>>CHRISTY JOHNSON-HUGHES:
HELLO AND WELCOME TO THE U.S. FISH AND WILDLIFE SERVICE WIND ENERGY BROADCASTS I AM CHRISTY JOHNSON-HUGHES OF THE U.S. FISH AND WILDLIFE SERVICE AND WE ARE COMING TO YOU FROM THE NATIONAL CONSERVATION TRAINING CENTER STUDIO IN SHEPHERDSTOWN, WEST VIRGINIA.
AS MANY OF YOU KNOW, WE HAVE BEEN DOING A SERIES OF BROADCAST AND FOR THOSE OF YOU WHO HAVE JOINED US IN THE PAST, WE ACCEPT QUESTIONS AND COMMENTS IN THE CHAT FEATURE OF THE BROADCAST, AND YOU WILL SEE THAT JUST TO THE SIDE OF YOUR SCREEN SO ANY TIME DURING THIS BROADCAST, FEEL FREE TO TYPE IN YOUR QUESTION OR COMMENT AND WE WILL HOLD A QUESTION AND ANSWER SESSION AND BE ABLE TO GET BACK TO SOME OF YOUR QUESTIONS.
WE WILL BE HANDLING THAT LATER ON IN THIS BROADCAST.
WHAT I WOULD LIKE TO DO TODAY IS TALK ABOUT THE NEXT PHASE OF THE TIERED APPROACH AND WE HAVE SEVERAL GUESS WITH US WHO WILL HELP US TALK ABOUT THE REALITIES OF DOING POST- CONSTRUCTION STUDIES.
JUST AS A QUICK REFRESHER, LET'S TALK ABOUT THE TIERED APPROACH AND WHERE WE HAVE BEEN.
I HAVE A PRESENTATION, A FEW SLIDES TO SHARE WITH YOU TODAY ON TIER 4 POST- CONSTRUCTION STUDIES TO ESTIMATE IMPACTS.
AND WHERE ARE WE IN THE TIERED APPROACH.
WE STARTED OUR BROADCAST TALKING ABOUT TIERS ONE AND TWO

WHICH IS SITE ASSESSMENT AND CHARACTERIZATION.
MAKING SURE YOU FIND THE BEST POSSIBLE FIGHT WITH THE LOWEST AMOUNT OF RISK.
AND IN OUR SECOND BROADCAST, WE TALKED ABOUT PRECONSTRUCTION STUDIES.
WHAT DO WE NEED TO LOOK FOR BEFORE WE GET INTO ACTUAL CONSTRUCTION OF THE FACILITY AT MUCH LESS OPERATION OF THE FACILITY SO TODAY WHAT WE WOULD LIKE TO DO IS TALK ABOUT POST- CONSTRUCTION STUDIES.
THOSE STUDIES THAT CAN BE DONE AFTER THE FACILITY IS ACTUALLY UP AND OPERATING.
IN POST- CONSTRUCTION STUDIES WE HAVE TO ASSESS SEVERAL THINGS.
SECTIONS OF FATALITY RISK AND THE DIRECT AND INDIRECT IMPACTS TO HABITAT AND ESSENTIALLY MAKE SURE THAT OUR PREDICTIONS ARE ON TRACK.
WE HAVE TWO SETS OF FIELD STUDIES, TIER 4 8 WHICH ARE FATALITY STUDIES WHICH MOST EQUAL ARE FAMILIAR WITH AND TIER 4 B. WHICH ARE ASSESSING THE DIRECT AND INDIRECT IMPACTS TO HABITAT.
IT'S PARTICULARLY IMPORTANT THAT WE DON'T HAVE THAT CONCEPT LOST.
TIER 4 A FATALITY STUDIES REALLY ARE DESIGNED TO MAKE SURE THAT OUR ESTIMATES THAT WE DEVELOPED DURING TIERS ONE, TWO, THREE ARE FOLLOWING WHAT WE ANTICIPATED TO HAPPEN, THAT THE SITE IS NOT EXPERIENCING ANY ADDITIONAL TAKE OF SPECIES THAT THE SPECIES THAT ARE BEING TAKEN ARE THOSE THAT WE ANTICIPATED AND THAT THERE IS NOTHING

