

## **Upper Sacramento River Monitoring Project Work Team Annual Meeting – 2018**

**DATE:** Wednesday March 21, 2018

**TIME:** 10:00 AM – 4:00 PM

**LOCATION:** Red Bluff Community Center (1500 S. Jackson St. Red Bluff, CA 96080)

**HOST AGENCY:** US Bureau of Reclamation

**NOTES:** Harmony Gugino, WSRCD

### **MISSION/PURPOSE**

The Upper Sacramento River Monitoring Project Work Team mission statement is "To meet on an annual basis to facilitate communication and information exchange among the agencies monitoring Chinook salmon and steelhead in the Upper Sacramento River Basin."

The team traditionally meets in March to coordinate exchange of study plans prior to the upcoming field season. Since its formation, we have extended data sharing to include Green Sturgeon studies and ecological monitoring in the Upper River.

In more recent years, at least half of the annual meeting has focused on informal oral presentations of the results of the monitoring activities conducted in previous years. The annual meeting chair rotates each year among US Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife, National Marine Fishery Service, US Bureau of Reclamation, and the California Department of Water Resources. The year to year primary contact for the PWT is James G. Smith - USFWS, Red Bluff Fish and Wildlife Office.

### **SELECT ACCRONYMS**

BY	Brood Year
CWR	Coded Wire Tag
FCS	Fall Chinook Salmon
LAD	Length and Date
LFCS	Late Fall Chinook Salmon
RST	Rotary Screw Trap
SCS	Spring Chinook Salmon
STT	Steelhead Salmon
WCS	Winter Chinook Salmon

### **INTRODUCTIONS/ATTENDEES (\*CALL-IN)**

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**MONITORING UPDATES (ROUND TABLE)**

**WCS Reintroduction at Battle Creek (Presented by Jim Smith, USFWS)**

- Actively releasing approximately 200,000 WCS hatchery juveniles. Press release available [here](#)
- Generally smaller because spawned later
- 100% marked by adipose fin clip, CWT, and third fin clip (e.g. pelvic)
- May see 2-year-old returns in 2019
- Final release (20,000 count) scheduled for early April

**Clear Creek and Battle Creek Monitoring Update (Presented by Laurie Earley, USFWS)**

- 2017-18 Clear Creek Escapement:
  - ~ 25 SCS spawners (9 redds; 4 adults – August index)
  - ∅ LFCS spawners (30 redds)
  - ∅ STT spawners (379 redds)
- 2017-18 Battle Creek Escapement:
  - ~ 30 SCS spawners (5 redds)

**Central Valley Steelhead Monitoring Program Update (Presented by Jonathan Schram, CDFW with additional detail added following meeting)**

- Steelhead Fyke Trapping Update
  - 7 sites sampled with large wire fyke traps between mouth of American River to Clarksburg in 2016 were sampled again for the 2017 season.
    - During this sampling period, the 7 Lower Sacramento large wire fyke traps were operated weekly (Thurs – Mon), while the 4 Knights Landing traps were operated each week (Mon – Thurs) respectively.
  - Days un-sampled between Jan 1<sup>st</sup>, 2017 – December 31<sup>st</sup> 2017:
    - Traps pulled January 9<sup>th</sup>, 2017 – January 13<sup>th</sup>, 2017, and February 6<sup>th</sup>, 2017 – March 3<sup>rd</sup>, 2017 due to high flows.
      - Trap CB2 resumed fishing on February 10<sup>th</sup>.
      - Traps 7 and CB1 resumed fishing on February 14<sup>th</sup>.
      - Trap 6 didn't fish January 7<sup>th</sup> – July 28<sup>th</sup> due to site-specific flows and erosion issues.
    - First STT caught for the 2017-2018 season on June 20<sup>th</sup>, 2017; wild in origin.
    - 137 STT adults (370-780mm FL) were collected and sampled from traps deployed in the Lower Sacramento River.
      - 129 Hatchery origin; 8 wild.
  - In an exploratory attempt to increase STT capture efficiency, an additional four traps were operated in the Sacramento River at Knights Landing from August 22, 2017 through October 26, 2017.
    - 82 STT adult (395-504mm FL) were collected and sampled from traps deployed in the Sacramento River at Knights Landing.
      - 77 hatchery origin; 5 wild origin (largest fish caught in Knights Landing in 2017 at 504mm was wild origin).
  - Number of fish tagged in fyke traps that were later detected at hatcheries:
    - 2016-2017 STT:

