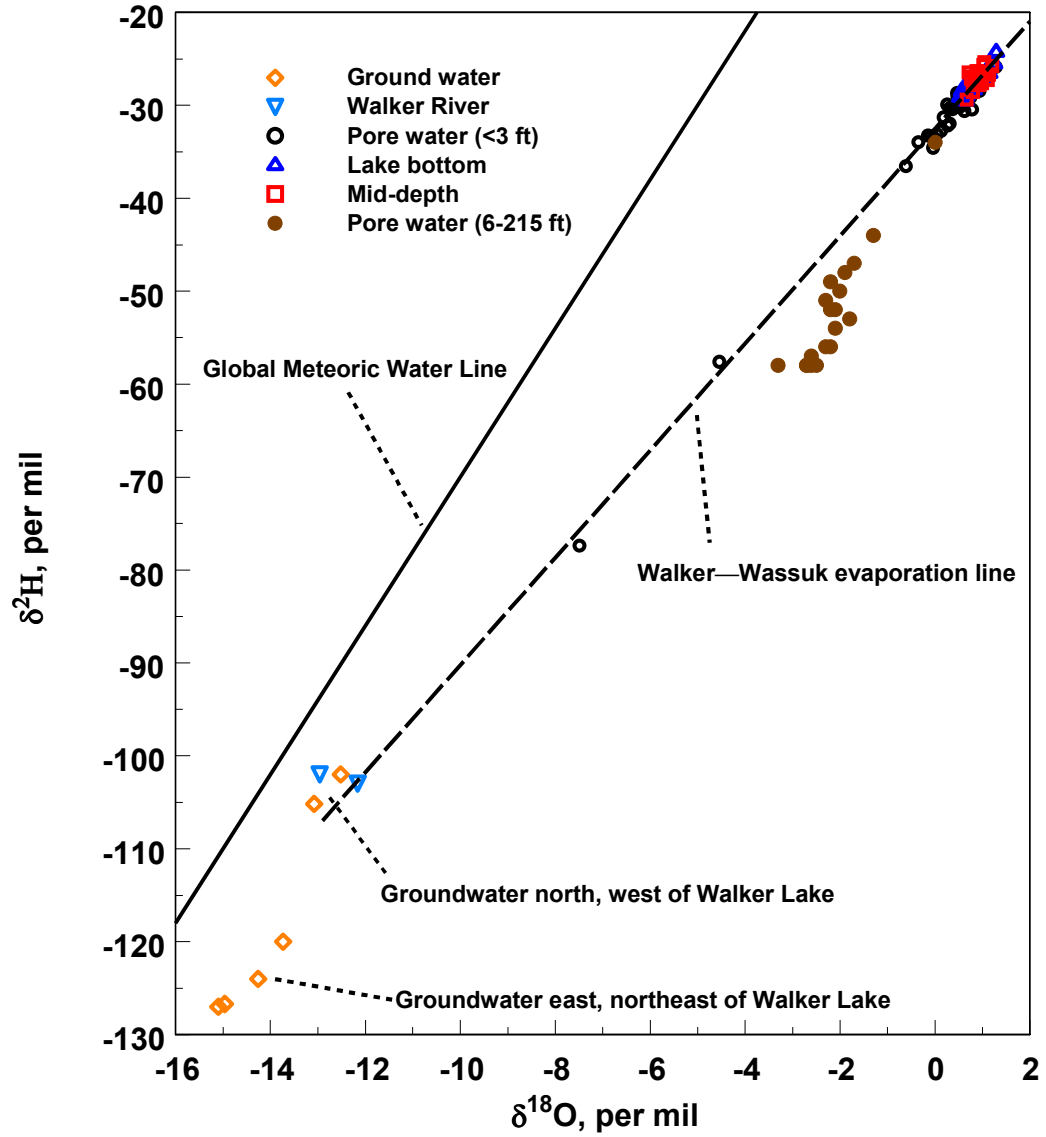
USGS

Stable Isotopes in Core and Water-Column Samples



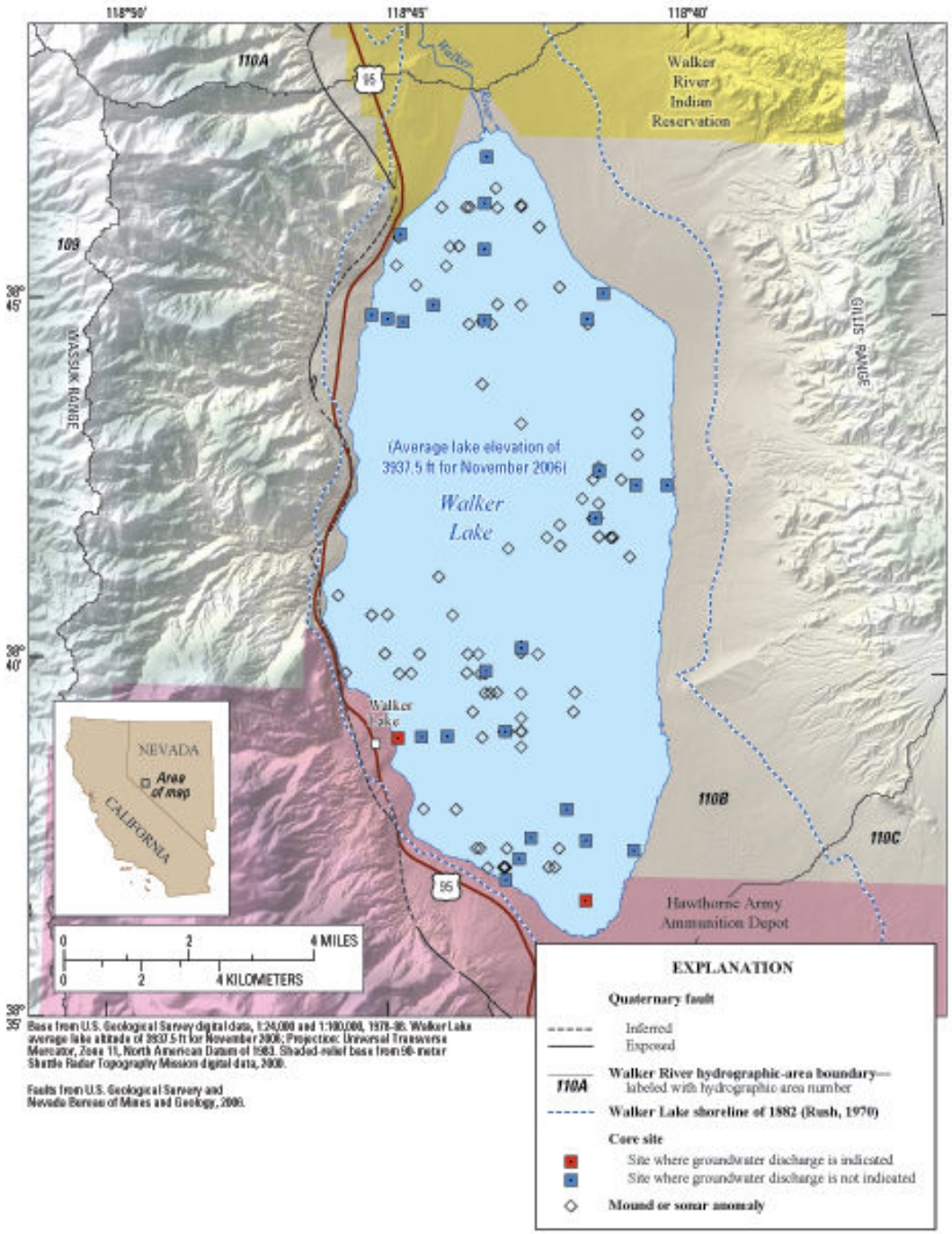
USGS

Little GW Discharge to Lake

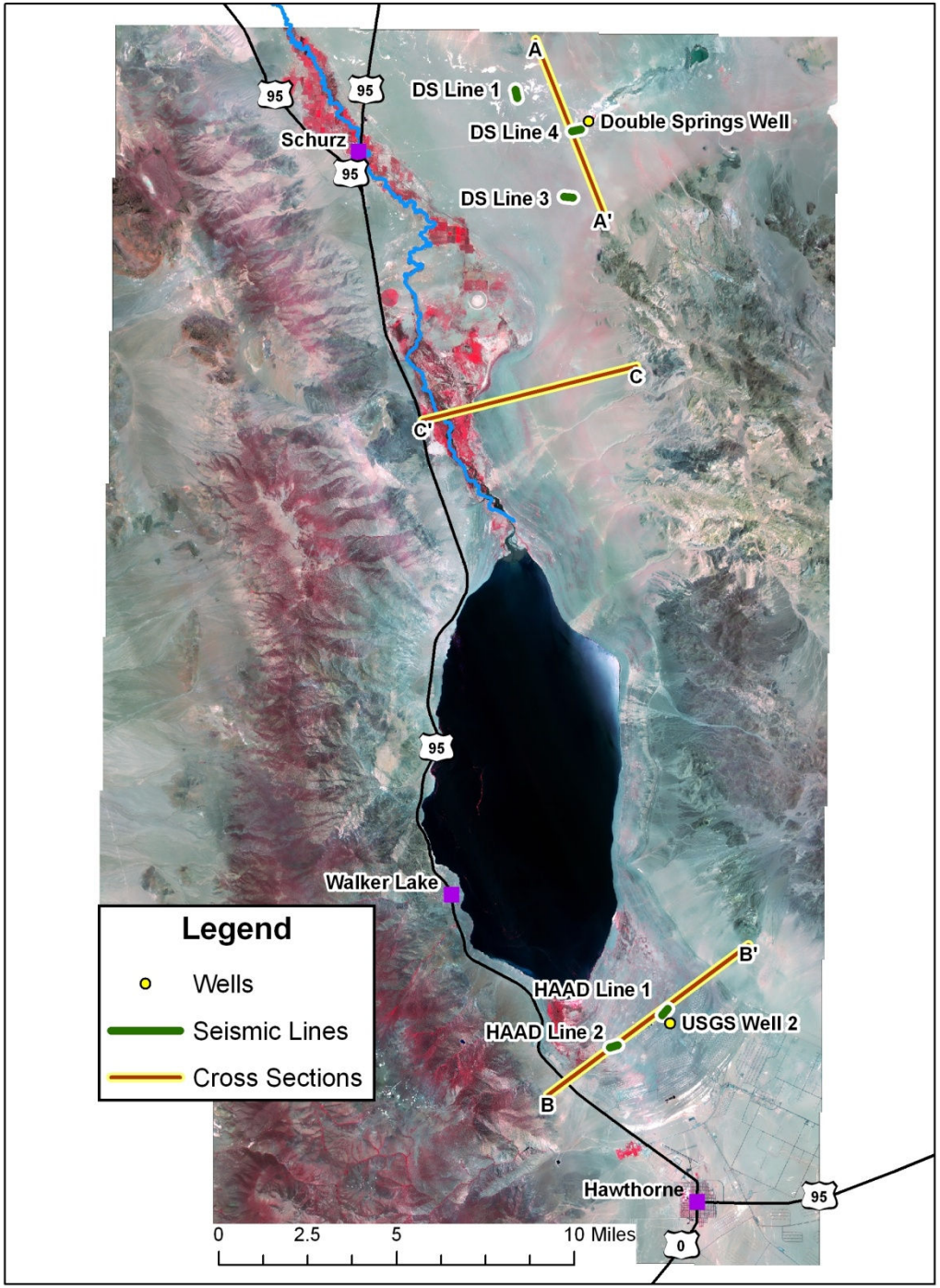


USGS

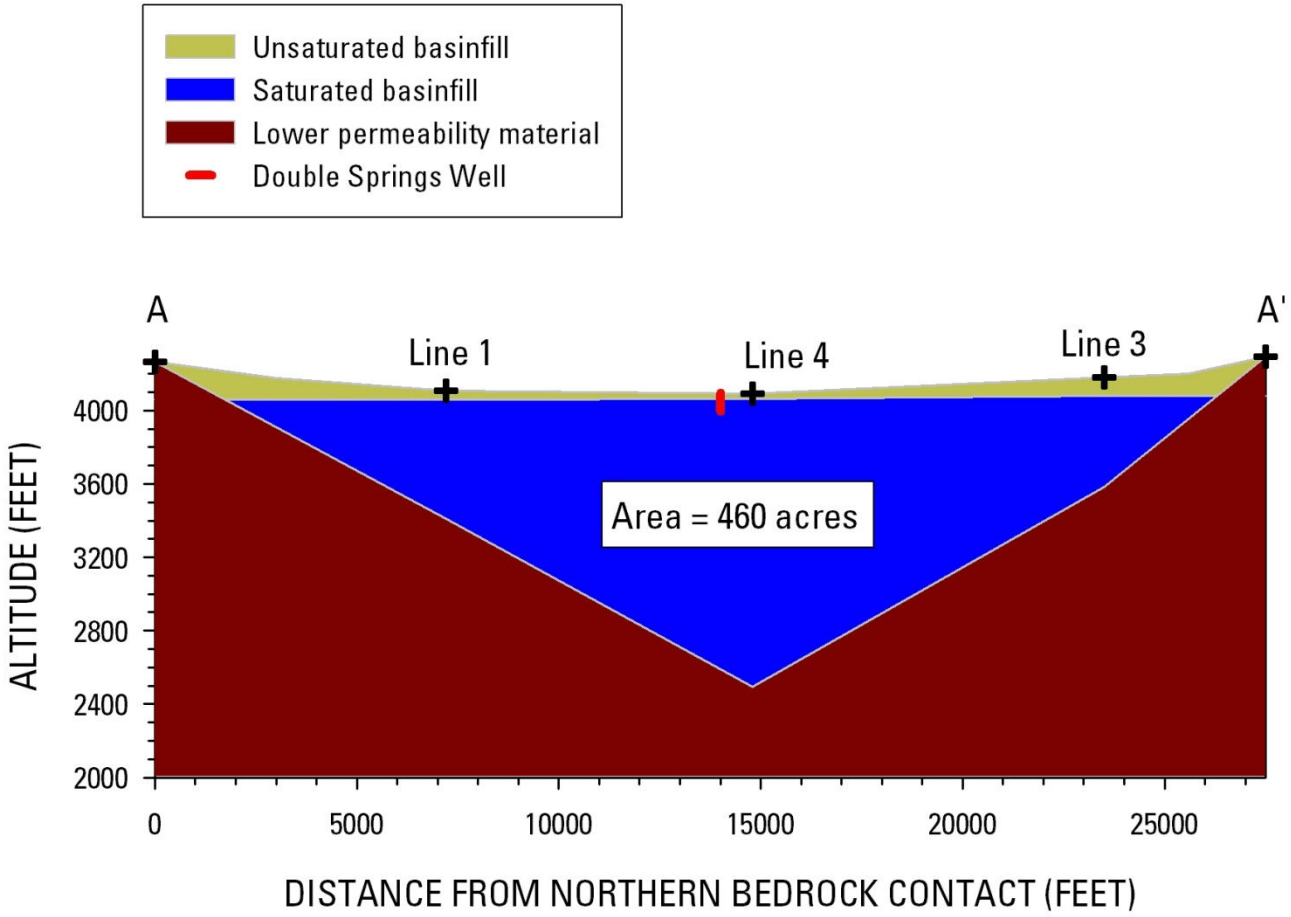
Sample Sites



Cross Sections

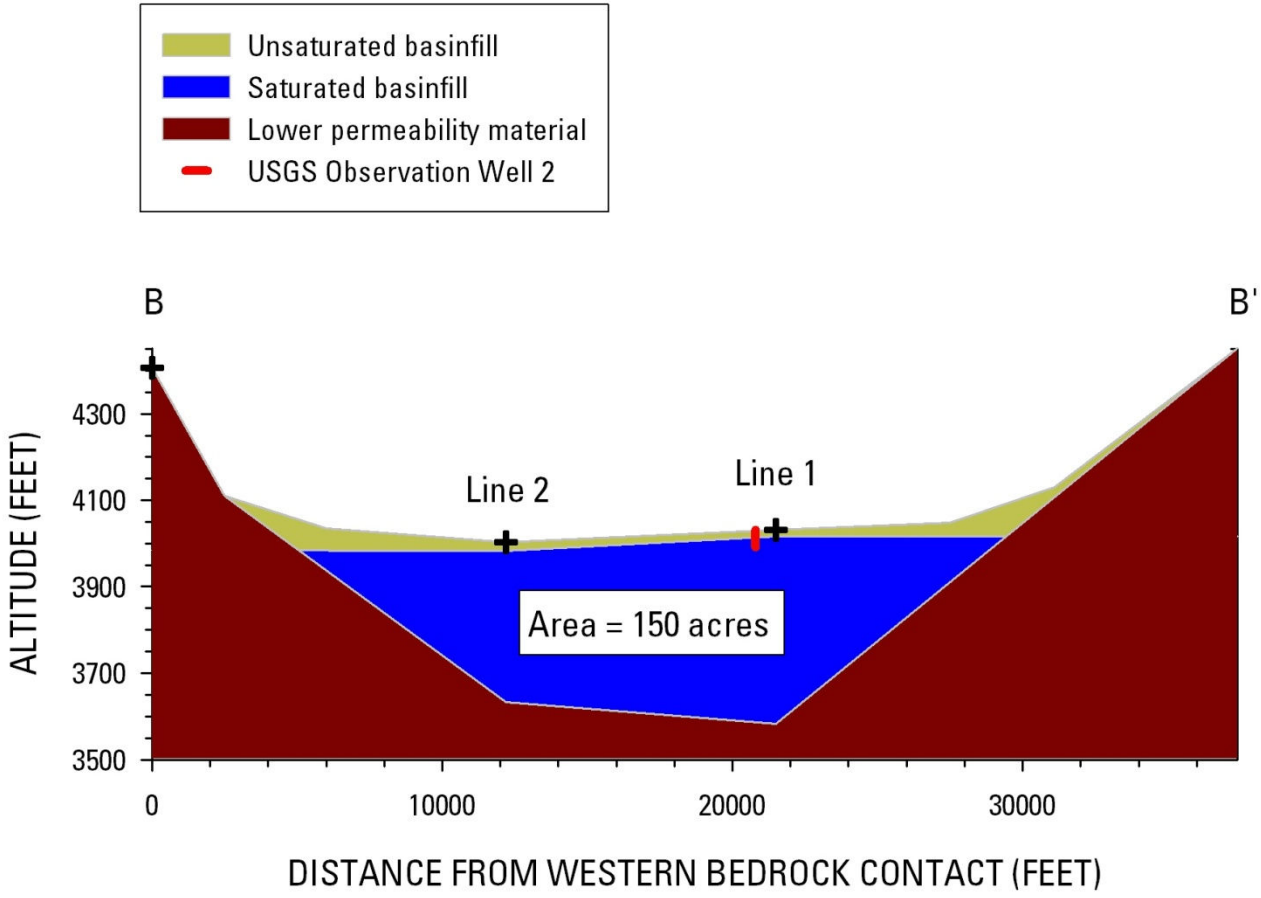


Double Spring



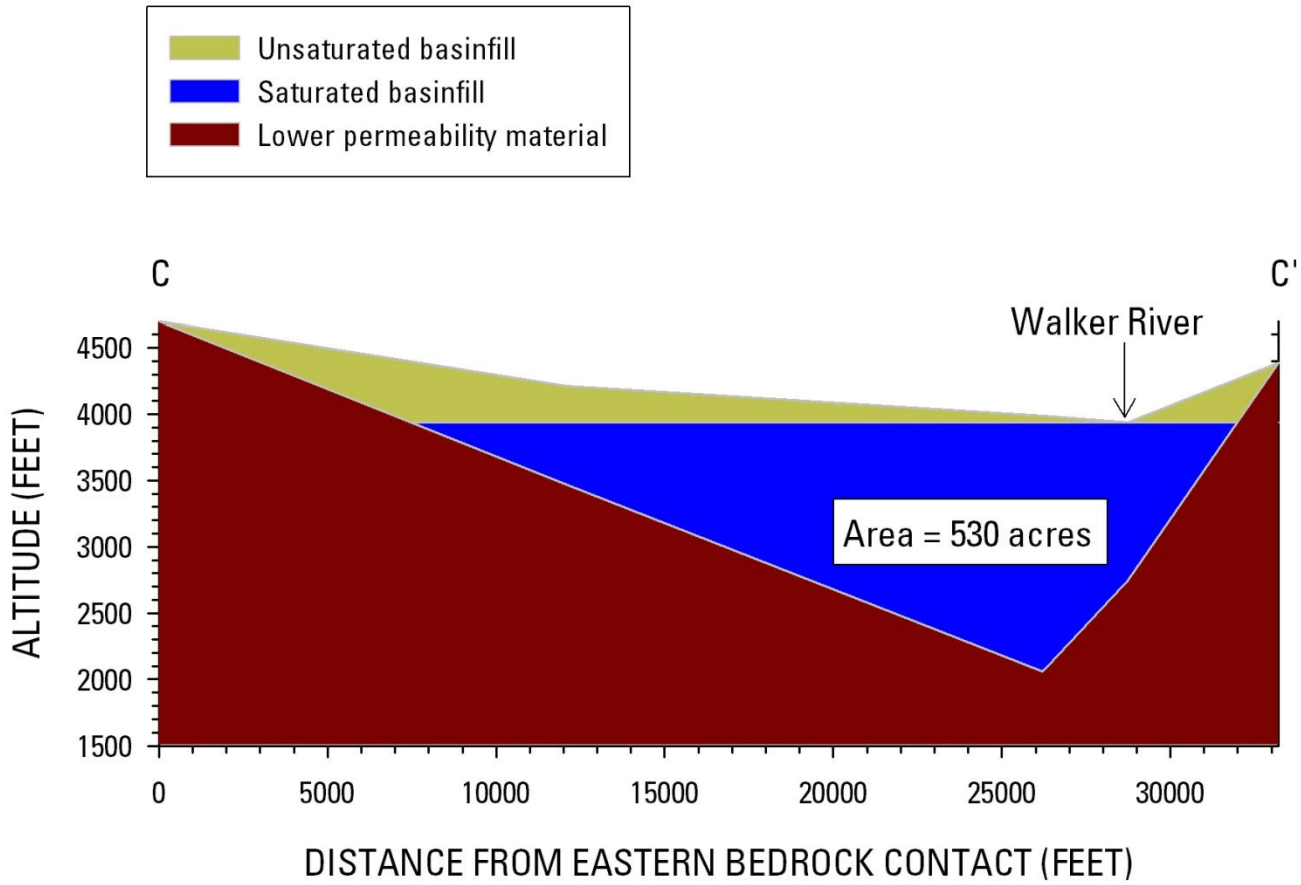
USGS

Southern Lake



USGS

Northern Lake



USGS

Subsurface Flow Estimates

- Average hydraulic conductivity (K)
  - near-stream aquifer 70 ft/d
  - distant aquifer 10 ft/d
- Darcy's Law

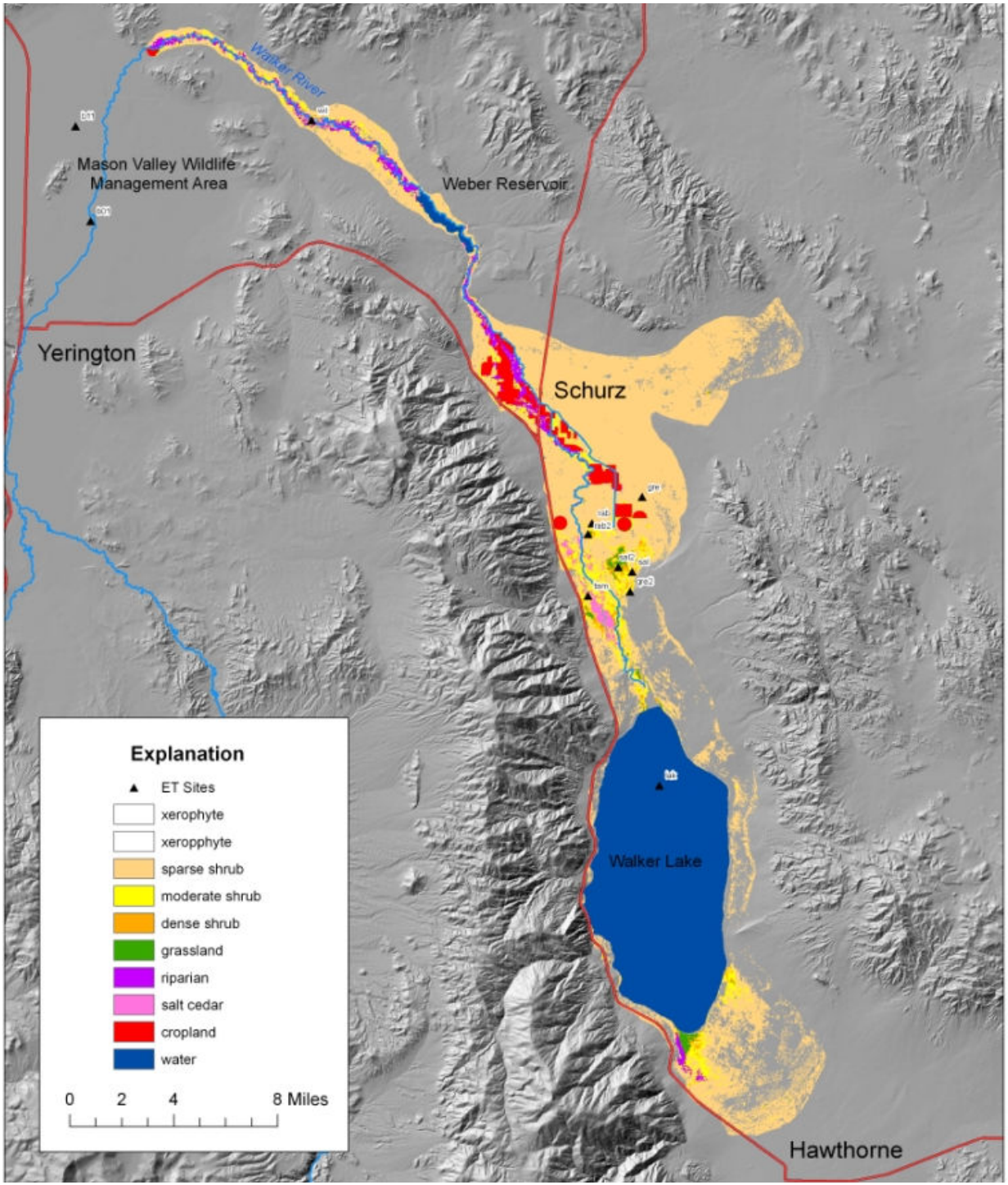
  Q = KAI

  5,000 AF/yr north of lake

  2,200 AF/yr south of lake

  2,700 AF/yr Double Spring

USGS

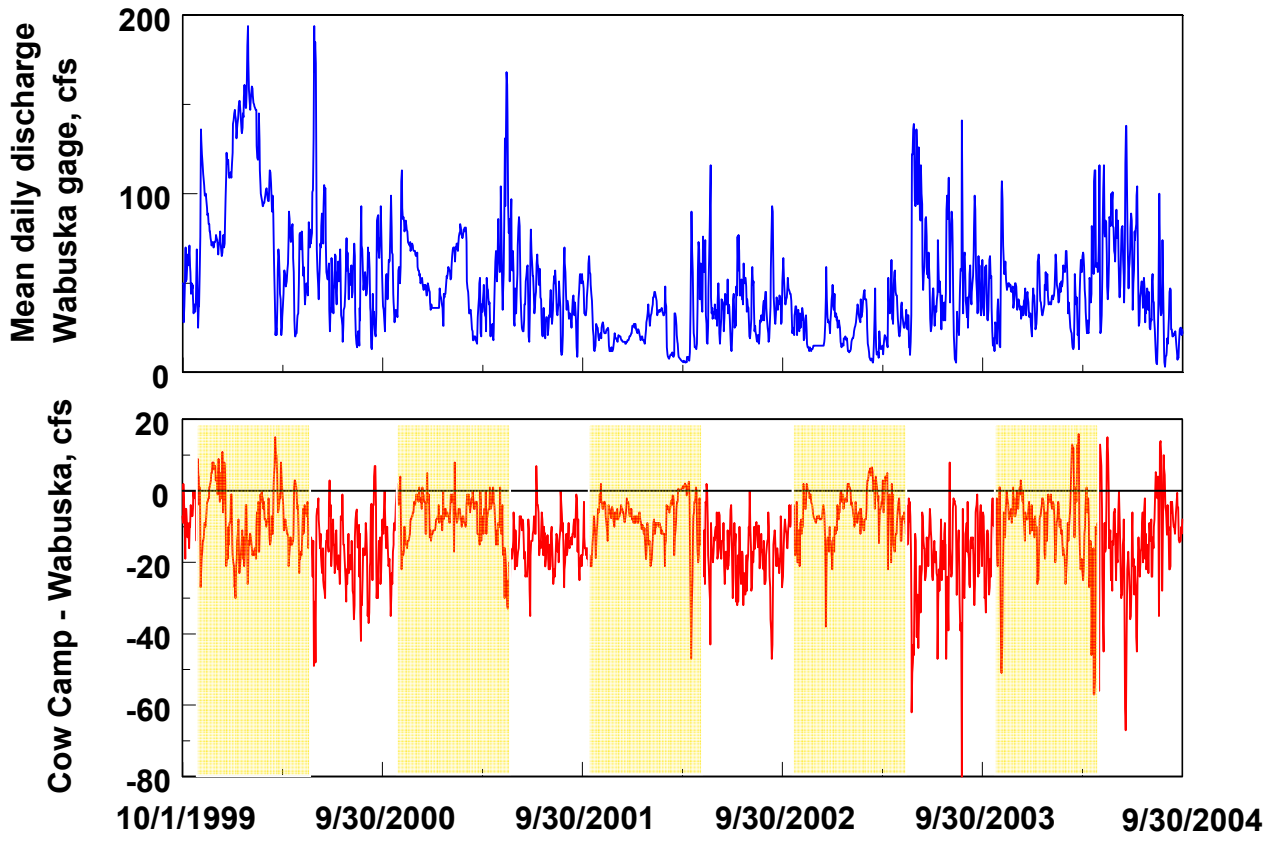

Walker River
Mason Valley Wildlife Management Area
Weber Reservoir
Yerington
Schurz
Walker Lake
Hawthorne
Explanation
ET Sites
xerophyte
xeropphyte
sparse shrub
moderate shrub
dense shrub
grassland
riparian
salt cedar
cropland
water
0 2 4 8 Miles

