DUSKYTAIL DARTER ESA CONSULTATION

Moderator: Courtney Chambers
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Chip Hall: Thank you very much for asking me to speak today and just to reiterate - my name is Chip Hall. I'm a biologist and a regional technical specialist in the Nashville district.

My plan for today is basically a show and tell of this Endangered Species Act consultation that we have recently completed last year and the ongoing compliance with a biological opinion.

First I'm going to give you a quick background of the seepage project that we've been conducting over the last eight years at Wolf Creek Dam and how we came to need a formal consultation with the service with that project then I'm going to discuss the consultation and again the ongoing compliance with the BO.

Big South Fork begins in Northern Tennessee and flows north into Kentucky where it joins up with Lake Cumberland and as you can see, Wolf Creek Dam. Wolf Creek Dam is a large storage project. It is a - has a combination concrete structure and earth and embankment over a mile long and at max flood capacity it contains six million acre feet of water.

Historically the dam has a history of seepage through its foundation and it was designated a DSEC one under the risk management system. In 2007 based on recommendations from an independent peer review panel, the corps decided to lower the reservoir below its normal operating range and to target a year round elevation of 680 feet. This was approximately 43 feet below our

summer target of 723 and 12 feet below the winter target of 692. Because of this action that the corps took, we completed an environmental impact statement and signed a record of decision in 2010.

In our record of decision and during public and agency coordination the corps committed to complete surveys for federal listed aquatic species and tributaries upstream of the dam prior to returning the lake to normal operations. And on this slide you can see our more historical operations represented by the average observed headwater elevations from 2001 and 2002. That's the gray line and we'll call that a dark purple line.

And then starting in 2007 we were then trying to manage for a year round target of 680. As you can see the erratic headwater elevations - this dam is very hard to hold a single target because of the inflows. It's a very flashy system and it often is - has more water inflow than we can put out of the dam.

So during the EIS process the corps coordinated with the Fish and Wildlife Service's Frankfort, Kentucky field office and the service had three main concerns from our drawdown. They were concerned about the cold water supply to a national fish hatchery that was located just downstream of the dam. They were concerned about mussel species located many miles downstream of Wolf Creek Dam and any water quality conditions that could affect them during the drawdown and then they were concerned also about the re-colonization of habit in streams upstream of the dam that were temporarily restored to pre-impoundment conditions during the drawdown.

So then fast forward through our rehab project - we - after we completed the main structural component in 2013, we hoped to return the dam to normal operations beginning in 2014. Therefore we had to conduct our aquatic species surveys in 2013 in order to meet our commitment prior to raising the

lake. So through additional discussions with the service we decided to focus only on mussel species and potential host fish in the Big South Fork.

So in 2008 we completed a habitat survey in Big South Fork to determine what habitat was available for mussels after drawing the lake down. So using this survey that we completed in 2008, we determined what sites we were going to look at in 2013.

So we had 15 sample sites that covered approximately eleven river miles. Using a TVA, we partnered with Tennessee Valley Authority to access personnel and their expertise and equipment in order to conduct this survey and the results were we found 42 live individuals covering nine species and then we found 24 relic shells representing an additional three species. And all live mussels were found in sites one through eight. No additional live mussels were found downstream and no mussels and none of the species were federally listed.

For fish we were only looking at species' presence and absence in order to just know what mussel host presence was there. We found 52 species that were present - one nonnative - and we found Duskytail Darters in sites one through eight.

So the Duskytail Darter was listed endangered in 1993. It was found in six geographically distinct populations both in the Tennessee and Cumberland River watersheds however in 2008 the six populations were described as four distinct species. The Big South Fork population is considered the Tuxedo Darter and is the only known population. However the service has not listed any of these four species under the Endangered Species Act yet therefore legally the fish have continued to be referred to as a Duskytail Darter hence while we will continue to do that in this presentation as well.

So once we found this federal species, we began informal discussions with the Fish and Wildlife Service and conducted a phone conversation right after the survey in November. Then we held an interagency meeting between the Fish and Wildlife Service, the Park Service and TVA in January and based on these discussions we initiated formal consultation in January.

So we began our biological assessment and we first needed to determine for this assessment what our substrate elevations were for each riffle site where the fish had been observed. So to do that we used a historical stream profile that we had from a survey in the 1930's and were able to determine what the average elevation was for each shoal where the darters were found.

Then we - we got our hydraulics and hydrology branch folks to start to analyze what - or to run analysis to quantify the impacts that we could have from bringing the lake back to a normal operation. So the goal was to try to determine where, how much and when impacts occurred from normal operation.