- 16 STT detected at Nimbus (array).
- 1 STT detected at Feather River Hatchery.
- 2 STT detected at Coleman National Fish Hatchery.
- 2017-2018 STT:
  - 4 STT detected at Nimbus (array).
  - 3 STT detected at Feather River Hatchery.
  - 15 STT detected at Coleman National Fish Hatchery.
  - 2 STT detected at Mokelumne River Hatchery.
- 2017 – 2018 Chinook
  - 33 Chinook salmon were collected and sampled from traps deployed in the Lower Sacramento River, and 23 Chinook salmon were collected and sampled from traps deployed in the Sacramento River at Knights Landing.
  - From traps deployed in the Lower Sacramento River, 21 were designated WCS (captured between December 1<sup>st</sup> – March 15<sup>th</sup>) and 12 were designated SCS (captured between March 16<sup>th</sup>-July 31<sup>st</sup>) for the purposes of preliminary reporting.
  - Genetic samples were collected from all Chinook salmon captured during 2017, and how many Chinook captured from each run will be confirmed and updated with genetic analysis later in 2018.
- Summary
  - Steelhead catch in large-wire fyke traps increased during 2017 relative to previous seasons; however there were still no steelhead recaptures by the fyke traps in 2017.
  - One hatchery steelhead was captured, tagged, and released from the Freeport trap (trap 7) on 3/4/2018 was recaptured in the upper Clarksburg trap (CB1) on 3/5/2018.
  - Considering no steelhead were recaptured in the fyke traps in 2017 and only one steelhead was recaptured as of March 2018, perhaps trap avoidance is a learned behavior? Planned acoustic studies to evaluate this idea in the near future.
  - Since the last incidence of a California sea lion being found deceased in one of the fyke traps on December 8, 2016, no California sea lions have been recovered from any of the fyke traps since, following further modification of the trap's marine mammal exclusion devices. It's possible that the modified marine mammal exclusion devices are also prohibiting sturgeon from entering the traps (no sturgeon were captured in the fyke traps in 2017), and it is unknown if the modified design is having any other effect on fyke trap capture efficiency for other species.

**Bank Swallow Surveys (Presented by Joe Silveira, USFWS, Sacramento River National Wildlife Refuge)**

- Results from the Cooperative Bank Swallow Colony Survey (USFWS, DWR, CDFW) along Sacramento and Feather Rivers follows:
- *Riparia riparia* (or, BANS) has declined on the Sacramento River (along 100 River Miles representing Reaches 2 & 3, where a majority of the taxa breed in the State) from over 25,000 active burrows in 1986, when CDFW began the surveys, to just over 10,000 burrows in 2010 and 2015.

- The 2017 Sacramento River Red Bluff (RM234) to Colusa (RM 143) survey resulted in 12,044 active burrows; the recent 5-Year Average is 11,752 active burrows, with a low of 10,093 (2015) and high of 12,887 (2014).
- The 2017 Sacramento River Redding/ACID to Red Bluff DD resulted in three colonies, totaling 675 active burrows. Results from Reach 4 (Colusa to Verona) are pending, and there are few colonies and active burrow in this reach (2016 results show 3 colonies and 968 active burrows).
- Results from the 2017 Feather River survey show 15 colonies with 1,095 active burrows.
- Bank revetment (agency rip-rap and private rubble) is the cause for declining breeding populations due to the attenuation of fluvial geomorphic process (overbank flow, erosion, lateral bank movement, sediment deposition) which create steep cut-banks suitable for BANS breeding habitat. With authorization of Chico Landing to Red Bluff Project (1958) SRBPP Phase 1 (1960) and Phase 2 (1974), the rate of bank revetment on Reaches 2 & 3 went from 5 Liner Miles to 50.

