The Lateral Line

The Newsletter of the Utah Chapter of the American Fisheries Society

Volume 41 Issue 1 February 2015

INSIDE THIS ISSUE:

2015 Annual Meeting March 24-26, 2015

The Moab Valley Inn will be hosting the 2015 Utah Chapter Annual Meeting March 24—26, 2015. Registration and lodging information on page 2.

SECOND CALL FOR PAPERS!

The UTAFS Executive Committee invites abstracts for contributed oral presentations and posters. The meeting will include a poster session to encourage discussion between poster presenters and attendees. Symposia presentations, contributed oral presentations and poster abstracts must be received by March 6, 2015. All submissions must be made by emailing an abstract to calvinblack@utah.gov.

Suggested topics for contributed papers and posters include but are not limited to:

Fisheries Management and Monitoring, Recovery Programs, Stream Restoration and Aquatic Habitat Monitoring, Stream and Boater Access, Aquaculture and Aquatic Invasive Species.

2015 Annual Meeting

2015 Utah Chapter of the American Fisheries Society Annual Meeting
March 24-26th, 2015 Moab Valley Inn

REGISTRATION:

Early UTAFS Member:	$80	Late UTAFS Member:	$100
Early Non-UTAFS Member:	$130	Late Non-UTAFS Member:	$150
Early Student UTAFS Member:	$25	Late Student UTAFS Member:	$30
Early Student Non Member:	$50	Late Student Non Member:	$60
Early One Day Registration:	$70	Late One Day Registration:	$80
Extra Banquet Dinner:	$30		
Trap Shoot Competition:	$30	Trap Shoot Fun Shoot:	$20
Utah Chapter Membership:	$25		

ONLINE REGISTRATION:

Register through www.utahafs.org using the link below.
http://www.123signup.com/register?id=ydnsg

EARLY REGISTRATION DEADLINE FEBRUARY 24TH.

MOAB VALLEY INN
AND CONFERENCE CENTER

To reserve rooms call Moab Valley Inn at (435) 259-4419 or book online using this link http://booking.ihotelier.com/istay/istay.jsp?groupID=1317946&hotelID=75490. You must identify yourself by providing the group code **FISH315** and Utah AFS. Rooms are limited and so please find a roommate. Please tell hotel who you will be rooming with.

2015 Annual Meeting

SECOND CALL FOR PAPERS!

Send them to calvinblack@utah.gov

SUGGESTED TOPICS FOR CONTRIBUTED PAPERS AND POSTERS INCLUDE BUT ARE NOT LIMITED TO:

1. Fisheries Management and Monitoring (Native & Sportfish)
2. Recovery Programs
3. Stream Restoration and Aquatic Habitat Monitoring
4. Aquatic Invasive Species
5. Fish Culture
6. Stream and Boater Access

CONTINUING EDUCATION COURSES:

1. GIS Refresher Course
2. Partnering with Beaver in Restoration - Overview of the full workshop

AWARD NOMINATIONS:

1. Award of Merit
2. Partner of the Year
3. Professional of the Year
4. Habitat Conservationist of the Year
5. Lifetime Achievement Award

Email nominations to Daniel Keller danielkeller@utah.gov.

SECOND ANNUAL TRAP SHOOT FUNDRAISER:

Come shoot on your way home on Thursday the 26th.
Located at the Green River Shooting Sports Park in Green River, Utah.
Register online or at the meeting.

President's Message

The 2015 UT-AFS Annual Meeting is fast approaching and it's time to get registered. The Executive Committee are working diligently planning a diverse and exciting meeting. There is a lot of change happening throughout all levels of the Society and I hope to provide an overview of those changes at the annual meeting. I encourage everyone to submit an abstract and present during one of the sessions. Two terrific continuing education courses are being offered; a GIS refresher course, and an overview of the Partnering with Beaver in Restoration workshop. Please take the opportunity to recognize one of your colleagues and nominate them for an AFS Award. I'm excited to announce the 2nd annual trap shoot fundraiser during the last afternoon of the meeting. Take advantage of this chance to shoot at the new Green River Shooting Sports Park before you head home. The only way for a successful meeting is if you help make it successful. I hope to see all of you there!

2015 Meeting—Portland, Oregon

Special Workshop—Evolutionary biology and taxonomy of the cutthroat trout (*Oncorhynchus clarkii*): Is it time to formally revise the currently recognized 14 subspecies biological classification of this species?

Purpose and Objectives of the Workshop

The purpose of this Special Workshop is to bring together a select panel of leading experts on trout evolutionary biology, systematics, and taxonomy to review and weigh carefully all evidence, both old and new, on which the present 14-subspecies biological classification of *Oncorhynchus clarkii*, as well as the several more recently proposed classifications of the species, are based. The panel's principal objectives will be to 1) decide if the 14-subspecies classification remains valid and defensible given the totality of the evidence; and 2) if it finds otherwise, define and provide the rationale for a new set of subspecies that in its collective judgment does satisfy both the old and newer evidence. A third panel objective will be to provide guidelines to those who may be charged with writing new formal subspecies descriptions as to what specific character descriptions and supporting information to include, given the array of new DNA-based methods now being brought to bear.