This graph shows - basically at Wolf Creek we have an operating guide curve called the SEPA curve and you can see the purple line is basically the bottom band of the curve and the green line is the top band. The light blue and the dark blue lines - these are average observed elevations of the lake from the entire period that the dam existed minus a couple of years that were outliers. And the light blue line is actually a model that was run using a resident model. And basically this just shows certain areas where the model is more liberal and more conservative than what the average historical levels were.

So what we did was - is we created this graph which we've been calling a depth hydrograph and the graph is only good for a single elevation meaning a

single site on the river. This graph in particular is site eight. So what we did was we plotted the average lake levels and then we plotted the Big South Fork baseline flows that was obtained from a gauge just upstream of where our sites began.

By doing this you can see what the increased depths were over a time duration from the lake over the existing environmental baseline. In essence at site eight from our normal operations you could have a maximum increased depth of 7.8 feet and the changes in the depths at the river would last approximately 116 days.

So by plotting these graphs at each of our sites, you can tell where the impacts were, how much impacts, when the impacts occurred for each site. And as we go upstream, you can see the impacts get less until you hit site three where the averages appear not to impact anymore sites upstream.

So our results of our biological assessment basically said that lake level impacts all sites upstream to site four. There are potential impacts to site two and three based on extreme weather events and therefore we could have a potential elimination of the Duskytail Darter population from sites two through eight. So the corps found that we would likely adversely affect the Duskytail Darter.

So the Fish and Wildlife Service came back with their biological opinion and this was estimated to be approximately $3 million and the corps will construct water quality improvements in Big South Fork watershed. We'll have an interim damn operation that strictly follows the top of the SEPA curve during fill cycle for at least three years or until water quality measures mentioned before are implemented and we'll have long-term monitoring of the Duskytail

Darter in Big South Fork for five to seven years and that five to seven years is based on what the observed lake elevations are.

If we have years - if we have a number of dry years then we wouldn't necessarily see as great of impacts as we would during the wet years and so we could possibly monitor a little longer if we get a dry - if we go through a draught.

And then the final piece is what we're calling the capture and hold measure and I'm going to go into a little more detail about these measures. So the Big South Fork was historically impacted by coal mining. So there are a lot of acid mine drainage streams coming into the Big South Fork and currently we are looking at a number of alternatives to try to determine if we can do some water quality improvement projects on any of these asset mine drainage inputs.

There's also a couple of places that there are old coal mining spoil piles. This one in particular is right along the banks of the Big South Fork and so this site would be considered as an alternative for stream bank erosion removing excess sediment input into the river. These project - these project studies are ongoing currently.

So our monitoring piece - we've partnered with Tennessee Valley Authority and we're currently monitoring at sites two through ten. Site one was considered to be basically a control point. The lake rarely gets above site one and therefore there's really not considered to be any impacts to this site and site nine is being monitored because the habitat there was considered quality enough to have darters even though we did not see them in our first 2013 survey.

Site ten we added in because this site was the first site that we started to see dramatic habitat impacts from the lake - a lot of embedded-ness and lots of detritus piles and so forth. So we wanted to look at site ten to see if we had darter presence in a site that was actually - had habitat impacts. We're looking for Duskytail presence and absence and we're going to monitor the habitat conditions at each site and look at fish species richness.

For our first survey in 2014 we used snorkel observation to search out Duskytail Darters. Whenever a snorkeler would observe a Duskytail Darter, he would place - he or she would place a weighted marker at where they saw the darter and then once the region had been well searched, there were a number of sane halls taken to try to catch any darters not seen during the snorkeling.

During the habitat condition monitoring each location where the way the marker had been placed - we would take the water velocity at the substrate and for the water column at 60% from the bottom. We would estimate the substrate percentages of older cobble gravel, etcetera and then we also placed three transits throughout the shoal at the upstream, downstream end of the shoal and the midpoint and then we would take these habitat data from ten points along those transits.

We were interested in the overall fish species richness mainly as an indicator of changing stream conditions over time. This was measured using a species depletion method. Basically three sane efforts were conducted in each habitat type and each time a new species was found, two more sane efforts would be added to the effort until no further species were found.

We also used a boat electroshocking unit and two of the pools between shoals to record species that would have otherwise not been encountered during

wading. The reason we're interested in the overall fish species resistance is normally - under normal conditions the Duskytail Darter only occurs 1 to 15 individuals per shoal. So it's perfectly reasonable that when you go in one year to look for these darters that you may observe zero darters in a shoal and that would not necessarily mean that the darters aren't there.

So we were concerned with that occurring so we decided okay, we're going to monitor habitat conditions and we're going to monitor fish species richness and if those two parameters weren't changing then we would not necessarily be alerted to the fact that we didn't see a Duskytail Darter in a particular shoal.