ET Results
Lower Walker River Basin

- Total Net ET 169,000 AF/yr
  (net is in excess of precipitation)
  - 84% Walker Lake
  - 7% riparian areas
  - 4% shrubs, grassland, turf
  - 2% agriculture
  - 2% Weber Reservoir
  - 1% saltcedar (after beetles)
    - Beetles reduced saltcedar ET by 50%

USGS

Riparian ET from Streamflow



Summary of Hydrology

- 2/3 of streamflow during spring runoff
- 2/3 of years below, 1/3 above average streamflow
- Subsurface outflow through Adrian Valley, Wabuska lineament, Double Spring
- Gaining reaches
  a) Smith Valley
  b) Above Weber—Little Dam
  c) Below Lateral 2-A—Walker Lake

USGS

Summary of Hydrology

- Losing reaches
  a) Mason Valley
  b) Wabuska—Above Weber (little infiltration)
  c) Little Dam—below Lateral 2-A
- Little GW discharge to lake
- Lower Basin ET
  1) Lake (>>)
  2) Native vegetation
  3) Ag ET
  4) Little ET by saltcedar

USGS

1971-2000 Average Streamflow (AF/yr)

Headwater Inflows	
West Walker River	223,000
East Walker River	145,000
Sweetwater Mtns	17,000
East Fork	2,000
Total inflow	387,000
Lower Basin Streamflow	
Wabuska gage	138,000
Lateral 2-A gage	108,000
Walker Lake	105,000

USGS

1971-2000 Surface-Water Budgets

Component	Antelope Valley	Smith Valley	Bridgeport Valley	East Fork	Mason Valley
Inflow	221,000	201,000	142,000	131,000	269,000
Reservoir precipitation	2,000	---	3,000	---	---
Total inflow	223,000	201,000	145,000	131,000	269,000
Reservoir evaporation	8,000	---	9,000	---	---
Diversion	22,000	54,000	17,000	6,000	117,000
Infiltration, riparian ET	TSTE	TSTE	TSTE	3,000	14,000
Outflow	193,000	147,000	119,000	122,000	138,000

USGS

Application Rates

Diversion = Inflow – outflow – evaporation

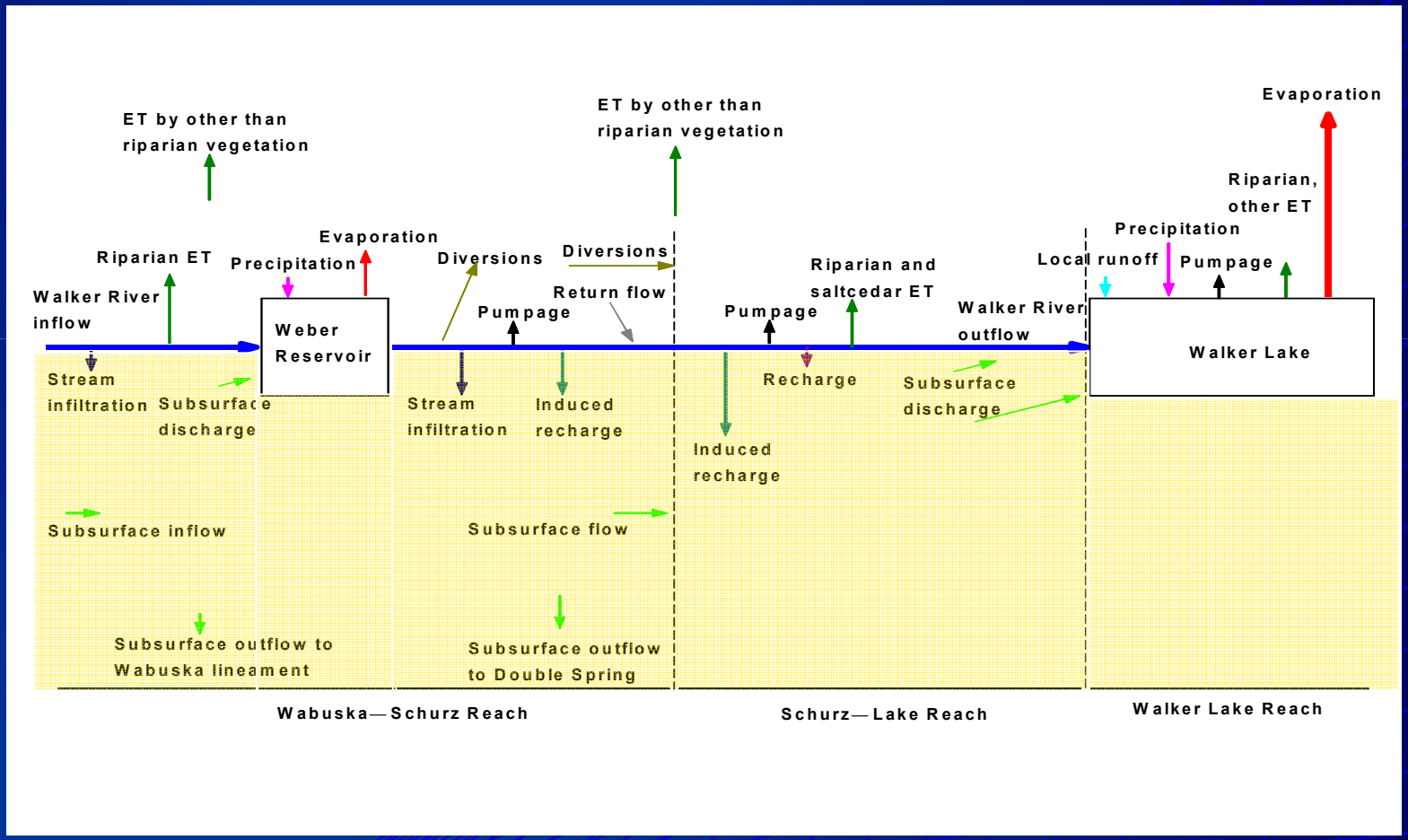
Diversion rate = Diversion/irrigated acres

Application rate = Diversion + Precipitation rates

Area	Rate (ft/yr)
Antelope Valley	3.8
Smith Valley	3.8
Bridgeport	2.4
East Walker	4.8
Mason Valley	4.8
Reservation	7.0

USGS

Wabuska—Lake Water Budget



Wabuska—Schurz Water Budget

Inflow	
Walker River	138,000
Weber precipitation	200
Subsurface inflow	800
Total inflow (rounded)	139,000
Outflow	
Walker River	108,000
Weber evaporation	2,200
Net natural ET	12,500
Agricultural ET	2,300
Canal 2 diversion	9,300
Pumpage	200
Subsurface outflow	5,500
Total outflow (rounded)	140,000
Imbalance	-1,000
Percent	-1%

USGS

Wabuska—Schurz Groundwater Budget

Inflow	
Subsurface inflow	800
Net infiltration	11,800
Induced recharge	2,800
Total inflow (rounded)	15,000
Outflow	
Net natural ET	10,300
Pumpage	200
Lineament outflow	100
Double Spring outflow	2,700
Subsurface towards lake	2,700
Total outflow (rounded)	16,000
Imbalance	1,000
Percent	7%

USGS

Schurz—Lake Water Budget

Inflow	
Walker River	108,000
Canal 2 diversion	9,300
Recharge	500
Subsurface inflow	2,700
Total inflow (rounded)	120,000
Outflow	
Walker River	105,000
Net natural ET	7,400
Net agricultural ET	1,700
Subsurface to lake	5,000
Total outflow (rounded)	119,000
Imbalance	1,000
Percent	1%

USGS

Schurz—Lake Groundwater Budget

Inflow	
Subsurface inflow	2,700
Stream infiltration	3,000
Natural recharge	500
Induced recharge	8,100
Total inflow (rounded)	14,000
Outflow	
Riparian ET	1,000
Saltcedar ET	1,800
Phreatophytic ET	4,600
Agricultural ET	500
Discharge to lake	5,000
Total outflow (rounded)	13,000
Imbalance	1,000
Percent	7%

USGS

Walker Lake Water Budget

Inflow	
Walker River	105,000
Precipitation	14,600
Subsurface inflow	7,800
Local runoff	3,000
Total inflow (rounded)	130,000
Outflow	
Lake evaporation	157,400
Net ET	2,200
Diverted local runoff	2,000
Pumpage	100
Total outflow (rounded)	162,000
Storage change	-29,000
Imbalance	-3,000
Percent	2%

USGS

Water Budget to Maintain Lake Level

	Lake-Surface Altitude (ft)		
	3,952	3,965	3,986
Dissolved solids (mg/L)	12,000	10,000	8,000
Supplemental volume (AF)	700,000	1,200,000	2,000,000
Inflow (AF/year)			
Walker River	105,000	105,000	105,000
Other inflow	25,000	26,000	28,000
Total inflow	130,000	131,000	133,000
Outflow (AF/year)			
Evaporation	152,000	162,000	182,000
Other outflow	4,000	4,000	4,000
Total outflow	156,000	166,000	186,000
Supplemental inflow	26,000	36,000	53,000

USGS

Summary of Water Budgets

- 387,000 AF/yr total streamflow
- 138,000 AF/yr streamflow at Wabuska
  - 64% diverted, infiltrated, ET, basin outflow
- 110,000 AF/yr at Lake
  - 105,000 streamflow + 5,000 GW discharge
  - 20% diverted, infiltrated, ET, basin outflow
- 700,000—2 million AF supplemental volume
- 26,000—53,000 AF/yr supplemental inflow

USGS

Reports

- Bathymetry of Walker Lake (2007)
- Evapotranspiration (2009)
- Setting/Conceptual Model (2009)
- Water budget (2009)

  http://nevada.usgs.gov/walker/index.htm
- Precipitation estimates (2007)

  http://www.nvwra.org/journal/

USGS

Walker Part II
(2010 through 2014)

Objectives

1. Refine upper basin water budgets
2. Characterize seasonal, annual, and decadal changes in groundwater levels and storage
3. Characterize changes in irrigated land and native vegetation
4. Characterize changes in the quality of Walker Lake

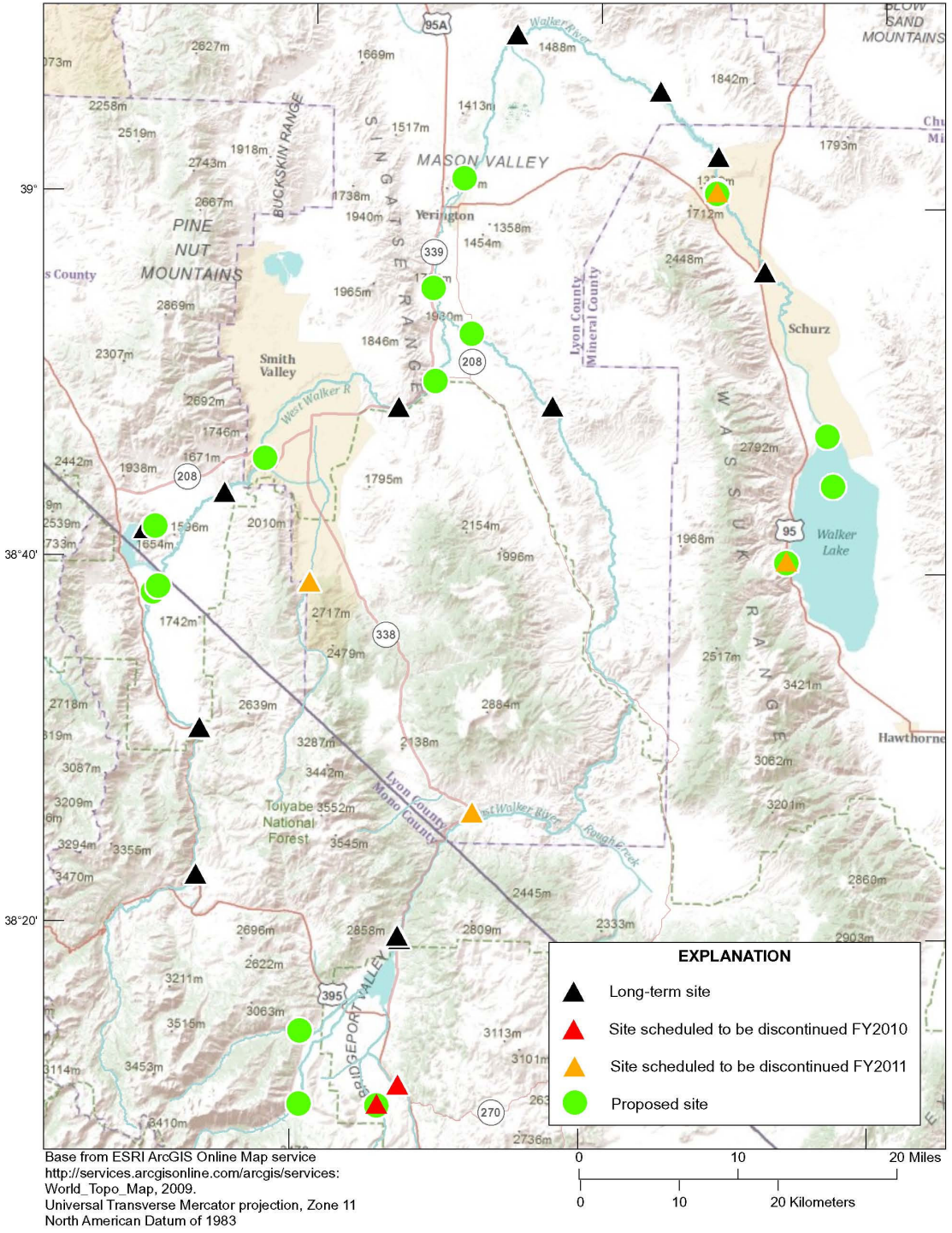
USGS

Data Collection

- 24 stream gaging stations (15 new or continued gages)
- Measure infiltration along 11 stream reaches and 9 canals
- Lake stage and WQ station (vertical profiles of EC, T, pH, DO, fluorescence, turbidity)
- Bathymetry and accumulated sediment in Topaz Lake, Bridgeport, and Weber Reservoirs

USGS

SW Gages


EXPLANATION
Long-term site
Site scheduled to be discontinued FY2010
Site scheduled to be discontinued FY2011
Proposed site
MASON VALLEY
Yerington
PINE NUT MOUNTAINS
BUCKSKIN RANGE
Smith Valley
Schurz
Walker Lake
Hawthorne
Lyon County
Mineral County
Lyon County
Mono County
Toiyabe National Forest
WASSUK RANGE
39°
38°40'
38°20'
95A
339
208
338
95
395
270
Base from ESRI ArcGIS Online Map service
http://services.arcgisonline.com/arcgis/services:
World_Topo_Map, 2009.
Universal Transverse Mercator projection, Zone 11
North American Datum of 1983
0 10 20 Miles
0 10 20 Kilometers

Data Collection

- Install monitoring wells in Wabuska—Schurz area
- Measure water levels in spring and fall from Antelope Valley to Hawthorne
- Monthly water levels in subset of wells
- Conduct aquifer tests
- Measure chloride in atmospheric deposition, streamflow, and groundwater for recharge estimates

USGS

Data Collection

- Map land-cover change in 5 year increments since 1972
- Monitor vegetation where changes are expected

USGS

National Fish and Wildlife Foundation
Walker Basin Restoration Program (WBRP)

Water Group Meeting convened by NFWF
Reno, Nevada, Desert Research Institute, CVRB Building Room 209
March 11, 2010 - 10 am to 2 pm

Meeting Summary

Participants

- Tom Strekal – BIA
- Steve Brown – BIA
- Paul Hamai – NRCE/BIA
- Elmer Bull - NDOW
- Rick Felling – NDWR
- Tom Gallagher, NDWR
- Kelvin Hickenbottom – NDWR
- Mike Liquori, SWC/WRID
- Michelle Langsdorf – MVCD/SVCD
- Glenn Bunch – Walker Lake Working Group
- Lisa Heki - U.S. Fish and Wildlife Service
- Kip Allander – USGS
- Tom Lopes – USGS
- Jim Shaw – USBWC Federal Watermaster
- Norm Harry –WRPT
- Gerry Emm – WRPT
- Jim Thomas – DRI
- Doug Boyle – DRI
- Anna Knust – DRI
- Greg Pohll – DRI
- Tim Minor – DRI
- Chris Garner – DRI
- Joy Giffin – NFWF
- David Yardas – NFWF
- Bruce Aylward – Ecosystem Economics
- Erik Borgen – Ecosystem Economics

I. USGS Presentation - Tom Lopes discussed the hydrology of Basin, the basin water budget and the new gages being added to the basin.

(PLEASE NOTE: One error was found in the overall water-budget table and one error in the groundwater budget table for the Wabuska-Schurz reach. The online report will be revised with these corrections.)

Points on general hydrology:

- lake has declined 150 ft since 1882
- Walker does not really have an "average" stream flow as flows are extremely variable from year to year
- 2/3 of flow occurs in spring runoff
- high salinity in groundwater in the area close to lake
- some groundwater exits basin – e.g. flows toward Artesia Lake from Smith Valley
- pumpage increases in dry years
- Wabuska to Weber is a losing reach
- from Wabuska to Cow Camp riparian vegetation leads to ET losses during growing season
- below Weber to Little Dam is a gaining reach
- where lake sediments are deposited there is little infiltration/leakage
- Little Dam to Walker Lake is a losing reach

Highlights from Water Budget Calculations:

- data sets contained info from 1971 to 2000
- total inflow 387k acre ft/yr (include estimate of ungaged runoff) headwater
- 138k acre-ft makes it to Wabuska
- 108k makes it to the Lateral 2a gage
- 105k to Walker Lake
- based on water budgets, between 700,000 and 2 million acre-ft of supplemental volume is needed to be delivered to Walker Lake to get TDS levels between 12,000 and 8,000 mg/L
- Then, between 26,000 and 53,000 acre-ft per year will be needed to maintain those levels

Part II of USGS study includes ongoing data collection and new gages/new water quality monitoring station

II. DRI GIS Presentation - Tim Minor from DRI discussed the datasets used in the DST

Objective: to provide hydrologic, geographic and water rights data for the analysis of potential water rights acquisitions in the Walker

Geographic Data:
- admin (parcels, county, etc)
- ditches and drains
- agricultural fields (boundary and crop type)
- topography
- public land survey system – township and range

Hydrologic Data:
- diversions
- wells

Water Rights
- surface & groundwater

Also:
- made use of an Aerial Photography Base Layer
- Digitizing ditches and drains took much time
- GW POUs and PODs - many to many relationships required link table to be created
- HRUs - explanation of spatial scale employed in model

GIS Role for next phase of project
- updating spatial data used in model
- updating water rights info

Question of total water used - whether it's incorporated in model based on types of water
- Reiteration that data is at the main point of diversion level

III. DRI Groundwater Model Presentation - Greg Pohll from DRI presented the Mason Valley Groundwater Model (a component of the DST)

Highlights and notes:
- Smith Valley GW Model is 2-dimensional model only, while the Mason Valley Model has 3 dimensions
- Focus Question: What is nature of the GW and SW exchange?
- Area of irrigated land is variable/dependent on the amount of water diverted and pumped as well as crop consumption needs for month based on the types of crops in the HRU

- Groundwater pumping records are not available for all irrigation wells and annual volumes for all groundwater pumped in the basin are only available for years 1995 to 2002. A regression between annual sum of streamflow at the Hudson and Strosnider gages and annual recorded groundwater withdrawals was developed to estimate pumping volumes. The annual, basin-wide pumping estimate was distributed to individual HRU's by area and consumptive use. The groundwater pumping was evenly distributed among all wells within an HRU.
- Question about groundwater exiting north into the mountains – 4 points of exit on the model – hypothesis that its extracted by evapotranspiration – about 800 acre ft; USGS handled it a bit differently but seemed to have similar numbers
- More variability during drought – less water
- Water balance comments – river primary source of water into the basin – river inflows make 84% but during drought river contribution drops to 66%
- Question on crop ET and non-agricultural ET – crop ET came from NSE; phreatophytes from USGS
- Irrigated acres were varied to accommodate year to year variability
- Model was well calibrated to observed data

IV. DRI DST Presentation - Doug Boyle from DRI presented results from model runs simulating the movement/transfer of water to instream use using (a) the Mason Valley Modflow model and (b) the integrated Modflow/MODSIM model

Highlights and notes:

- a quick recap of how the DST consists of 3 models linked together – PRMS/MODFLOW/MODSIM
- exploration of full set of water transactions from previous meeting was not possible, but instead provide results from two scenarios
  1) reduce diversion and supplemental pumping in the MV MODSIM model
  2) water right transfer in the full DST
- clarification that the (1) scenario does not reflect any watermaster behavior, the water put instream is assumed to be instream and not reallocated through the water rights system
- in the (2) scenario, MODSIM reallocates the water based on the model (which is calibrated and is a relatively good predictor of past watermaster behavior in allocating water by priority)

The results (see the powerpoint) suggest the following:

- Under (1) most of the water placed instream from ditches like West Hyland moves downstream to Wabuska
- Variations from ditch to ditch in how much water moves to Wabuska under (1) may reflect proximity to the river and to Wabuska
- In some cases the results suggest unexplained increases in water reaching Wabuska (at 3x what is left instream) – this may be related to HRUs where there are river pumps, but requires further investigation
- Scenario (2) shows more water going to the lake but causes a system "shortage" – this may reflect that the model was instructed to move West Hyland Rights to Wabuska – and in doing so it moved water that before the simulation was diverted by other HRUs

Next steps for the modeling include:

- Need to develop ability to unpack the "shortage" and explain components of changes in the water allocations in terms that stakeholders can understand
- Need to repeat scenario (2) for the rest of the ditches in Mason Valley and Smith Valley
- Develop capability to easily move individual fractions
- Develop capability to incorporate storage water into the DST so that changes in water rights and responses will also incorporate adjustments in the storage regime

The next meeting was scheduled for May 13th to further explore use of the DST and bring in additional information/models to expand our understanding of water management in the basin

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada
Desert Research Institute, Stout Conference Room A
June 15, 2010 – 1:00 to 3:30 pm

AGENDA

1:00 – 1:15 **Overview**
- **Introductions**
- **Purpose of the Meeting and Review of Agenda**

1:15 – 1:45 **Decree Discussion**

1:45 - 2:00 **Overview of Masini Sale**

2:00 – 2:15 **Break**

2:15 – 2:45 **DST Update**

2:45 – 3:30 **Monitoring Discussion**

Wrap up

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada

June 15, 2010

Meeting Summary

Participants:

- Steve Brown – BIA
- Paul Hamai – NRCE/BIA
- Rick Felling – NDWR
- Tom Gallagher - NDWR
- Keith Conrad – NDWR
- Adam Sullivan - NDWR
- Mike Liquori - SWC/WRID
- Glenn Bunch – Walker Lake Working Group
- Stephanie Byers - U.S. Fish and Wildlife Service
- Tom Lopes – USGS
- Jim Shaw – USBWC
- Karen Peterson - USBWC
- Norm Harry –WRPT
- Gerry Emm – WRPT
- Jim Thomas – DRI
- Doug Boyle – DRI
- Tim Minor – DRI
- Chris Garner – DRI
- Susan Mortenson – UNR
- Joy Giffin – NFWF
- Bruce Aylward – Ecosystem Economics
- Erik Borgen – Ecosystem Economics

1. Opening Remarks

Bruce Aylward recapped the purpose of the meetings and underlined the main theme: scientists, managers, transaction stewards partnering and sharing technical expertise over time.