BEYOND WHAT WE ANTICIPATED SO IN ORDER TO DO THAT THE WIND ENERGY GUIDELINES ASK THAT YOU COLLECT A MINIMUM OF ONE-YEAR FATALITY INFORMATION OVER ALL SEASONS.
WE REALIZE THAT THIS IS JUST A MINIMUM, A STARTING POINT AND ADDITIONAL TIME IT MAY BE APPROPRIATE FOR HIGH RISK SITES IN THIS INCLUDES CARCASS REMOVAL AND WHETHER WE CAN EVEN DETECT THESE CARCASSES OUT THERE.
AS WE'VE DISCUSSED IN THE PACT, YOU'RE PROBABLY FAMILIAR WITH WITH SOME OF YOUR SITES OR IN READING THE RESEARCH A TINY BAT THAT FALLS ON GRAVEL MAY BE EASIER TO DETECT THAN A TINY BAT THAT FALLS INTO A FIELD WITH TALL GRASS.
WE HAVE DISCUSSED SOME OF THESE ISSUES IN THE PRECONSTRUCTION CONTEXT.
HERE WE ARE TALKING ABOUT THE POST-CONSTRUCTION CONTEXT.
WE HAVE A GUEST HERE TODAY WHO WILL TALK TO US A LITTLE BIT MORE ABOUT FATALITY ESTIMATES AND HOW TO REALLY UNDERSTAND THOSE ESTIMATES WHEN YOU TAKE A LOOK AT THE REPORT OR CONSIDER PERFORMING THOSE ESTIMATES.
WE ALSO HAVE TIER 4 B. THIS IS THE DIRECT CONSIDERATION IN THESE STUDIES MAY NOT ALWAYS BE WARRANTED BUT IF YOU HAVE A SPECIES OF HABITAT FRAGMENTATION CONCERN AND THAT SPECIES HAS BEEN IDENTIFIED AND MAY BE AT RISK FOR THIS PARTICULAR PROJECT THAT YOU MAY BE INVOLVED WITH, THEN YOU MAY BE DOING DIRECT AND INDIRECT HABITAT IMPACT STUDIES.

AGAIN IT FOLLOWS THE SAME SORT OF TRAJECTORY AS OUR FATALITY ESTIMATES.
THE HABITAT IMPACTS, WERE THEY COMPARABLE WITH WHAT WE ANTICIPATED DURING THE INITIAL TIERS.
OR ARE WE SEEING BEHAVIORAL MODIFICATIONS OR INDIRECT HABITAT IMPACTS THAT WE DID NOT ANTICIPATE?
IS THERE AN OPPORTUNITY FOR MITIGATION?
AND IF MITIGATION HAD BEEN CONSIDERED PREVIOUSLY, AND WE HAVE TALKED ABOUT USING MITIGATION, AND MITIGATION IN TIER 3 PRECONSTRUCTION STUDIES, THEN IS THAT MITIGATION IS BEING USED, IS IT DOING WHAT WE NEED IT TO DO OR DO WE NEED TO TAKE ANOTHER LOOK AT IT AND SEE IF PERHAPS THERE MIGHT BE SOME MODIFICATIONS THAT WOULD BE NEEDED AT THIS TIME.
SO IN SUMMARY, TIER 4 STUDIES ARE MONITORING FATALITIES AND HABITAT IMPACTS AFTER THE CONSTRUCTION AND OPERATION OF A FACILITY, WHERE THOSE PREDICTIONS WE MADE IN EARLIER TIERS CORRECT, AND ALSO KEEPING IN MIND WE HAVE TALKED ABOUT TIER FIVE LONG-TERM RESEARCH THAT CAN BE DONE WHICH IS NOT DONE AT EVERY FACILITY, BUT IT CAN BE PART OF TIER 4 STUDIES SO IT'S A FACILITY HAS DECIDED TO DO TIER FIVE RESEARCH STUDIES, THE TIER 4 MIGHT BE PART OF THAT.
AND THROUGH THIS ENTIRE PROCESS, COMMUNICATION IS KEY.
IT DOES NOT STOP ONCE THE FACILITY IS BUILT.
WE NEED TO CONTINUE