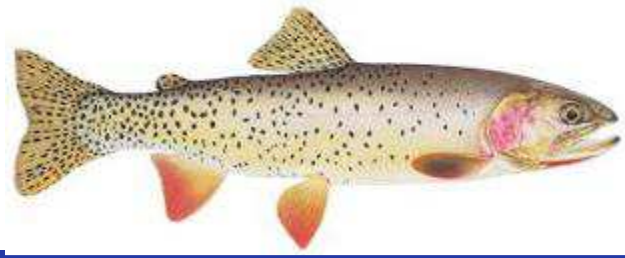
This Workshop will be staged as a special sponsored project of the Western Division American Fisheries Society (WDAFS), and will be held in conjunction with its 2015 Joint Annual General Meeting with the Society in Portland, Oregon.

The panel will produce a manuscript of its proceedings that will include its findings on the objectives above, as well as all reviews and deliberations of the evidence presented to and considered by the panel, along with the new guidelines for what to include in formally describing subspecies. We propose to seek publication of this manuscript by AFS either in its AFS Symposium Series, its Monograph Series, or as a Special Publication. A summary of the findings of the Special Workshop may also be prepared for publication in *Fisheries*.

Justification for the Workshop

Ever since it was first published by the late R.J. Behnke in 1979, a classification consisting of 14 subspecies (12 extant, 2 extinct) has been recognized for the species *O. clarkii* (Behnke 1979, 1988, 1992, 2002). Behnke wrote that he based his classification on an evolutionary history and sequence of radiations first proposed by David Starr Jordan back in 1894. Jordan (1894) believed that ancestors of all modern Cutthroat Trout traveled up the Columbia and Snake Rivers. From there they reached the Lahontan and Bonneville Basins, the Yellowstone River, the Green and Colorado Rivers, and then, via headwater transfers, the basins of the South Platte, Arkansas, and Rio Grande Rivers. Behnke believed that much of the present diversity, especially at the subspecies level, is the result of events that occurred in the last million years (Behnke 1992). He utilized the fossil record and early chromosome studies, but relied on meristic character differentiation to hone his classification. Although differences of opinion did occasionally arise, he believed that the later allozyme electrophoresis studies of others largely corroborated his classification (Behnke 1992).

However, workers examining levels of genetic divergence and diversity among subspecies using more recently developed DNA-based methods have increasingly called the validity of this classification into question. Also, management agencies charged with making listing decisions and executing recovery actions under the Endangered Species Act (ESA) have increasingly been lumping subspecies together on their own, without input from taxonomists, but citing these newer DNA studies as justification for doing so.



http://www.westernnativetrout.org/content/yellowstone-cutthroat/

2015 Meeting—Portland, Oregon

For example, in 2001, the U.S. Fish and Wildlife Service lumped the Fine-Spotted Snake River Cutthroat, a separate subspecies in the Behnke classification, together with the Yellowstone subspecies as a single distinct population segment (DPS) when it issued its decision not to list the Yellowstone Cutthroat as threatened under the ESA (Kaeding 2001). The Service based its decision on the lack of genetic distinction found in allozyme and mtDNA markers. A spokesman for the Service later wrote that the Service considers the Yellowstone Cutthroat to comprise but a single DPS everywhere across the subspecies range including the Fine-Spotted Snake River enclave, and that taxonomic validation of the Fine-Spotted Snake River Cutthroat as a separate subspecies was the role of taxonomists, geneticists, and other qualified scientists, not the Service (Kaeding 2006). So the question remains, are there two subspecies in that area as per Behnke's classification, or are these two forms merely spot-size and ecological variants of a single Yellowstone Cutthroat subspecies as the Fish and Wildlife Service and the other management agencies treat them? In 2006, Idaho Chapter AFS held a symposium to tackle this question, but reached no resolution (Van Kirk et al. 2006).

In the Lahontan and Willow/Whitehorse basins of the Great Basin region, what Behnke recognized as three subspecies based on morphological and meristic character distinctions (i.e., the Lahontan subspecies of the western part of the basin, the Humboldt subspecies in the eastern part of the basin, and the Willow/Whitehorse subspecies in its own contiguous basin) have been lumped into just one subspecies, the Lahontan (ESA-listed), based on results from DNA methods (Coffin and Cowan 1995). Is this really justified, based on the totality of evidence? A fourth similar-appearing subspecies now believed extinct in pure form existed in the contiguous Alvord basin; would this subspecies also be lumped with the Lahontan? And how should the long-recognized but rare (and also ESA-listed) Paiute Cutthroat subspecies fit into this classification? It is also a western Lahontan Basin subspecies. Based on DNA evidence available to date (Nielsen and Sage 2002; Peacock and Kirchoff 2004), there is about the same amount of genetic divergence between the Paiute and western-basin Lahontan as there is between the western Lahontan and Humboldt forms that the agencies have already lumped into one. So again, is this lumping justified based on the totality of evidence, and if so, should it be extended to also absorb the rare Paiute subspecies?

