Fish & Wildlife Service – National Conservation Training Center
Critical Writing/Critical Thinking Follow-up Web Series
HEAT Your Paragraphs Up!

Speakers: Michelle Baker (MB) Karene Motivans (KM)

[audio start]

KM: Today's topic is about that wonderful paragraph structure we learned about in class called HEAT. Michelle Baker is with us today, our favorite consultant from Shepherdstown, and writer. We're really glad to have her back.

We have all the attachments from today's webinar in an email for you today. All that's at your disposal to use We'll also post this program up on the archives with the other archived programs, and all the downloads will be available there. I'm going to put myself on mute and welcome Michelle.

MB: Hi everybody. It's really good to be here again. I'm very excited to be sharing this program with you today. HEAT is one of those great strategies that we don't have a lot of time to share during the week, because as you know, it's a really packed week. But it's a really good strategy for creating argument paragraphs that are solid in their analysis, that are focused, that are easy to read for your reader to follow, and that are integral with the rest of your document. So let's HEAT those paragraphs up now that's fall and we're ready for some good hot topics.

I'm going to start today's discussion by showing you an example of what the H-E-A-T all look like. Then we're going to get into some terminology, and we'll start breaking down each of those sections throughout today. If you have any questions at all throughout today's session, please feel free to enter them into the chat box, or to unmute your phone and ask that question. I'll be pausing several times to ask, but feel free to jump in and ask those questions as well.

Let's take a look then at how a HEAT structure actually looks in practice. The H in HEAT stands for the Hypothesis. A hypothesis a claim that looks something like this. The primary impact the invasive python has to the south Florida environment is the threat it poses to threatened and endangered species in the region. The reason I call this the hypothesis is because this statement is debatable in a few ways.

First, the invasive python has a number of impacts, so the idea that this is the primary impact is open to debate. Second, the fact that the python poses a danger to threatened and endangered species is another area that's contentious. It's open to debate. We need evidence and analysis to prove that point.

The E stands for evidence. The current range of the python includes at least 10 protected species at risk as prey. Obviously this could be beefed up with some research studies, some source citations, but this is a start.

Analysis answers the question why or how. So this one starts with the word *because*. That's a good indication that it's analysis. Because the python is larger than the native indigo snake, it can outcompete the native for food and threaten the species' survival further. So we have some evidence in here, but there's also analysis telling us how the python is able to endanger that native species.

And then finally the Thesis. Trapping and removing the python will lessen the impact to the indigo snake and aid in that species' survival. Again, there's some analysis thrown in here, but it connects this piece of information back to the entire document.

Now ideally, we want the HEAT structure to serve as an entire paragraph. This is a little bit too short. It's a little bit underdeveloped. It doesn't have all the transitions we need. But it's a good breakdown of the Hypothesis, Evidence, Analysis, and Thesis. So this gives us a good starting place.

You'll notice right away that I'm using the term *hypothesis* in a way that's a little bit different than the way you use it in science. That's because we have a different definition for hypothesis in rhetoric than we do in science. So this is probably a good time for us to discuss some terms. In that package that Karene talked about of handouts that you have in your email box and that you can download after today's session, you have this glossary that you want to talk about today.

The hypothesis is basically a claim. It's an idea that you want to support. But it's part of your overall argument, which is in your thesis statement. Let's start with that idea of the argument, which is right here. The argument is embodied in your thesis statement, and the definition of the argument is a series of connected propositions intended to establish a proposition. Some of you might remember that definition from the Monty Python sketch that we played in class. That actually is the real definition of an argument.

An argument is a stand that we take on a debatable issue. That's our position. But it's not an arbitrary stand. That wouldn't be an argument; it would be a bias. The connected propositions, the logical basis for our position is what makes it an argument instead of a bias. Let's talk about that idea of a position for just a minute.

A position is an opinion on a disputed topic. The Service is required on a pretty regular basis to render an opinion on a disputed topic. There are really three different kinds of opinions that the Service is being asked to render. Some of those are for the future. You are often asked to suggest a course of future action. A comprehensive Conservation Plan is an opinion on a disputed topic, because people disagree about how we should best maintain our natural resources.

