

ENVIRONMENTAL PLANNING IN LONG RANGE TRANSPORTATION PLANS

Tribal Transportation Training
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Hello everyone. My name is John Edwards, I am a Natural Resources Scientist with Cross Timbers Consulting. This presentation is to provide information regarding environmental planning in long range transportation plans. Specifically, with this presentation I hope to establish both the need and regulatory framework for environmental planning, both in the LRTP and throughout the planning process, and provide methodology for doing so.

Long Range Transportation Planning



- **Key Word: Planning**

- Includes more than just writing the LRTP
- Requires planning at all steps in the process

- **What are the steps in the process (hierarchy)**

- LRTP > NTTFI > Priority List > TTIP > Project
 - LRTP
 - NTTFI
 - Priority List
 - TTIP
 - Project

Lets begin with a discussion of long range transportation planning. The key word here is “planning”. The LRTP should be, and is intended to be, a long-term guide for all transportation projects, providing the background information and basis for shorter-term planning. That being said, the LRTP is not just a thing to check off your list to be able to get funding. The more detail and planning that goes in to the LRTP, the better off all projects will be down the road.

Also, long range transportation planning (although eponymous with LRTP) does not end with production of the document. It involves planning at all stages in the transportation process, which begins with, and is guided by, the LRTP.

So what is the process/what are the steps in this tribal transportation hierarchy.

LRTP -> Guiding document for all TTP, routes/projects allocated

NTTFI -> All non-proposed routes

Priority List -> All projects next 5 years

TTIP -> Financially constrained, updated every year

Project -> individual project

Environmental Impact Consideration



- **At what step do we typically consider environmental impacts of a project?**

- At best at the beginning of a project
- Generally further down the project stage once designs are close to done and your looking to go to construction and just need the approval to proceed

- **What is the general perception of environmental issues amongst transportation managers?**

- Generally negative
- Regulatory hurdle that impacts project costs and timing

- **Is this negative perception deserved?**

- YES.....ish

Just a quick clarification, when I say environmental in this presentation, I am referring to everything included in the NEPA process (includes section 7, 404, and 106, and all others-see NEPA 101 presentation).

Now lets think about at what step in the hierarchy (previously discussed) do we typically consider environmental impacts of a project. At best towards the beginning of a project, but often much further down the project process, generally once designs are fairly far along and managers are looking to go to construction. This is often the point when managers/engineers check about environmental clearance to make sure they are good to proceed with construction, sometimes only to find out that there are major issues that need to be addressed.

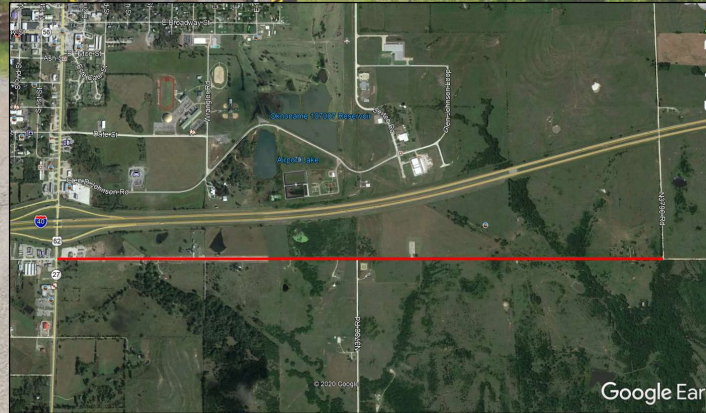
So, amongst most transportation managers the perception of environmental issues/considerations is generally negative, and thought of simply as “burdensome regulations” that impact the project cost and timing.

Now is this negative perception truly deserved? I’d say yes, especially from the perspective of transportation managers.

Project Example – The Bad



- K-Bar Road (MCN)
 - 2-mile roadway reconstruction
 - Provided access to new MCN hospital being built
 - Seemingly straight-forward project, wide-open low topography area



A roadway project we did for the MCN a few years ago is a prime example of where this negative perception is earned. This project was a 2-mile roadway reconstruction of an existing gravel road where the new MCN hospital was going to be built. There seemingly were no major issues present with this design. The project occurred in a relatively flat area, with clear ROW and little structures.

This project began and proceeded as most projects do with the design being conducted independent of (and started a ways before) the environmental review. However, late in the design process, when the environmental review was being conducted, some hiccups began to appear.