http//www.westernativetrout.org/content/paiute-cutthroat/

Most recently, mtDNA and microsatellite DNA studies of Cutthroat Trouts of Colorado (Evans and Shiozawa 2001; Metcalf et al. 2007) raised doubts about the genetic purity of Colorado River and Greenback Cutthroat populations being used in recovery programs, and effectively stalled the recovery program for the ESA-listed Greenback subspecies. Then, in 2012, came a publication that makes a case for seven subspecies (two extinct) in the southern Rocky Mountain region historically rather than the four subspecies (one extinct) we have long recognized from Behnke's classification, but with substantially different distributional boundaries, particularly for the Greenback (Metcalf et al. 2012; see also Bestgen et al. 2013). In 2013, the Fish and Wildlife Service convened a panel of taxonomic experts similar to the one being proposed here to examine this latest evidence with a focus on the taxonomic status of just the Colorado subspecies. Although that panel hasn't completed its work, it serves as a model for the much broader Special Workshop we propose here.

These examples illustrate the extent to which lumping (or in the Metcalf et al. [2012] case, splitting) of Cutthroat Trout subspecies has either been proposed or put into practice without regard for recognized taxonomic classification in recent years. Three additional papers, one published in 2009 and the other two in 2012, but each based on sequence comparisons of mtDNA genes, offered revised subspecies classifications of *O. clarkii* (Wilson and Turner 2009; Loxterman and Keeley 2012; Houston et al. 2012).

2015 Meeting—Portland, Oregon

Wilson and Turner's (2009) results support Behnke's original classification in part, but they do group Behnke's Lahontan, Paiute, Humboldt, and Willow-Whitehorse subspecies together as a single Lahontan subspecies, and they do consider the Fine-Spotted Snake River and Yellowstone subspecies to be just one subspecies, the Yellowstone. Loxterman and Keeley (2012) propose an 8-clade classification for the extant subspecies, in which the Coastal, Westslope, Colorado River, Greenback, and Rio Grande subspecies are the same as Behnke's, but, like Wilson and Turner (2009), their Lahontan clade now includes Behnke's Lahontan, Paiute, Humboldt, and Willow-Whitehorse subspecies. But these authors propose two new clades: a Bonneville-Yellowstone clade that includes the majority of Bonneville Cutthroat sampling locations plus all the Yellowstone and Fine-Spotted Snake River Cutthroat locations; and a distinct Great Basin clade that comprises the remainder of the Bonneville locations that did not cluster with the Yellowstones. This new Great Basin clade appeared to the authors to be more closely related to the Colorado River clade than to the other Bonnevilles in their Bonneville-Yellowstone clade, but nevertheless they considered it a distinct subspecies (Loxterman and Keeley 2012). The paper by Houston et al. (2012) was focused on discovering diagnostic single nucleotide polymorphisms (SNPs) for each subspecies, but in so doing these authors proposed a 10 subspecies classification for the extant subspecies. Like Behnke, they recognized the Coastal, Westslope, Colorado River, Greenback, and Rio Grande forms as distinct subspecies, and they also recognized the Lahontan of the western basin and Humboldt of the eastern basin as distinct subspecies. But unlike Behnke, they folded the Paiute subspecies into the western basin Lahontan subspecies owing to genetic similarity, and the Willow/Whitehorse form into the Humboldt subspecies as Trotter and Behnke (2008) had done earlier. They also lumped the Fine-Spotted Snake River form together with the Yellowstone as a single Yellowstone subspecies. As for the Bonneville subspecies, they recognized it as a distinct subspecies but split out the Bear River strain, which they set apart as its own distinct subspecies (Houston et al. 2012). The bottom line from these three papers is that each of these newly proposed classifications shows some congruence with Behnke's original classification of *O. clarkii*, but not always the same congruence; and, where they differ from Behnke's classification, they also differ among themselves as to what the new subspecies classification should be. These differences highlight issues that beg resolution in a Special Workshop setting

http://www.westernnativetrout.org/content/greenback-cutthroat/

And finally, we point to a paper published in 2002 that proposed an entirely different evolutionary history and sequence of radiation for the modern cutthroat subspecies—one centered around an inland, Bonneville Basin origin of Cutthroat Trout much earlier in geological time than Behnke had believed, followed by an outward radiation of the various Cutthroat lineages that spanned about the last 4 million years (Smith et al. 2002). The authors of this paper reached their conclusions from their own interpretation of the fossil record coupled with mtDNA analysis of modern specimens and molecular clock estimates of divergence times based on that analysis. Although this work did not offer a new classification for the species, it did challenge Jordan's basic evolutionary and radiational history assumptions that provided the underpinning for Behnke's classification.

http://www.westernnativetrout.org/content/rio-grande-cutthroat/

2015 Meeting—Portland, Oregon

These examples highlight issues that have cropped up in recent years regarding the proper biological classification of the Cutthroat Trout species. All could have direct bearing on ESA listings and recovery programs, in addition to their importance for land and aquatic habitat managers, fisheries managers, and scientists engaged in research on cutthroat trout. We submit that these are all issues that should be addressed and resolved by experts in trout taxonomy in face-to-face working sessions, not by operating remotely from one another or by corresponding back and forth via the scientific journals. We believe it is high time that a panel of such experts is convened to critically review all the evidence and, if deemed necessary, come up with a new, agreed-upon classification at the subspecies level for the entire cutthroat trout species. As noted above, the Fish and Wildlife Service convened a panel to consider the taxonomy of the cutthroat trouts of the southern Rocky Mountain region. That panel should be reporting soon, and its findings will be incorporated into the deliberations of this Workshop.