#### **Marijuana Effects Study Update – YR 1 of 2 (Presented by Tricia Bratcher, CDFW)**

- Effects of Marijuana Cultivation on Anadromous Fish
  - Funded by AFRP
  - Implemented by CDFW in the Deer Creek watershed
  - Emphasis on SCS
  - YR 1 of study is complete with data analysis underway.
  - YR 2 data collection will be finished in late spring 2018, with a wrap-up of data collection by end of June 2018.
- Methodology/Approach
  - Using a host of data analysis techniques, with the primary element being the Surface Water Ambient Monitoring Program (SWAMP) bioassessment methodology.
  - Causal analysis (using the EPA CADDIS model) and assessment of the potential number of marijuana grows in the majority of the spring-run Chinook watersheds (Antelope, Mill, Deer, Big Chico, and Butte) are also two of the study elements, to be completed later this year.
- Staff Contacts
  - Tricia Bratcher and Jim Harrington (CDFW) are co-leads, with a LOT of assistance by the Redding Regional Water Quality Control Board (RWQCB) office. Results cannot be shared at this time, but if you want more information, please contact Tricia.

#### **Butte Creek Monitoring Update (Presented by Clint Garman, CDFW)**

- 2017 Escapement
  - 932 SCS adults (snorkel survey estimate)
  - 515 SCS (Cormack Jolly-Seber carcass survey estimate)
- 2018 Escapement (to date)
  - 130 SCS adults (75 within 1st week of February; earliest on record)
    - Does not represent 100% count; fish can ascend the apron of the Dam and not travel through the Vaki River Watcher.
- Juvenile RST Data
  - 90,000 SCS juveniles
- Data available [here](#)

#### **Tisdale RST Monitoring Update (Presented by Diane Coulon, CDFW)**

- 2017-18 is the 8<sup>th</sup> season of trapping at Tisdale Weir
  - 97 FCS juveniles, 11 SCS juveniles, 50 WRCS juveniles and 4 LFCS juveniles (all unmarked)

- Daily data and Bi-weekly reports available on Calfish [here](#)

#### **NOAA Fisheries - California Central Valley Office Update (Presented by Sarah Gallagher, NOAA)**

- Upcoming Events:
  - March 22, 2018 → First Sacramento River Temperature Task Group Meeting of WY 2018. Monthly meetings held by the BOR to discuss the Sacramento R. temperature management season. Encouraged to attend in person, and there is a plan to alternate meeting locations.
  - April 5&6 2018 → Sacramento R. ROC Band Workshop will be held by BOR to help develop ideas for Track 3 of the Reinitiation of Consultation on the Coordinated Long-term Operation of the CVP and SWP. Scope includes the Sacramento River down to the Delta and any issues (temperature management) that are integrated with Trinity / Clear Creek.
- 2017 Long-term Operations Biological Opinions (LOBO) Biennial Science Review available [here](#)
  - Evaluation of the prior years' water operations against Reasonable and Prudent Alternative (RPA) actions → make implementation adjustments for future water operations
  - 2017 report focused on four major topics:
    - Stanislaus River
    - Enhanced Delta Smelt Monitoring (EDSM) program
    - Old and Middle River (OMR) index demonstration project
    - Shasta RPA Draft Amendment

#### **Coleman NFH Update (Presented by Bob Null, USFWS)**

- Will release 3,500 to 4,000 reconditioned STT kelt in April → truck to Sac R. bend.
- Approximately 6,000,000 FCS juvenile release for 2018 (lower than 12,000,000 production goal)
- Smaller female broodstock = smaller eggs = smaller juveniles

#### **Knights Landing RST Update (Presented by Jason Julienne, CDFW)**

- Sept 2017 → 1<sup>st</sup> WCS catch (all natural origin)