K-Bar Road – Wetland Issue



- Wetland discovered adjacent to roadway
 - Not on National Wetland Inventory maps; not in hydric soil series
 - Identified during environmental field investigation
- Required formal delineation to determine bounds
 - Determine impacts of proposed project on wetland

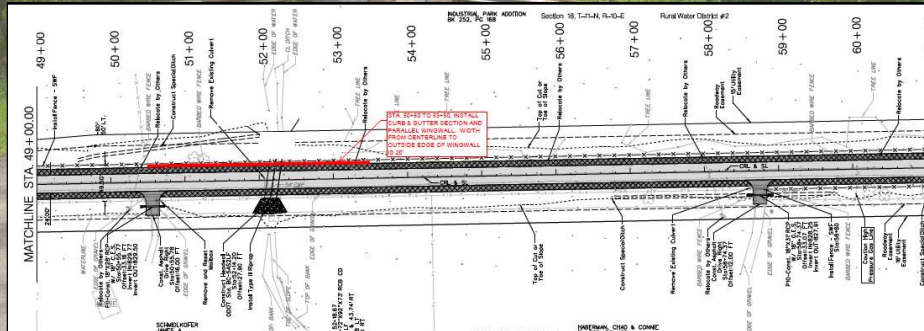


The first issue was the discovery of a wetland area that was adjacent to the project site, and at a point where a culvert was going to be replaced. This wetland was not previously identified via remote methods from the NWI maps or hydric soils maps. This discovery necessitated a formal delineation of the wetland bounds and determination of its jurisdictional status. The delineated bounds were then compared to the project plans to determine the amount of impact of the proposed project.

K-Bar Road – Wetland Issue



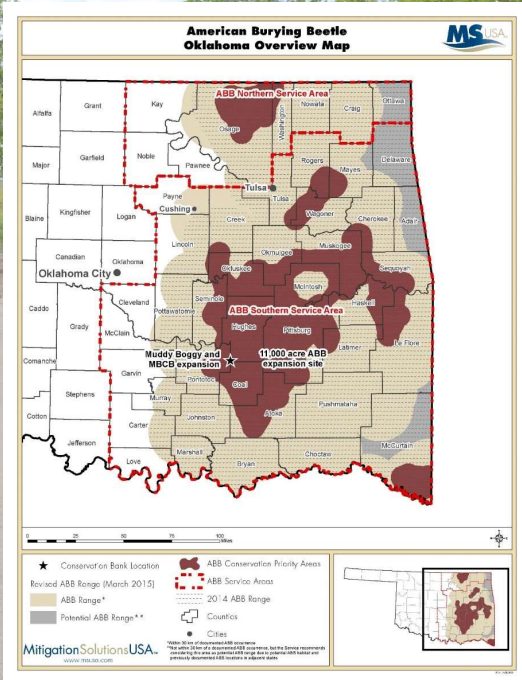
- Consult with USACE to determine permitting needs
- USACE required redesign of culvert headwall to reduce impacts to wetland



Once the delineation was complete, it was determined that the project would impact the wetland and thus a permit through the Army Corps of Engineers was required. Formal consultation with the Corps resulted in the required redesign of the culvert, thus resulting in additional timing and cost of the project.

K-Bar Road – ABB Issue

- American Burying Beetle
 - ESA Endangered
 - USFWS requires rigid survey guidelines for determining impacts to this species
 - Survey for K-Bar Road completed towards the end of the environmental clearance
 - Survey came back positive



The second issue was related to an endangered species, the American Burying Beetle (ABB). The USFWS requires presence/absence surveys to be conducted for projects that have potential to impact ABB habitat. A survey was conducted during the environmental review process, which unfortunately came back positive.

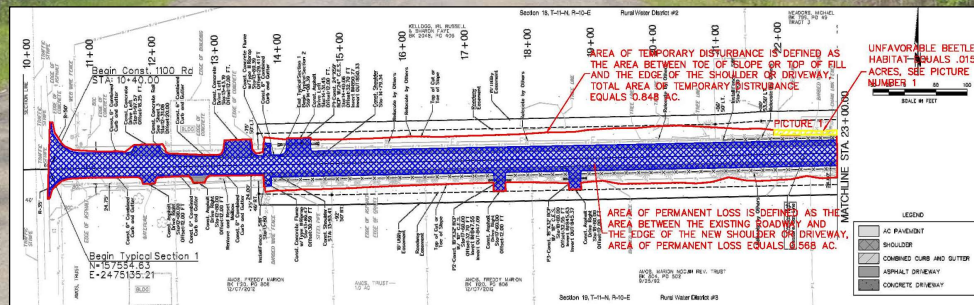
K-Bar Road – ABB Issue

• Positive results = mitigation

- Given the positive ABB survey the project was determined to affect ABB habitat
- How much habitat is being affected?
- How much mitigation is needed?
- What is the cost in time and money of this mitigation?