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Potential Panel Members and/or Presenters

Gerald R. Smith
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Ted M. Cavender,
Ohio State University (emeritus)
R.F. Stearley
Calvin University
Richard L. Mayden
St. Louis University
Marlis Douglas
University of Illinois
Jeffrey Olsen
U.S. Fish and Wildlife Service
Dennis Shiozawa
Brigham Young University
Andrew R. Whiteley
University of Mass. Amherst
Fred Allendorf
University of Montana
William Eschmeyer
California Academy of Sciences
Sheldon J. McKay
Simon Fraser University
Ruth B. Phillips
Washington State Univ., Vancouver
Gary Thorgaard
Washington State Univ., Pullman
Bob Gresswell
USGS Bozeman
Jennifer Nielsen
USGS Anchorage
Louis Bernatchez
Laval University, Quebec
Peter B. Moyle
University of California Davis
Wade D. Wilson
University of New Mexico
Mary Peacock
University of Nevada Reno
J.L. Metcalf
University of Colorado
Kevin B. Rogers
Colorado Parks and Wildlife
Ernest R. Keeley
Idaho State University
Douglas F. Markle
Oregon State University
D.A. Hendrickson
University of Texas

John G. Lundberg

Treasurer's Report

Utah American Fisheries Society
FY15 1st Quarter +
October 1, 2014-January 26, 2015

Savings Balance	$ 25.09
Money Market	$ 1,626.12
Starting Business Checking Balance	$11,893.51
Income	
Gifts and donations	$ 75.00
Sponsorship	$15,500.00
Interest	$ 0.56
Total Income	$15,575.56
Expenses	
Western Division donation	$ 389.41
Excomm meetings	$ 183.45
Fundraising	$ 466.51
Website	$ 8.99
Total Expenses	$ 1,048.36
Savings Balance	$ 25.09
Money Market	$ 1,626.54
Starting Business Checking Balance	$25,920.15

Balance of UTAFS funds in WDAFS Endowment

6/30/14	$3,664.96
5/31/14	$3,635.73
4/30/14	$2,483.05
3/31/14	$2,516.04
2/28/14	$2,542.16
1/31/14	$2,424.46
12/31/13	$2,438.28
11/30/13	$2,405.60
10/31/13	$2,366.09

Thank you Trina Hedrick for providing this financial summary. If you have questions about Chapter finances please do not hesitate to contact Trina by

Fishing Events

Several sponsors, partners and members of the Utah Chapter of the American Fisheries Society participated in fishing clinics, festivals, and seminars across the state. These events were well attended and highly successful. Thanks to all who participated, and helped educate and promote fishing and fish management and research in the state of Utah.

- Scofield Ice-Fishing Tournament
- DWR and Blue Ribbon Fishery Advisory Council Ice Fishing Seminar
- Bear Lake Cisco Disco
- DWR Ice Fishing Clinics: Big Sandwash, Steinaker, Starvation, Moose Pond, Scofield
- Quadfishalon Tournament
- Fish Lake Perch Festival
- Firefighters Ice Fishing Event

Fishing Events

Featured Fisheries Projects

Twitchell Fire Study

Colton Finch, Ph.D. Student Utah State University

Figure 1. The Twitchell Fire photographed from the International Space Station (NASA Image of the Day for September 20th, 2010).

During the summer of 2010, lightning ignited the Twitchell Fire in the Tushar Mountains of south-central Utah. Before fall rains extinguished the blaze, it burned 18,000 hectares of montane forest (Figure 1), including important high-quality stream habitat for Bonneville cutthroat trout, *Oncorhynchus clarkii utah*. Post-fire habitat conditions, especially debris flows and channel alterations, eliminated nearly all fishes from the burned area (Figure 2). The Twitchell Fire is not exceptional; wildland fire is occurring with increasing frequency in western North America. Despite the potential threat of fire to fish conservation, the effects of fire on stream fish habitats and populations has only been qualitatively described. Researchers at Utah State University are enumerating the effects of wildland fire on coldwater stream ecosystems as part of a cooperative research project including Utah Division of Wildlife Resources, the U.S. Forest Service, and the USGS Utah Cooperative Fish and Wildlife Research Unit.

Featured Fisheries Projects

Utilizing data from both burned and adjacent unburned streams, the research team is describing the watershed effects of wildland fire in three principal ways,: (1) taking detailed measurements of pool depths, water velocities, stream widths, substrate size, overhead cover, and coarse woody debris within numerous 100-m index sites. These data will be complemented with aerial bathymetric lidar data to expand the description of physical habitat alteration to a watershed scale as part of a National Science Foundation grant, (2) measuring biological response to wildland fire as demonstrated by primary and secondary production, and selection of food and habitat by trout, and (3) construction of a metapopulation viability model to determine how the spatial structure of the watershed, including habitat alterations as a result of wildfire, affects persistence of Bonneville cutthroat trout (Figure 3).