COMMUNICATING AFTER OPERATION, PARTICULARLY IF SOMETHING GOES AWRY OR SOMETHING HAPPENS THAT WE NEVER ANTICIPATED.
THAT IS SORT OF A SUMMARY OF WHERE WE HAVE BEEN AND WHERE WE ARE IN THE TIERED APPROACH.
WHAT I WOULD LIKE TO DO NOW IS INTRODUCE OUR FIRST GUEST WHO WILL TALK TO US ABOUT FATALITY ESTIMATORS.
OUR FIRST GUEST TODAY IS MANUELA FROM THE US GEOLOGICAL SURVEY.
AND MANUELA IS A RESEARCH STATISTICIAN WITH THE USGS FOREST AND RAIN ECOSYSTEM IN OREGON ON.
SHE HAS BEEN INVOLVED IN DESIGN AND AMOUNT -- ANALYSIS OF POST- CONSTRUCTION FATALITY MONITORING STUDIES AS WELL AS CURTAILMENT STUDIES AT SEVERAL WIND POWER FACILITY SINCE 2004.
HER RECENT STATISTICAL RESEARCH HAS FOCUSED ON DEVELOPING ESTIMATORS OF FATALITIES PARTICULARLY OF RARE AND ENDANGERED SPECIES.
LET'S GO AHEAD AND GO TO MANUELA.
>>MANUELA HUSO: THANK YOU, CHRISTIE FOR INVITING ME TO COME AND TALK TO YOU TODAY ABOUT ESTIMATING FATALITIES AS PART OF THE FISH AND WILDLIFE SERVICE GUIDELINES TIER 4 ANALYSIS APPROACH.
AND THANK YOU FOR YOUR INTEREST IN THIS TOPIC.
ONCE I'VE GIVEN YOU A BRIEF INTRODUCTION TO THE CONSIDERATIONS WE HAVE IN ESTIMATING FATALITIES WE WILL GIVE YOU A CHANCE TO ASK QUESTIONS OF US.

FIRST, I WOULD LIKE TO ASK, MOST OF US WOULD NOT BE HERE IF ESTIMATING FATALITIES WAS EASY.
YOU MIGHT SAY ISN'T IT THE SAME AS ESTIMATING THE ABUNDANCE OF A POPULATION WHICH WE ARE ALL PRETTY WELL USED TO EVEN THOUGH IT'S A DEAD POPULATION.
IN SOME WAYS THAT'S TRUE, BUT IN OTHER WAYS THERE ARE UNIQUE CONDITIONS THAT MAKE IT DIFFERENT THAN SIMPLY ESTIMATING ABUNDANCE.
WE HAVE AN OPEN POPULATION IN WHICH CARCASSES CAN LEAVE AND ENTER AT ANY TIME.
WE HAVE A SUPER POPULATION WHERE WHAT WE ARE INTERESTED IN ESTIMATING IS NOT WHAT THE ABUNDANCE IS AT A PARTICULAR MOMENT LIKE IT MIGHT BE FOR A DEER POPULATION AND WE ARE INTERESTED IN ESTIMATING THE SUPER POPULATION.
THE DENSITY OF OUR POPULATION IS NOT CONSTANT AND IN FACT, THE POPULATION ITSELF IS NOT HOMOGENEOUS.
WE HAVE VERY DIFFERENT SIZES OF BIRDS AND BATS THAT ARE ARRIVING IN SO BECAUSE OF THAT WE HAVE VERY DIFFERENT PROBABILITIES OF DETECTIONS WITH MEMBERS OF OUR POPULATION.
AND THE DIFFERENT SPECIES THEMSELVES ENTER AND LEAVE AT DIFFERENT RATES.
ALL OF THESE THINGS COMBINE TO MAKE ESTIMATING FATALITY AT WIND TURBINES A BIT PROBLEMATIC.
THE TIER 4 GUIDELINES SUGGEST THAT WHEN WE ARE DEVELOPING OUR PROTOCOL TO ESTIMATE FATALITY, WE SHOULD KEEP IN MIND THAT WE NEED TO -- THE PROTOCOL