Sometimes the Service has to render an opinion about something that happened in the past. For example, did "take" occur? Obviously, that's a disputed topic, and we're giving our opinion. And then finally, sometimes the service is asked to

classify a situation that's happening in the present, like is a species right now being endangered? Again, an opinion on a disputed topic. So a biological opinion, take or listing opinion, a Comprehensive Conservation Plan, all of these documents, we have to take a position, and we are therefore making an argument.

So an argument is a series of connected proposition. Well then what is a proposition? We're calling propositions in today's discussion claims or hypotheses. These are tentative statements. They're open to debate. And that's because they are probable rather than certain. For example, is the polar bear endangered? We think so. It seems likely that the polar bear is endangered. But we don't know that for sure. What we do is to analyze the evidence that we have and based on that analysis we make our best possible guess.

The term evidence seems pretty self-evident, but we do need to keep in mind that evidence, although it comes from research, is sometimes disputed. For example, we believe that there are in existence I think 3 of those Key Largo woodrats that this python is accused of eating in the Everglades. Do we really know for sure that are 3 in existence? That seems like a pretty contentious piece of evidence. It could be possible that there's a nest we haven't discovered yet.

So evidence can be disputed, and that's one reason why we have to take a position. More importantly is the analysis piece. Analysis is the logical activity that connects evidence to our proposition. How are we supposed to interpret the evidence and lead us to a right conclusion?

Linda Tate has just a great way of understanding this. She uses the analogy, in any legal case, both the prosecution and the defense stipulate to using the exact same body of evidence. But the prosecution interprets that evidence to lead you to one conclusion. And the defense uses that same evidence to lead you to the opposite conclusion. So it's that analytical work that leads you to the argument involved.

And this is one of the great strengths of the HEAT structure. It forces us to show that analysis and to connect it directly to both our hypothesis and our thesis. And that strengthens our argument.

Let's talk first about the thesis. Even though that's the last piece of your paragraph, it's the first piece of your document. And just before we talk about this, there's one side note I'd like to make. The HEAT structure is a paragraphing structure. It only works at the paragraph level. It is not used to organize an entire document. And it's only good for organizing certain kinds of paragraphs. You cannot use the HEAT structure for introductions or conclusions.

Introductions, you should be establishing your context, building a rapport with your audience. In your conclusion, you should be summarizing, making a call to action, stating what needs to happen next in the chain of events. At other places in your document, you should be narrating, describing, or setting out procedures. If you're doing any of those activities, you're not using the HEAT structure. You're only using HEAT when you're making an argument.

Argument by authority, example, analogy, or cause. If you're using the IRAC structure to organize your entire document, the paragraph of Analysis, the A paragraph, that's where you can use the HEAT structure. So the HEAT is a paragraphing structure, and it's only suitable for argumentative paragraphs.

With that in mind, let's talk a look at thesis statements. A thesis statement is a single sentence that summarizes the argument of your entire document. This sentence should be familiar to you both from the class and from your studies in civics, right? This is that sentence from the Declaration of Independence, *we hold these truths to be self-evident.* What you'll notice about this sentence is this provides a perfect blueprint for the entire Declaration of independence.

Starting with this dash right here, *that to secure these rights, governments are instituted*—if you go back to your course notebook and look at the reading, or if you Google the Declaration, you'll see that the second paragraph of the Declaration explains how the colonies became a government underneath of the British government. This point is actually the second paragraph in the Declaration of Independence.

This next point—*whenever any form of government becomes destructive*—starting in the fourth paragraph, Jefferson lists all the ways that King George has been abusing his power so this next point in the thesis statement is the next point in the Declaration of Independence, and then finally, *it is the right*. The final paragraph of the Declaration separates the colonies from the British government and lays out the colony's right to institute itself as a new government.