Figure 2. Channel aggradation and vegetation loss due to the 2010 Twitchell Fire.

Results of the Twitchell Fire study will help accelerate biological recovery of streams in the burned area, which will be the largest watershed in Utah devoid of exotic species. The restoration of this native fish community will be a large step forward in conservation of Bonneville cutthroat trout, as well as sensitive non-game species such as southern leatherside chub, *Lepidomeda copei*. As fire occurrence and scale continues to increase due to legacy fire suppression, climate change, or other factors, the opportunistic watershed restoration typified by Utah State University's research offers a valuable conservation tool in increasingly challenged stream ecosystems.

Figure 3. Bonneville cutthroat trout in a beaver pond in the Tushar Mountains of south-central Utah.

Featured Fisheries Projects

Razorback Suckers at Stewart Lake WMA

Robert Schelly, Utah Division of Wildlife Resources

Growing to lengths of three feet and living for up to 40 years, Razorback Suckers *(Xyrauchen texanus*), with their brilliant yellow undersides and prominant nuchal humps, are one of the iconic fishes endemic to the Colorado River Basin. As dams have wrought changes to the natural flow cycle, Razorback Suckers have steadily declined, due to plummeting rates of larval survival, and the species is currently listed as endangered. Factors contributing to poor Razorback Sucker recruitment include loss of off-channel wetlands important as nursery habitats for young suckers and an expanding presence of nonnative fishes in the basin acting as predators and competitors. With the middle Green River population maintained in recent years only by intensive stocking of large hatchery-raised fish, recovery efforts have focused on improving sucker recruitment by more closely mimicking the timing and intensity of historical peak-flows associated with spring runoff, and on restoring connectivity with wetland nursery habitats.

Stewart Lake, a gated wetland on the Green River near Jensen, Utah, managed by the Utah Division of Wildlife Resources, is playing a vital role in these efforts. It is a final link in a complex chain of events involving the cooperation of numerous State and Federal agencies under an experimental scheme called the Larval Trigger Study Plan. In the weeks following Razorback Sucker spawning along a Green River gravel-bar in Dinosaur National Monument, the U.S. Fish and Wildlife Service deploys light-traps at various points downstream. As Razorbacks begin to hatch and drift in the current, they are detected in the light-traps, with rapid identification made possible by the work of the Colorado State University Larval Fish Lab. The presence of drifting Razorbacks signals the Bureau of Reclamation to increase releases from Flaming Gorge Reservoir. This restores the historical coupling of peak Green River flows with the period of Razorback Sucker larval drift, allowing larval suckers to enter warm, productive nursery habitats in off-channel wetlands that only connect to the river at high flows. Stewart Lake is one such wetland.

Featured Fisheries Projects

After a dry year in 2013 in which Stewart Lake was partially filled for two months but nevertheless produced a successful cohort of juvenile Razorbacks, 2014 provided the wettest year yet to test the Larval Trigger Study Plan. Using picket weirs with openings of ¼ inch to exclude large-bodied nonnative fishes, Stewart Lake's gates were opened for two weeks during the period of larval drift in early June, when peak Green River flows (supplemented by Flaming Gorge Reservoir releases) reached nearly 20,000 cubic feet per second. Light-trapping inside Stewart Lake confirmed the entrainment of Razorback Sucker larvae in the wetland, which was filled to capacity before closing the gates to the river.

With the wetland completely full, a longer period of entrainment was possible, allowing the 2014 year-class of Razorbacks three months to grow in the Stewart Lake nursery. This additional month of growth produced great results. During the two weeks of drawdown in early September, over 700 wild-spawned juvenile Razorback Suckers were netted in a fish trap at the outlet gate and measured before being released to the Green River. (That more than 110,000 small nonnative fishes, mostly carp, were also trapped and removed underscores the severity of the nonnative threat in the system.) The largest Razorback Suckers were nearly double the size of the largest fish from the previous year, with one sucker having grown to 168 mm in just three months. These large suckers, in excellent condition, are less at risk of predation and have sufficient reserves to overwinter, greatly increasing their chances of survival to adulthood. Such promising results at Stewart Lake demonstrate that the Larval Trigger Study Plan is on track toward restoring the necessary conditions for successful Razorback Sucker recruitment—excellent news for the prospect of Razorback Sucker recovery.

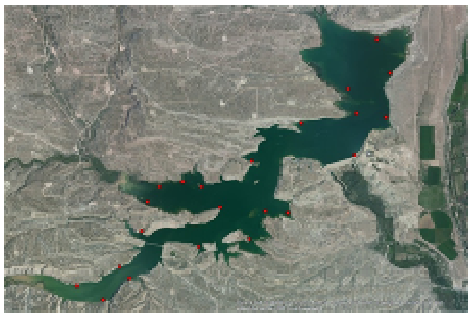
Featured Fisheries Projects

Starvation Reservoir Fisheries Assessment 2014
Northeastern Region Sportfish Crew, Utah Division of Wildlife Resources

Over the 13 October 2014-16 October 2014 time period, we initiated Fall Walleye Index Netting (FWIN) at Starvation Reservoir. The FWIN procedure was developed in Ontario, Canada as a way to standardize information between walleye waters. This was the first successful attempt to FWIN net at Starvation Reservoir.