	Likely to Adversely Affect		Not likely to Adversely Affect
Sheet #	Temporary Disturbance (acres)	Permanent Loss (acres)	Unfavorable habitat (acres)
1 (17 of 127)	0.848	0.568	0.150
2 (18 of 127)	0.558	0.662	0.404
3 (19 of 127)	0.612	0.546	0.728
4 (20 of 127)	1.165	0.608	0.084
5 (21 of 127)	0.606	0.569	0.609
6 (22 of 127)	0.757	0.579	0.403
7 (23 of 127)	0.077	0.021	0.000
Total	4.623	3.553	2.378



Similar to the wetland consultation, the positive ABB survey result necessitated formal consultation with USFWS. First, we had to delineate the full impact of the project on ABB habitat; determining what was and wasn't habitat, what was temporary vs. permanent loss of habitat. Then consultation with USFWS was conducted to determine mitigation measures to accommodate this loss of habitat.

Mitigation for this project included a 2:1 (mitigated acres/lost acres) ratio for permanent loss and 0.5:1 ratio for temporary loss. Average mitigation costs are \$15,000/acre. This process also added multiple months to the project for consultation and mitigation.

K-Bar Road – Completion



In the end the project was completed; however, at an much increased cost, and was heavily delayed.

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- **Is this negative perception deserved?**

- YES.....ish

- **Should it be/does it have to be?**

- NO.....at least not as much (which may be the best we can get with some)

Now that you have an extreme example of this process definitely not going smoothly and for environmental factors significantly affecting a project's cost and timing, let's revisit that question.

Again, is the negative perception surrounding environmental issues deserved? YES....

But, should it be or does it have to be....which hopefully you can see the answer here is NO...or at least this perception doesn't have to be as bad.

The question is how do we change this perception? And that goes back to the original question of what step do we consider environmental impacts of a project.

Proper Environmental Planning



- At what step **SHOULD** we consider environmental impacts of a project?

- Think back to the project hierarchy:

- LRTP
- NTTFI
- Priority List
- TTIP
- Project

So hopefully you're getting an idea of where I'm going with this, but here at what step should we consider environmental impacts of a project. The answer is all of them.

So now let's take a look at each step-working down through the hierarchy-seeing what the actual regulations say, and see what we can do at each step.

Long-Range Transportation Plan



25 CFR 170.409 What is the purpose of long-range transportation planning?

- (a) The purpose of long-range transportation planning is to clearly demonstrate a Tribe's transportation needs and to develop strategies to meet these needs. These strategies should address future land use, economic development, traffic demand, public safety, and health and social needs. The planning process should result in a LRTP.

We'll start at the highest level of the hierarchy, the LRTP. What is the purpose of the LRTP. This very general statement is not a great guide and quite vague; however, it does state that the goal is to document the Tribe's transportation needs and to develop strategies to meet these needs. Its this second half of the statement that should be the focus here "developing strategies to meet needs." Now this is still fairly vague, but it establishes the LRTP as a place to start planning in a more detailed fashion that purely listing routes.

Long-Range Transportation Plan



25 CFR 170.411 – What should a LRTP include?

- e) A review of the existing and proposed transportation system to identify the relationships between transportation and the environment
 - **Section 7 ESA – Threatened & Endangered Species**
 - **Section 10/401 CWA – Waters of the US**
- f) Cultural preservation planning to identify important issues and develop a transportation plan that is sensitive to Tribal cultural preservation
 - **Section 106 NHPA – Cultural & Historical Preservation**

The regulations do get more in depth regarding what an LRTP include? In regards to environmental (i.e., NEPA) resources we can look at sections e and f.

So now we have the regulatory basis and general framework for the need to incorporate environmental concerns into the LRTP. But even with that, these points are still fairly vague without any real specifics. Which obviously is part of just the way the regulations are written, but also to leave it up to the discretion of each individual tribe of what is necessary and warranted.

Incorporating Environmental Concerns into LRTP



• What concerns can we incorporate? (Basic)

1. General Information
 - NEPA, Environmental Regulations
2. Common issues within tribal boundary
 - General potential to impact project
 - Section 7 (ESA) – which species are found here, nuisance species, background on each
 - Section 10/404 (CWA) – issues with WOTUS/wetlands, how abundant are these across your area
 - Section 106 (NHPA) – known historical/cultural sites, NRHP, historic bridges

The question now is what environmental concerns can we and should we incorporate, and how do we go about that? There are endless possibilities and these need to be based on the depth deemed appropriate by each tribe based on their individual transportation needs and common issues within their boundaries.

1. A basic starting point that all LRTPs likely should include is the inclusion of general information about the NEPA process and its obligatory status as part of the TTP process. Transportation managers just need to be aware of what environmental regulations there are and what their general effect on transportation projects is. Always turnover in departments and updated guidelines. Use your LRTP to be an information base for these environmental concerns. Includes information on NEPA process, agencies needed to consult with, general timing of process.

Incorporating Environmental Concerns into LRTP



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2. Common issues that are widely known to affect projects and have in the past. Know your region, the species in it – information about each, habitat, seasonality; water resources – commonness of wetlands, creeks, lakes, etc.; known cultural sites.