So this thesis statement, which is the very first sentence of the Declaration of Independence, lays out in the order of the document, all the claims, or the hypotheses, or the propositions that that document is about to make. Let's look at just a few more examples.

Each of these comes from the pre-course writing samples you were asked to write. Let's take a look at the first one. *You should consider applying for the Fish and Wildlife Service because the position allows you to put your college courses into practice, the US government is a stable employer, and you would like the location.* So if you're writing a letter to a recent college graduate, here are some reasons they would like to apply for the job, and here are the three next paragraphs of your letter. That is a very simple strategy that is taught to almost all of us in our high school and college writing courses.

You have your three-part thesis statement, your three-paragraph document with an introduction and conclusion to back it up. The second one here is a little more sophisticated.

Because we are an agency dedicated to conserving our nations' natural resources, our office should recycle cardboard and sponsor weekly bike rides to work. Now what actually would happen here is this first phrase would become the next paragraph. The first paragraph of the document would describe how the

FWS has become an agency dedicated to conserving natural resources. The next paragraph would describe a cardboard recycling operation, and the next paragraph would describe a weekly bike ride.

So we're actually going to begin with a standard and then start making an argument. What I'd like to point out here is that very often after you finish writing the document, you need to go back and reverse engineer your thesis statement. Very rarely does the thesis come out perfectly when you're writing your first draft. Once you're finished with the document, go back to your thesis statement and reverse engineer it so that it flows in this kind of way.

I'll let you look at that last one on your own so that we can stay in good time for today.

A well-formed thesis statement should outline for you all the different propositions or claims that your document is going to make. I'm going to give you an example that should be pretty familiar from the course we just went through. Here's a sample thesis statement.

The best means immediately at our disposal to lessen the environmental impact of the Burmese python in the Everglades are to capture and remove the invasive species as well as to continue designing traps to increase their effectiveness.

Most of you will recognize this as a good thesis statement for the final skill check, where you're asked to select two out of the five programs from the UF to recommend to the superintendent. At this point, I'm going to ask you either through the chat box, or by unmuting your phone to suggest a couple of hypothesis or propositions that you would make based on this thesis.

What are some hypothesis that you would need to make if this was your thesis? Let me ask the question in a different way. What's one paragraph you would have to write to support this.

KM: Michelle, we have a couple of suggestions here on the chat.

Several methods have been suggested to lessen the environmental impact of the Burmese python, as a hypothesis.

And then a question, *Do we know that the traps have been effective in the past?*

We have another chat contribution. *Does the hypothesis have something to do with the effectiveness and techniques of capture and removal?*

MB: Good. So just to recap, I'm hearing a couple of different answers. One of them is focused on the traps themselves. How effective are the traps, how do they work, and in comparison with other methods of removing the pythons, how effective are they. And that's good. That's a paragraph definitely. Another idea that I'm hearing is how do they compare to other methods of removal, and why are they

perhaps better or more streamlined than other methods. Good. Any other suggestions?

Alright. One idea that I didn't hear is the idea that the Burmese python are negatively impacting the environment of the Everglades, and based on the context of the document and this audience, you may or may not have to establish this point. You'll have to go back to your writer's triangle and decide, is this a hypothesis that I need to establish in this document.

Now I have a yes or no question. Let's take this one example. Let's say that this is my hypothesis. *The current trap design is effective at catching smaller pythons. The current trap design is effective at catching smaller pythons.* Can I address that hypothesis in a single paragraph. Give me a green checkmark if you think yes. Give me a red x if you think no. *The current trap design is effective at catching smaller pythons.* Green checkmark if you think I can handle that in a single paragraph. Red x if you think I need more than one paragraph to handle that question.

Good. Most of you are saying you can do that in one paragraph, and I think I would probably agree. Go ahead and clear your answer. Now let me ask you this. *Trap design is proceeding on three fronts.* Can I handle that hypothesis in one paragraph? Green checkmark if you think yes. Red x if you think no. *Trap design is proceeding on three fronts.* Green checkmark if you think yes. Red x if you think no. Very good.