SHOULD BE ADEQUATE TO ANSWER APPLICABLE TIER 4 QUESTIONS AT AN APPROPRIATE LEVEL OF PRECISION.
THAT APPROPRIATE LEVEL OF PRECISION IS VERY IMPORTANT.
WHAT WE WILL DO TODAY IS EXAMINED THE TIER 4 PROTOCOL DESIGN CONSIDERATIONS LISTED KEEPING IN MIND THE CONTEXT OF THE TIER 4 OBJECTIVES.
AS WE GO THROUGH THIS, I WOULD LIKE YOU TO KEEP IN MIND OR ASK YOURSELF, WHICH QUESTIONS ARE RELEVANT TO YOUR PARTICULAR SITE?
WHAT LEVEL OF PRECISION DO YOU NEED?
HOW CAN YOU ARRIVE AT THAT LEVEL?
THESE ARE THE TIER 4 QUESTIONS.
BUT TODAY WE ARE NOT GOING TO FOCUS ON ALL OF THEM BECAUSE IF WE FOCUS ON JUST THE FIRST ONE, MUCH OF WHAT WE GO THROUGH AND TALK ABOUT TODAY WILL BE APPLICABLE TO ALL THE REST AND WE WILL SEE THAT.
SO JUST TO SET THE STAGE, WE ALL ARE PRETTY WELL AWARE THAT WHAT WE SEE WHEN WE ARE SEARCHING FOR CARCASSES BELOW TURBINES IS NOT WHAT ACTUALLY PROBABLY DIED OUT THERE.
THE REASON IT IS NOT IS FIRST OF ALL, WE DON'T SEARCH ALL OF THE TURBINES.
WE ONLY SEARCH A SAMPLE OF THE TURBINES.
NOT ALWAYS BUT SOMETIMES.
CARCASSES MAY FALL OUTSIDE OUR DESIGNATED SEARCH PLOT WHICH IS THE RECTANGLE REPRESENTED IN THE SCHEMATIC, BUT THEY ALSO MAY FALL WITHIN OUR SEARCH PLOT, BUT IN AREAS THAT ARE INACCESSIBLE TO

US SO WE CAN'T FIND THEM BECAUSE WE CAN'T SEARCH THEM.
SOME CARCASSES ARE REMOVED BY SCAVENGERS AND, OF COURSE, SOME ARE SIMPLY MISSED BY CHANCE BY THE SEARCHING PROCESS.
SO THE CONSIDERATIONS THAT THE GUIDELINES SET OUT ALL ADDRESS IN ONE WAY OR ANOTHER, ARE FACTORS THAT ALL CONTRIBUTE TO IMPERFECT DETECTION.
WE WILL GO THROUGH EACH OF THESE ONE BY ONE.
FIRST, WE WILL START WITH THE DURATION OF THE MONITORING.
THE DURATION REALLY NEEDS TO SIMPLY REFLECT YOUR PERIOD OF INTEREST.
IF IT'S A YEAR, YOU NEED TO MONITOR FOR YEAR IF IT'S A SEASON, YOU NEED TO MONITOR FOR A SEASON.
THE FREQUENCY WITH WHICH YOU MONITOR, THAT IS THE SEARCH INTERVAL DURING PERIOD WHAT CAN VERY.
IT IS AND SHOULD BE TRIED -- TIED TO THE REMOVAL PROCESS AND THE PERSISTENT TIME OF THE CARCASSES NOT THE ARRIVAL TIME EVEN THOUGH YOU MIGHT GET MORE CARCASSES OR MORE ANIMALS ARRIVING IN THE CARCASS POPULATION DURING A PARTICULAR PERIOD OF TIME, SAY A FALL SEASON, THAT DOES NOT NECESSARILY MEAN YOU NEED TO SHORTEN YOUR INTERVAL.
IT WOULD BE NECESSARY TO SHORTEN THE INTERVAL IF THE CARCASS PERSISTENCE ALSO IS REDUCED DURING THAT PERIOD.
IT IS EXTREMELY RARE AT THE TIER 4 LEVEL FOR US TO NEED DAILY