Tribal transportation managers, like any job, change constantly and especially if not familiar with the TTP process, may not understand many of the regulations surrounding this issue and this would be a good source of information for any new personnel as well.

Incorporating Environmental Concerns into LRTP



• What concerns can we incorporate? (Complex)

1. Route-specific information

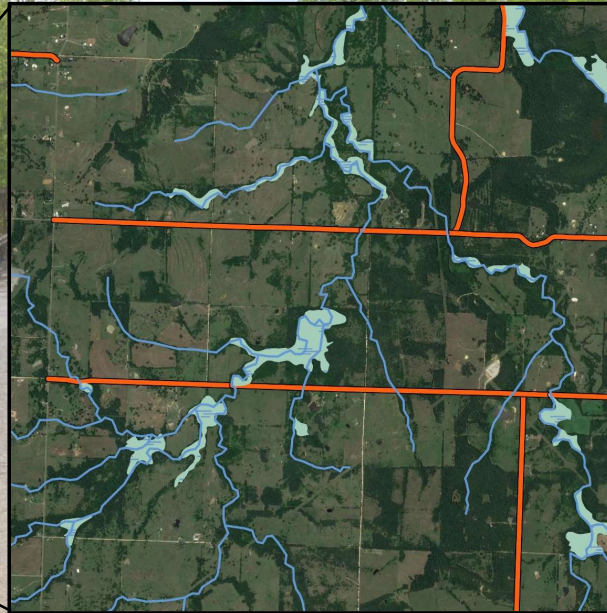
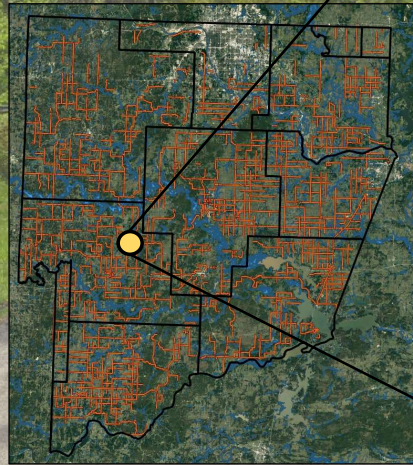
- ESA species listed by route
- Wetland/WOTUS by route
- NRHP by route

Route #	American Burying Beetle	American Burying Beetle Core Area	Arkansas River Shiner	Arkansas River Shiner Critical Habitat	Least Tern	Piping Plover	Piping Plover Critical Habitat	Red Knot	Whooping Crane	Whooping Crane Critical Habitat	Wetland Area (acres)
1900	X	X			X	X		X			0.82
1902	X	X			X	X		X	X		0.00
1903	X	X			X	X		X	X		0.01
1905	X	X			X	X		X	X		0.00
1906	X	X			X	X		X	X		0.00
1907	X	X			X	X		X			0.00
1909	X	X				X		X	X		1.23
1910	X	X	X		X	X		X	X		0.00
1911	X	X			X	X		X	X		0.00
1912	X	X			X	X		X	X		0.00
1913	X	X			X	X		X	X		0.00
1914	X	X	X		X	X		X	X		0.00
1915	X	X			X	X		X	X		0.08
1916	X	X			X	X		X	X		0.00
1917	X	X			X	X		X	X		0.00
1918	X	X			X	X		X	X		0.00
1919	X	X			X	X		X	X		0.01
1920	X	X			X	X		X	X		0.38
1922	X	X			X	X		X	X		0.00
1923	X	X			X	X		X	X		0.00
1924	X	X	X		X	X		X	X		0.00

The previous options, while fairly simple to determine, do provide a wealth of information for managers at such an early stage in the planning process. However, the more information you can include at this stage the better your ability to plan will be throughout the whole process.

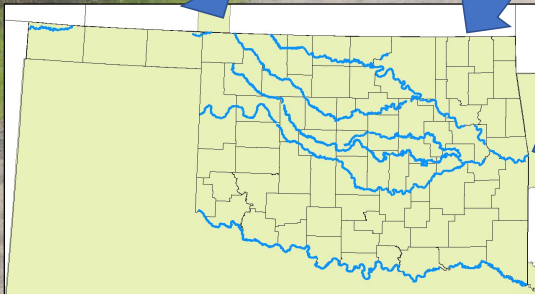
One thing that may help in future planning is having route-level data on environmental resources. This requires a bit more complex methodology, generally based on geoprocessing tools. Again, we can look at various NEPA related concerns, including ESA species, wetland acreages or WOTUS crossings, or NRHP/historic bridges, each by route. This level of information will assist more specific, route-level planning down the road.

Incorporating Environmental Concerns into LRTP



Here's a quick example of evaluating WOTUS along individual routes. You can assess the number of intersections between streams and the route and determine area of wetlands based on NWI wetland layers.