2. Closing of First Acquisition

2.1 Acquisition Details

Joy Giffin from NFWF discussed the first water rights acquisition.

The acquisition closed May 13, 2010. The deal included surface and supplemental ground water rights appurtenant to approximately 646 acres of land; 7.745 cfs of natural flow decree water rights; 402.55 acre-feet of associated storage water rights; 2,585 acre-feet of supplemental ground water rights; and associated shares of stock in the West Hyland Ditch along the main Walker River in northern Mason Valley.

2.2 Comments and discussion

- The deal is public knowledge, the total purchase price was $6.11 million, which is approx. $9500 an acre for fully reliable water, assuming reliability is 4 ft per acre.
- Priority dates of decree rights range from 1874-1906.
- NFWF is currently drafting a change application and working with various entities to determine when water will be called for. Will depend somewhat on historical use of water acquired.
- Consumptive use and/or instream flow quantities have not been determined
- We do not know yet if the NDOW 55% number (the amount of water NDOW was able to transfer to Walker Lake in the only previous instream transfer to have been completed in the basin) will be used. It was hypothesized that for a straight transfer, the transfer would likely be the consumptive use for alfalfa (not sure exactly what that is – maybe 3.5 AF/acre) but NSEO may consider different crop types in future. If there is an application to transfer a portion of a water right where the crop has changed to a less consumptive use crop, then the net water savings could be transferred to Walker Lake, assuming it is a permanent transfer. Nothing under state law precludes split-duties, but issue hasn't been decided yet. An application for change would likely be what is needed to settle the questions.

3. Walker River Decree Presentation

Jim Shaw, Chief Deputy Water Commissioner (a.k.a., Federal Water Master) for the Walker River Basin gave a presentation describing the decree, his position, and how water is managed in the basin.

Water rights in the Walker River Basin were adjudicated by the federal court, which continues to oversee changes to water rights in the basin. The U.S. Board of Water Commissioners (USBWC) manages distribution of Walker River water and is comprised of 6 board members, representing different geographic areas. The commissioners serve at the pleasure of the court. Before 1953 there was no professional staff.

This is the 9th season for Jim Shaw. His responsibility is to monitor river flows and reservoir operations on a daily basis. In delivering water, the Water Master determines the year of priority to be served on daily basis and must keep in mind that it takes 3 days to get water from either reservoir to the Wabuska gage. Jim manages the reservoirs using the WRID operation manual. The USBWC employs river riders and delivers water 6 days a week during irrigation season – meaning no adjustments on Sundays, the Water Master tries to keep river from "bouncing."

The USBWC annual budget is 350,000 and pays USGS 58,000 for gaging.

The Walker is a "non-navigable" river.

The C-125 decree settled claims of CA, NV and WRPT.

Bridgeport Valley has 31,000 acres of water righted. Individuals own reservoirs in CA nr Bridgeport. Bridgeport Reservoir has a 42,000 AF capacity with 57,000 AF annual fill/refill rights for WRID.

Antelope Valley has individually owned reservoirs as well.

Topaz Lake has a 59,000 AF capacity with a 85,000 AF fill-refill right for WRID.

The WRPT has the oldest right in the basin: 26.25 cfs for 180 days (1859 priority right).

The Decree was finalized in 1936 and amended 1940. The decree doesn't recognize CA riparian rights, even though it covers CA acreage.

For delivery of water, the Water Master relies on USGS gaging stations including E Walker nr Bridgeport, the Bridgeport Reservoir gage (which provides lake elevation), Strosnider, West Walker river nr Coleville (lower gage), Topaz lake gage (for elevation), Hoye Bridge, Hudson and Wabuska. The Water Master uses a formula that includes natural flow and return flows where the sum equals the amount to be used to satisfy vested rights. After the Water Master delivers vested rights and allows for storage, then the excess is flood/permit water.

Jim made adjustments 45 times last year to ensure priorities were delivered properly.

In response to a question of how the changing decree has affected how farmer call for water,the Water Master indicated that some irrigators (especially row crop farmers) have begun calling for water more often so that they do not have to wait the one or two days for the delivery of the water, but much of the water just ends up in the drain.

Irrigators can combine and rotate decree as long as they have the same priority rights.

The Water Master only investigates formal complaints that are signed.

The only entity that is always on demand is WRPT.

Is there a penalty for using water when should not be? Misdemeanor in NV; CA is $500/day

The Water Master sets priority for E, W and Main rivers. Whichever river has the lowest priority the main will have that priority.

Erratic flows on river make for difficult management.

The watermasters office does not keep on the farm level delivery records, the records reflect ditch level deliveries.

The decree court established the rules and regs for changes.

Farmers advise the ditchriders, WRID or the watermasters office to let them know how long they want the water delivered for.

2010 was the first time ever that NDOW called for Walker Lake flood rights.

The Water Master explained his stance that the system is not over-allocated – just that every drop of water is allocated.

4. Update from Doug Boyle and DST team

Doug Boyle is taking a new position in the Geography Department at UNR but will continue to lead the DST team.

Chris Garner presented a demonstration of a "proof of concept" approach to visualize the system shortages that the last model run predicted (shutting down West Hyland ditch, stopping supplemental pumping and moving to Wabuska) – spatially and temporally. The animation made for a very practical/informative way to look at the change.

The demonstration elicited many questions, but the point of Doug's presentation was to show how the animations can create more discussion and will help explain the results of their efforts. The DST team will continue working on the modeling runs and visualization products over the summer and will be prepared to address many of the questions using the animation at the August meeting.

5. Monitoring

Bruce Aylward (Ecosystem Economics) began a discussion on how the group will be helpful with respect to monitoring. He indicated that now that initial transactions are underway and WRID will likely be running a leasing program next year, there are some issues to consider: who is delivering what where, whose water is it, what color is it, etc.

Bruce asked the group which entities are currently looking at flows. The responses were: USGS, BIA, USBWC, Mike Liquori on behalf of WRID, NSE (looking at surface and groundwater pumpage), USFWS.

Once transferred instream, who will be monitoring? USFWS, USGS, BIA, USBWC, Mike Liquori on behalf of WRID.

Which groups are taking their own measurements? BIA, USGS, NSE, USFWS, WRPT

NSE will specifically be monitoring land fallowing, and what is not being pumped – ie. supplemental groundwater. A discussion ensued regarding what fallowing requirements NSE will have and how supplemental wells would be affected. There was a concern that irrigator will split

a supplemental well. It was indicated that the NSE would not allow a transfer of supply well water to worse priority decree right.

The DST will help with ex post facto monitoring.

Most of the groups at the meeting will be doing monitoring from the perspective of their own groups interest; we need to try to create a program to coordinate.

There was a suggestion to look at monitoring from the perspective of compliance, effectiveness and validation of the model. A discussion developed on what each of compliance, effectiveness and validation mean.

There was a comment that a compliance system is already in place, though it is not transparent.

6. Next Meeting

Next meeting: Last week in August or second week in September

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada
Desert Research Institute, Stout Conference Room A
August 26, 2010 – 10:00 to 1:00 pm

AGENDA

10:00 – 10:15 Overview (Aylward)
- Introductions
- Purpose of the Meeting and Review of Agenda

10:15 – 11:00 Updates on Recent Activities
- NFWF Update
- DST Update
- USGS Update
- Others

11:00 – 11:30 Nevada State Engineer presentation on METRIC (NDWR)
- Overview of METRIC
- NSEO intended use of METRIC for monitoring

11:30 – 12:00 METRIC Presentation (Huntington/Minor)
- METRIC tool prepared for NSEO

12:00 – 12:30 Lunch (Provided)

12:30 -1:00 Wrap Up

Water Modeling Group Meeting
Reno, Nevada
Desert Research Institute, Stout Conference Room B
October 26, 2010 – 10:00 to 2:00 pm

AGENDA

10:00 – 10:30 Overview (Aylward)

- Introductions
- Purpose of the Meeting and Review of Agenda
- Updates
  - NFWF
  - Water Report (Watermaster)
  - Open Invitation

10:30 – 11:00 Water Rights Change Application Process (NDWR)

- Presentation on the Change Application Process

11:00 – 12:00 Decision Support Tool (DST Group)

- Developments
- Scenario results

12:00 – 12:30 Lunch (Provided)

12:30 -1:30 USGS Water Model (USGS)

- Presentation and discussion of water model from wabuska to the Lake

1:30 – 2:00 Wrap Up and Next Meetings (Aylward)

Getting More Water to Walker Lake

Successfully Navigating the Water Right Process

Presented for the National Fish and Wildlife Foundation
Walker Basin Restoration Program

Thomas K. Gallagher, P.E.,
Water Rights Section Chief

Successfully Navigating the Water Right Change Process in Nevada

- Proposals to get more water to Walker Lake will involve purchases and leases of existing water rights in the Basin and transferring them downstream.
- We will look at what will be required in order to effect those transfers and we will start first with some water law basics.

Fundamentals of Western States Water Law – Nevada Style

- Water belongs to the public and may be appropriated for beneficial use only as provided by Nevada law.
- Beneficial use of the water ultimately becomes the limit and extent of the water right and defines it.

Fundamentals of Western States Water Law – Nevada Style

- The water right is an appurtenance to specific lands upon which the water was placed to beneficial use.
- This appurtenance or incidental right is attached to the principal property right and passes in possession with it, unless it is specifically withheld in the deed.

Fundamentals of Western States Water Law – Nevada Style

- The water right can only be severed from that place of use by an application to change the place of use.
- The change application requires a supporting map that shows the entire water right place of use and that portion being stripped or removed.

Successfully Navigating the Water Right Change Process in Nevada

- Title on the application to change must be consistent with the portion of the base water right to be changed.
- The source of water on the application to change must be consistent with the base water right to be changed.

Successfully Navigating the Water Right Change Process in Nevada

- The amount of water on the application to change is related to the duty of water associated with the acreage being stripped.
- For example, if we are stripping 300 acres of water righted ground that has a 4 acre foot per acre duty of water, then the change application is moving 1,200 acre feet of water to the new manner and place of use.

Successfully Navigating the Water Right Change Process in Nevada

- Typically, there is also a diversion rate in cubic feet per second associated with the right being changed, so the 1,200 acre foot example also has a pro rated diversion rate with it.
- The application then describes the existing and proposed points of diversion by survey to an established corner.

Successfully Navigating the Water Right Change Process

- The application then describes the proposed and existing place of use of the water right being changed.
- In the Walker Basin, much of the water righted lands are described in the Decree as lying within a certain legal description of land, but the area was never carefully mapped.
- If the change application proposes to move only a portion of the Decreed right, we will have to see on the supporting map where all of the base water right is appurtenant, and then what portion of that area is to be stripped.

Successfully Navigating the Water Right Change Process

- If the change application proposes to move all of the Decreed right, we will still have to see on the supporting map what specific lands are being legally dried up.
- The remainder of the application is straightforward, fill-in-the-blanks, and there is also a "Remarks" section where we encourage the applicant to make the intent of the proposed change abundantly clear.

Successfully Navigating the Water Right Change Process

- Now we can review an example application to see what it and the supporting map looks like, taken from a similar type of change application for the Stillwater Wildlife Refuge.

TEMPORARY Application No. 76523 T

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office DEC 1 1 2007

Returned to applicant for correction _____

Corrected application filed _____ Map filed JUL 2 3 2003 under 70208-T

The applicant United States of America, Fish and Wildlife Service

1000 Auction Road (Street Address or P.O. Box) of Fallon (City or Town)

Nevada 89406 (State and Zip Code), hereby make(s) application for permission to change the

☐ Point of diversion ☒ Place of use ☐ Manner of use ☒ of a portion

of water heretofore appropriated under (Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree and identify right in Decree.)

Permit No. 61129 and United States of America v. Orr Ditch Co. in Equity No. A-3, Claim No. 3; United States of America v. Alpine Land and Reservoir Co., No. D-183-BRT; both in the United States District Court of Nevada.

1. The source of water is Truckee and Carson Rivers (Name of stream, lake, underground, spring or other source.)
2. The amount of water to be changed 2,436.85 acre-feet (815.00 acres @ 2.99 acre-feet per acre) (Second feet, acre-feet. One second foot equals 448.83 gallons per minute.)
3. The water to be used for Maintenance of Wetlands for Recreation and Wildlife/Storage (Irrigation, power, mining, commercial, etc. If for stock, state number and kind of animals. Must limit to one major use.)
4. The water heretofore used for As decreed (If for stock, state number and kind of animals.)
5. The water is to be diverted at the following point (Describe as being within a 40-acre subdivision of public survey and by course and distance to a found section corner. If on unsurveyed land, it should be stated.)
   Lahontan Dam, being within the SW 1/4 SE 1/4, Section 33, T19N, R26E, M.D.B & M.
6. The existing point of diversion is located within (If point of diversion is not changed, do not answer.)
   No change.

76523-T

7. Proposed place of use (Describe by legal subdivisions. If for irrigation, state number of acres to be irrigated.)
All Federally-owned or controlled lands within the approved boundary of Stillwater National Wildlife Refuge, as described in Exhibit "A" and supporting map filed with Permit No. 65700.

8. Existing place of use (Describe by legal subdivisions. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.)
See Exhibit "B", attached hereto, and supporting map filed with Permit No. 70206T. Portions of Truckee-Carson Irrigation District Serial Nos. 980, 980-2, 980-4, 980-5, 980-6, 980-8, 980-9 and 980-10.

9. Proposed use will be from As decreed (Month and Day) to _____ (Month and Day) of each year.

10. Existing use permitted from As decreed (Month and Day) to _____ (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.)(State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.)
No new diversion or storage works on the Truckee River and the Carson River will be constructed.

12. Estimated cost of works N/A

13. Estimated time required to construct works N/A (If well completed, describe well.)

14. Estimated time required to complete the application of water to beneficial use N/A

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary). The proposed use should be temporary in nature, or the requested change should be the result of an unforeseen occurrence: (Failure to provide a detailed description may cause a delay in processing.)
Irrigation rights from within Naval Air Station, Fallon, which are under the jurisdiction of the U.S. Fish and Wildlife Service will be used for maintenance of wetlands within Stillwater National Wildlife Refuge during the 2008 irrigation season.

This application is for a one-year temporary permit.

16. Miscellaneous remarks:
Applicant expressly reserves the right to transfer in a later proceeding: 0.51 af/ac for each of the 815.00 acres from which the 2.99 af/ac per acre are to be transferred by this application.

2007 DEC 11 AM 3:04

(775) 423-5128
Phone No.

richard_grimes@fws.gov
E-mail

By Richard Grimes, Supervisory Realty Specialist
Print or type name clearly

Signature, applicant or agent

NV Realty Office, US Fish & Wildlife Service
Company Name

1000 Auction Road
Street Address or P.O. Box

Fallon NV 89406
City, State, Zip Code

APPLICATION MUST BE SIGNED

76523-T

Exhibit "A"

7. The proposed place of use is Stillwater National Wildlife Refuge, consisting of all Federally-owned or Federally-controlled lands within:

Township 21 North, Range 32 East, Mount Diablo Meridian

Sections: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, and 34

Township 21 North, Range 31 East, Mount Diablo Meridian

Sections: All

Township 20 North, Range 32 East, Mount Diablo Meridian

Sections: 3, 4, 5, 6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 21, 29 and 30

Township 20 North, Range 31 East, Mount Diablo Meridian

Sections: All

Township 19 North, Range 31 East, Mount Diablo Meridian

Sections: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32 and 33

Township19 North, Range 30 East, Mount Diablo Meridian

Section 13: all those portions of the NE¼ NE¼, SE¼ NE¼, NE¼ SE¼, and SE¼ SE¼ lying east of Stillwater Slough

Section 24: NE¼ NE¼, NW¼ NE¼, NE¼ NW¼, SE¼ NW¼ and SW¼ NE¼

Exhibit "B"

8. The existing place of use:

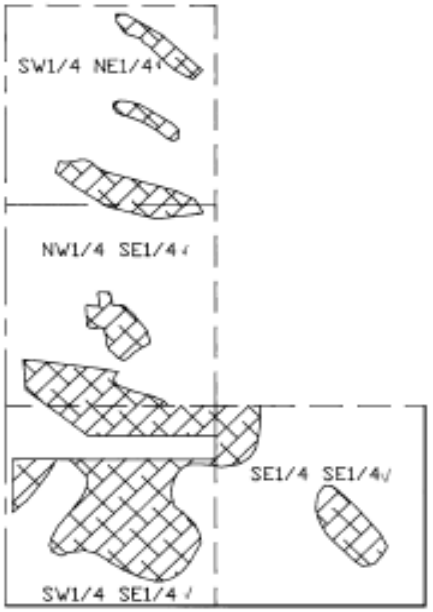
Township 18 North, Range 29 East, Mount Diablo Meridian

Section 1:	33.30 acres in the SW1/4 SW 1/4	
Section 2:	32.20 acres in the SW1/4 SE 1/4	(includes 5.70 acres from 61129)
	36.00 acres in the SE 1/4 SE1/4	(includes 8.10 acres from 61129)
Section 4:	6.10 acres in the NE1/4 NE1/4	
	22.10 acres in the SW1/4 NE 1/4	(includes 5.50 acres from 61129)
	25.60 acres in the NW1/4 SE1/4	(includes 6.00 acres from 61129)
	3.00 acres in the NE1/4 SE1/4	
	30.50 acres in the SW1/4 SE1/4	(includes 17.80 acres from 61129)
	26.70 acres in the SE1/4 SE1/4	(includes 5.20 acres from 61129)
Section 9:	1.60 acres in the SE1/4 NE1/4	
Section 10:	0.60 acres in the NW1/4 NW1/4	(includes 0.40 acres from 61129)
	27.30 acres in the NE1/4 NW1/4	(includes 27.30 acres from 61129)
	0.70 acres in the SW1/4 NW1/4	
	22.30 acres in the SE1/4 NW1/4	(includes 22.30 acres from 61129)
	27.30 acres in the NW1/4 NE1/4	(includes 27.30 acres from 61129)
	32.70 acres in the SW1/4 NE1/4	(includes 32.70 acres from 61129)
Section 11:	1.00 acres in the NE1/4 NW1/4	
	14.50 acres in the NW1/4 NE1/4	
	22.90 acres in the NE1/4 NE1/4	
	14.80 acres in the NE1/4 SW1/4	
	36.90 acres in the NW1/4 SE1/4	(includes 3.80 acres from 61129)
	38.70 acres in the NE1/4 SE1/4	(includes 6.70 acres from 61129)
	17.70 acres in the SW1/4 SE1/4	(includes 2.20 acres from 61129)
	33.30 acres in the SE1/4 SE1/4	(includes 1.40 acres from 61129)
Section 25:	2.20 acres in the NW1/4 NW1/4	
	23.40 acres in the SW1/4 NW1/4	

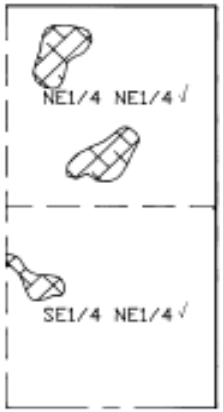
Exhibit "B", continued

Section 26:	37.10 acres in the NE1/4 SW1/4
	35.10 acres in the SE1/4 SW1/4
	37.70 acres in the NW1/4 SE1/4
	38.10 acres in the NE1/4 SE1/4
	35.90 acres in the SW1/4 SE1/4

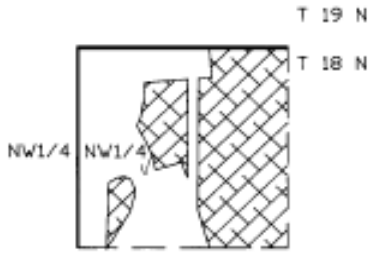
A total of 815.00 acres. **(includes 172.40 acres from 61129)**



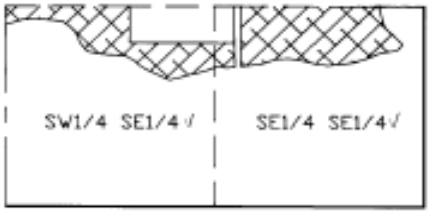
SEC. 4, T.18N., R.29E., MDB&M



SEC. 9, T.18N., R.29E., MDB&M

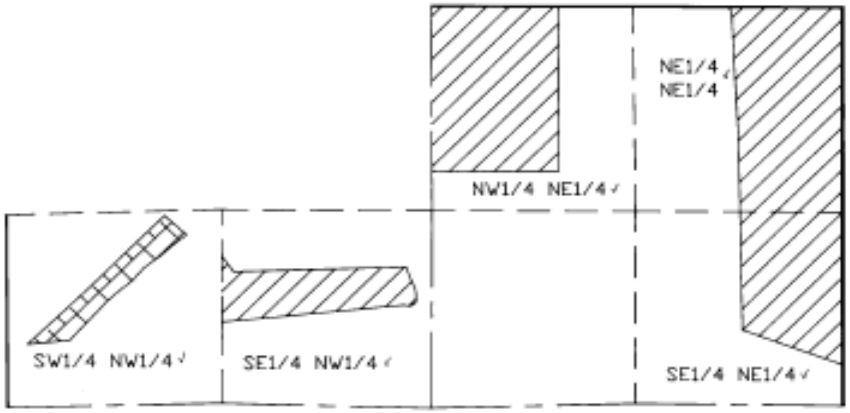


SEC. 2, T.18N., R.29E., MDB&M



SEC. 2, T.18N., R.29E., MDB&M

R.29E. R.30E.



SEC. 25, T.18N., R.29E., MDB&M

ACREAGE						
Section	Township	Range	Subdivision	Existing Acreage of Use	Proposed Acreage of Use	Surveyed Acres
2	18N	29E	NW1/4 NW1/4		25.2	74.2
2	18N	29E	SW1/4 SE1/4		5.7	20.8
2	18N	29E	SE1/4 SE1/4		8.1	28.4
9	18N	29E	NE1/4 NE1/4		4.2	14.7
9	18N	29E	SE1/4 NE1/4		1.1	3.8
4	18N	29E	SW1/4 NE1/4		5.5	19.2
4	18N	29E	NW1/4 SE1/4		6.8	23.8
4	18N	29E	SW1/4 SE1/4		17.8	62.3
4	18N	29E	SE1/4 SE1/4		5.2	18.2
25	18N	29E	NE1/4 NE1/4	17.8		62.3
25	18N	29E	NW1/4 NE1/4	19.4		67.9
25	18N	29E	SE1/4 NE1/4	16.4		57.4
25	18N	29E	SE1/4 NW1/4	8.0		28.0
25	18N	29E	SW1/4 NW1/4		4.4	15.4
			Sub Total	61.6	89.0	
		Sheet 2	Sub Total	98.1	98.1	
		Sheet 3	Sub Total	102.5	125.1	
			Total	262.2	262.2	921.2

STATE OF NEVADA
COUNTY OF CHURCHILL } ss

I, STEPHEN G. VANS BEING FIRST DULY SWORN, DEPOSE AND SAY THAT THIS MAP CONSISTING OF [illegible] SHEETS HAS BEEN CORRECTLY MADE FROM THE SURVEYOR'S SCALE FROM TRUCKEE-CARSON IRRIGATION DISTRICT RECORDS THAT IT FULLY AND CORRECTLY REPRESENTS THE EXISTING PLACE OF USE AND THE PROPOSED PLACE OF USE OF WATER FROM THE TRUCKEE RIVER AND THE CARSON RIVER IN CHURCHILL COUNTY, NV.

APPLICANT

FOR IRRIGATION PURPOSES, THE POINT OF DIVERSION, LAHONTAN DAM, EXCHANGES, AND THE BOUNDARY OF ALL LANDS ENTERED BY 40 ACRE SUBDIVISION FOR THE AREAS PROPOSED TO BE IRRIGATED, ARE FULLY AND CORRECTLY DESIGNATED THEREON.

STEPHEN G. VANS [illegible]

SUBSCRIBED AND SWORN TO BEFORE ME THIS [illegible] DAY OF [illegible], 19[illegible]
NOTARY PUBLIC IN AND FOR CHURCHILL COUNTY, NEVADA

NOTARY PUBLIC

I, THE UNDERSIGNED AGENT OF THE PROPOSED PLACE OF USE, DO HEREBY CERTIFY THAT I HAVE REVIEWED AND EXAMINED THIS WATER RIGHT TRANSFER MAP AND DO HEREBY CERTIFY IT TO BE CORRECT.