#### **Colusa Basin Drain and Wallace Weir Fish Salvage Update (Presented by Shig Kubo, CDFW)**

- In 2016, improvements made at Wallace Weir to handle higher flows and incorporate a fish collection facility to replace temporary trapping operations.
- Estimated completion date for construction of fish collection facility → May 2018<sup>1</sup>
- 2014-18 weir counts (to date)
  - 1,740 Chinook adults → this is the total count of all adult CS salvaged from Wallace Weir and Colusa Basin Drain trapping from the start of the project (2014) to present day.
    - Don't yet have genetics back on all of our samples, so cannot confirm the run of all salvaged fish. We do know that a majority of the fish are FCS origin. And we do have 3 confirmed winter-run and 4 confirmed spring-run that we've salvaged.
  - 4 STT adults
  - 1 white sturgeon
  - Current Season:
    - 12 CS adults (5 clipped); all trapped are tagged with two grey floy tags

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<sup>1</sup> Added May 2018 data since meeting

**Central Valley Angler Survey Update and Effects of Trucking of Coleman NFH (Presented by James Lyons, CDFW)**

- Estimated angler effort for 2017 salmon season
  - 805,000 hours (~ 160,000 fishing trips)
  - Total harvest estimate → 41,571 salmon (jack rate of 38%)
    - Based on CWT data → 34,464 Sacramento FCS, 80 Feather River SCS, 998 LFCS, and 6,030 San Joaquin FCS
- Central Valley Angler Survey (CVAS)
  - 0 of 13,000,000 FCS juveniles trucked from Coleman NFH (YR 2013, YR 2014) have been observed in the CVAS as returning adults in the Upper Sacramento River Management Zone (Knights Landing to Deschutes Rd).
    - Trucked Coleman Hatchery fish were observed mainly in the American River, with a handful observed in the Feather and Mokelumne rivers.
    - Based on CWT data (for CVAS during 2017 salmon season) → 80% of known-origin Chinook were of hatchery origin.

**Big Chico Creek Monitoring Update (Presented by Clint Garmin)**

- In 2017, 25 SCS observed but no spawning detected
- Adults not moving up far (e.g. past Salmon Hole), even with suitable flows last year

**Lower American River RST Update (Presented by Cesar Blanco, USFWS)**

- 2017-18 RST counts<sup>2</sup>:
  - 7,885 FCS juveniles; natural origin
  - 9 WCS juveniles; natural origin

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<sup>2</sup> Numbers are only part of the monitoring season and are provisional.

## **PRESENTATIONS (PPT)**

PowerPoints available upon request

### **Central Valley Restoration Authorized Permanent Impacts under CWA Section 404 (Presented by Robert Chase, USACE)**

- Corps Issued Permits (2015 – 2018) for following activities:
  - Clear Creek (8.5 ac) → Gravel injections
  - Deer and Mill Creeks (0.7 ac) → Gravel injection, fish passage and maintenance
  - Feather River (1.1 ac) → Gravel injection, side channel (Project info [here](#))
  - Yuba River (80 ac) → Excavation, gravel injection, side channel (Project info [here](#))
  - Lower American (8.1 ac) → gravel injection, side channel , recreation (Project info [here](#))
  - Sacramento River (23.8 ac) → Gravel placement, side channels (Project info [here](#))
  - Future impacts from restoration activities anticipated
- Corps Regulatory Division Programmatic BA is in draft form for NMFS programmatic Bi-Op. ESA consultation suspected in the future.
  - Will cover ESA consultation for multiple activities, including NWP 27 projects.