So our 2014 results - the Duskytail Darters were present at all sites - two through nine. We found 55 species of fish and the habitat conditions were very similar to conditions that were observed during the drawdown and shortly after the drawdown was taken in 2008.

There was very little distinction in the substrate in the available habitat throughout the entire shoal but there was a distinction in the water velocities that were observed where the Duskytail Darters were specifically located versus velocities in the available habitat. Overall we observed 59 Duskytail Darters across the eight sites.

So in the future if we - if our monitoring shows that the Duskytail Darters were eliminated from all sites then another phase of our conservation measures from the biological opinion will kick in. This measure requires that we would complete additional surveys for potential population introduction or augmentation therefore as part of this phase we're establishing a captive population in order to facilitate the possible future population augmentation should it become necessary.

So currently we captured 27 individuals in 2014 and they are being held at a facility in Knoxville where a propagation program is being set up in order to maintain that captive population.

If at some point the captive population can support it, the hopes are that it would be held at two localities in the future both in Knoxville and then possibly at the Wolf Creek National Fish Hatchery. Also as part of this - as part of this capture and hold measure we're going to be completing genetic analyses in order to make sure that we're not eliminating genetic diversity with the captive propagation.

So this is just a quick timeline of all of the main events here. We completed the last of the concrete pour for the structural component on Wolf Creek rehab project at the end of February and beginning of March in 2013. We completed our first survey for aquatic species in October and November of 2013 and then the vertical team with corps recommended that we would return to normal operations in mid-December of 2013.

At the same time we kicked off our biological assessment and initiated formal consultation with the Fish and Wildlife Service at the begging of January. We completed the biological assessment at the first week of February and then received a final biological opinion in March of 2014.

Overall from initiation of the biological assessment and initiation of consultation we received a biological opinion in 42 days. With that, I'll take any questions.

Courtney Chambers: Very good. Thanks, Chip.

Operator: All participants are now in interactive talk mode.

Courtney Chambers: Okay so now you're free to unmute your phone line and ask away. You're also free to utilize your chat feature. Chip if you'll go up to the top of your window there and select stop sharing, it'll take us back to the meeting interface. There we go.

Chip, are those some in your captive population?

Chip Hall: Yes and I didn't include any pictures of them in the facility only because, you know, this being a public page, I didn't know how much it would matter seeing the facility and so forth to the public.

Courtney Chambers: Right, okay. Thanks. Alright, any questions for Chip today? You must have wowed everybody Chip or you were just extremely thorough. I certainly learned a lot. We'll give a few more minutes for people to gather their thoughts and I can work at getting the link to our gateway page down here in the chat box so that you can - if you don't already have access to it, you can copy it and paste it and go check it out or sign up for webinars if you hadn't done so already.

While we are waiting another few minutes if you - just a reminder - if you're calling in as a group of people, we'd really like to have record of the number in your group and the organization you're with. By organization I mean if you're outside the corps, or I mean division or district.

(Margaret): This is (Margaret) at SWD. I have a question.

Courtney Chambers: Hi (Margaret). Yes, please go ahead.

(Margaret): We saw the timeline where it showed the number of days to reaching the signed biological opinion. I'm not, you know, this isn't what I do every day so was that a pretty easy biological opinion to get or was that a long timeframe or you had longer or how did this meet up with your expectations in getting it approved or assigned?

Chip Hall: Sure. It was certainly a unique consultation. I think that probably anybody who's gone through a formal consultation with Endangered Species Act would - I would assume would be quite surprised with 42 days.

It was - it was a lot of fun on how well the corps and the Fish and Wildlife Service was able to interact and, you know, combine in efforts to complete the consultation. This consultation - because it was - because the return to normal operations at Wolf Creek relied so heavily on completing this consultation, there was a lot of political oversight. So the corps was able to prioritize the consultation and as well as the Fish and Wildlife Service.

So there were a lot of sacrifices made in both agencies in order to complete this consultation in that amount of time - a lot of - a lot of overtime, six day weeks and so forth. Does that answer your question?

(Margaret): Yes, thank you. So it was atypical really. You had to make extra efforts to achieve it.

Chip Hall: I would say it was very atypical, yes.

Courtney Chambers: Alright, we have time for some other questions if you have one and you'll also notice I posted the link to the gateway in your chat box.

(Jeff Laufle): This is (Jeff Laufle) in Seattle. I've got a quick one. Yes, first the - I agree that's a very short time to get a biological opinion in a formal consultation in our experience here. Aside from the value of the collaboration with the services, was there any other particular standout lessons learned that you had passed along?