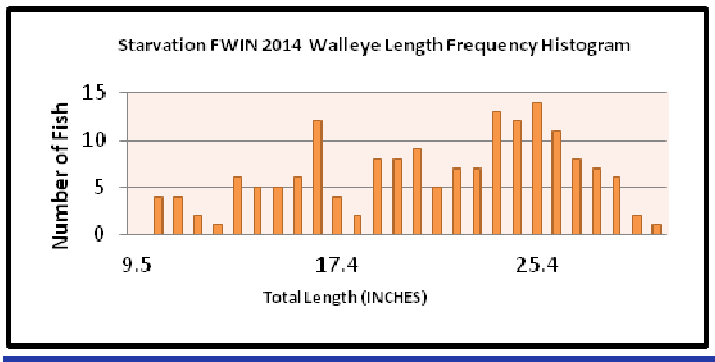
Data collected was used to calculate relative abundance, length distribution and condition of all species with an emphasis on Walleye. Relative abundance of each species was characterized as catch-per-unit-effort (CPUE) and as either fish caught by net night or fish caught by net hour.

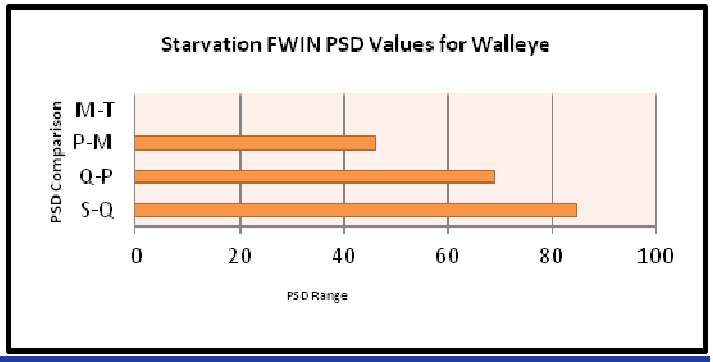
A total of 342 fish were captured in 22 gill nets during the 2014 FWIN surveys at Starvation Reservoir. Species captured included Smallmouth Bass, Walleye, Rainbow Trout, Brown Trout, Yellow Perch, Common Carp, Utah Chub and Flannelmouth Sucker. Water temperature ranged from 13.8 C – 14.9 C at the time of net retrievals. Average total length of net sets was 24.13 hours (target set is 24 hours). Average CPUE for all species was 0.65 fish net/hour or 15.5 fish net/night. The highest CPUE observed by individual net was 1.6 fish net/hour or 36 fish net/night and the lowest was 0.13 fish per net/hour or 3 fish per net/night.



Walleye

A total of 169 walleye were captured. CPUE for Walleye only was 0.31 fish net/hour or 7.68 fish net/night. Mean total length of these 169 Walleye was 527 mm (95% CI = 507 mm- 546 mm) with mean total weight of 1857 g (95% CI = 1664-2051 g) and mean W_r of 98.7 with a 95% CI range of 98.3-99.05. Visceral fats were collected on a scale of 0-5 with zero being no visceral fat and five being abundant visceral fat. Average fats for this population were 2.94 with a 95% CI range of 2.69-3.19. Proportional Size Distribution (PSD) values for Walleye at Starvation are as follows: 85 (stock to quality), 69 (quality to preferred), 46 (preferred to memorable), and 0 (memorable to trophy). Trophy size walleye are 760 mm or larger; none were captured in the 2014 FWIN.

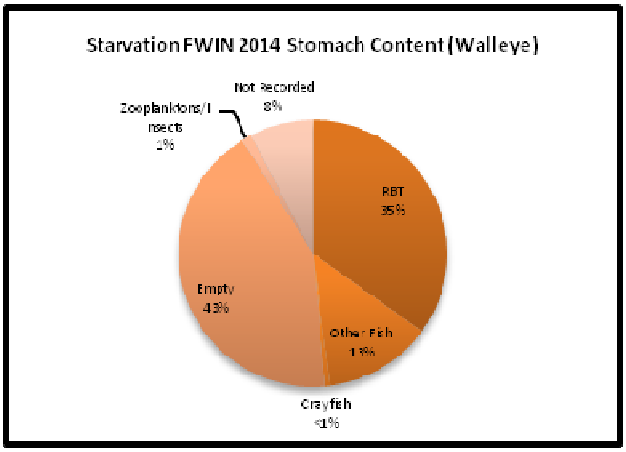




Featured Fisheries Projects

Of 169 fish collected, 43 were identified as male, 110 were female and 16 were unknown. Level of maturity was also determined with 154 fish being mature, 4 fish immature and 16 fish unknown.