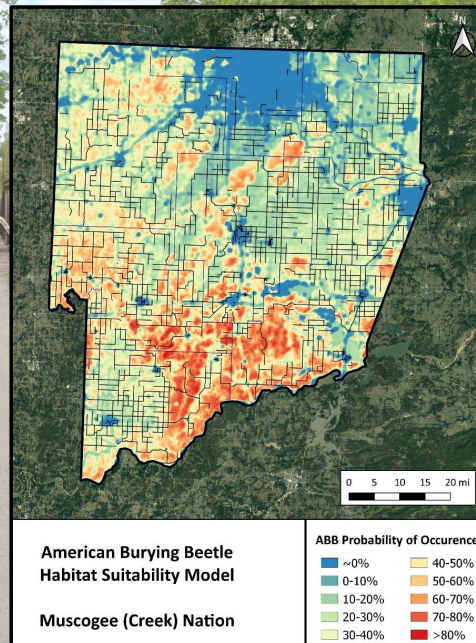
Incorporating Environmental Concerns into LRTP



For ESA species there may be more information needed beyond just a species range. For example, 3 migratory bird species (piping plover, least tern, and rufa red knot) ranges covers nearly all of Oklahoma, and thus would be listed on every route for an OK tribe. However, more detailed knowledge about the species would let you know that this species is only a seasonal migrant to OK and only inhabits sandbars of major river systems within the state (shown in blue). Thus unless a project is directly adjacent to or cross any of these rivers (which most tribal routes wouldn't be given the scale of the roadways and bridges that span these rivers, and the limited number of crossings)

So if we amended our route-level data with more specific data concerning these species, e.g. distance to or intersection with a major river, this would give us a better indication of impacts to these species. Again, this is not too complicated with GIS, but does require some additional effort

Incorporating Environmental Concerns into LRTP



That previous method works well for species with very defined habitats and ranges, although not so much for more generalist species like the ABB. This species has been quite notorious in Oklahoma given its wide range of habitats and presence throughout much of Eastern OK, and also due to the extremely strict (and costly) survey and mitigation requirements. One thing we have done is to utilize previous survey data to create habitat suitability models, which divide the ABB range into areas of probability of occurrence. Now using this map, we can use GIS to determine the probability of ABB along each route.

Now taking a step back and looking at the options that have been provided, I want to reiterate that the amount of detail needed/required for the environmental section of an LRTP is highly discretionary based on multiple factors, and should be: tribe-specific, region-specific, environmental resource-specific, and species-specific. There is no one cookie-cutter approach, and thought needs to be placed on what information best serves the tribe's ability to manage their transportation projects. Hopefully, these decisions will become more clear as we continue to work through the hierarchy.

National Tribal Transportation Facility Inventory



25 CFR 170.442 What is the National Tribal Transportation Facility Inventory?

- National Tribal Transportation Facility Inventory (NTTFI) means at a minimum, transportation facilities that are eligible for assistance under the Tribal transportation program that an Indian Tribe has requested

So the next level in the hierarchy is the NTTFI. All of the methods for incorporating environmental information in the LRTP holds whether a route is in the inventory or still proposed. And as long as you have routes georeferenced, all of the route-level data can be obtained. Thus, there is not extra consideration at this stage for including environmental information beyond what was in the LRTP.

Priority List



25 CFR 170.420 What is the Tribal priority list?

- The Tribal priority list is a list of all transportation projects that the Tribe wants funded. The list:
 - a) Is not financially constrained; and
 - b) Is provided to BIA or FHWA by official Tribal action, unless the Tribal government submits a TTIP.
- **What environmental considerations occur at this stage?**
 - Again, not financially constrained – general knowledge from LRTP still ok
 - However, priority projects should review regulations, check for any upcoming or recent changes to regulations

The next step down is the priority list. So, when determining what environmental considerations occur at this stage we can again defer to the information in the LRTP. However, unlike for the inventory, determining projects to include on the priority list should take into account information from the LRTP, and provides an opportunity to review this information. Now while the priority list is not financially constrained, it is still based on a shortened planning time frame (5 years). So general knowledge may still be ok, however, priority projects should review environmental considerations and future rulings/regulations E.g., ABB updated rules, WOTUS updated rules – discuss briefly here. And also, if there are projects that have multiple environmental issues based on the information in the LRTP, that may affect their status as a priority to the tribe, given potential costs and timing.