### **Evaluating Feasibility of Winter-run Chinook Reintroduction Upstream of Shasta Dam (Presented by John Hannon, USBR):**

- 3 year evaluation per RPA (more info [here](#)). Annual reports after each year of pilot project implementation (~2019, 2020, 2021...)
- Pre-implementation Chinook migration studies in Shasta Reservoir conducted by USGS
  - 262 LFCS acoustic tagged juveniles released @ head of McCloud arm of Shasta reservoir in early 2017;
  - 70% (182 fish) made it to Shasta Dam within 4-month tag life
  - 16% (41 fish) were detected at least once downstream of Keswick Dam
  - 1% (3 fish) were detected in San Francisco Bay
- Continuation of pre-implementation study in 2017-18:
  - 355 LFCS juveniles released in November (smaller size to better represent WCS)
  - Added more receivers in front of dam to provide fish position data
  - [To date 1% (4 fish) were detected at Shasta Dam and one was detected below Shasta Dam]; flows and turbidity were lower than 2016-17 winter conditions
- Initial WCS juvenile release upstream of Shasta possible for late 2018 pending completion of an environmental impact statement and fabricating the pilot juvenile collection system. NMFS working on getting experimental population of winter-run Chinook designated. Parallel track - assisting Winnemem Wintu with collecting Chinook tissue samples from New Zealand rivers for genetic analysis.
- Pilot study will inform the feasibility determination for long-term WCS reintroduction (more info [here](#))

### **Upper Sacramento River Basin Salmon and Steelhead Escapement Updates (Presented by Doug Killam, CDFW):**

- Upper Sacramento River Basin – 2017 Adult and Jack Spawning Escapement:
  - 3,812 FCS adults, 8,729 jacks → 2<sup>nd</sup> lowest on record (2009 worst, 2002 best)
  - 4,426 LFCS adults, 382 jacks (just okay)
  - 490 WCS adults, 485 jacks (bad #s)
  - 1,430 SCS adults, 375 jacks (bad #s)

- 2017 Sacramento River Index:
  - 139,997 FCS (river harvest, ocean harvest, and escapement)
- Upper Sacramento River – 2017 Escapement Monitoring:
  - <3,000 FCS spawners; 24% hatchery marked (recovered few CWT)
  - ~3,000 LFCS spawners; 91% natural origin (recovered few CWT)
  - ~975 WCS spawners; 15% natural origin (recovered 269 CWT)
- Tributaries – 2017 Escapement Monitoring:
  - Rock Creek → XCS were spawning in March (marked 12 redds); natural barrier accessible during very high flows. Emergence observed in May
  - Clear Creek → 2,353 FCS (~75% jacks); 4% hatchery marked (recovered 1 CWT)
  - Cow Creek → 288 FCS; 74% hatchery marked
  - Bear Creek → 2 FCS
  - Beegum Creek → ∅
  - Cottonwood Creek → 124 FCS (~75% jacks)
  - Battle Creek → 6,700 FCS (~354 spawned in creek)
  - Paynes Creek → ∅
  - Antelope Creek → 5 FCS (used VAKI counter); annual rescues b/c diversions have no bypass back into creek. Fish screen project planned.
  - Mill Creek → 258 SCS; 342 FCS
  - Deer Creek → 219 SCS; 106 FCS

**Salmon Smolt Survival in Relation to Flows in Mill Creek and the Sacramento River (Presented by Jeremy Notch, NOAA):**

- Effort to answer following questions:
  - What are the survival rates for smolts in Mill Creek and the Sacramento River?
  - What is the relationship between flow and survival in Mill Creek and the Sacramento River?
- Acoustic Tagging in April – June (YR 2013 – 2017):
  - Unique ID for each tag w/ 30-day battery life
  - 14 receivers along Sacramento R. used for study (2 receivers at each site except for Benicia, which has 14)
  - Smolts tagged in morning/released at night in lower Mill Creek
  - 334 total; mix between FCS and SCS (23 to 185 sample size)
  - 1 survived to SF Bay delta (YR 2013 – 2016); 8 survived to Golden Gate Bridge (YR 2017)
  - Data from real-time receivers (updated daily) available [here](#)
- Adult SCS returns:
  - 25 year average = 630 adults
  - 2012-2017 average = 435 adults
- Conclusions:
  - Smolt outmigration occurs same time as agricultural diversions begin (April – May) → increased vulnerability
  - Correlation between increased flows and increased survival
    - Water diversions up to 5,000 cfs occur between Hamilton City and Verona
    - YR 2017 at 14,000 cfs, there was 80% survival recorded from Mill Creek to receiver #5 at Butte City
  - **Q:** Were temperatures evaluated?
  - **A:** Yes, but flows were primary factor affecting survival
- Recommendations:
  - In drought conditions, minimum flow values should be agreed upon