Walleye stomach content analysis was conducted during this FWIN survey and yielded 59 (35%) with stocked Rainbow Trout in the stomach. These Rainbow Trout were stocked in September of 2014 at approximately 10 in. At most, one walleye had consumed three stocked Rainbow Trout in the hours prior to being captured in the gill net. Twenty-two Walleye (13%) had consumed a variety of other fish species including Yellow Perch, Brown Trout, Walleye and unidentifiable fishes. Two Walleye had each consumed 6-12 young-of-year Brown Trout before being captured in the gill nets. Two smaller Walleye had consumed zooplanktons and insects. One Walleye had consumed crayfish. Thirteen Walleye (7%) stomach contents were not recorded at the time of sample processing. Seventy-two Walleye (42%) had empty stomachs.



Age structure for Walleye captured during the Starvation FWIN netting yielded interesting results. Of the 169 Walleye captured, 124 fish (73%) were effectively aged. Age distribution of Walleye capture in 2014 was comprised of fish ranging from 1 to age 13. All year classes of fish appear to be represented suggesting good recruitment from year to year. Age-5 fish represented the highest number captured within the sampled population. Several year classes had representation in this survey with age-6 to age-10 fish well represented. In this particular survey the younger fish including young-of-year to age-2 were the least represented.

Rainbow Trout

A total of 75 Rainbow Trout were captured in the 2014 FWIN net surveys at Starvation. Of these 75 fish, 67 were represented in the overall statistics here. Mean total length for Rainbow Trout was 376 mm (95% CI = 355-398 mm). Maximum total length for Rainbow Trout was 520 mm. Mean weight of Rainbow Trout was 678 g and mean W_r was 98.6. CPUE for Rainbow Trout was 0.14 fish net/hr or 3.4 fish per net/night.

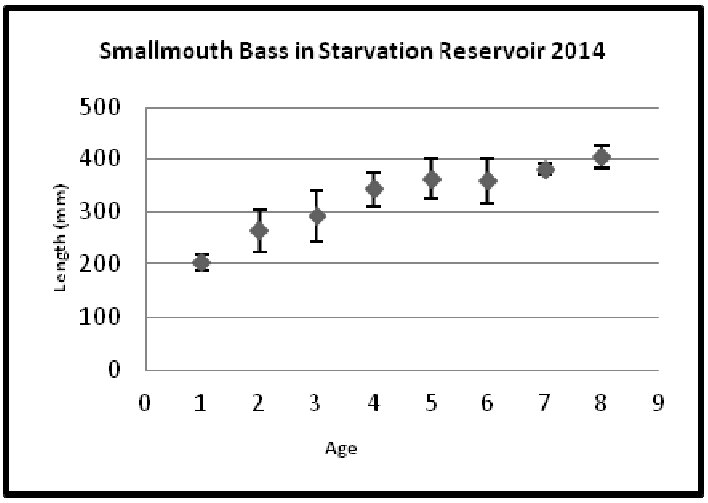
Brown Trout

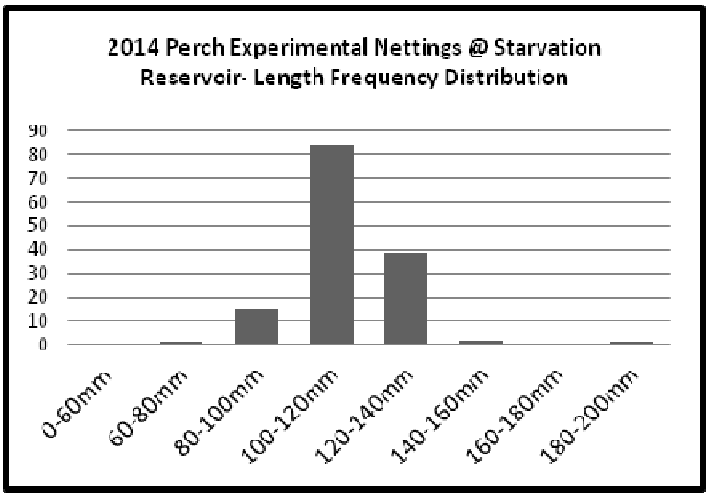
A total of 15 Brown Trout were captured in the 2014 FWIN survey. Mean total length was 468 mm and mean weight was 1106 g. W_r of these Brown Trout was 95 with a range of 90-99. CPUE was 0.028 fish per net/hour or 0.68 fish per net/night. One notable fish was a 725 mm, 4794 g fish captured in the north end of the reservoir. This fish was a mature male and was eating stocked Rainbow Trout at the time of capture.

Featured Fisheries Projects

Smallmouth Bass

A total of 56 Smallmouth Bass were captured in 2014 FWIN surveys. Mean total length for these fish was 348 mm and mean total weight was 665 g. W_r for Smallmouth Bass was 99.3 with a range of 96-101. CPUE for Smallmouth Bass was 0.10 fish per net/hour or 2.54 fish per net/night. During this FWIN survey we also collected stomach content and age data for Smallmouth Bass. Smallmouth Bass collected ranged from 1 to 8 years of age with 47 (84%) of these fish being classified as female and 15 (26%) classified as male. Smallmouth Bass in Starvation forage mostly on crayfish but do consume other fishes within the reservoir as the opportunity exists.