Most of you a re absolutely right. You probably are going to need more than one paragraph to handle that. What you will see as you break down your thesis statement into individual hypotheses is how many paragraphs do I need to address each one of these topics? So one of the advantages of HEAT is as you start breaking your thesis statement down into paragraph-sized chunks, you start getting an outline that shows you really how big is your document, and that's where we're going to move next.

So you can clear off your x's, and we're going to move into our next question. We're going to start now delving into the difference between evidence and analysis. I'm going to take us into our first poll question. I'm sorry, no I'm not. I'm going to give you some information first. Let's look at the difference between evidence and analysis.

Evidence typically answers the questions who, what, where, and when. Analysis works at that higher level of critical thinking and it addresses the questions of why and how. Analysis connects the dots between our evidence and conclusions. Let's look at an example and tell me what you think.

There are four statements here, and I'd like to know which one of these constitutes analysis. Take a couple of minutes to read through these. Remember that you have a scroll bar on the right hand side of your screen, so you can go up and down between A-D. I'm going to give you just one minute, and then you'll have another two minutes to answer A-D. I'm going to open the poll. You still

have two minutes. You still have about 30 seconds left. We're waiting on two participants. And everyone is done. I'm waiting for the system to calculate the results. And can everyone see the results along with me?

I can't hear anybody. Can everybody see the results along with me? Can somebody chat a response back.

[yes Michelle]

Oh, thank you. I see that there's a split between B and D, and one person answered C. Let's start with A since nobody got that one A. You're all right. Why is that one not analysis. What is it instead?

[statement of fact, isn't it?]

Very good. It's evidence. In this case. It's an authority. The IUCN is an authority who has categorized the akikiki. I'm going to skip B, since a lot of people selected it and move on to C. We have to do something. Does that answer the question why or how? And the answer is no. This is part of our context, and that might be part of our thesis statement, but this is more likely to be part of our introduction. We now have to issue a finding. The finding, or the position, would be called what?

Let me go back to our glossary for a second. Our position on this topic is going to be called what?

[hypothesis]

The hypothesis is the proposition. And the whole series of propositions is embodied in one sentence. What's that one sentence called?

[is that the thesis?]

That is the thesis. The series of propositions. For that reason, D is not analysis. It's actually too big. The species has a small population. That may or may not be true. If it is, I need evidence to prove it, and the evidence is not here. The evidence will be later in a smaller bit. The species occurs in a small geographic range. Again, that's probably a debatable point. We need evidence and that evidence has to be analyzed. Is undergoing rapid decline. I'm sure that is a hugely contentious issue, so again, evidence and analysis.

So for all of these reasons, D is too big to be analysis. It's a thesis. C is context. And A is evidence. So what does that leave us with? Right. *Invasive exotic plant species endanger the akikiki by displacing native plants used for foraging and nesting.* And by is our key word. Remember that analysis answers the question how or why. How is the akikiki endangered? Native places are being displaced, and the akikiki use those foraging and nesting.

Analysis really gets down to the nitty gritty. It goes hand in hand with evidence, and it answers those questions how or why. Let's look at a couple of examples of where it's missing and where it's present and how we can make this work a little more clearly. Take just a minute to read through this paragraph here.

Those of you who have been working with me with this class for quiet a while know that I have a huge objections to lists, and this is exactly the reason why. All analysis is missing from lists exactly like this. Things to consider are lighting—use of timers, etc. Light sensors, HVAC systems. Materials used in constructions. There actually is one tiny little bit of analysis that is being implied in these sentences through the use of punctuation. Lighting, and then this semicolon, HVAC systems, semicolon, materials used in construction, and then that semicolon is actually incorrect. It should be a comma.

What the writer has done in this list is to group items together into categories. And if you ever have to include a list, if your supervisor instructs you to do that, this is the way to do it while still including some kind of analysis. What this does is to tell your reader how the items are connected to one another, but it is buried. And one of the keys to analysis is showing your work.