Tribal Transportation Improvement Plan (TTIP)



25 CFR 170.421 What is the Tribal Transportation Improvement Program (TTIP)?

- Is developed from and must be consistent with the Tribe's Tribal priority list or LRTP;
- (2) Is financially constrained
- (3) Must include public involvement;
- **What environmental considerations occur at this stage?**
 - Here we review and re-evaluate environmental considerations documented in LRTP
 - Use this information to aid in financially constraining the project
 - This step also provides an opportunity to further examine the project in a bit more detail than the LRTP provided and double-check resources

Once we move down to the TTIP this is where we really need to assess the information in the LRTP concerning each route (or general issues for the area). The primary reasoning is because the TTIP is financially constrained and thus we need to incorporate any environmental costs or timing issues into our calculations for the cost of each project.

In addition to the information provided in the LRTP this is a good point in the process to assess the environmental resources in more detail than perhaps was provided in the LRTP, and/or follow up on the information provided.

Pre-Project Planning



25 CFR 170.415 – Pre-project planning

- a) Pre-project planning and project identification studies.....include the activities conducted before final project approval on the TTIP. These processes provide the information necessary to financially constrain and program a project..... These activities include:
- 4) Preliminary needs assessments
 - 5) Preliminary environmental and archeological reviews

And those considerations we just mentioned are actually in the regulations as well under pre-project planning; again conducted before final approval on the TTIP, and meant to provide information to financially constrain a project; and again the more information you have in the LRTP document, the easier this process will be.

Tribal Transportation Improvement Plan (TTIP)



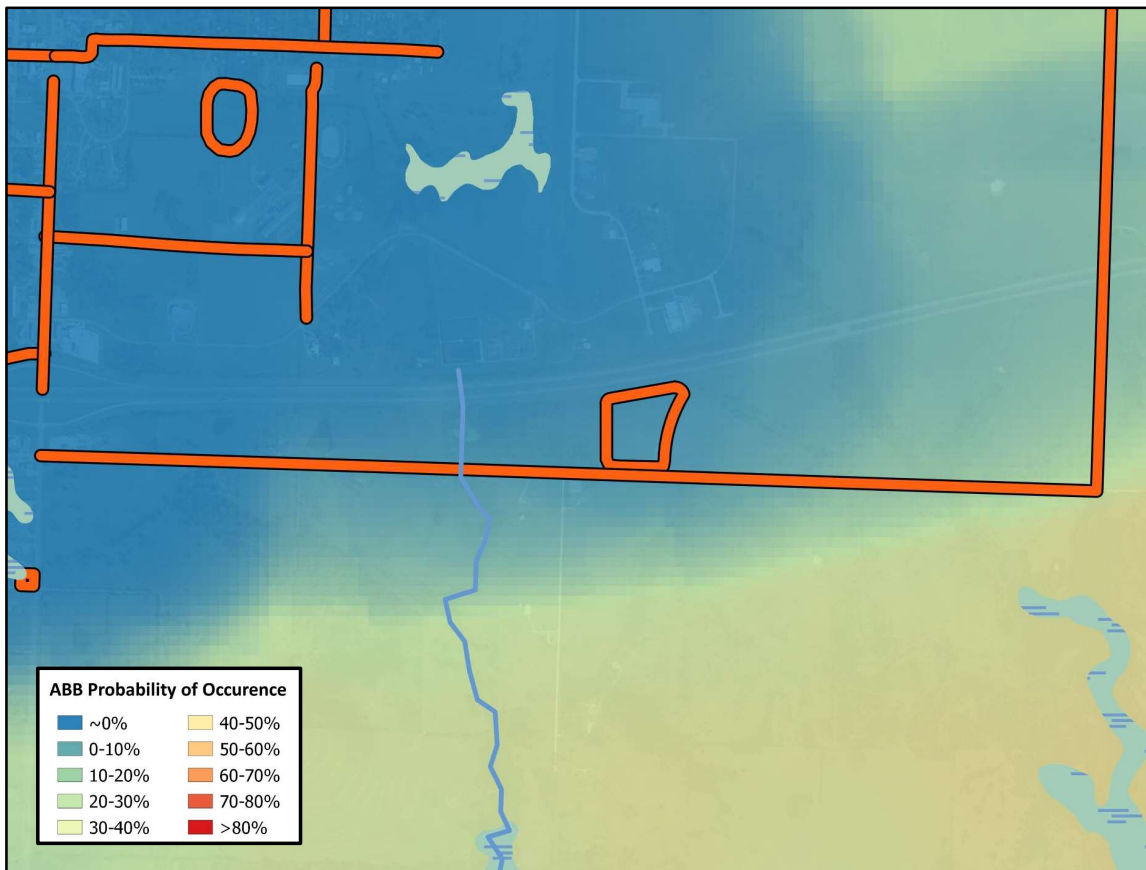
• What environmental considerations occur at this stage?