Chip Hall: Yes, absolutely. The - one of the things that would have been very, very helpful in this consultation and assessment of impacts, you know, we performed a habitat survey prior - well not prior to the action. The decision to draw Wolf Creek was made under emergency conditions so a lot of this - a lot of this compliance with NEPA and the ESA and so forth was done after the fact under alternative arrangements with CEQ.

So having only - only having the habitat survey we were unable - nobody could know whether or not the darter existed in this stretch of river prior to drawing the river down or prior to drawing the lake down.

The last time this section of river had been sampled for fish was in the early 90's and that was just a cursory look that an etiologist performed as he was driving through the region. He hopped off the side of a bridge and took a couple of kick sane hauls and that was all the 90 - the early 90's survey was and before that it was prior to the 80's.

So because of that, the Fish and Wildlife Service has to take a conservative approach and state that the fish was not located in this river section because of the lake and therefore when we drew the lake down, the species recolonized from sites upstream. They recolonized this section of river.

They - since we didn't have a survey prior to drawing the lake down, you know, there was no way to know whether that was true or not. So the first

thing is, you know, always perform a survey at the beginning in case you run into this situation.

Another - another problem and lesson learned was, you know, the fish - even the Fish and Wildlife Service did not have the darter on their radar when we were going through coordination under the EIS. Really the only concern was mussel species. So, you know, again just doing your research in the beginning and trying to determine possibilities will be very helpful. I would say that's probably the main lessons learned from this.

You know, the political oversight which, you know, obviously got oversight from the vertical team and the corps all the way to headquarters and for Fish and Wildlife Service there was oversight all the way from the Department of the Interior down.

You know, that was kind of intimidating during the process however I'll say there's absolutely no way we would have ever completed this process this quickly had none of that occurred. So, you know, there's pluses and minuses with that.

Courtney Chambers: Thank you, Chip. Any other questions?

Chip Hall: This is kind of interesting. I was expecting to hear some snorkel questions.

Courtney Chambers: Do you have some exciting stories to share of your snorkeling experiences?

Chip Hall: I guess that we can throw that into the lessons learned. What I have found is that the corps has not conducted many snorkel surveys and if they are, they have not necessarily been - been in the open and so it was - it was somewhat

trying to get a snorkel survey approved through our safety regulations and so forth.

There's, you know, there's - oh it's 385 - our safety manual addresses snorkel surveys for contractors and so I would just say you've got to be really observant of those regulations, follow them to a T and try to look into that as early on as possible if you plan on doing it. If anybody is planning on doing that, I've got a great example of a snorkel plan. If anybody would like a copy of that, you can just get a hold of me.

Courtney Chambers: Okay, that's good to know. Alright, any other questions lingering out there?

(Brad): Yes, this is (Brad) in Walla Walla. I just had a question on how your partnership worked with the TBA and was there - I guess was there like a member exchange with them to collect data?

Chip Hall: Sure. So we had - we have an existing - actually a couple of existing memorandum of understandings with - I'm sorry - MOA's and with TBA. And so those MOA's made it very easy to establish that partnership. The - basically we conducted an economy act purchase with them and we did member fund.

Fish and Wildlife Service is also doing part of this work. Technically the capture and hold measure and the genetic analysis is being conducted by Fish and Wildlife Service and that one was a little bit more difficult only because of the way that the money had to be transferred to them under the MOA. Under the TBA MOA's you could do a member but under the Fish and Wildlife Service all of the money has to be transferred down to them upfront.

So I - frankly right now off the top of my head I can't remember how it was achieved but in essence there was a check sent by the financial center to the Fish and Wildlife Service so the money was actually transferred as opposed to, you know, a member.

(Brad): So I assume that was rather difficult to accomplish?

Chip Hall: Well it just took, you know, it's not done every day and so it took a little while to find people who knew how to do it in the corps and it actually took a while to find people in the Fish and Wildlife Service who actually knew how to accept the money. So I mean it happened. It wasn't that big of a deal. I think it took maybe - I don't know - maybe a month or two to make that piece happen but once we found out the information, it went real quick.

(Brad): Interesting. Thank you.

Courtney Chambers: Additional questions? Alright well hearing none, Chip do you have any final comments before we close today?

Chip Hall: No. I'd just like to say thanks again for letting me, you know, spill the information out there.

Courtney Chambers: Well we appreciate you sharing it and it does sound like a successful - successful project and just some good lessons learned from it. Alright well thank you very much again, Chip and participants, thank you for joining us today to make for a successful webinar. Please watch your email for future meeting announcements and I hope you have a wonderful afternoon.

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