- Spring pulse flows to flush smolts out
- Flow vs Survival curves can be used as a management tool

**CVPIA (b)(13) Upper Sacramento River Habitat Restoration Monitoring Update (Presented by Ryan Revnak, USFWS):**

- Methodology
  - Approx. 12 spawning and rearing sites in some phase of monitoring (impact and control)
  - Snorkel surveys for relative abundance
  - Redd surveys (aerial and ground)
  - Rearing habitat mapping at various flows (suitable depth & velocity, cover)
  - Annual Fisheries Reports available [here](#)
- Observations
  - Multiple runs of juvenile salmonids using restoration sites (counts as of March 2018):
    - 4,330FCS, 66 LFCS, 1,230 WCS at North Cypress Side Channel (completed Dec 2016)
    - 204 FCS, 0 LFCS, 474 WCS at Lake California Side Channel (completed January 2018)
  - Adequate spawning gravel available in upper reaches:
    - Gravel filled in former deep pool near Salt Creek (RM 301)
    - Gravel built up at Turtle Bay Island (RM 296.5)
    - High flows dispersed gravel from Market St placement (RM 298), but suitable gravel still present

**Central Valley Steelhead Monitoring Program Update (Presented by Ryan Revnak, USFWS)**

- PIT Tag Antenna Array Installation:
  - Added 1 pass-over/FDX antenna arrays on Bear, Mill, and Cottonwood Creeks
  - Installed a pass-through/HDX antenna arrays on Deer and Middle Creeks, as well as Nimbus FH ladder (total of 3)
- Steelhead PIT Tagging (YR 2017):
  - 83 STT at Deer Creek RST
  - 21 STT at Mill Creek RST

**Redd Dewatering and Juvenile Stranding Monitoring Update (Presented by Mike Memeo, PSMFC)**

- Sacramento River Redd Dewatering (2017-18)
  - Data is sent to Reclamation and CDFW managers→ flow release decisions for listed species
    - 0 WCS dewatered redds
    - 15 FCS dewatered redds
    - UPDATE SINCE MEETING: Only 1 LFCS redd was dewatered this spring
  - Low river flows (<5,000 cfs) disconnect salmonids from cover/edge habitat
  - Observed redd-building in shallow near-stagnant areas which then go dry (e.g. Shea Island side channel)
- Sacramento River Stranding (2017-18)
  - Rescues conducted year-round, especially after high flow events
  - PIT tag stranded Rainbow trout to supplement STT monitoring
  - Working on new interactive maps of stranding locations
  - ~5,000 fish rescued (including ~1,000 WCS)
  - **Q:** Do you monitor for STT dewatered redds?
  - **A:** Not currently
  - **Q:** Has modeling been done to determine flow that redd dewatering begins?
  - **A:** No, we rely on field observations