The next example does a slightly better job, although there still needs to be more detail. Again, take a minute to read. Now, this is a personal note to a friend, right? This is that introductory pre course writing sample where you're trying to get someone to join the agency, but there's still a persuasive element here where you're trying to persuade them. This is a debatable topic. Does this person want to join the FWS?

So let's take the sentence in the center. Think specifically of a friend that you have. Why would they want to work for the only government agency primarily responsible for managing natural resources? Think about that for a second, and then answer either in the chat or on the phone. Think of your friend. Why would they want for the only government agency primarily responsible for managing natural resources?

JM: This is Joann Mills. I would suggest one that you are an avid environmentalist and have a degree in Fish and Wildlife biology, or something like that.

KM: And Michelle, we have another possibility on the chat. *Because they love natural resources.* And another idea is t*hey want to benefit natural wildlife and their habitat, the FWS is the organization to work for.* Also *that you're a conservationists and you want to contribute to and protect the environment.* Another chat is because *we have the same major*. I'm assuming that's educational major, *and same environmental ethic.* I think we see some similarities in those answers. And that's all we have.

MB: Good. What I'd like to point out here is we take a lot of that for granted. One of the advantages of the HEAT structure is it forces you not to do that. You really have to show your work. And you would be shocked at how often you need to show your work, even when you're writing to people that you know very well, the

number of times that you need to express the common ground that you just take for granted.

And if you just take about the number of times that you and the people that you love the most have to articulate what is on your minds, then this point really gets driven home. You have to say it, because it's so rarely understood.

This next example is much more biological in nature, and I think it's a lot harder, but take a few minutes to read through it, and let's see if we can dissect it together.

So the first question I have for you is what analysis do you see? There's lots of evidence. What analysis is here?

C: This is Carlene. Is the reference to the tweed at all in 2006, you could go to that, and it would be analysis of predation. But otherwise, I don't see a lot of.

MB: Good. There's not a lot. There may be one more bit. Maybe that roosting or incubating by cats, because we're kind of missing a piece of evidence. We're not sure if the cats are eating the roosting birds. We know that the birds are being eaten, right? And we think that they're being eaten when they're either roosting or when they are very young.

Also, what exactly is similar about the, and I don't know how to pronounce the island's name, but about the Kauai thrush and the akikiki. Just because they co-occur, do they have the same nesting cycles? Are they the same size? Do they nest in the same places? Like if the thrush nests on the ground and the akikiki nests on cliffs that would make a significant difference between the two. So you see how the analysis when it's missing can really cause some problems.

The one piece of analysis that's very clear here is the phrase *all are likely predators of the akikiki*. There are rats and cats on the island. That's evidence. And *all are likely predators of the akikiki*. That's analysis. How are they a likely threat? They are likely predators. So we have a hypothesis, another one of the nefarious threats to Hawaiaan forest birds are the myriad predators. We have evidence, rats and cats are on the island. And we have analysis, they are likely predators of the akikiki. We have additional evidence, which is that the Kauai thrush is at risk, but we need analysis beyond the fact that they co-occur.

We also have evidence that cats are eating the birds. But we need additional analysis about when and where to determine whether those birds are likely eating the roosting. So there's some analysis, some missing analysis, there's a hypothesis, and there's evidence. What's missing from this paragraph?

[the thesis]

Exactly. Why do we care that the forest birds are being threatened? What are we going to do about it? We have no idea, because we don't know what the thesis of

the document is. Something at the end of the paragraph needs to say, this is another reason to warrant the listing of the akikiki.

Nathan: Michelle, I think this is a pretty typical kind of analysis we do. And I think there's a missing piece of analysis too to explain why this piece of evidence of predation would lead you to the conclusion that this is a serious threat. And maybe that's inherent and maybe not, but that would be a nice thing to piece together.

MB: Good. I agree. Alright, let's take. We've got just two more quick topics to cover. One of these is just to show you, it is possible to bring evidence and analysis together in a fairly smooth kind of way. They don't have to be really pieced out the way that the HEAT structure implies. Here's one example.