Yellow Perch Nettings

To better understand the prey base in Starvation Reservoir, we set four perch-specific nets in August, not associated with annual trend or FWIN netting. A total of 148 Yellow Perch were captured in these four gillnets resulting in a CPUE for Yellow Perch of 1.85 fish per hour or 37 fish per net/night. Average total length for Yellow Perch was 114 mm and average weight was 19 g. W_r was 100 with a range of 84-131. Perch were found in each of the four nets from the Strawberry River arm to the points across from Juniper Springs. Perch were most abundant in the shallows and where submerged vegetation exists.

Summary

We sampled Walleye in 2014 that ranged from 244 mm to 745 mm in total length. The largest Walleye observed in our nettings in 2014 was 527 mm. Walleye also had good mean W_r of 98.7 and were overall in good condition, which indicates they are able to find sufficient forage. At this time, the Walleye population at Starvation Reservoir is comprised of larger fish as indicated by a high PSD (89) with most fish falling between 475 mm-700 mm range. During this survey, smaller Walleye were least abundant with no young-of-year fish captured and few age one fish. Many of the fish captured in 2014 were large and mature female fish which could indicate a strong spring spawn in 2015, though recruitment from this remains to be seen.

Featured Fisheries Projects

Other species of fish in Starvation Reservoir are doing well with relative weights in the upper 90s. Relative abundance of these species does differ greatly according to the 2014 FWIN, but all continue to show up in creel surveys and angler reports. Rainbow Trout are stocked annually at a rate of 50,000 (10 in) fish and are normally stocked in the fall months of September or October. The addition of Rainbow Trout to the reservoir likely changed the food web therein; however, we have very little pre- stocking information with which to compare the current condition. Foraging trends by all species appears to change with the seasons and has produced some interesting results.

All fishes in the system utilize zooplanktons during early life stages and one of the main reasons Rainbow Trout were initially stocked into the reservoir was because of the abundance of zooplanktons at the time. During the winter and spring months at Starvation, both Walleye and Rainbow Trout utilize Yellow Perch and this appears to be lakewide. We have documented both species with Perch in the stomach in both seasons. One of the most interesting observations as a result of the 2014 FWIN surveys was the fall utilization of stocked Rainbow Trout by large mature Walleye.

In several published papers (Baldwin et al. 2003, Yule et al. 2000) stocking of a 10 in fish to avoid predation by Walleye appeared to be successful. In Starvation this appears to be the case until Walleye reach a certain size, then these 10 in stocked Rainbow can easily become just another forage fish. Our suspicions are that 2014 is not the first year in which large adult Walleye have heavily predated on stocked Rainbow Trout. The overall condition of the fish that were consuming these Rainbows was amazing with visceral fats between 4-5 on most fish. It is possible that stocking of Rainbow Trout each fall has a significant effect on the ability of anglers to catch large Walleye in the fall months.

Another notable observation is the distribution of Walleye and large Walleye in the Reservoir. The north end of the lake held 58% of all Walleye captured and mostly female individuals. The majority of smaller Walleye and a large percentage of male Walleye were captured in the middle and south ends of the reservoir.

All species utilize Perch in this system; large and mature Walleye utilize stocked Rainbow Trout; Smallmouth Bass heavily utilize crayfish and everything utilizes the rich and abundant zooplanktons that exist in Starvation Reservoir during some life stage. The lack of the Utah Chub over several years seems to indicate it is not an important or utilized part the food web in Starvation now.

It appears that in 2014 Starvation is a dynamic, big-fish producing reservoir with species of all types finding and settling into their niches. This fishery is becoming very popular for Rainbow Trout with the completion of the 2014/15 creel census in March of 2015 we will know more about its use and its harvest of all species.

Thanks to all who helped with the 2014 Starvation surveys!

Featured Fisheries Projects

With the revival of our Lateral Line we decided to feature ongoing fisheries projects conducted by Utah Chapter members. In each issue we hope to highlight projects from each student subunit and at least one project from a Utah professional. As the year goes on, please keep your Executive Committee aware of interesting projects occurring in our state. In addition, encourage your colleagues to present their findings at our annual meeting. Many thanks to our contributors!

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Utah State University Subunit

2015 WESTERN DIVISION AFS STUDENT COLLOQUIUM

February 11 – 14, 2015

Hosted by Utah State University at the Bear Lake Training Center on the shores of Bear Lake (Garden City, UT)

Network, attend workshops, practice your presentations, and receive feedback on your research! This is an opportunity to meet fellow Western Division students and learn about the diverse fisheries and current research in the West.

We are committed to coordinating a great event, at very little or no cost to students attending!

PRIZES! *More details coming—housing, travel allowance, etc. provided.* **PRIZES!**

Meeting schedule:

Wednesday 2/11 – Travel & opening social event

Thursday 2/12 – Professional development workshop with academic/industry professionals

Friday 2/13 – Interactive student presentations, with feedback!

Saturday 2/14 – Ski day or ice fishing trip

Important dates:

Initial RSVP (approx # of students attending from your sub-unit)—**November 15, 2014**

Abstract submission – **January 15, 2015**

Final RSVP (# of students attending from your student sub-unit) – **January 25, 2015**

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Like and follow the USU Student Sub-unit on Facebook for updates on the 2015 WDAFS Student Colloquium--

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Fish Tails or Fish Tales?

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