- K-Bar Road Example

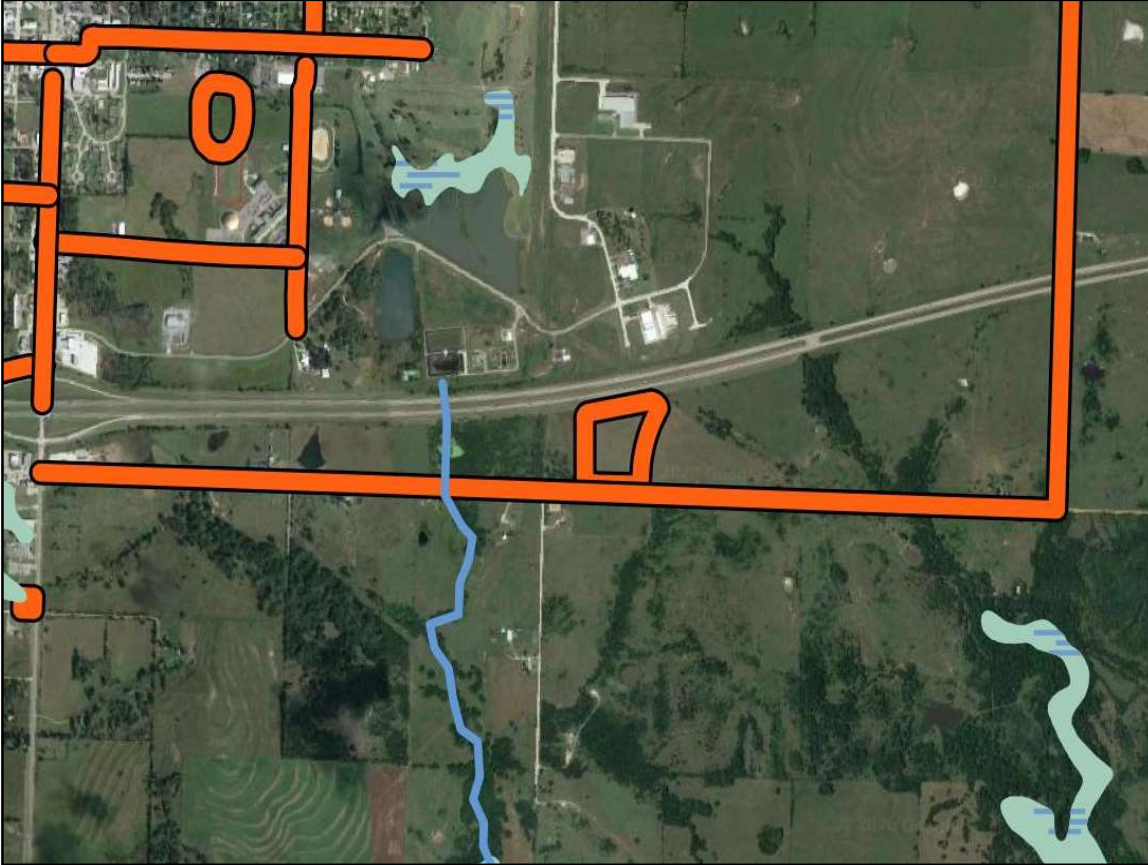
Route	ABB	ABBCA	ABB Probability	LST	NLB	PIP	RDK	Wetland (Acres)
1377	X	X	16%			X	X	

So let's come back to our K-Bar road project and work through the process. This is the route-level information for K-Bar road (Route 1377) that was included in the MCN LRTP. You can see the ABB is listed here and the project is within the core area of the ABB, however the probability map only showed it having a 16% probability of occurrence. Also note here that there are no wetland acres for this site. So just based on that information we would feel somewhat confident that this project wouldn't have any hiccups.

2 things to note here: 1) the data collected in the LRTP is based on broad-scale trends and is somewhat limited as a guide depending on alternative factors, and 2) the LRTP information is meant to be followed-up with and is not collected to be the final say, and the TTIP stage provides that opportunity.