PROPERTY AGENT

DATE

LEGEND

EXISTING PLACE OF USE

PROPOSED PLACE OF USE

N

0 400 800 1200 1600
SCALE : 1"=400'

61129 CERTIFICATE No. 15547 ISSUED 09-29-60

STATE ENGINEER'S USE

FILED
JUL 07 [illegible]

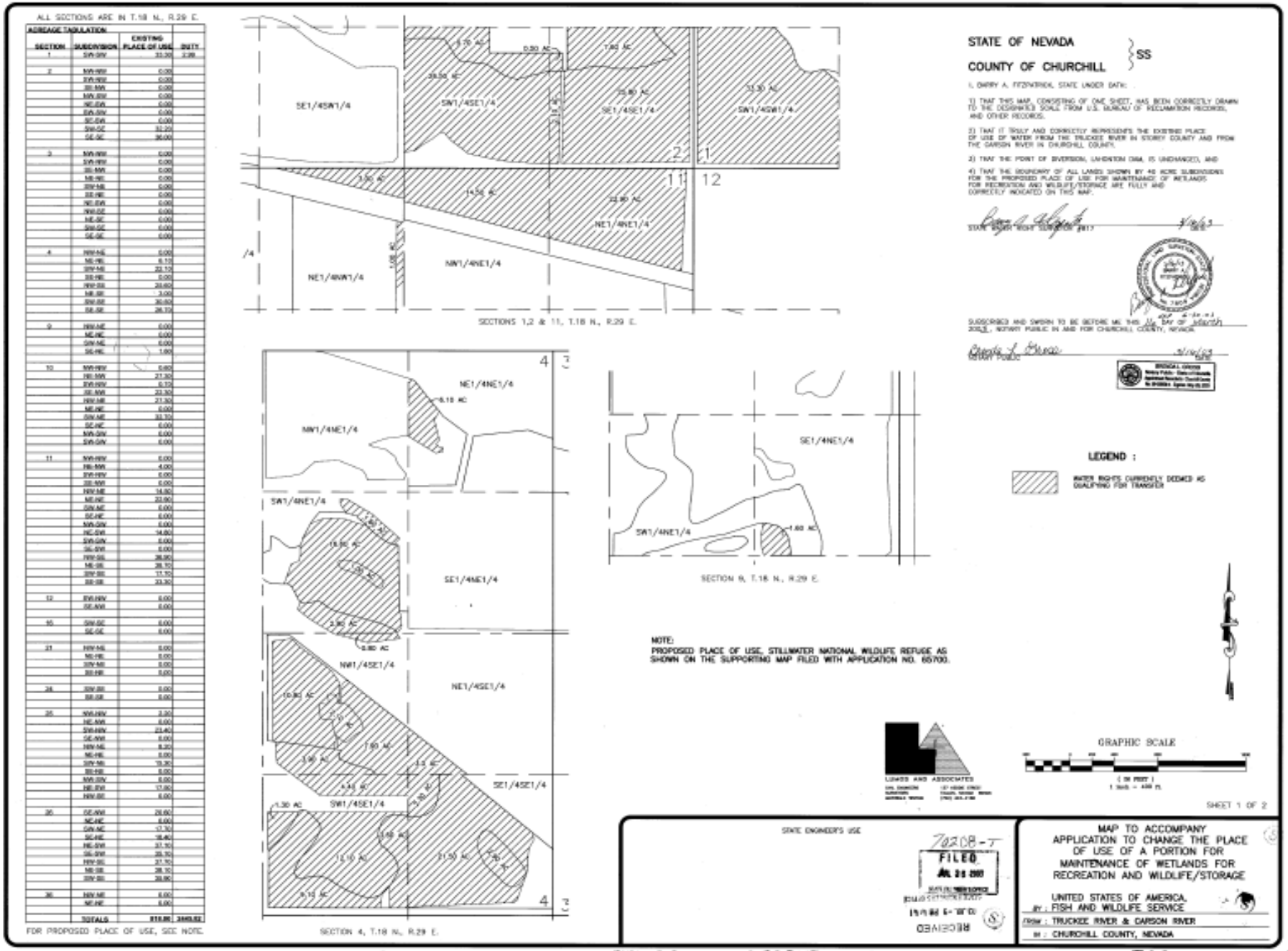
MAP
TO ACCOMPANY APPLICATION TO
CHANGE THE PLACE OF USE
FOR IRRIGATION WATER

BY NAS FALLON (U.S. NAVY)

FROM TRUCKEE RIVER & CARSON RIVER

IN CHURCHILL COUNTY, NEVADA

61129

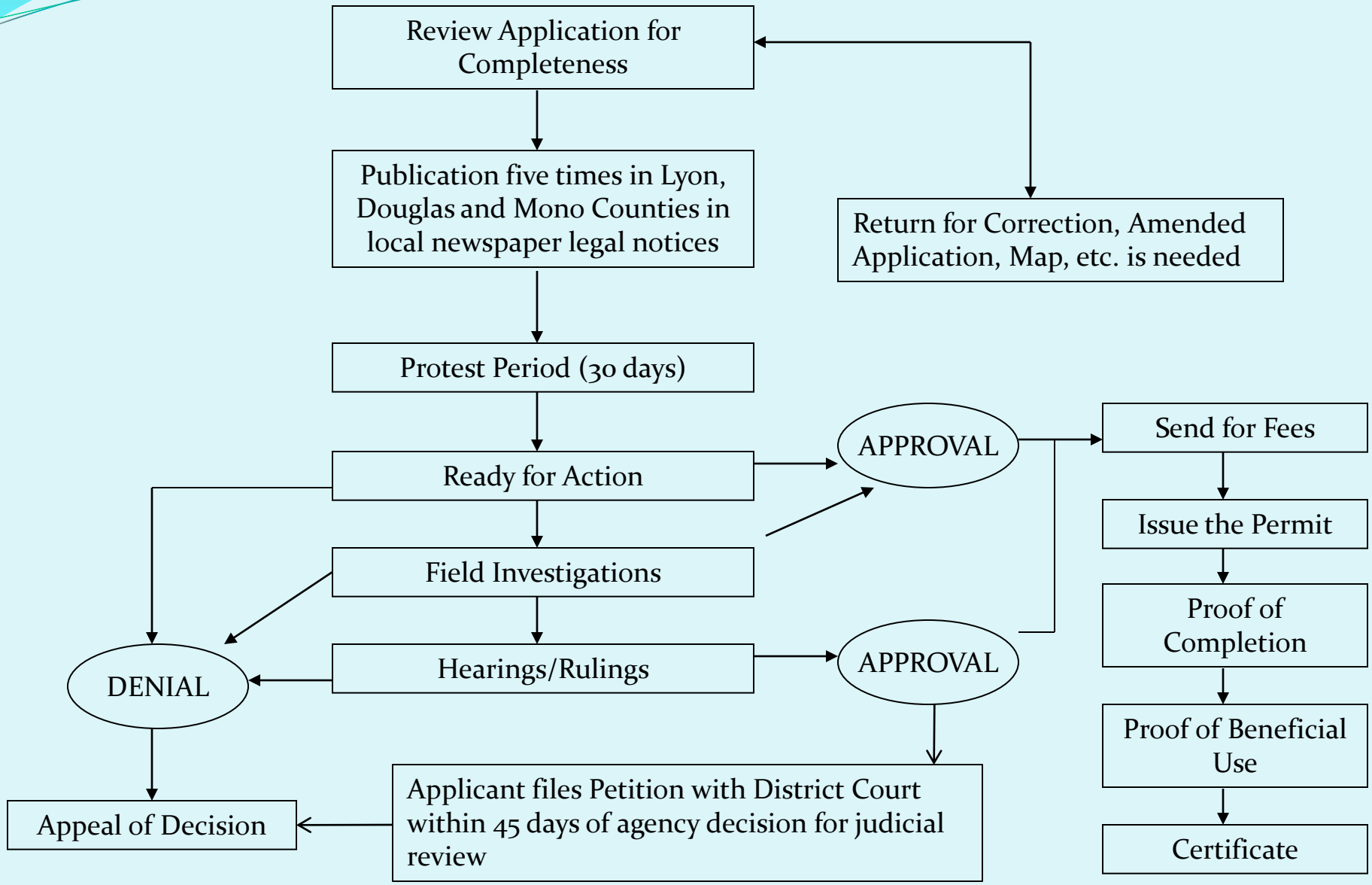


79029T 77620T 76523T 75667T 73806T 72177T 71264T 70208T

Successfully Navigating the Water Right Change Process

- Once the application and map are reviewed, a notice is prepared and sent to the local newspapers for publication for five weeks for public comment, if any.

- Now let's review the entire process and then entertain any questions.


Review Application for Completeness
Publication five times in Lyon, Douglas and Mono Counties in local newspaper legal notices
Return for Correction, Amended Application, Map, etc. is needed
Protest Period (30 days)
Ready for Action
APPROVAL
Send for Fees
Issue the Permit
Field Investigations
Proof of Completion
DENIAL
Hearings/Rulings
APPROVAL
Proof of Beneficial Use
Applicant files Petition with District Court within 45 days of agency decision for judicial review
Appeal of Decision
Certificate

Successfully Navigating the Water Right Change Process

- Thank you.
- Questions?
- Visit our web page at http://water.nv.gov

Walker Basin Restoration Program

Water Modeling Meeting
January 13, 2010, 10:00 am to 2:00 pm
Desert Research Institute, Stout Conference Room A
Reno, Nevada

AGENDA

10:00 – 11:00 Overview (Aylward)

- Introductions
- Purpose of the Meeting and Review of Agenda
- Updates
    - NFWF
        - Acquisitions
        - Stewardship/Grants
    - Water Report
    - Open Invitation

11:00 – 12:00 (Boyle/Aylward)

- Discussion of various definitions including:
    - Consumptive Use
    - Points of Non-Diversion
    - Etc.
- Monitoring
    - Wabuska Gage

12:00 – 12:30 Lunch Provided

12:30 – 1:45 (Boyle)

DST Model

- Closure on current scenario
- Scenarios with current Model
- Phase II
    - Updating the model
    - Assumptions
    - Timeline
- Storage water

1:45 – 2:00 Closing (Aylward)

- Next Meeting Date
- Topics for next meeting
- Wrap Up

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada
January 13, 2011

Sign-In Sheet

Participants:

- Kim Tisdale – NDOW
- Kris Urquhart – NDOW
- Paul Hamai – NRCE/BIA
- Mike Collopy – UNR
- Rick Felling – NDWR
- Jim Shaw – USBWC
- Karen Peterson – USBWC
- Anna Gering – NFWF
- Louis Provencher – TNC
- David Yardas – NFWF
- Joy Giffin – NFWF
- Steve Brown – BIA
- Anita Lahey – USFWS
- Stephanie Byers – USFWS
- Karie Wright – NDOW
- Glenn Bunch – WLWG
- Adam Sullivan – NDWR
- Jon D. McMasters – WRPT
- Dwight Smith – Interflow/Tribe
- Gerry Emm – WRPT
- Tim Minor – DRI
- Doug Boyle – UNR
- Chris Garner – UNR
- Tom Gallagher – NDWR
- Mike Liquori – WRID/Sound Watershed
- Steven A. Fulstone - WRID

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada
July 22, 2011

Sign-In Sheet

Participants:

- Bruce Aylward – Ecosystem Economics
- Greg Pohll – DRI
- Alyssa Burt – WRPT
- Ariel Richardson – WRPT
- Gerry Emm – WRPT
- Lilly Bobb – WRPT
- Lareina Jim – WRPT Interm
- Jon McMasters – WRPT
- Sara Twiss – WRPT
- Michael Cameron – TNC
- Marlene Bunch – WLWG
- Steve Brown – BIA
- Erik Borgen – Ecosystem Economics
- Joy Giffin – NFWF
- David Yardas – NFWF
- Anita Lahey – USFWS
- Doug Boyle – UNR
- Chris Garner – UNR
- Paul Hamai – NRCE/BIA
- Dwight Smith – Interflow/Tribe
- Mike Liquori – WRID/Sound Watershed
- Rick Felling – NDWR
- Jim Thomas – DRI
- Mike Collopy – UNR
- Kip Allander – USGS

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Reno, Nevada
January 11, 2012

Sign-In Sheet

Participants:

- Joy Giffin – NFWF
- Caryn Huntt DeCarlo – BOR
- Dwight Smith – Interflow/Tribe
- Glenn Bunch – WLWG
- Tom Gallagher – NDWR
- Steve Tomac – NFWF
- Jamie Morin – NFWF
- Chris Mixson – NFWF
- Matt Spaulding – BIA
- Derek Bloomquist – USFWS
- William Bettenberg – WRPT
- C. Eugene Franzoy – WRPT
- Adam Sullivan – NDWR
- Tim Minor – DRI
- Bruce Aylward – Ecosystem Economics
- Chris Garner – UNR
- Michael Cameron – TNC
- Scott Bassett – UNR
- Mike Liquori – WRID/Sound Watershed
- Stephanie Byers – USFWS
- Jim Thomas – DRI
- Mike Collopy – UNR
- Greg Pohll – DRI
- Elmer Bull – NDOW

Seminar on Walker Basin Models
Tuesday April 17th, 2012
9:00 – 5:00
US Geological Survey (USGS) Offices
2730 North Deer Run Road, Carson City, NV

Audience: Participants/Protestants in Water Rights Change Application No. 80700 (NFWF-Walker Basin Restoration Program) and Walker Basin Water Group members

9:00am - 10:15am ***Walker Basin Hydrology Water Budgets (Kip Allander on behalf of Tom Lopes, USGS)***

In 2009 USGS issued three reports on Walker Basin hydrology and water budgets entitled "Evapotranspiration from the lower Walker River Basin"; "Hydrologic setting and conceptual hydrologic model of the Walker River Basin"; and "Water budgets of the Walker River basin and Walker Lake". These reports summarize 4 years of research into the ground and surface water hydrology of the Basin. Tom Lopes, the principal author of the study, will present the findings of the study. These USGS scientific studies will help participants understand how water moves through the basin from headwaters to Walker Lake. Those wishing to come to the meeting with questions may preview an earlier powerpoint on this topic that was presented to the Walker Water Group in March of 2010 (www.walkerbasin.org)

10:30am - noon ***Hydrological Model of the "lower" Walker Basin (Kip Allander, USGS)***

In 2012 USGS will publish its GSFlow model that covers groundwater and surface water interactions of the "lower" Walker Basin, which encompasses the basin from the Wabuska gage on down to Walker Lake and includes the drainage basin south of Walker Lake in Mineral County. This model is instrumental in understanding how water acquired from irrigators in the upper basin will be conveyed through the river, Weber Reservoir and on down to the lake. Kip Allander, the principal author of the study will present the data, assumptions and mechanics of the model as well as some example scenarios. As the model is not yet published only preliminary model runs can be presented at this time. Those wishing to come to the meeting with questions may preview an earlier powerpoint on this topic that was presented to the Walker Water Group in July of 2011 (www.walkerbasin.org)

1:30pm – 5pm ***Decision Support Tool for the "upper" Walker Basin (Mike Collopy UNR and Jim Thomas DRI)***

Since 2009, the Desert Research Institute and the University of Nevada Introduction to the DST (Doug Boyle, UNR) have collaborated on a Decision Support Tool (DST) for the "upper" Walker Basin, i.e., the basin above the USGS Wabuska Gage. The DST integrates a rainfall-runoff in the headwaters of the basin with groundwater models of Smith and Mason valley (MODFLOW) and a surface water rights distribution model (MODSIM) for the East, West and Main Walker Rivers. In late 2011 the DST team completed Version 2.0 of the model, and in early 2012 the data layers were updated to reflect the last two years of data collection. The model is designed to allow the simulation of different scenarios for water rights acquisition and leasing, particularly of natural flow decree, storage, and ground water rights. The model and its updates have been presented a number of times to the Walker Basin Water Group, which has made a number of requests of the DST team for future modeling scenarios. The DST Team is also using the model to inform discussions and development of

NFWF's Walker Basin Restoration Program. Copies of earlier presentations to the Walker Basin Water Group can be found at (www.walkerbasin.org)

A draft agenda for the DST presentation is as follows:

1. Geographic Information and the DST (Tim Minor, DRI)
2. MODFLOW Groundwater Models of Mason and Smith Valleys (Greg Pohl, DRI and Chris Garner, UNR)
3. MODSIM Water Distribution Model of the Walker Basin above Wabuska (Doug Boyle and Chris Garner, UNR)
4. DST Version 2.0 Calibration and Interpretation of Initial Simulation Results (Doug Boyle, UNR)

National Fish and Wildlife Foundation
Walker Basin Restoration Program

Model Seminar convened by NFWF
Carson City, Nevada
April 17, 2012

Sign-In Sheet

Participants:

- Glenn and Marlene Bunch – WLWG
- Tami Thompson – MBK Engineers/WRID
- Lee Bergfeld – MBK Engineers/WRID
- Marc Van Camp – MBK Engineers/WRID
- Gordon DePaoli – Woodburn & Wedge/WRID
- Nico DePaoli – Woodburn & Wedge/WRID
- Mark Bevington – Maven Engineering
- Marlene Begay – WRPT
- Greg Pohll – DRI
- Chris Facque – NFWF
- Stephanie Byers – USFWS
- Jim Snyder – WRID
- Steven A. Fulstone – WRID
- Ken Spooner – WRID
- Tim Minor – DRI
- Dale Ferguson – Woodburn & Wedge/WRID
- Doug Busselman – NV Farm Bureau
- Gerry Emm – WRPT
- Dwight Smith – Interflow
- Chuck Savard – USGS
- David Yardas – NFWF
- Joy Giffin – NFWF
- Gary Garms – Self
- Chris Fichtel – TNC
- Eweda Martinez – WRPT
- Jon McMasters – WRPT
- Bruce Aylward – Ecosystem Economics
- Steve Tomac – NFWF
- Mike Liquori – WRID/Sound Watershed
- Paul Hamai – NRCE/BIA

- Lisa Heki – USFWS
- Doug Boyle – UNR
- Linda Wimberly – DRI
- Chris Garner – UNR
- Rick Felling – NDWR

FACT SHEET
NFWF CHANGE APPLICATION No. 80700

In May 2010, the National Fish and Wildlife Foundation (NFWF) purchased 646 acres of water rights on the West Hyland ditch from the L &M Limited Family Partnership (L&M) on behalf of the Walker Basin Restoration Program (Program). The final transaction included 7.745 cfs of natural flow decree water rights; 402.6 AF of apportioned supplemental storage water rights; and 646.16 acres of associated supplemental groundwater rights. Under agreements negotiated prior to closing, NFWF pays annual water rights assessments to the West Hyland Ditch Company, the Walker River Irrigation District (WRID), and the US Board of Water Commissioners (USBWC).

In March 2011, NFWF filed an application with the Nevada State Engineers Office (NSEO) to change the place and manner of use of the acquired natural flow decree water rights .[1] The application was given number 80700.

The application requests:

a) a change in the place at manner of use of the entire 7.745 cfs of acquired natural flow decree rights
b) a change from Irrigation to Wildlife Purposes in accordance with NRS Chapter 533,
c) that the water be left in the Walker River at the Yerington Weir instead of being diverted, and
d) that the place of use be changed from irrigated lands on the West Hyland Ditch to the Walker River at and below the Yerington Weir all the way to and including Walker Lake.

The application does not request a change in:

a) the existing point of diversion, or
b) the season of use of the water.

The application further states that:

a) the amount approved for non-diversion will not conflict with existing rights,
b) NFWF will withdraw/cancel the 646.16 acres of associated supplemental groundwater rights as a condition of exercise once the application has been finally approved by the NSEO and the Federal Decree Court, and
c) NFWF intends to negotiate an agreement with the Walker Paiute Tribe and the Bureau of Indian Affairs to move water through the reservation reach of the lower Walker River to Walker Lake.

NFWF wishes to emphasize that:

a) water under this application will remain in the Walker Basin system for the benefit of Walker Lake, and
b) the associated storage water rights are managed by WRID and any future applications to change those rights to the Walker River and Walker Lake will be done through the process set forth in WRID Regulation #14.

[1] NFWF continues to acquire water rights and will file additional applications on those water rights at a future date.

9th Water Group Meeting
Thursday April 19th, 2012
9:00 to 11:00
US Geological Survey (USGS) Offices
2730 North Deer Run Road, Carson City, NV

9:00 -9:15 ***Introductions and Agenda (Aylward, Ecosystem Economics)***

9:15 -9:45 **USGS Streamflow *(USGS)***

Presentation by USGS surface water team on accuracy of USGS streamflow data and what can be done to improve the streamflow record.

9:45 -10:45 ***Decision Support Tool Scenarios (Collopy, UNR and Thomas, DRI)***

Presentation by Doug Boyle (UNR) of DST Version 2.0 initial simulation results for NFWF Water Rights Change Application No. 80700 involving 7.745 CFS @ the West Hyland Ditch POD plus associated supplemental ground water.

10:45 – 11:00 ***Questions, Discussions, Next Steps***

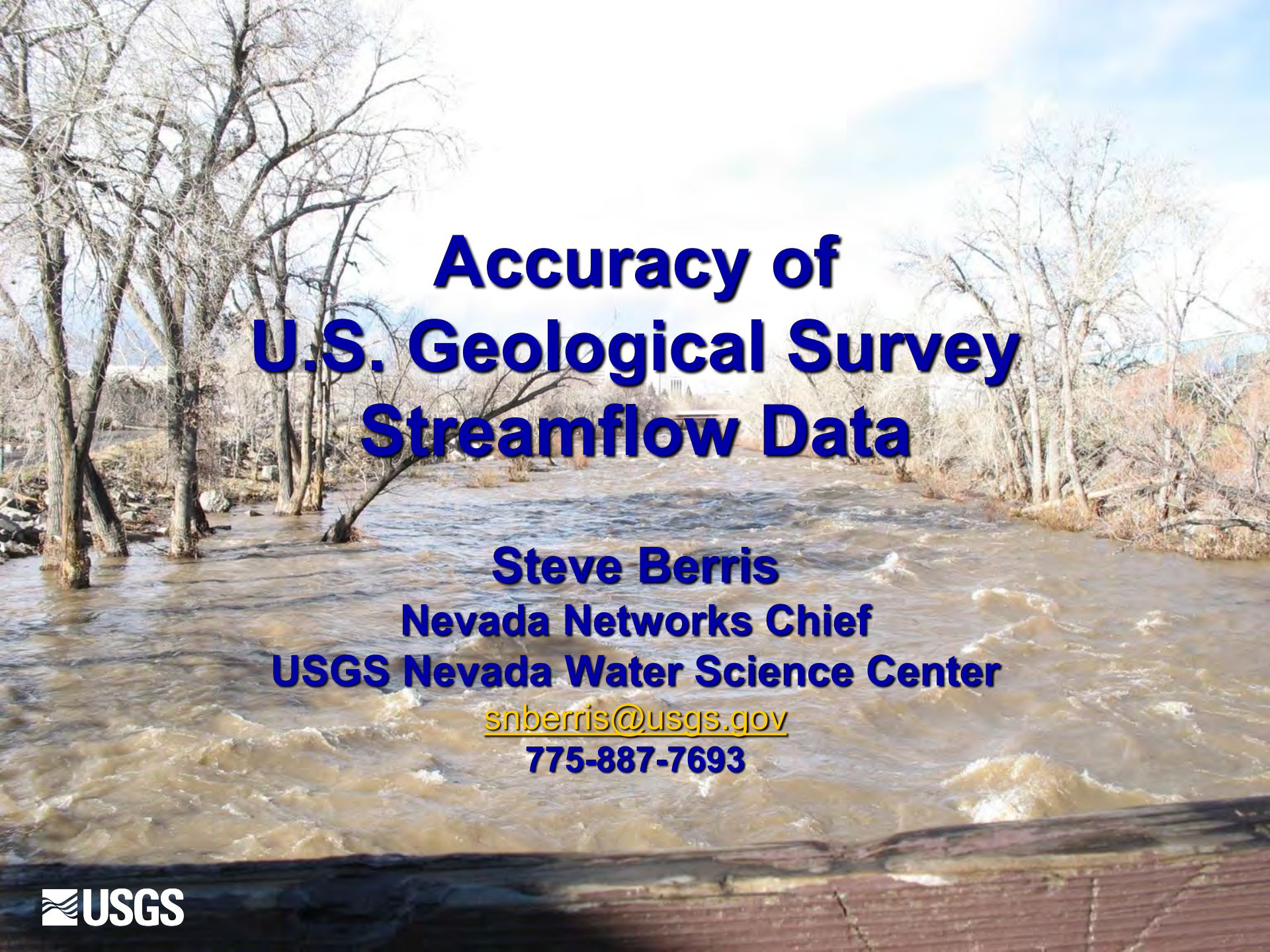
National Fish and Wildlife Foundation
Walker Basin Restoration Program

Water Group Meeting convened by NFWF
Carson City, Nevada
April 19, 2012

Sign-In Sheet

Participants:

- Greg Pohll – DRI
- Rick Felling – NDWR
- Tami Thompson – MBK Engineers/WRID
- Gordon DePaoli – Woodburn & Wedge/WRID
- Nico DePaoli – Woodburn & Wedge/WRID
- Mike Liquori – WRID/Sound Watershed
- Caryn Huntt DeCarlo – BOR
- Kip Allander – USGS
- Steve Berris – USGS
- Chris Garner – UNR
- Tim Minor – DRI
- Jim Shaw – USBWC
- Joy Giffin – NFWF
- Doug Boyle – UNR
- Chuck Savard – USGS
- Dwight Smith – Interflow
- Gerry Emm – WRPT
- Jon McMasters – WRPT
- Jim Snyder – WRID
- Dale Ferguson – Woodburn & Wedge/WRID
- Gary Garms – Self
- Tom Gallagher – NDWR
- Cathy Wilson – BIA
- George Benesch – Lyon County
- David Yardas – NFWF



Accuracy of U.S. Geological Survey Streamflow Data

Steve Berris

Nevada Networks Chief

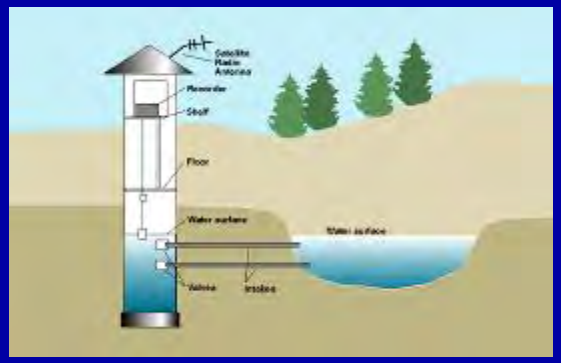
USGS Nevada Water Science Center

snberris@usgs.gov

775-887-7693

USGS

The USGS measures stream stage and produces a continuous record of discharge by making periodic discharge measurements