The fact that the rabbits ate all the vegetation is evidence. The fact that that turned this island Laysan into a barren landscape and that eliminated all the wildlife, that's a causal chain, and that's really analysis. So here in this one sentence, you're doing the E and A together in a really organic way in a way that's concise and pleasing and simple.

Here's another good example. This sentence could actually be your Hypothesis, your Evidence, and your Analysis all wrapped up into one. You've got your year, the fact that the nest was found, and the evidence. The fact that the nest was found means that the pythons are breeding in the wild. All of that is here combined.

So this HEAT structure, I do want you to think about all the pieces, because especially that analysis piece is so often missing. But just because you have all those pieces, you don't have to have this clunky sort of sentence by sentence structure that can be awkward to read and difficult to handle.

The last little bit that I want to share with you before we wrap up today has to do with the way this works hand in hand with the argument modules that we discussed in class. Here is an example of a piece of evidence that we deal with all the time. Hornswiggle reported that migratory bird populations are declining, in part because of predation by domestic cats. This is a piece of evidence, and in this case it's an argument by authority. We have an authority by the name of Hornswiggle. If you go to the argument module, and you look at the rules for an argument by authority, analysis would include the following points.

Number 1, relevance. How is it relevant to your argument? If you're arguing that feral cats are the primary reason of migratory bird population reductions, then this doesn't seem like a relevant argument. Number two, citation. If you don't have the Hornswiggle citation, and you're trying to use this in your document, you're going to get called down on the carpet for that. Number three, qualifications. You may need as part of the analysis of this authority to say, who is Hornswiggle? Is he a pedestrian? Is Hornswiggle a professor at a local university? Number four, you might need to discuss his bias. Does Honrswiggle hate cats? He personally owns dogs, and has a shotgun that he uses to shoot cats. Independent

verification. You might need a sentence, or it might strengthen your argument to have a sentence saying, Hornswiggle's reports were supported by three other scientists studying in the same area. And then finally, you might want to support that it's free from fallacy.

So if you're stuck thinking, I know I need to analyze this piece of evidence, but I don't know how to do that, go back to the argument modules, and say, this is an argument by authority. How is it relevant? How can I qualify it? How can I prove that Hornswiggle is free of bias? So there's lots of good information in your notebook that will help you to analyze the different pieces of evidence that you have to prove your case. If you're stuck on analysis go back to your notebook and follow the rules that are there.

Alright. Let's take a look at one paragraph and do a HEAT analysis. Is this a good or a bad HEAT paragraph, and what needs to be changed about it to make it a better HEAT paragraph. Again, by chat or by telephone, what do you think?

Question number one, does it have a hypothesis?

[no]

Question number two, is there any evidence?

[I think it's a yes, although it's hard to tell without the hypothesis.]

Question number three, has the evidence been analyzed?

[Maybe a little bit in the second sentence, perhaps?]

Very good Linda. There would be no need to use station funds for my participation. Analysis would include the relevance to my supervisor. In other words, the estimated time commitment. You wouldn't have to give me up very often. It's only three days a month. You wouldn't have to pay for my travel costs. Those are covered by the team. The analysis shows to the supervisor what the benefits are to him or her. That is largely missing. There's just little tiny pieces of it. Is there a thesis?

[no]

Good. You've got the PowerPoint in your email. If you want to try rewriting it, that would be a great exercise to wrap up today's webinar. So the advantages to using the HEAT structure. By setting out your thesis at the beginning and lining up your hypothesis with it, it allows you to brainstorm your argument and establish an outline for your whole document. Second, it lets you line up your thesis statement with your document so that both of them go in the same order.

Third it allows you to focus your paragraphs using your hypothesis on one proposition only. Fourth, it allows you to develop each of your ideas with evidence and analysis that are appropriate and relevant. And fifth, it allows you

to connect all of those ideas back to your thesis statement. So HEAT up your paragraphs and keep your paragraphs relevant. Thank you so much for your patience today. I hope I've been able to write some hotter paragraphs and some stronger arguments. Have a great week everybody.

[audio end]