**Mainstem Juvenile Monitoring Update – RBDD RST (Presented by Scott Voss, USFWS)**

- Juvenile Salmon Monitoring:
  - WCS juveniles released at Battle Creek during flow events are reaching RST quickly
  - WCS genetic sampling/ parentage analysis project ongoing
  - Passage Trend Data:
    - In November 2017, daily passage proportion of SCS was greater than WCS; deviation from standard ratio. May be explained by later than average WCS spawn timing<sup>3</sup> (see Doug Killam’s PPT).
    - Will be making correction to 2017 data by changing run value from SCS (identified by LAD) to WCS (confirmed from genetic sampling) → subtracts 93% of SCS value (through 12/31/17) and adds 25% to WCS value.
  - **Q:** Were the smaller fish from Coleman NFH part of why WCS were misidentified as SCS?
  - **A:** Possibly. Also, “jelly bellies” (yolk sac fry – fry) were observed.
- Juvenile Green Sturgeon – Migration Monitoring:
  - 2017 was first full year of monitoring
  - Research goals (2016-2020) are to acquire life history info on Sacramento R. population to determine:
    - Extent of freshwater residency
    - Habitat use
    - Migration cues
    - Timing of brackish water entry
  - Methodology:
    - Sampling exclusively after dark using benthic trawl within 50 km reach.
    - Added 15 acoustic receivers to network (Red Bluff to I-80 bridge)
    - Onsite surgery station for tagging
    - Can tag up to 50 individuals annually (in 2017, 55 of 85 caught were large enough for tagging)
  - 2017 Preliminary Findings:
    - Largest outmigration in November 2017 during high flows
    - Tag tracking displays low juvenile activity/movement within rearing habitat
    - 32% detected reaching Delta; 62% moved at least 3 reaches (as of 1/27/18)

**Impacts of Drought on Fall Chinook Salmon at Coleman National Fish Hatchery (Presented by Sarah Austing, USFWS)**

- Trucking Fall Chinook Salmon
  - Decision was based on degraded river conditions (high temps, low flows) during target juvenile release date; not anticipated to improve
    - In 2014, 62% of BY13 FCS were trucked to Rio Vista (2,500,000) and San Pablo Bay (4,800,000)
    - In 2015, 100% of BY14 FCS were trucked to Rio Vista (11,000,000) and San Pablo Bay (800,000)

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<sup>3</sup> Doug K. showed the spawn timing was about 15 days later than avg. for Winter Chinook adults and emergence was also later for brood year 2017 WCS and were at a smaller size than LAD criteria for WCS at that time (falling into SCS LAD instead).

- What are the impacts of 2014-15 trucking during drought?
  - CWT Recovery and Coleman NFH Returns:
    - Off-site releases were seen more in ocean fishery
    - Off-site releases had highest stray rate (2017 Battle Creek run size~6,750 FCS)
    - CWT Recovery at Coleman NFH → Most returning were 2 year old males, only 24 of BY14 adults returned
  - 2017 Coleman NFH Production:
    - Brood stock → additional 96 FCS (350,000 eggs) sourced from Keswick Dam trap; supplemented with eggs collected at Nimbus FH (from Coleman NFH strays). News article [here](#)
    - Only 50% (~6,000,000) of target eggs were collected between Coleman NFH returns, Keswick Dam trap and Nimbus FH
- Adaptive Management
  - Experimental early release began with BY15
  - Fish out smaller/earlier with flow event

**Proposed Application of inSALMO on the Sacramento River – An IBM for Winter-Run Chinook Presented by Peter Dudley, NOAA)**

- inSALMO is an individual-based model designed as a decision support tool (online article [here](#))
- Version 5.0 is latest available
- Grid is generated from 20 meter cells within waterbody reaches
- Model estimates when juveniles will move across these cells and reaches
- Biotic and abiotic variables are converted into input files. Variables include:
  - # and size of spawners
  - Flows (e.g. depth and velocity sourced from USACE)
  - Temperature
  - Velocity
  - Gravel (e.g. rough estimate based on sample area)
  - Habitat
- Model Evaluation
  - Calibration and validation
  - Have compared model results to actual field data and other models (e.g. GAM, linear)
  - Have experimented with various changes in conditions, including restoration
  - Might not work well for small restoration projects because 20 meter cell is rather granular and results can get “lost in the noise”.

**CLOSE/COMMENTS**

- Meeting space was large enough for high turnout. Lunch was appreciated.
- Audio/visuals improvements recommended for next year. U-shape style works for interactive discussion but made it difficult for attendees in the back to see presentation screen. It was difficult to hear remote attendees via external speaker.
- Refreshments (coffee) are nice to have.

**2019 MEETING**

**Host:** NOAA Fisheries

**Date:** Wednesday March 20, 2019

**Time:** TBD

FINAL DRAFT 5/7/2018

**Location:** TBD