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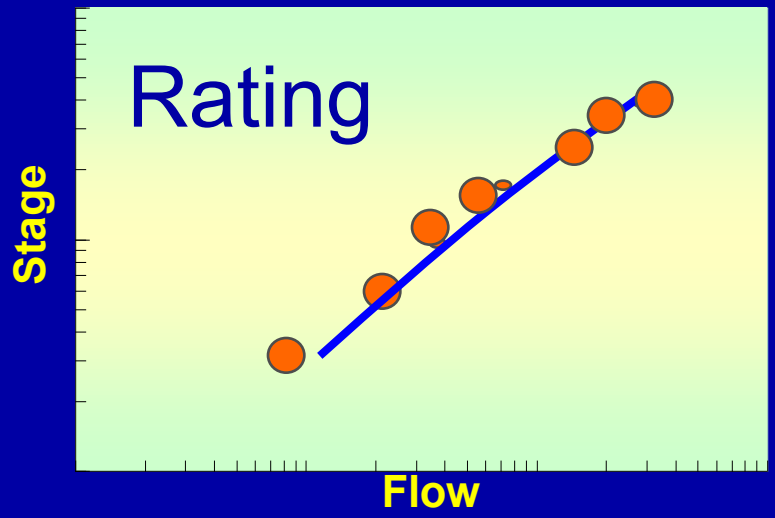
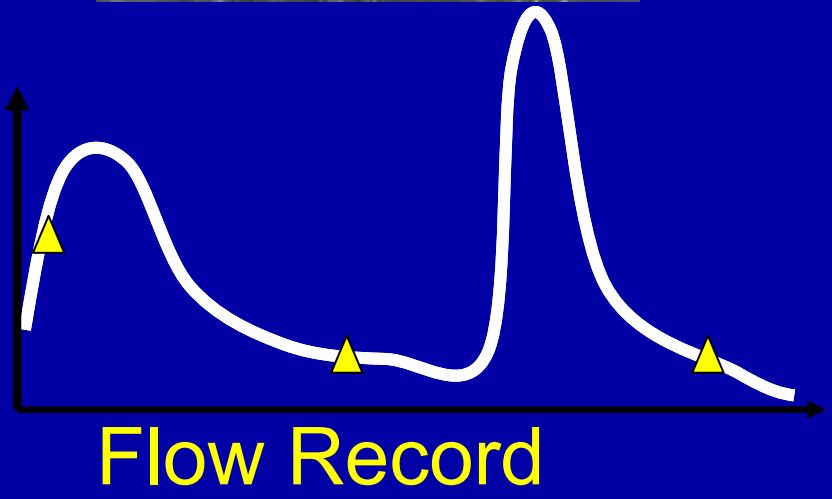
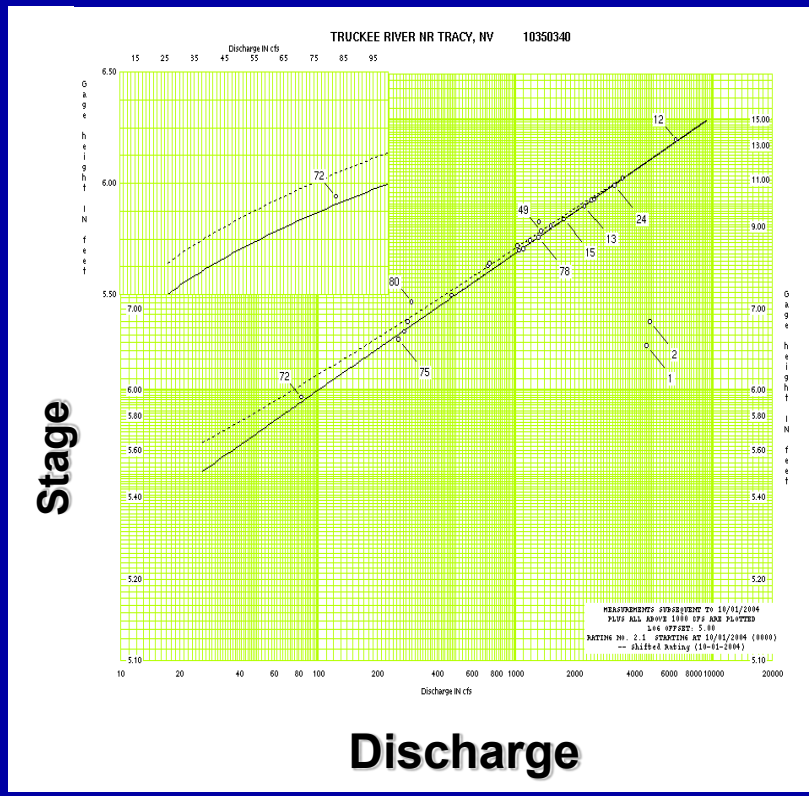




USGS

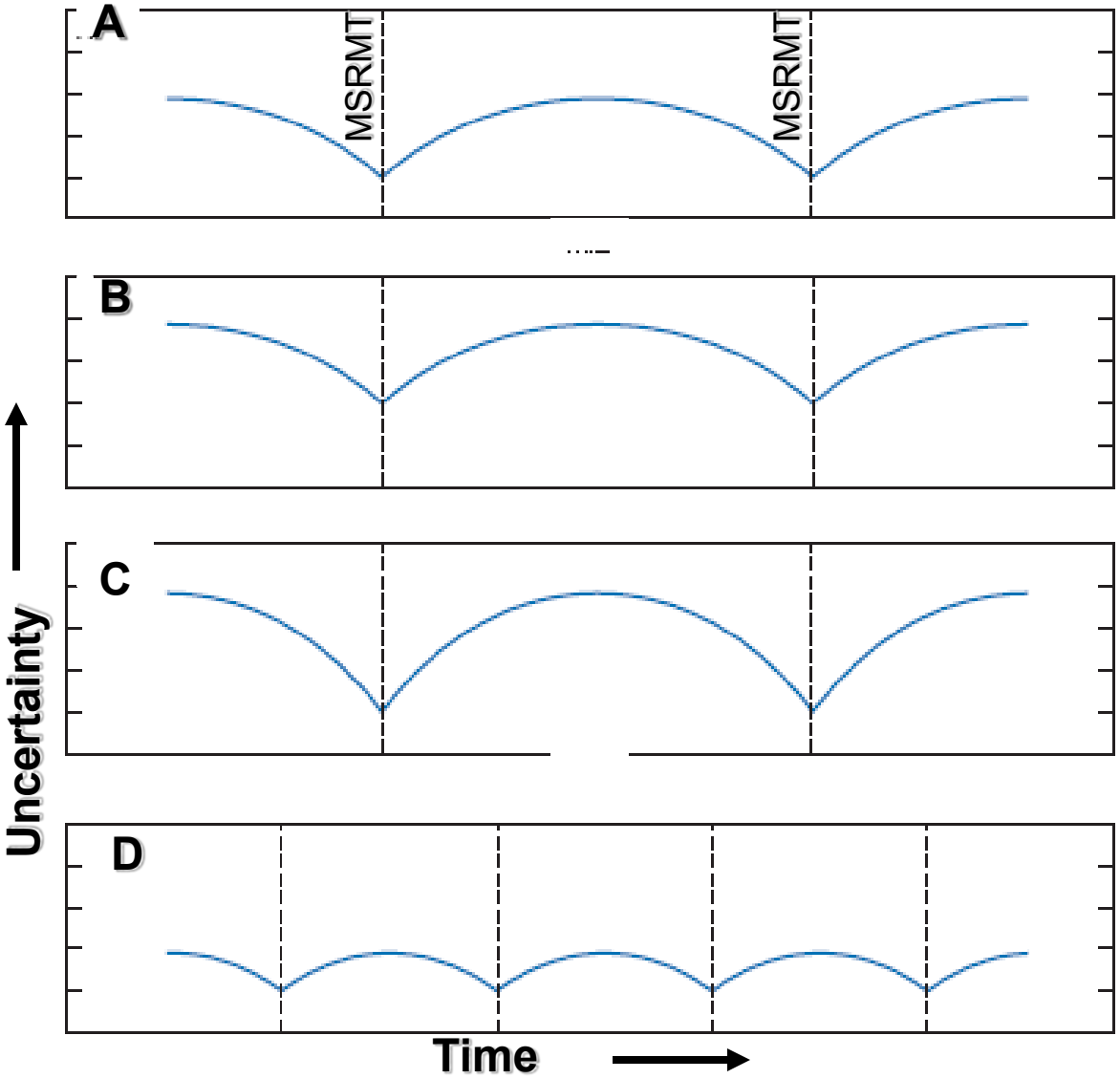
Published Accuracy of Streamflow Records are categorized according to the following ranks:

- **Excellent – 95% of daily discharges within 5% of true value**
- **Good – 95% of daily discharges within 10% of true value**
- **Fair – 95% of daily discharges within 15% of true value**
- **Poor – Daily discharges have less than "fair" accuracy**



USGS

Here is a conceptual model how uncertainty varies in a discharge record:



Base Condition

Larger Measurement Uncertainty:

- Verify instrument performance!

- Make check msrmts!

Larger Process Uncertainty

More frequent Visits/Measurements

-Visit/measure more often!

USGS

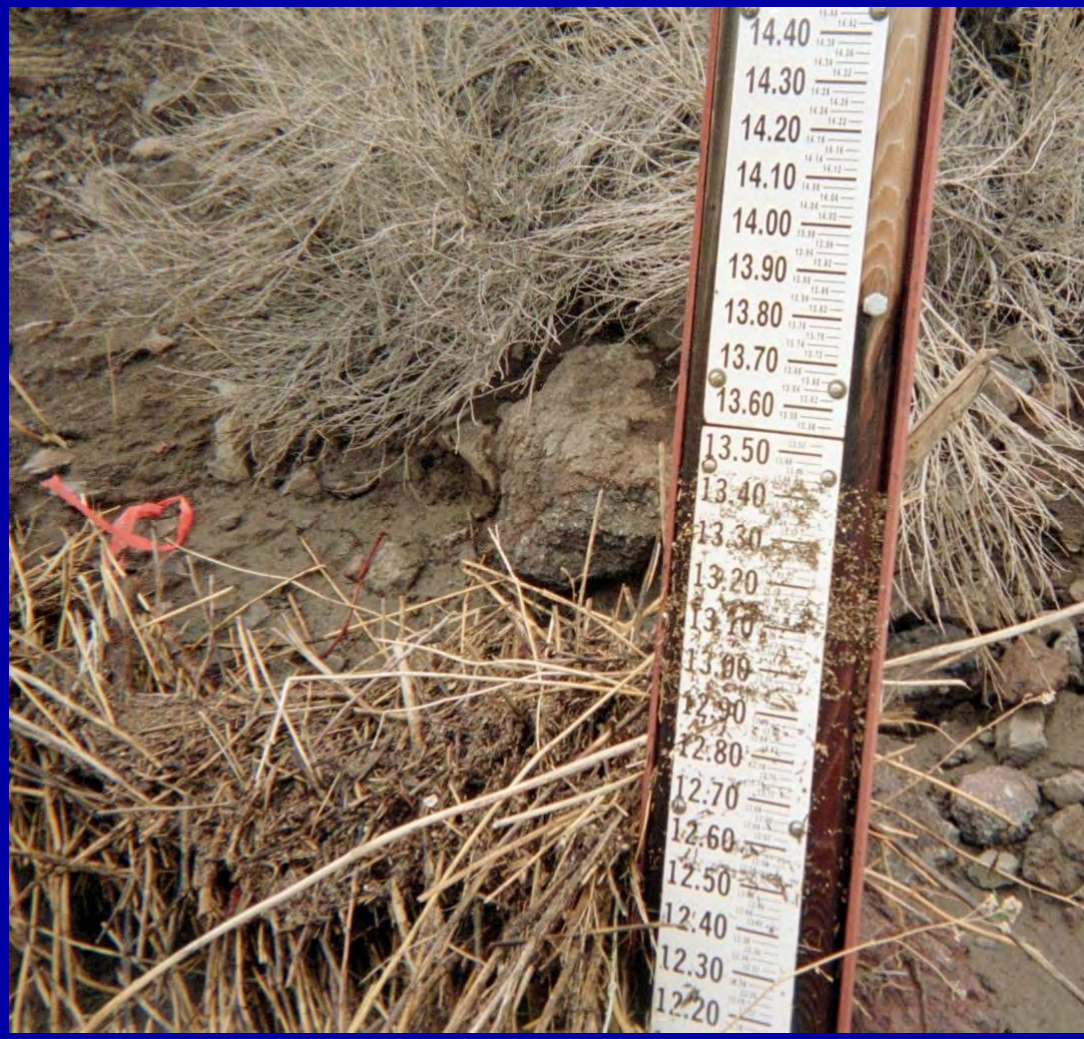
Accuracy of Streamflow Records

- Accuracy corresponds to the quality of the collected data and the computed record
- **Collected Gage-Height Data**
  - Quality of gage-height data / application of corrections to gage-height record
- **Computed Flow Record**
  - Measurement accuracy
  - Stability of control / application of shifts
  - Measurement frequency and timeliness

USGS

USGS has strict accuracy standards for collected stage data

- **Reference Gage Accuracy = +/- .01 ft or 0.2 % of effective range.**
- **Collected gage-height data compared with outside reference gage**



USGS

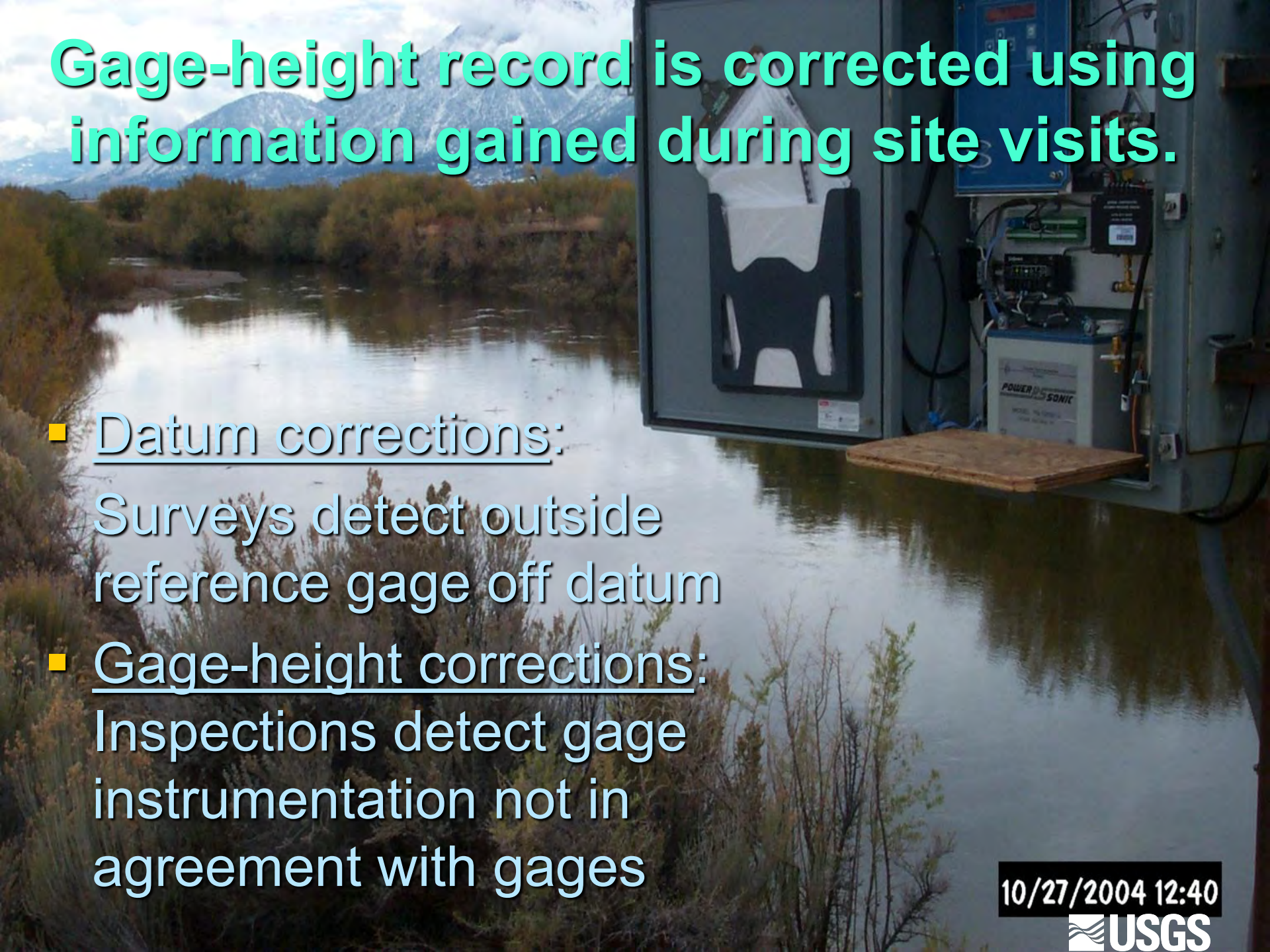
Datum at gages is regularly verified using guidelines established at USGS Headquarters.

Datum controlled to nearest 0.015 ft

Every 1 to 3 years, we run levels to verify gages have not moved from established datum

USGS

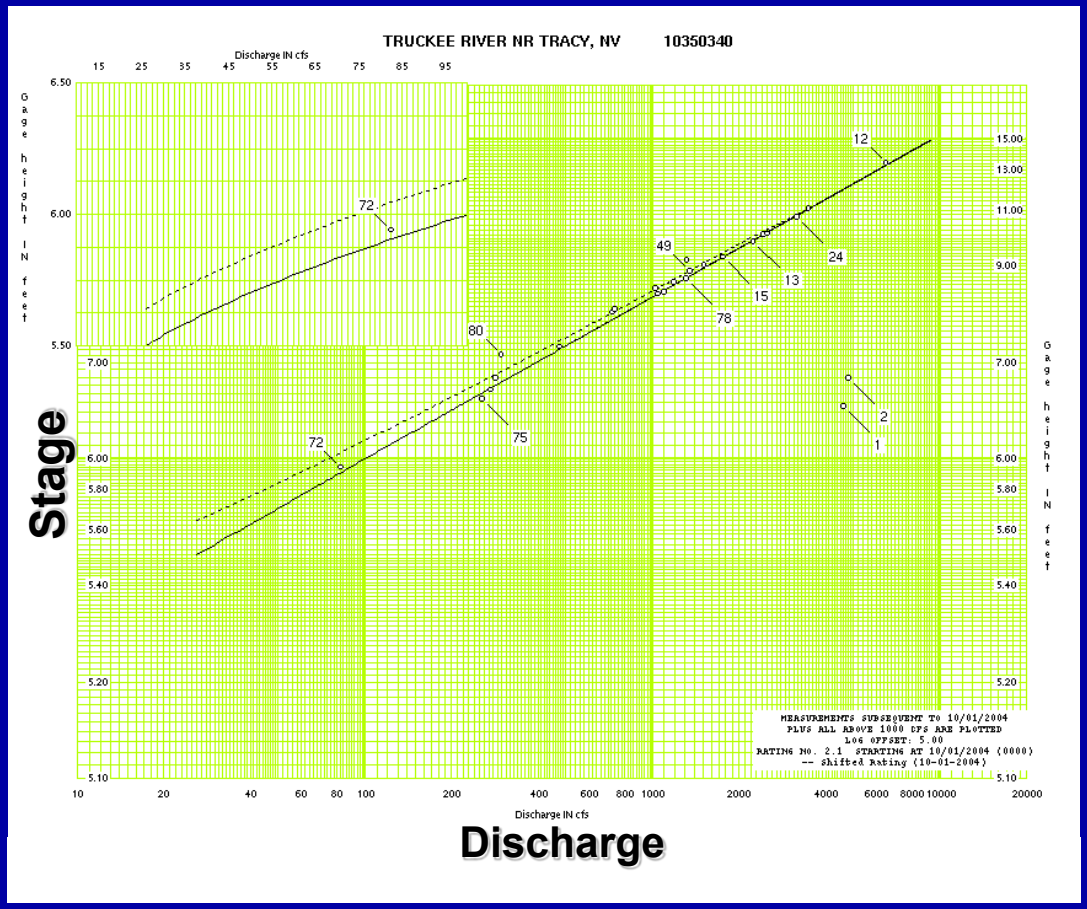
Gage-height record is corrected using information gained during site visits.



- Datum corrections: Surveys detect outside reference gage off datum
- Gage-height corrections: Inspections detect gage instrumentation not in agreement with gages

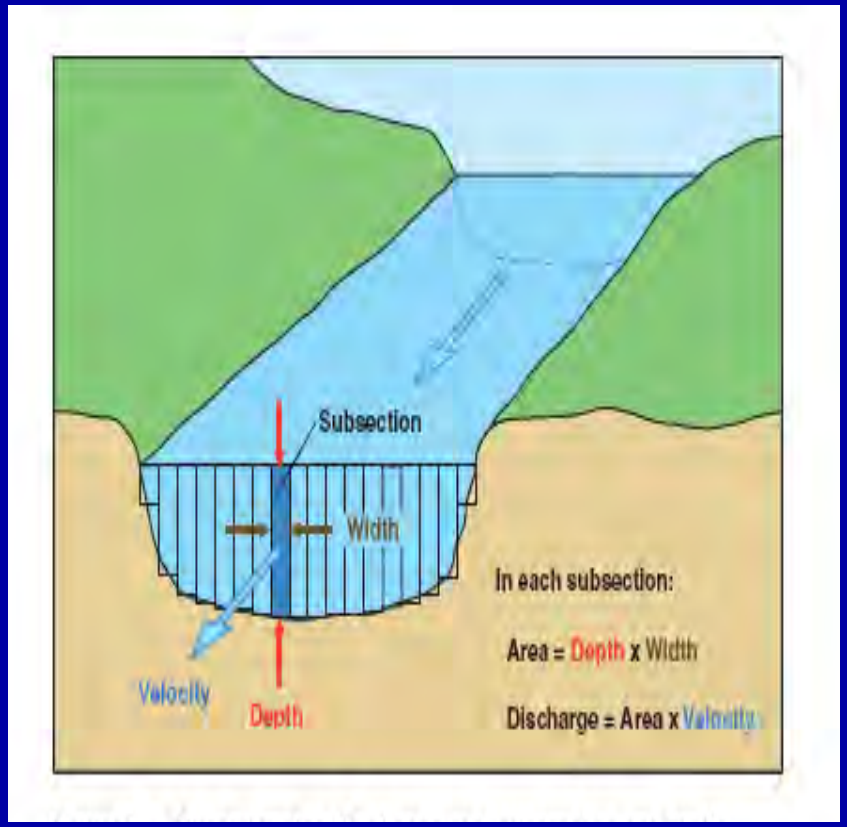
Flow Record: The relation between stage and discharge is regularly refined using periodic discharge measurements and other information noted during site visits.

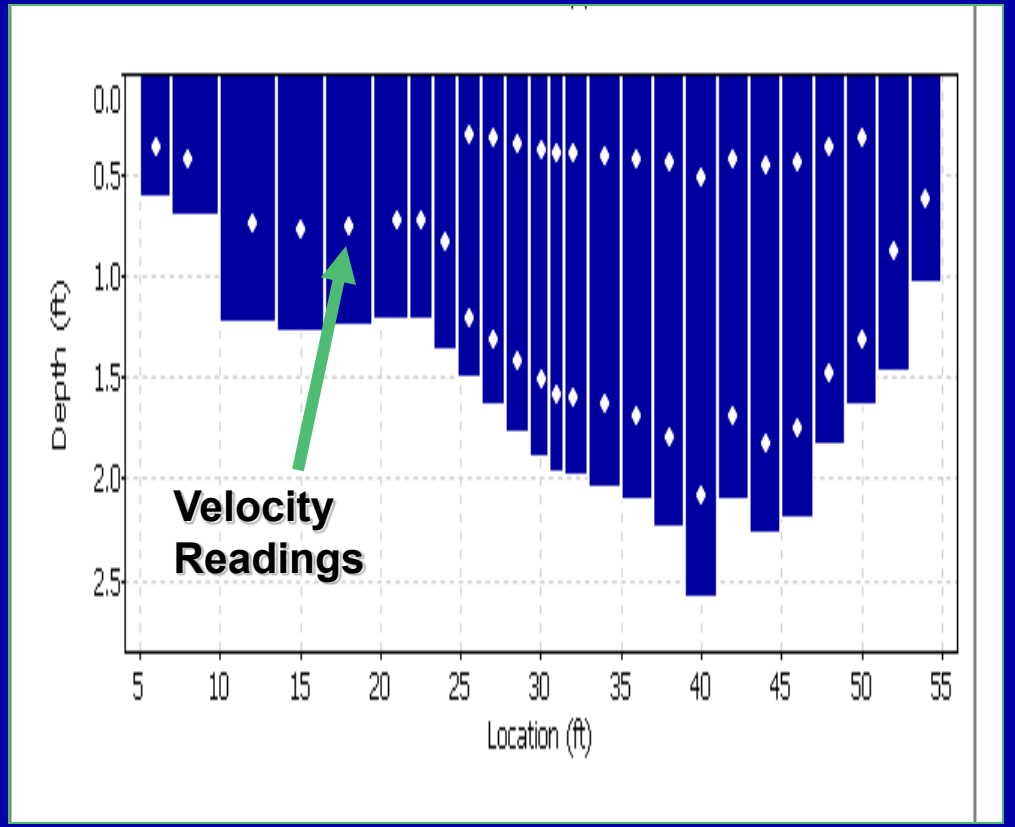
- Development
  - Requires wide range of flow measurements
  - Reviewed and approved by Office Chief
- Calibration
  - Measurements define subtle changes in channel control features that affect stage-discharge relation
  - Shifts defined by the measurements to correct stage-discharge relation



USGS

Flow Record: Discharge measurements are made using guidelines by USGS Headquarters.





USGS

The uncertainty of discharge measurements is determined using ISO and USGS standards.

- **ISO uncertainty – International Standard (published)**
  - **Accuracy of instrument**
  - **Number of verticals**
  - **Uncertainty in widths and depths**
  - **Number of velocity measurements in verticals**

- **Statistical Calculation – USGS (unpublished)**
  - **Accuracy of instrument**
  - **Uncertainty of depth and changes in depths between verticals**
  - **Variations of velocity and changes in velocity between verticals**
  - **Uncertainty in widths**

USGS

Here is an example of uncertainty assigned to a measurement using an acoustic Doppler velocity meter (ADV).