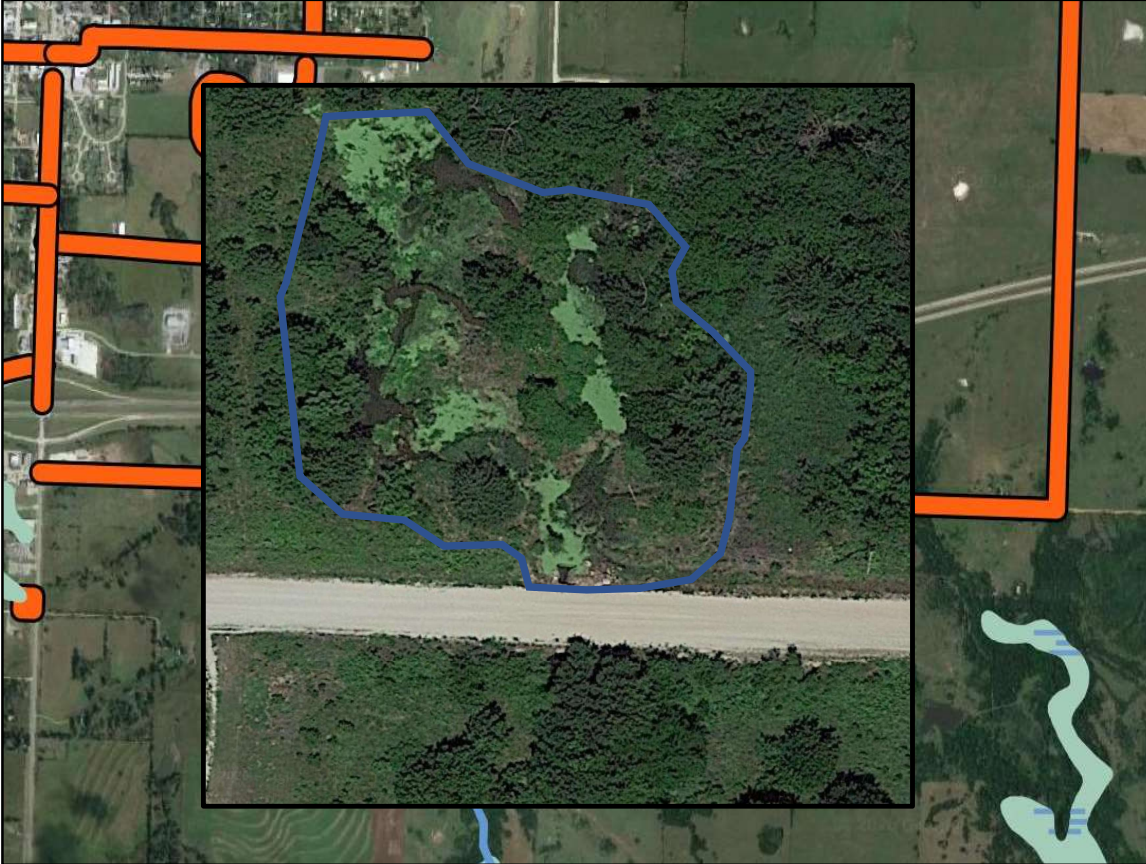


So what can we do to follow up on the LRTP information. First, let's take a look at the ABB probability map around K-Bar road (which is the horizontal orange route in the middle of the screen). Here we see it is mostly in blue (the lower probabilities), but the area just south of the route gets much higher (yellows/orange). Part of this discrepancy is due to the modeling of the ABB map and the influence that the city of Okemah and I-40, both just north of the route and very poor habitat for ABB, have on the output, given K-Bar road is right next to the interstate.



However, when we look just at the aerial image, we can see that the habitat surrounding the route is mostly pastureland and mixed woodland (both favorable for ABB) and that all of the urban area is north of the route on the other side of the interstate. Thus, with a bit more detailed assessment we may think that there is a higher probability for the ABB on this route, and at the very least, we would have to do a survey and deal with the timing and cost associated with that.

Secondly, we can see the stream and wetland layer on top of the aerial image. And while there is a stream, there are no wetlands listed along the route. But, if we take a closer look at just the aerial image along the route specifically focusing on the area by the stream we see a different picture.



When we zoom in, we can clearly see an inundated area (highlighted in blue)-determined based on the green algal growth-that is right alongside the road, in-line with that stream. Again, we can include this new information into the potential cost and timing of the project.

Now this example is kind of an extreme one, where even the information provided in the LRTP for the route wasn't a great guide. However, on average, the more broad-scale information in the LRTP will be accurate and reflect on the ground conditions. But even if they don't, they provide the background information and guide for things that we should be looking out for and need to assess prior to financially constraining a project.

And the follow-up here was just a simple view of the aerial imagery around the route. You can do a similar assessment by just driving the route as well. The point here is that you review the routes not only with the design or construction needs in mind, but potential environmental issues. We also now know of these resources well before the design begins and can adjust the design accordingly.

Project Planning



- **Now we can begin the project design/NEPA documentation having better idea from start of what will be required**

- All parties understand time and cost constraints

- **Design and environmental coordinate with each other**

- Design in a way to help mitigate impacts of resources (if possible), or immediately act to begin consultation on environmental resources to not delay project
- Also, environmental managers need to thoroughly understand the design to know the extent of impacts and to better evaluate the documentation needs
 - i.e., CatEX vs EA – overlay vs reconstruction, etc.
- Understand seasonality of when construction can commence and limitations on process

Project Planning



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Final Considerations



- **Won't ever mitigate all NEPA issues**

- Especially 106 issues
- But the idea is to start the process early and to better inform all parties as to the needs of the project

- **Proper Planning**

- Can reduce the cost and timing issues created by environmental concerns
- Can change the perception of impact issues by integrating them into the planning process and design

Questions?



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