Discharge Measurement Summary

Date Generated: Mon Aug 20 2007

File Information

File Name	1033610.2.WAD
Start Date and Time	2007/06/01 11:15:07

Site Details

Site Name	
Operator(s)	

System Information

Sensor Type	FlowTracker
Serial #	P461
CPU Firmware Version	3.2
Software Ver	2.11

Units (English Units)

Distance	ft
Velocity	ft/s
Area	ft^2
Discharge	cfs

Summary

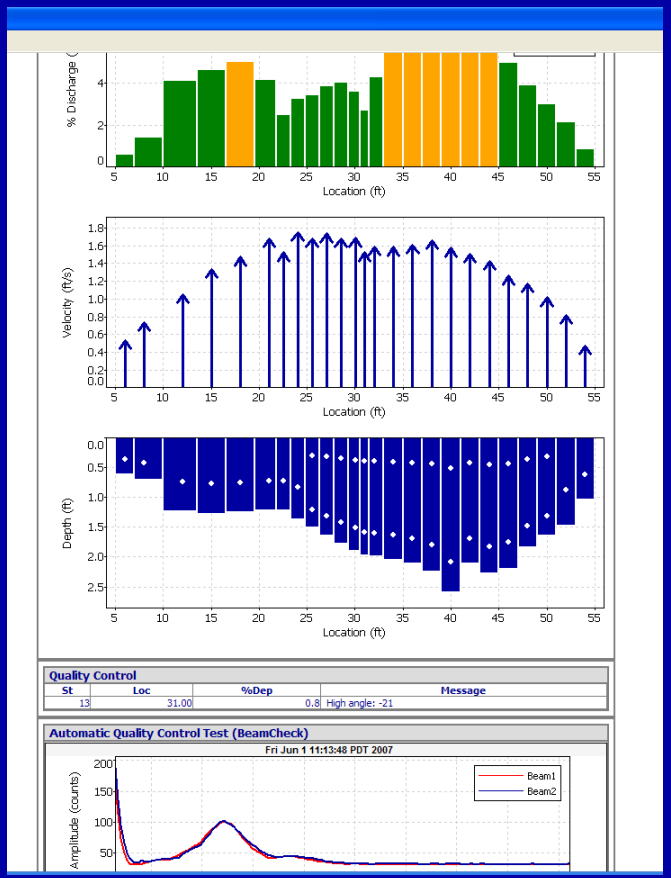
Averaging Int.	40	# Stations	27
Start Edge	LEW	Total Width	52.00
Mean SNR	26.9 dB	Total Area	80.020
Mean Temp	52.51 °F	Mean Depth	1.539
Disch. Equation	Mid-Section	Mean Velocity	1.3923
		Total Discharge	**111.4094**

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.1%	1.4%
Velocity	0.2%	1.0%
Width	0.1%	0.1%
Method	1.0%	-
# Stations	1.9%	-
Overall	**2.4%**	**2.0%**

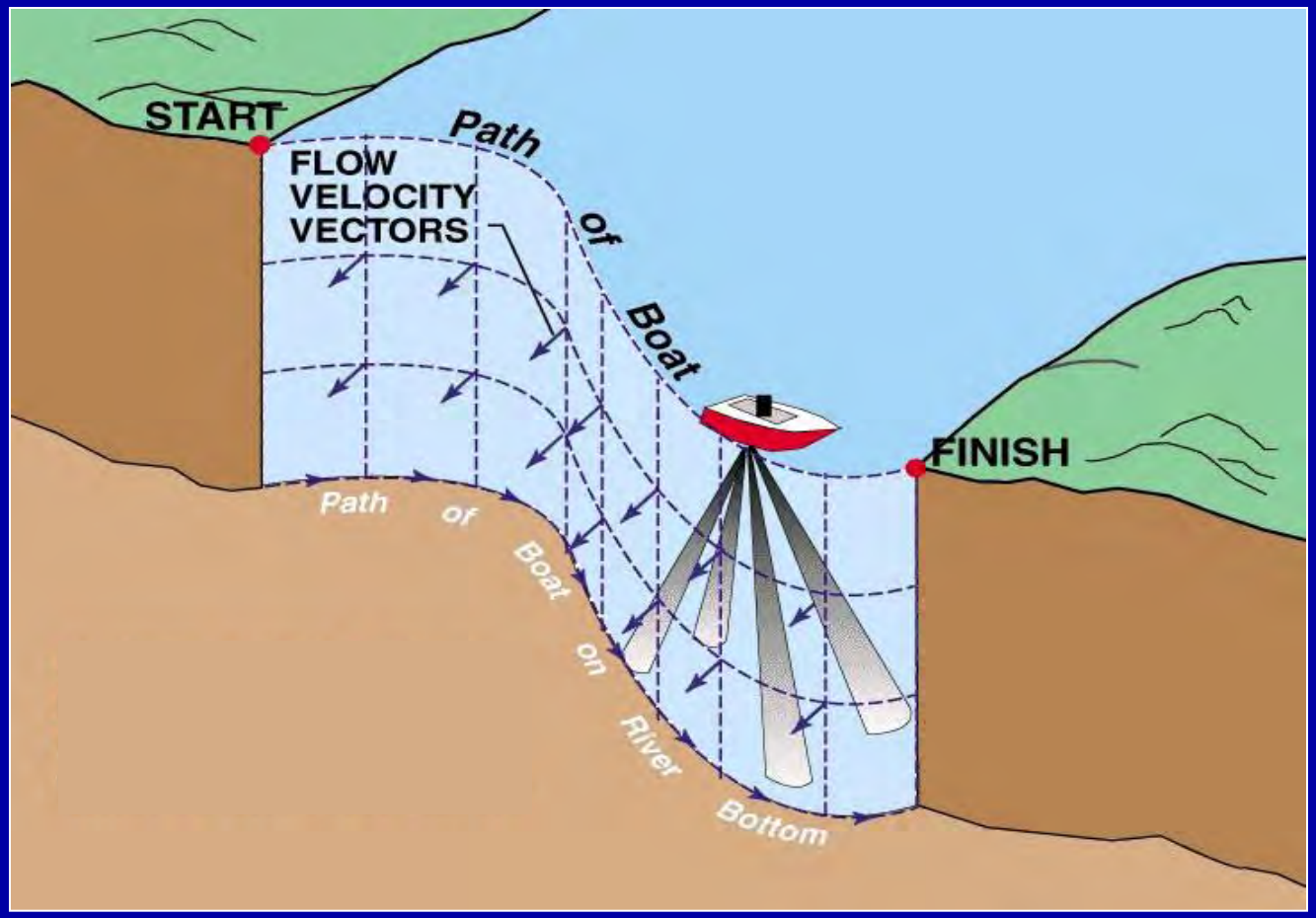
Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:15	4.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	11:15	6.00	0.6	0.620	0.6	0.248	0.5358	1.00	0.5358	1.240	0.6644	0.6
2	11:16	8.00	0.6	0.710	0.6	0.284	0.7385	1.00	0.7385	2.130	1.5730	1.4
3	11:18	12.00	0.6	1.240	0.6	0.496	1.0512	1.00	1.0512	4.341	4.5627	4.1
4	11:19	15.00	0.6	1.280	0.6	0.512	1.3353	1.00	1.3353	3.840	5.1270	4.6
5	11:21	18.00	0.6	1.260	0.6	0.504	1.4747	1.00	1.4747	3.780	5.5738	5.0
6	11:22	21.00	0.6	1.220	0.6	0.488	1.6795	1.00	1.6795	2.745	4.6107	4.1
7	11:23	22.50	0.6	1.220	0.6	0.488	1.5240	1.00	1.5240	1.830	2.7892	2.5
8	11:25	24.00	0.6	1.380	0.6	0.552	1.7510	1.00	1.7510	2.070	3.6243	3.3
9	11:27	25.50	0.2/0.8	1.510	0.2	1.208	1.8438	1.00	1.6798	2.265	3.8043	3.4
9	11:28	25.50	0.2/0.8	1.510	0.8	0.302	1.5157					
10	11:30	27.00	0.8/0.2	1.650	0.2	1.320	1.8901	1.00	1.7382	2.475	4.3018	3.9
10	11:29	27.00	0.8/0.2	1.650	0.8	0.330	1.5863					
11	11:32	28.50	0.2/0.8	1.780	0.2	1.424	1.8629	1.00	1.6780	2.670	4.4799	4.0
11	11:33	28.50	0.2/0.8	1.780	0.8	0.356	1.4931					
12	11:35	30.00	0.8/0.2	1.900	0.2	1.520	1.7953	1.00	1.6850	2.375	4.0018	3.6
12	11:34	30.00	0.8/0.2	1.900	0.8	0.380	1.5748					
13	11:37	31.00	0.2/0.8	1.980	0.2	1.584	1.7530	1.00	1.5223	1.980	3.0142	2.7

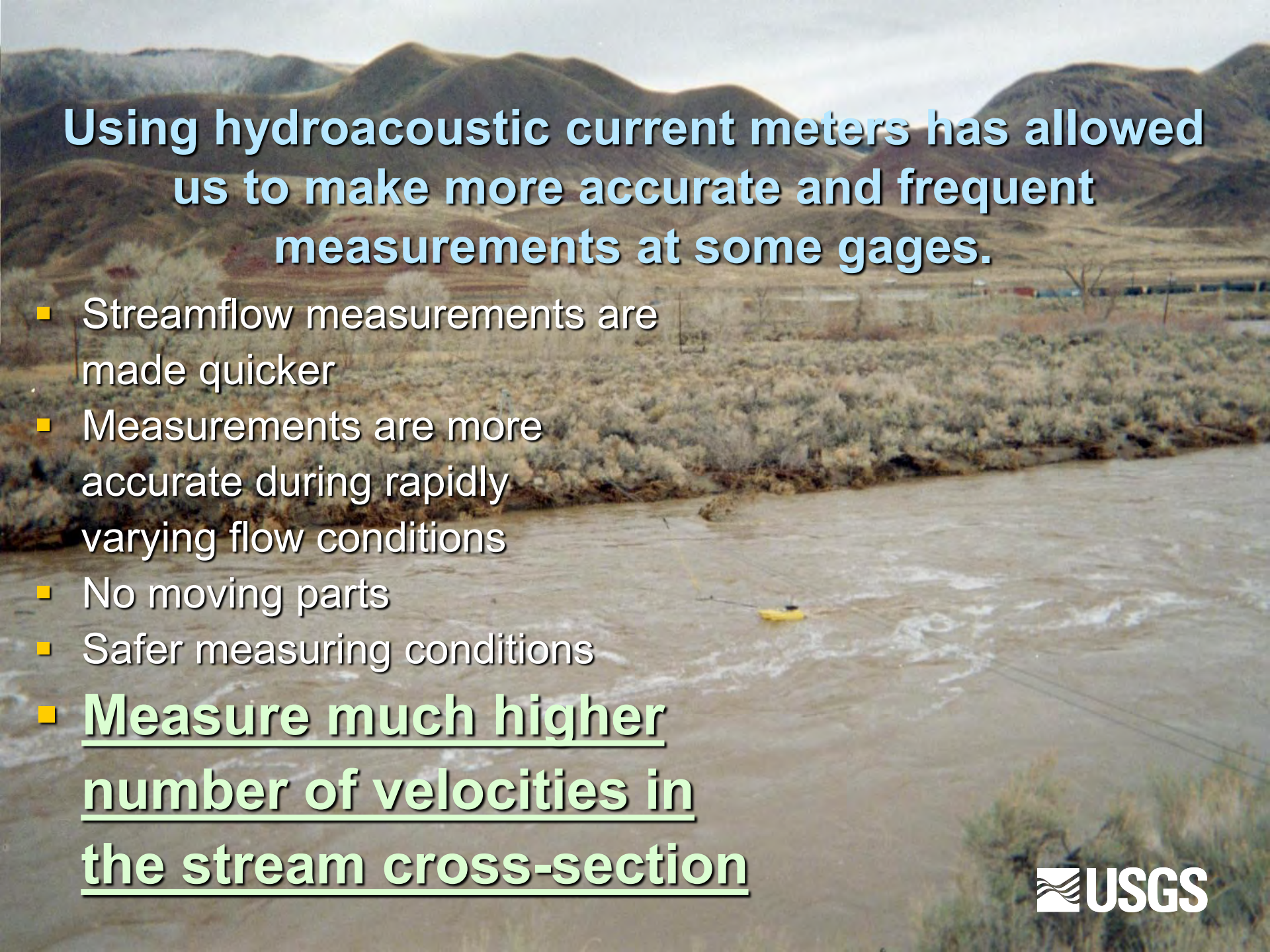


USGS

The USGS is making more measurements using hydroacoustic instruments.



USGS

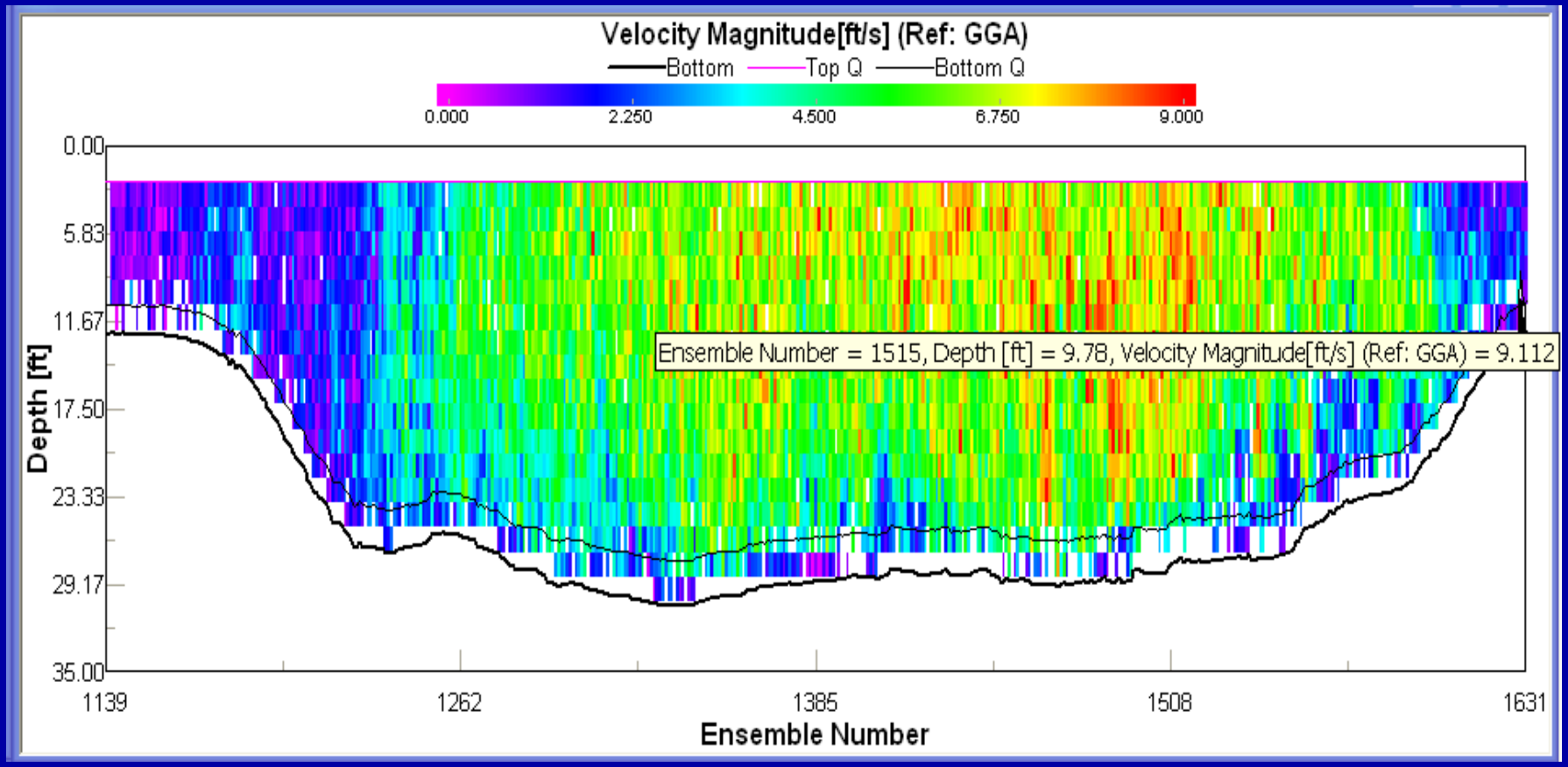


Using hydroacoustic current meters has allowed us to make more accurate and frequent measurements at some gages.

- Streamflow measurements are made quicker
- Measurements are more accurate during rapidly varying flow conditions
- No moving parts
- Safer measuring conditions
- **Measure much higher number of velocities in the stream cross-section**

USGS

Here is an example of the type and quantity of information available using hydroacoustic measurements.



USGS

We regularly make check measurements to ensure accurate discharge values.

- Check measurements routinely made for verification of instrument and measurement accuracy

USGS

Flow Record:

Shifting Controls on Stage-Discharge Relations

- The “Control” controls the stage of water in a gage pool for a given flow
- Ideally, but rarely stable so that for any given flow, the gage height is the same.

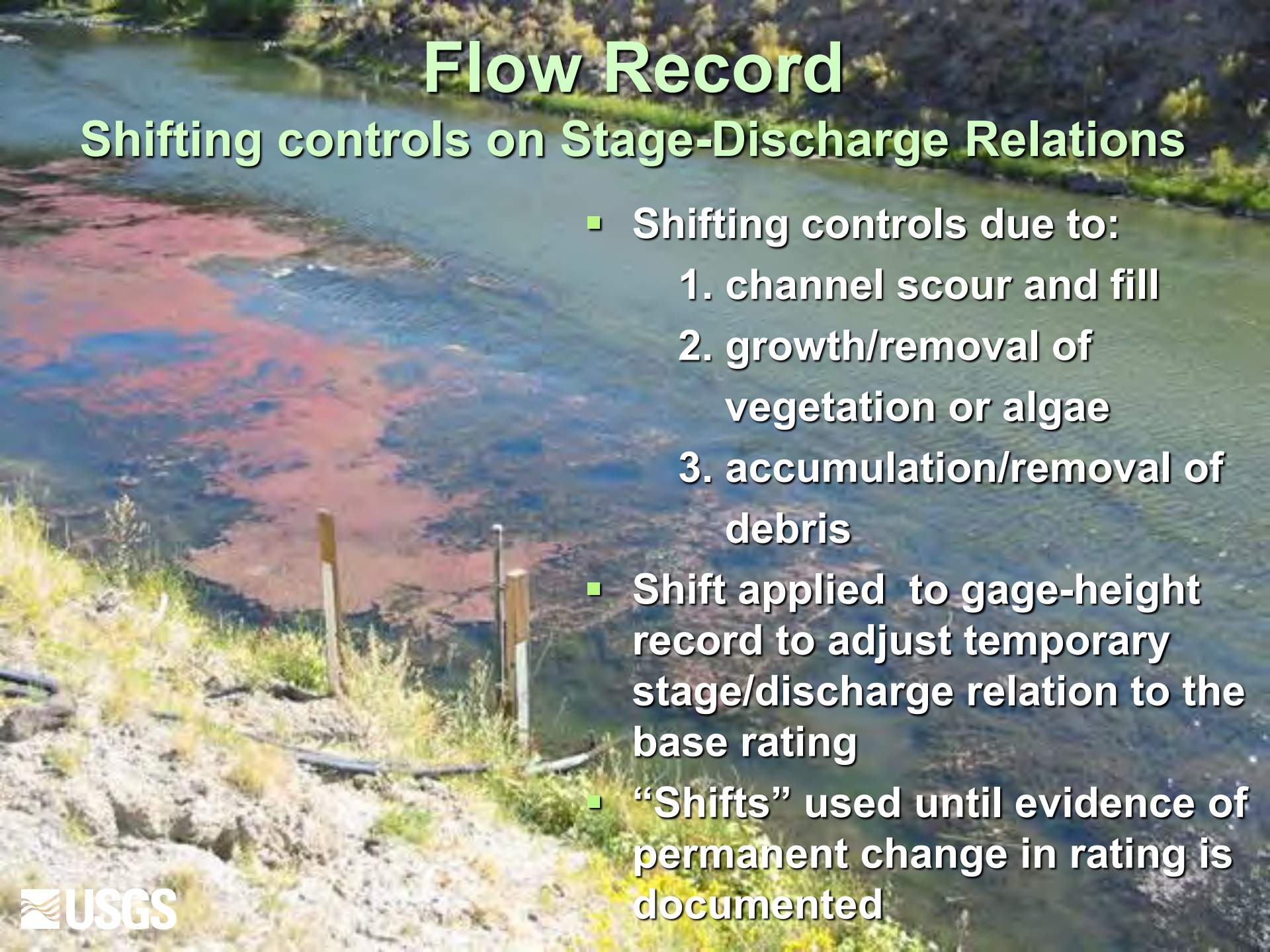
USGS

Here is another example of how the control can change the stage-discharge relationship.

USGS

Flow Record

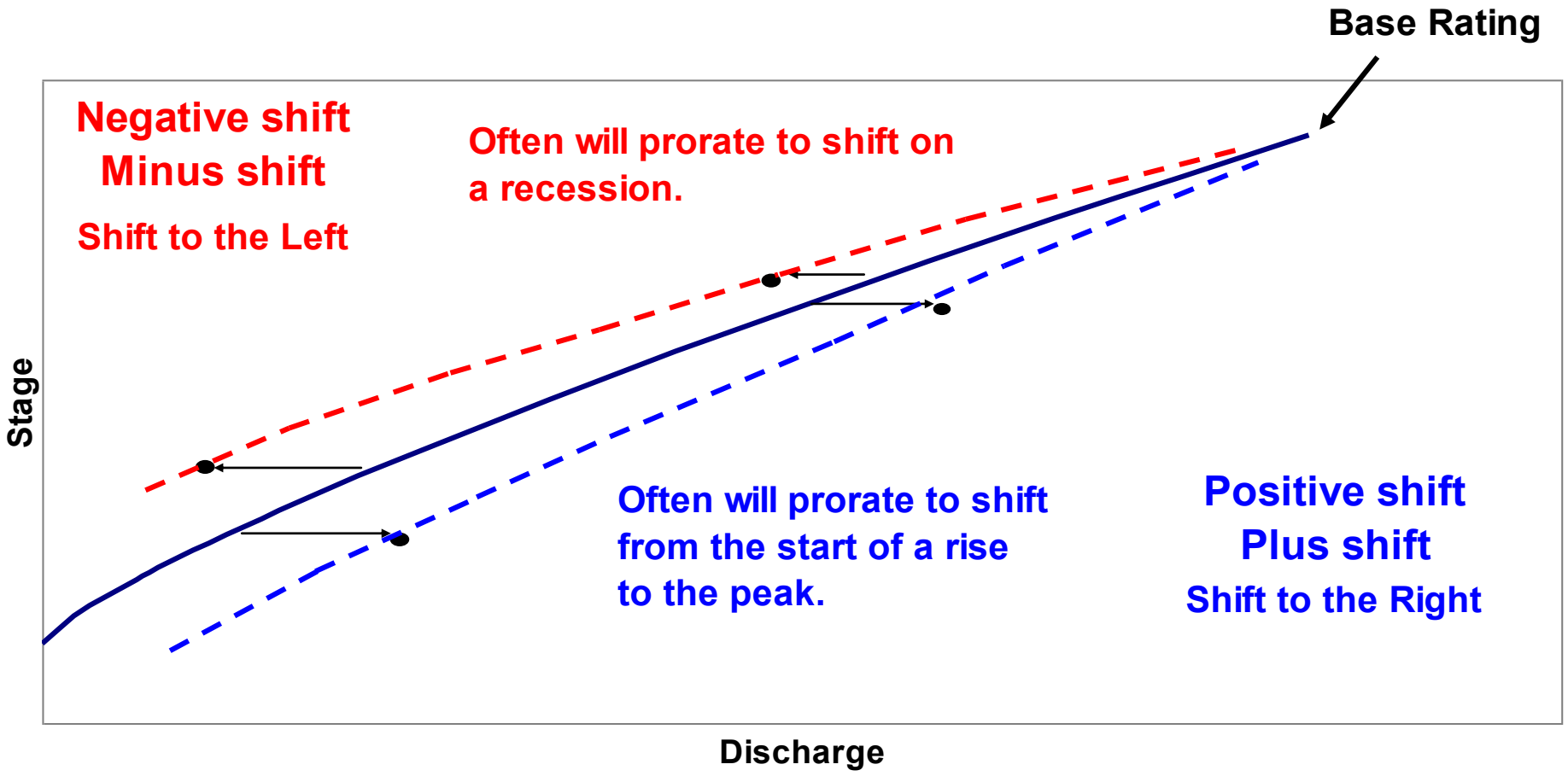
Shifting controls on Stage-Discharge Relations



- Shifting controls due to:
  1. channel scour and fill
  2. growth/removal of vegetation or algae
  3. accumulation/removal of debris
- Shift applied to gage-height record to adjust temporary stage/discharge relation to the base rating
- “Shifts” used until evidence of permanent change in rating is documented

USGS

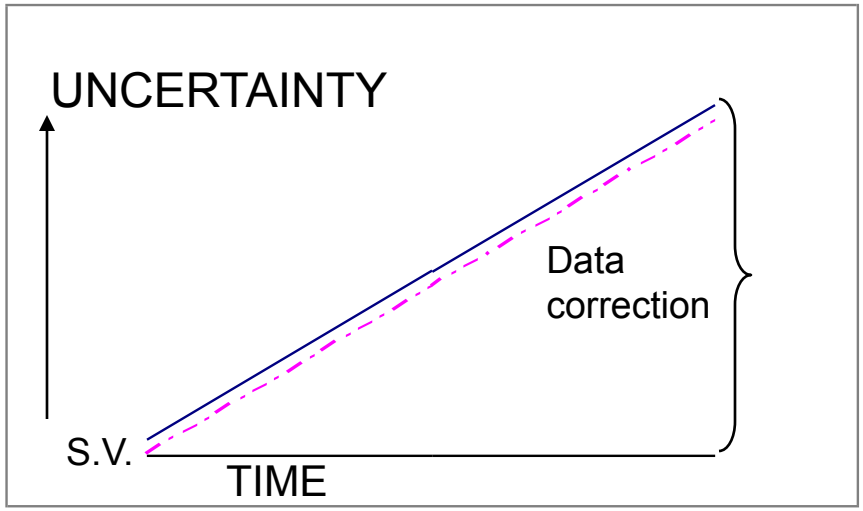
Again, frequent discharge measurements are required to refine the stage-discharge record to provide accurate discharge values.



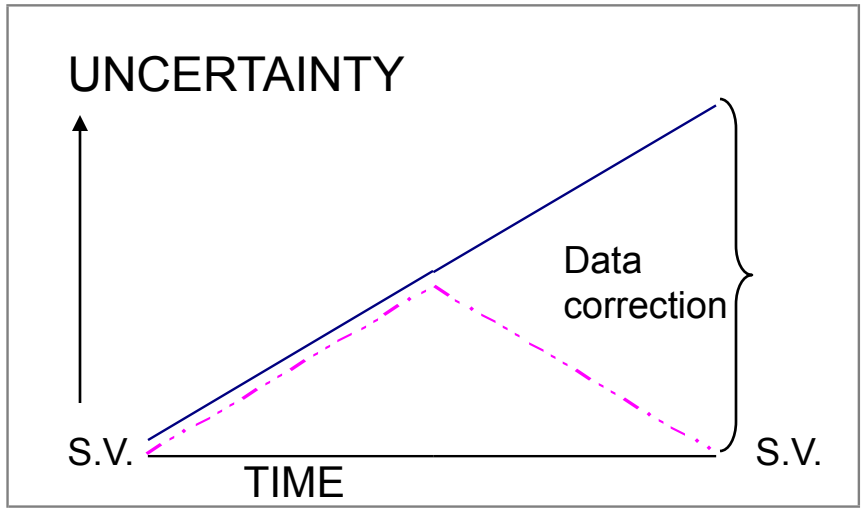
USGS

Shorter periods between discharge measurements can increase accuracy of the streamflow record.

Current Model of Data Uncertainty

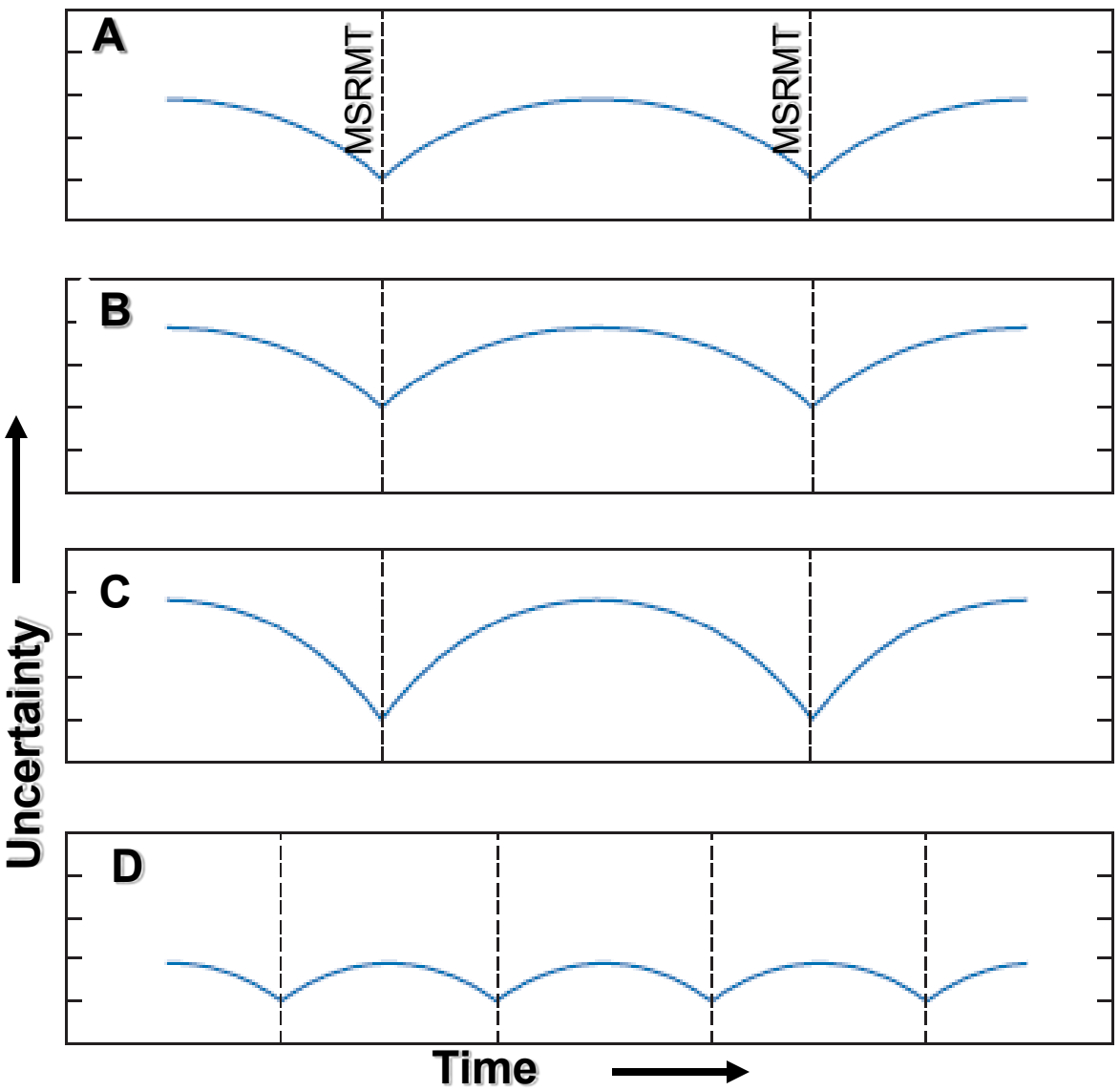


Future Model of Data Uncertainty



USGS

So using the conceptual model for uncertainty, here's what we do to produce accurate records.



Base Condition

Larger Measurement Uncertainty:

- Verify instrument performance!

- Make check msrmts!

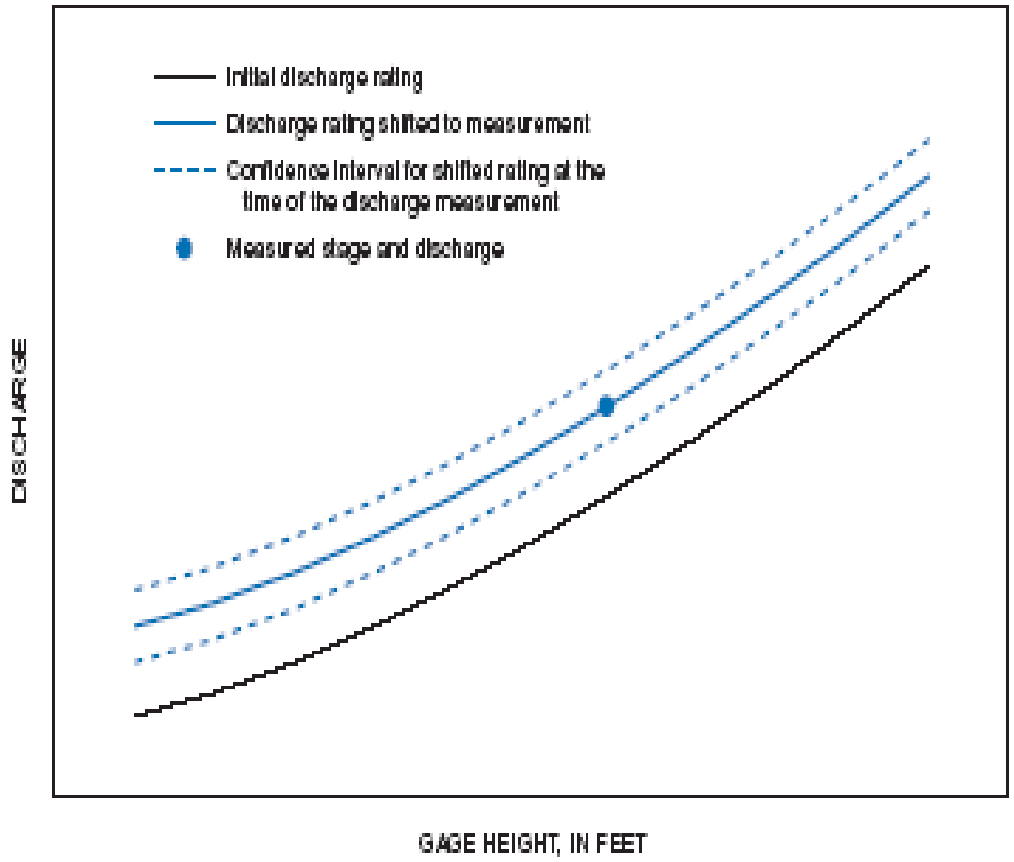
Larger Process Uncertainty

More frequent Visits/Measurements

-Visit/measure more often!

USGS

Flow Records: Uncertainty



- With uncertainty, published data has error bands, but with standard tested practices, little bias occurs over time
- USGS project to develop methods to evaluate and publish uncertainty of every data value

USGS

Walker River Basin Gages

East Walker River				
Gage Number	Gage Name	Parameter	Schedule	Remarks
10289500	Green Ck nr Bridgeport	Continuous Discharge	6-weeks	Re-started Oct 2004
10290300	Upper Twin Lake nr Bridgeport	**Discrete** Stage	Monthly	
10290400	Lower Twin Lake nr Bridgeport	**Discrete** Stage	Monthly	
10290500	Robinson Ck at Twin Lakes Outlet nr Bridgeport	Continuous Discharge	6-weeks	Re-started Oct 2009
10291500	Buckeye Ck nr Bridgeport	Continuous Discharge	6-weeks	Re-started Oct 2009
10292500	Bridgeport Res nr Bridgeport	Continuous Stage	6-weeks	
10293000	E Walker R nr Bridgeport	Continuous Discharge	6-weeks	
10293048	Sweetwater Ck at Hwy 338 nr Bridgeport	Continuous Discharge	6-weeks	Re-started Oct 2009
10293050	E Walker R blw Sweetwater Ck nr Bridgeport	Continuous Discharge	6-weeks	Re-started Apr 2011
10293500	E Walker R abv Strosnider Ditch nr Mason	Continuous Discharge	6-weeks	
10295000	E Walker R nr Mason	Continuous Discharge	6-weeks	Started Sep 2010

USGS

Walker River Basin Gages

West Walker River				
Gage Number	Gage Name	Parameter	Schedule	Remarks
10296000	W Walker R blw L Walker R nr Coleville	Continuous Discharge	6-weeks	
10296500	W Walker R nr Coleville	Continuous Discharge	6-weeks	Discharges greater than 600 cfs rated poor.
10296700	W Walker R blw Topaz Canal Div nr Topaz	Continuous Discharge	6-weeks	Started Aug 2010
10296750	Topaz Canal blw Div W Walker R nr Topaz	Continuous Discharge	6-weeks	Started Aug 2010
10297000	Topaz Lake nr Topaz	Continuous Stage	6-weeks	
10297010	Topaz Canal blw Topaz Lake nr Topaz	Continuous Discharge	6-weeks	Started Jul 2010
10297500	W Walker R at Hoye Bridge nr Wellington	Continuous Discharge	6-weeks	
10298600	W Walker R blw Smith Vly Div nr Wellington	Continuous Discharge	6-weeks	Started Sep 2010
10299100	Desert Ck nr Wellington	Continuous Discharge	6-weeks	
10299300	Red Canyon Ck nr Wellington	Continuous Discharge	6-weeks	Started Jul 2010
10300000	W Walker nr Hudson	Continuous Discharge	6-weeks	
10300200	W Walker R at Hwy 208 Bridge nr Mason	Continuous Discharge	6-weeks	Started Oct 2010

USGS

Walker River Basin Gages

Lower Walker River				
Gage Number	Gage Name	Parameter	Schedule	Remarks
10300600	Walker R nr Mason	Continuous Discharge	6-weeks	Re-started Sep 2010.
10301100	Walker R at E Bridge St nr Yerington	**Discrete** Discharge	6-weeks	
10301120	Walker at Miller Ln nr Yerington	Continuous Discharge	6-weeks	Started July 2010. Sandy channel subject to shifting.
10301500	Walker R nr Wabuska	Continuous Discharge, Temperature, Specific Conductance	6-weeks (Nov to Mar) Bi-weekly (Apr to Oct)	Sandy channel subject to shifting.
10301600	Walker R abv Weber Res nr Schurz	Continuous Discharge	6-weeks (Nov to Mar) Bi-weekly (Apr to Oct)	Streamflow can bypass primary channel during moderate to high discharges. Bypass streamflow is not measured and is not accounted for in the computed streamflow record.
10301700	Weber Res nr Schurz	Continuous Stage	6-weeks	

USGS

Walker River Basin Gages

Lower Walker River				
Gage Number	Gage Name	Parameter	Schedule	Remarks
10301720	Walker R at PT Site blw Weber Res nr Schurz	Discrete Discharge	Bi-weekly (Apr to Oct)	
10301742	Canal No. 2 abv Little Dam nr Schurz	Continuous Discharge	Monthly (Apr to Oct)	
10301745	Walker R abv Little Dam nr Schurz	Continuous Discharge	6-weeks	Re-started Oct 2004
10301755	Canal No. 1 blw Little Dam nr Schurz	Continuous Discharge	Monthly (Apr to Oct)	
10302002	Walker R at Lateral 2-A Siphon nr Schurz	Continuous Discharge, Temperature, Specific Conductance, Discrete pH	6-weeks (Nov to Mar) Bi-weekly (Apr to Oct)	
10302005	Walker R at Powerline Crossing nr Schurz	Discrete Discharge, temperature, conductance, and pH	Bi-weekly (Apr to Oct)	
10302025	Walker R nr Mouth at Walker Lake	Continuous Discharge, discrete, temperature, conductance, and pH	6-weeks (Nov to Mar) Bi-weekly (Apr to Oct)	Started Oct 2004, re-started Jul 2010
10288500	Walker Lake nr Hawthorne	Continuous Stage	6-weeks	Started Oct 2004

USGS

Accuracy
U.S. Geological Survey
Streamflow Data

Steve Berris
Field Office Chief
Nevada Networks
USGS Nevada Water Science Center
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775-887-7693

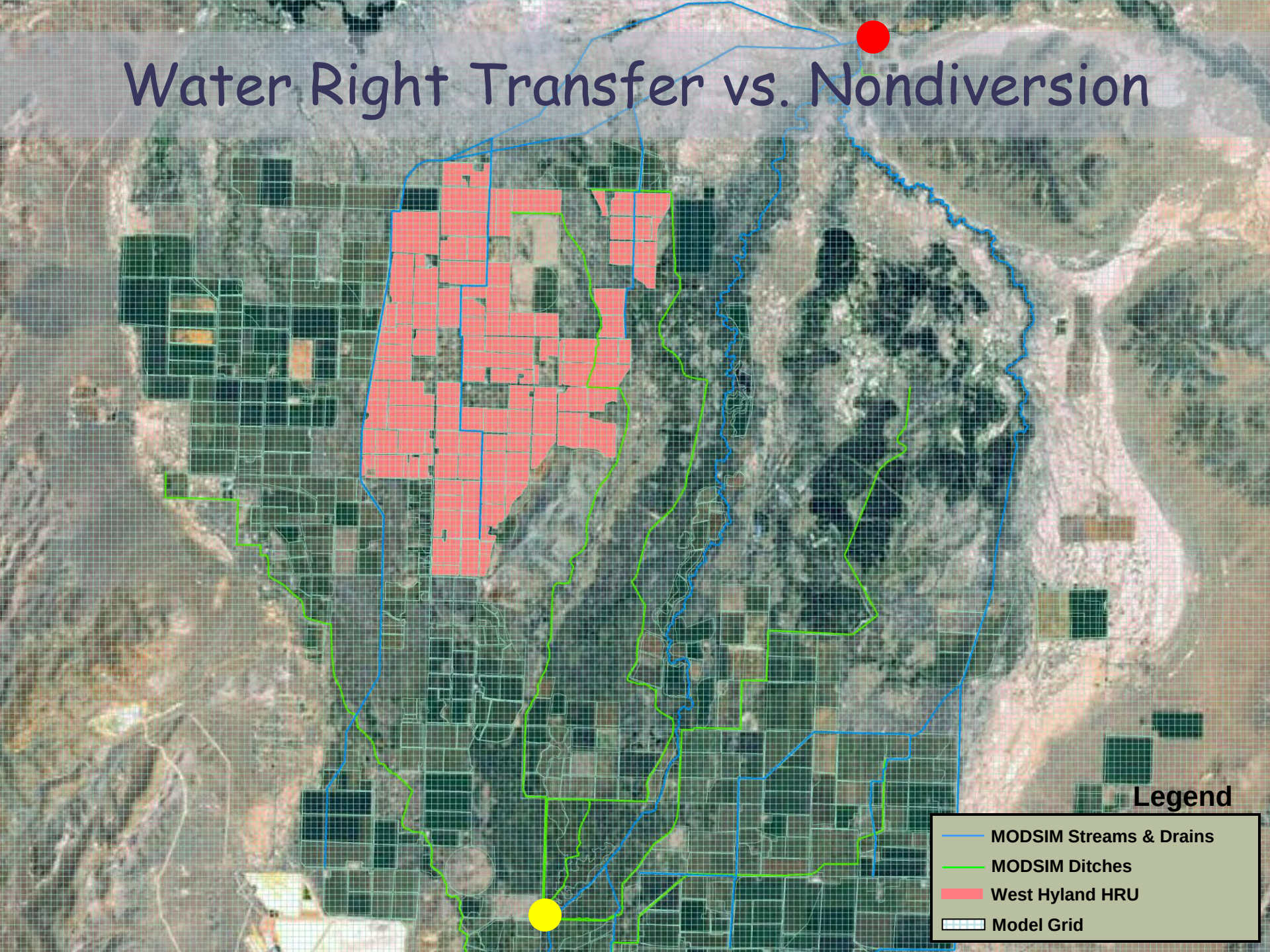
USGS

University of Nevada, Reno

Walker River Basin Decision Support Tool (DST) Version 2.0

National Fish and Wildlife Foundation (NFWF)
Change Application Scenario

Water Right Transfer vs. Nondiversion

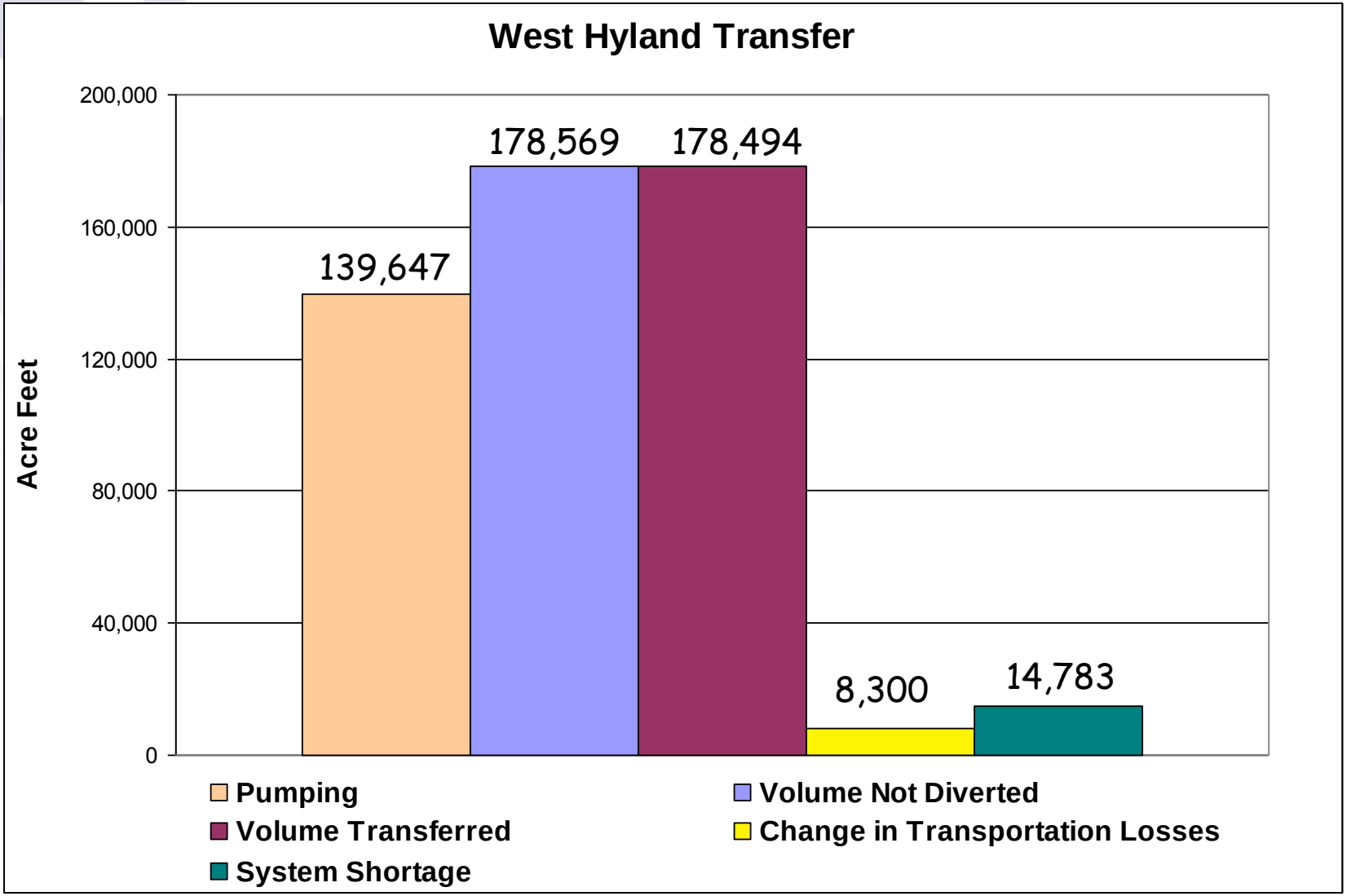


West Hyland Scenario

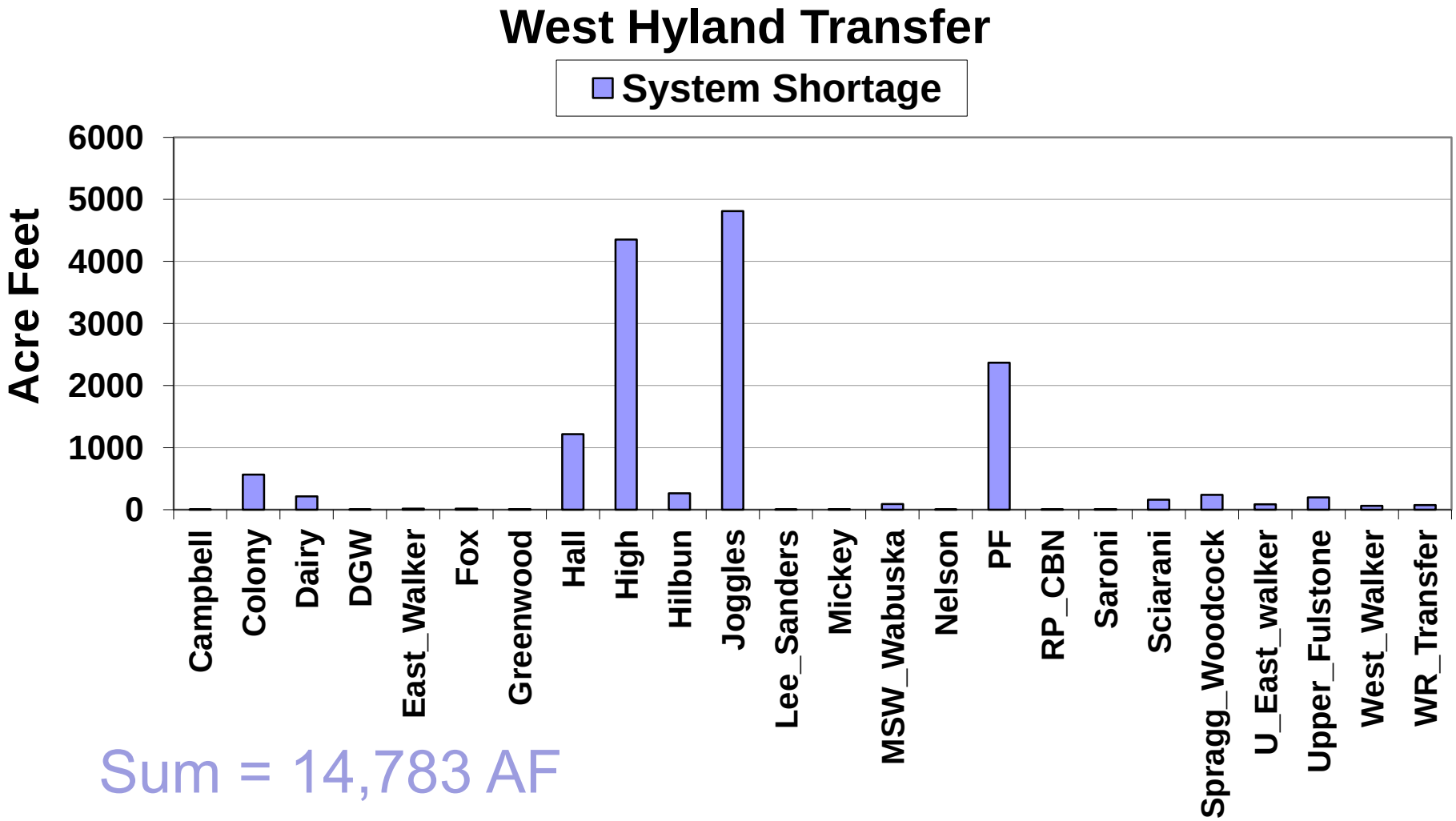
Investigate impacts of a water right transfer (MODSIM)

- Full transfer of West Hyland ditch water rights to Wabuska
- Disable supplemental pumping for West Hyland HRU
- Determine volume of West Hyland water rights that would be met at Wabuska
- Identify the change in transportation losses
- Identify system shortage associated with change in transportation losses

Scenario Results

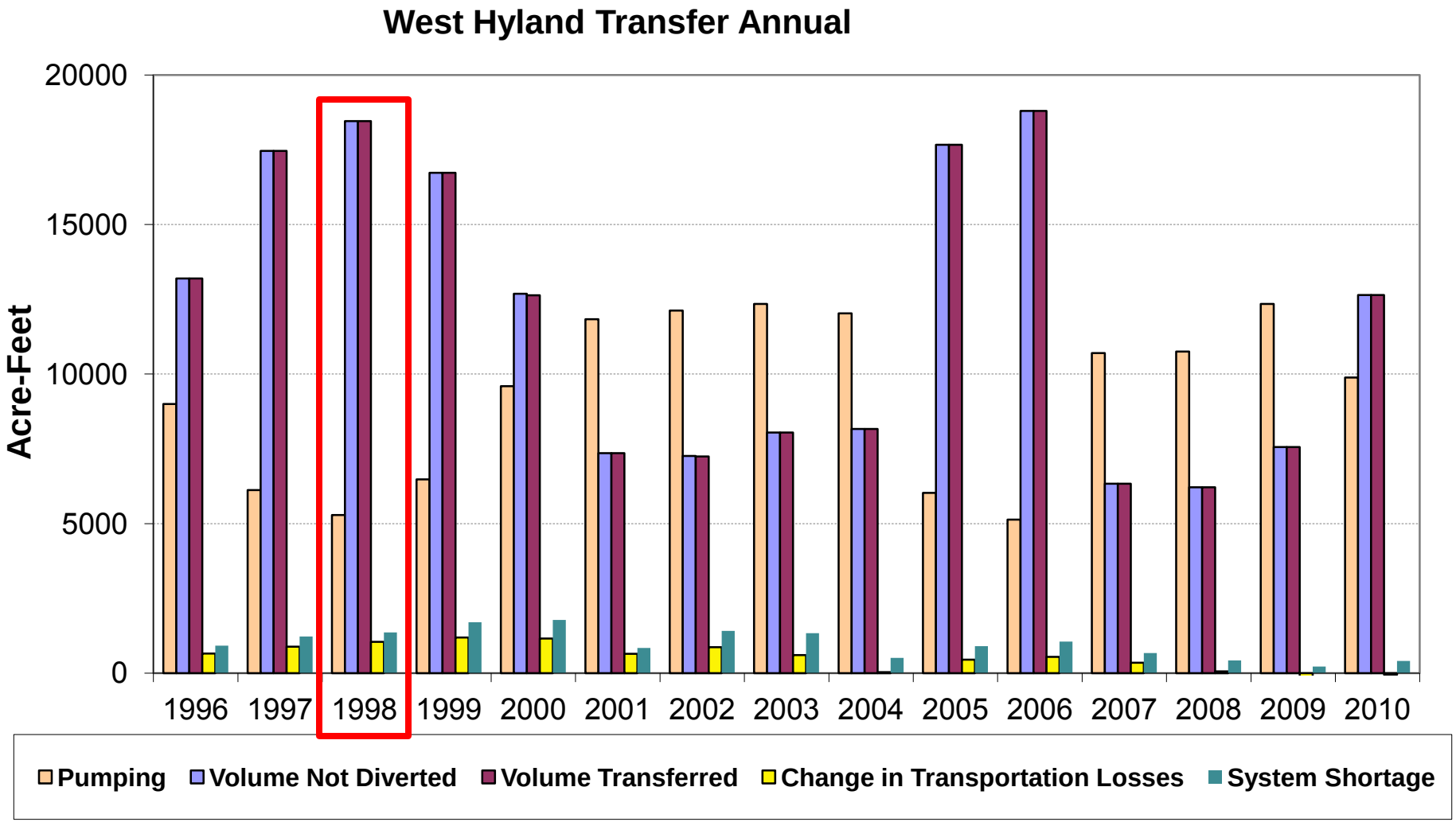


Amount and Location of System Shortage (All Years)

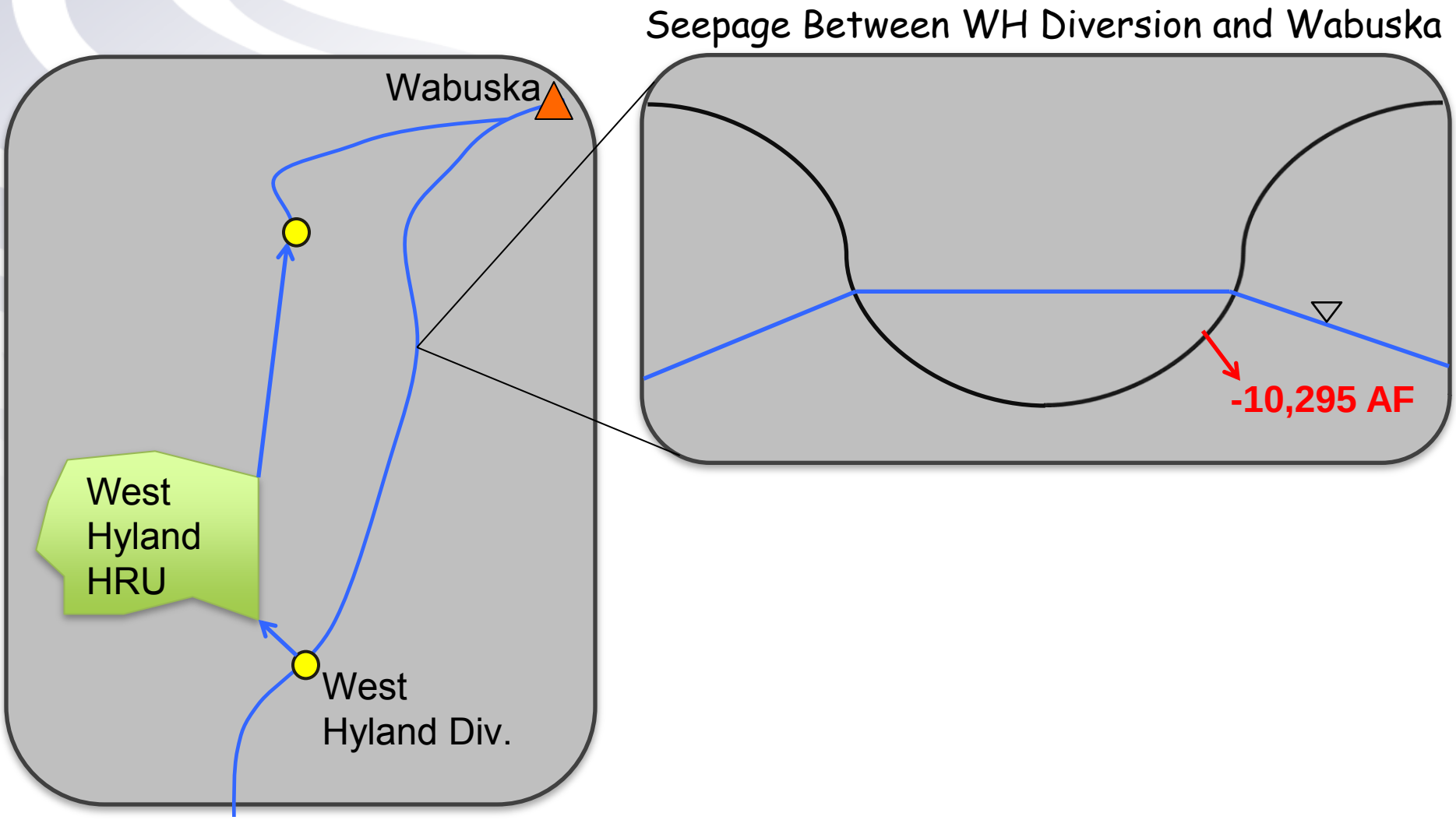


Sum = 14,783 AF

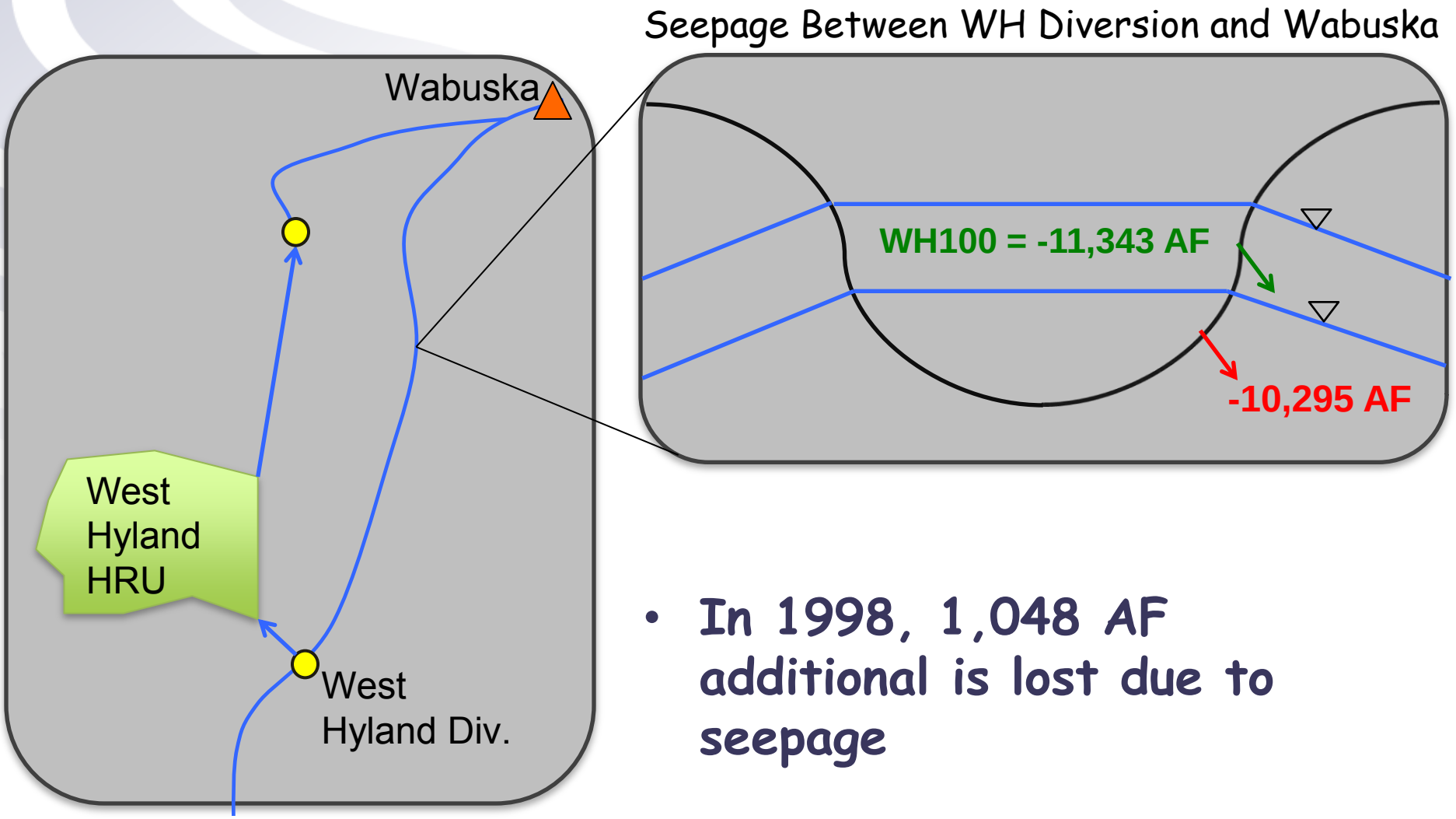
Scenario Results



Baseline Transportation Loss (1998)

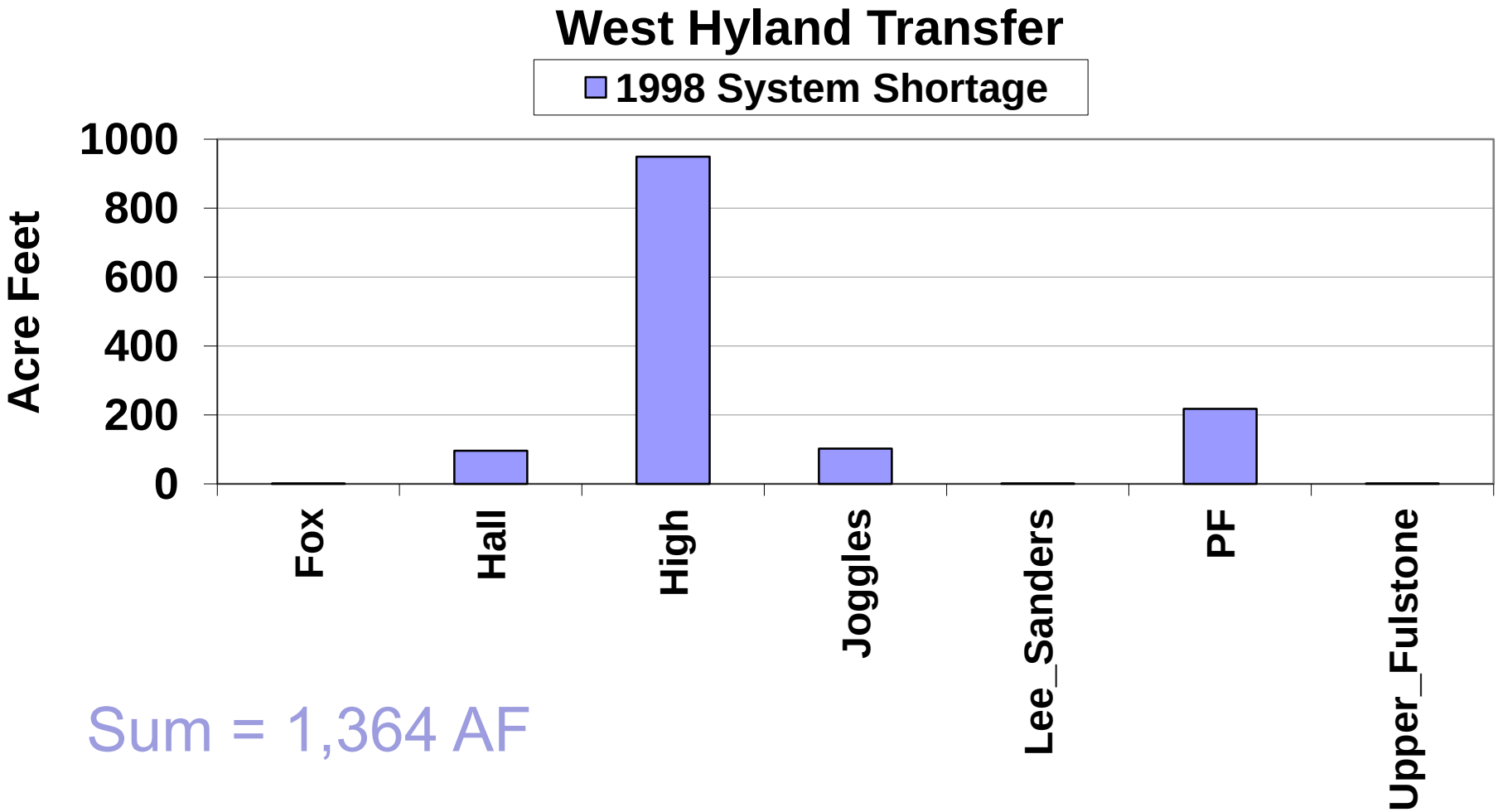


Scenario Transportation Losses (1998)



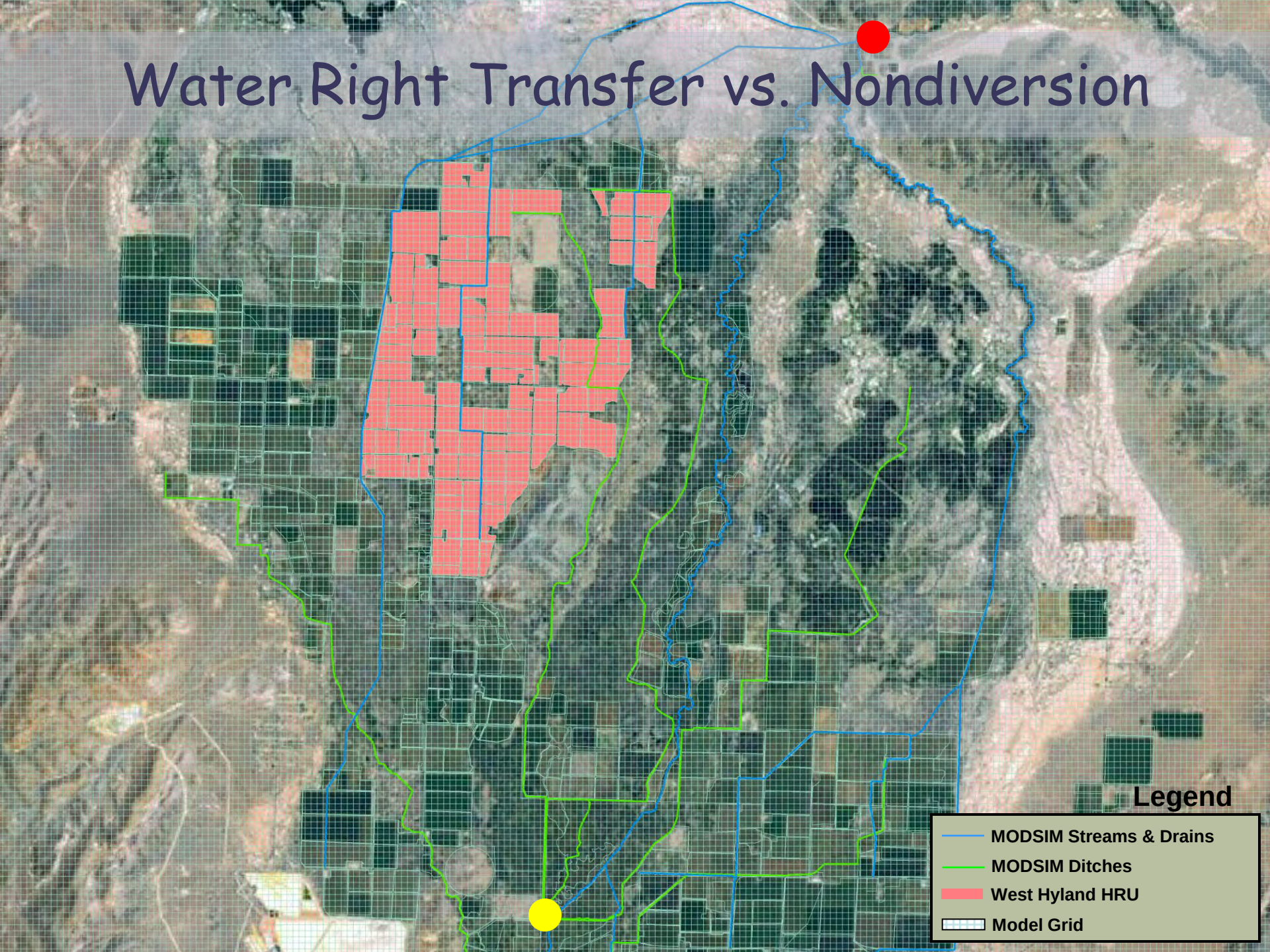
- In 1998, 1,048 AF additional is lost due to seepage

Amount and Location of System Shortage (1998)



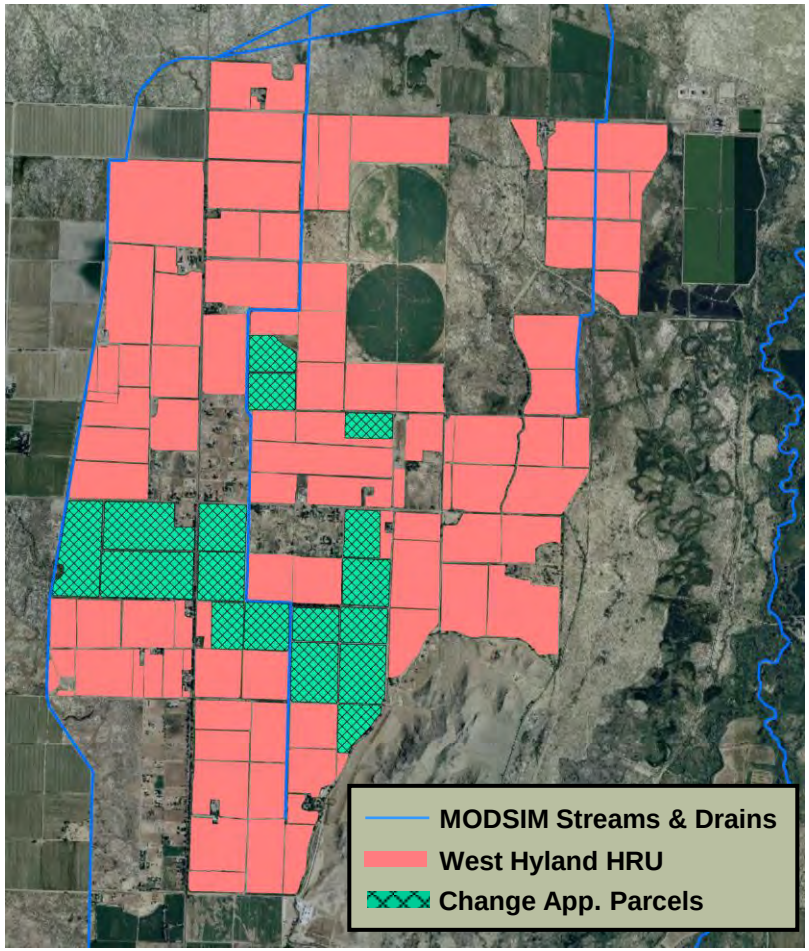
Sum = 1,364 AF

Water Right Transfer vs. Nondiversion

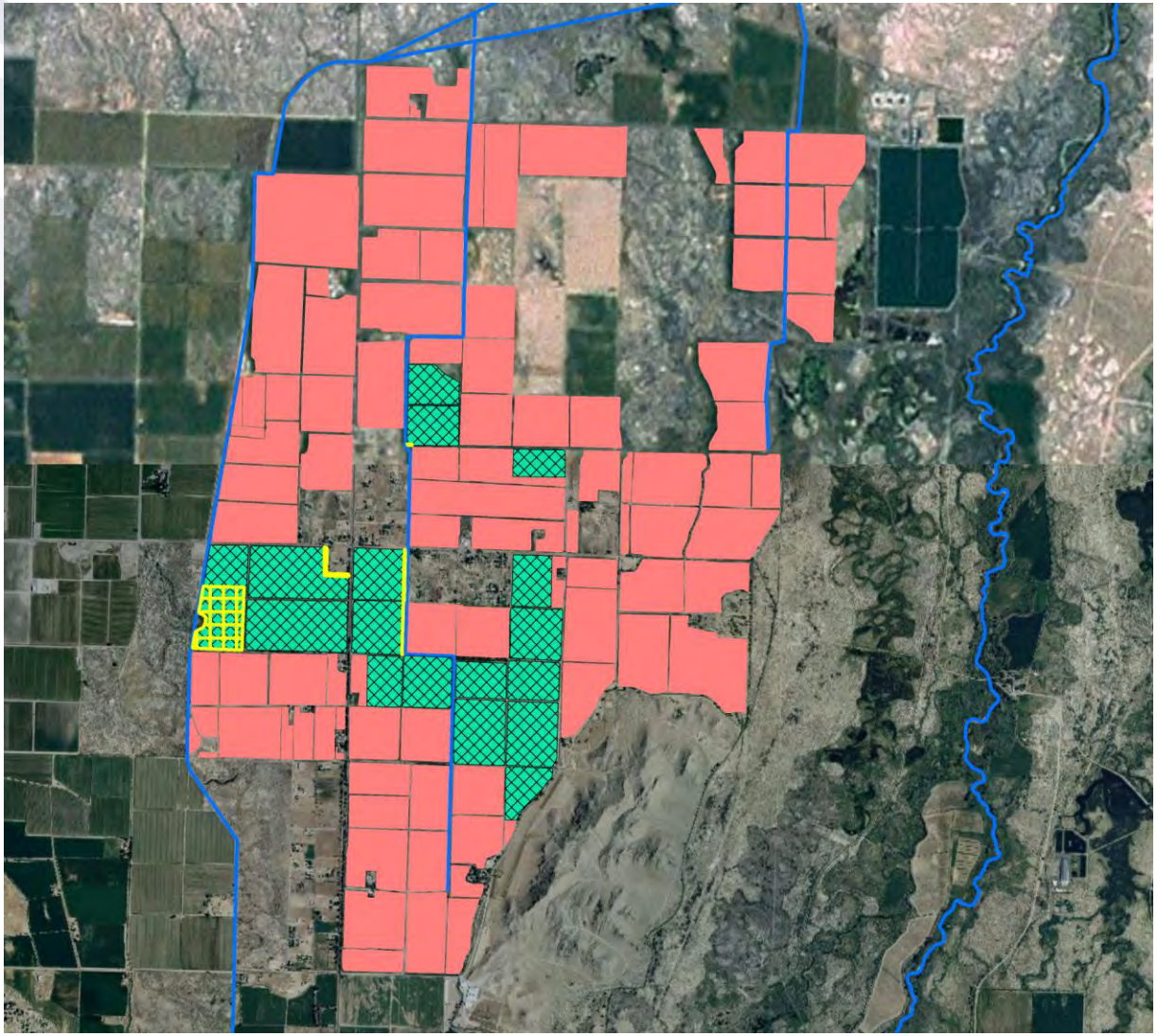


NFWF Change Application

- Summary
  - 646.16 Acres of West Hyland HRU
  - 7.745 CFS of Decree Rights
  - Claim Numbers: 23, 23A, 35, 44, 67, 89
  - Priority Dates: 1874, 1877, 1880, 1881, 1887, 1888, 1891, 1894, 1896, 1900, 1901, 1904, 1906



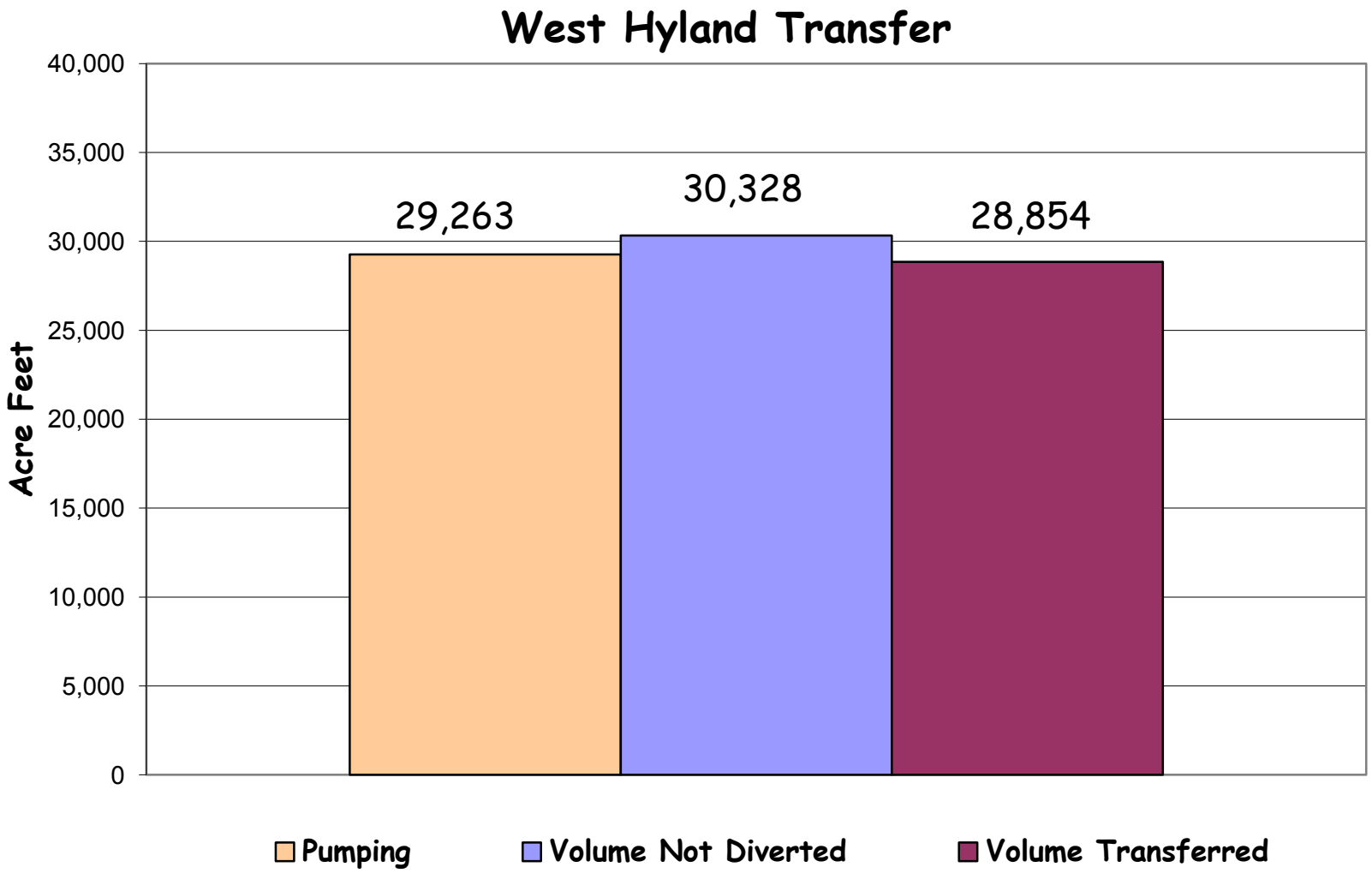
Surface Deliveries & Supplemental Pumping



NFWF Change App. Scenario

- Summary of DST Representation of the Change Application
  - The change app. parcels are removed from the DST modeling grid (i.e. fallowed) & supplemental pumping is disabled for the parcels.
  - The fraction of the diversion serving the change application parcels is calculated. This amount (x) represents the simulated decree, storage and flood delivery to the West Hyland diversion for the change app parcels.
  - (x) is subtracted from the original West Hyland diversion time series and applied to a new time series demand object at Wabuska called WR_Transfer.
  - The water rights for West Hyland and WR_Transfer Demand are adjusted to reflect the transfer of water rights.
  - The transferred water is delivered to the West Hyland diversion and allowed to flow down to the Wabuska gauge.

Very Preliminary Scenario Results



Very Preliminary Scenario Results