SEARCHES TURBINES.
THERE IS A HIGH COST TO THAT.
IF WE CAN AVOID DAILY SEARCHES
ITS BEST AND IT'S OFTEN JUST FINE.
THAT SHOULD BE RESERVED FOR THE
TIER FIVE PROCESS, FOR RESEARCH.
SO ULTIMATELY, THE SEARCH
INTERVAL WE USE IS REALLY A
TRADE-OFF BETWEEN THE NUMBER
OF TURBINES WE CAN SEARCH
VERSUS THE SEARCH INTERVAL.
SO NOW WE GO TO THE SECOND
FACTOR WHICH IS THE NUMBER OF
TURBINES TO MONITOR.
IN AFFECTED IS NOT REALLY NOT THE
NUMBER WE ARE INTERESTED IN BUT
THE SAMPLING FRACTION OF THE
PROPORTION THAT WE ARE
SAMPLING.
THIS IS A FACTOR OVER WHICH WE
HAVE A LOT OF CONTROL.
SO CONSEQUENTLY IT IS VERY
IMPORTANT IN OUR PROJECT DESIGN.
IF WE HAVE LESS THAN TEN
TURBINES AT A SITE, GUIDELINES
SUGGEST WE SEARCH 100 PERCENT
OF THEM, ALL OF THEM.
IF WITH MORE THAN TEN, MY
SUGGESTION IS RESEARCH AS MANY
AS POSSIBLE.
THAT'S A PRIMARY SOURCE OF
VARIATION WE ARE INTERESTED IN
HIM BEING ABLE TO MEASURE.
FOR EXAMPLE, IF WE HAVE THE
MONEY TO SEARCH HALF THE
TURBINES DAILY, MY SUGGESTION IS
WE ACTUALLY APPLY THAT MONEY TO
SEARCHING ALL OF THE TURBINES ON
A TWO-DAY BASIS THAT IS, OF
COURSE, WITH THE CAVEAT THAT THE
PERSISTENCE TIME IS EXTREMELY
LOW LIKE ONE DAY THEN MAYBE
THAT'S NOT ADEQUATE, BUT FOR
MOST OF OUR SITES IN THE
CONTINENTAL U.S. THAT I'M AWARE

OF, A TWO-DAY SEARCH OR A ONE-DAY SEARCH IS CERTAINLY NOT NECESSARY.
THE NEXT CONSIDERATION IS THE BIAS AND ERROR A ASSESSMENT WHICH COMES DOWN TO SEARCHER EFFICIENCY AND THE PERSISTENCE OF A CARCASS.
BOTH OF THESE HAVE SIMILAR KINDS OF THINGS ONE NEEDS TO THINK ABOUT.
WE NEED TO FIRST OF ALL IDENTIFY AS RESEARCHERS OR MONITORS THE FACTORS THAT WE THINK COULD SIGNIFICANTLY AFFECT THESE THINGS.
THESE ARE TYPICALLY THINGS LIKE THE HABITAT IN WHICH WE ARE SEARCHING OR WHICH THE CARCASS GLANCE, THE SIZE OF THE TARGET, THE SEASON, PARTICULARLY FOR CARCASS PERSISTENCE AS THE CARCASS SCAVENGER POPULATION MAY CHANGE WITH THE SEASONS.
ONCE WE'VE IDENTIFY THESE FACTORS, WE NEED TO REALIZE WE WILL NEED MANY CARCASSES IN EACH OF THE FACTOR COMBINATIONS IN ORDER TO BE ABLE TO RUN TRIALS TO ESTIMATE THE LEVELS OF THESE FACTORS.
I WOULD SUGGEST THAT WE TARGET ABOUT 20 FOR EACH COMBINATION.
HOWEVER, IF FOR EXAMPLE, ONE OF YOUR COMBINATIONS IS EXPECTED TO BE RELATIVELY SMALL, SAY A SMALL CARCASS IN A VERY DIFFICULT TO SEARCH HABITAT, THEN YOU PROBABLY NEED A LOT MORE.
IN THIS EXAMPLE, WE HAVE THREE SIZES OF CARCASSES, THREE HABITAT TYPES THAT RESULTS IN NINE DIFFERENT FACTOR COMBINATION EACH OF WHICH REQUIRES ABOUT 20 SO WE ARE

LOOKING AT 180 CARCASSES FOR THIS ESTIMATION PROCESS.
THIS IS PRETTY MUCH THE SAME IDEA FOR CARCASS PERSISTENCE AS WELL.
WE WANT TO DISTRIBUTE THE CARCASS THROUGHOUT THE PERIOD OF INTEREST, NOT JUST ON ONE DAY OR ONE TURBINE.
NOW I WILL FOCUS FOR A LITTLE BIT ON THE SEARCHER EFFICIENCY COMPONENT.
IN SOME PLACES I'VE SEEN THAT PEOPLE REQUIRE TIME LIMITED SEARCHES.
IN ALL OF THE ESTIMATION PROCESS THAT WE USE, THE TIME INTERVAL IS NOT ACTUALLY PART OF THE PROCESS.
IT IS NATURAL AND MAYBE EVEN ACTUALLY ADVANTAGEOUS FOR US TO SLOW DOWN WHEN WE ARE IN DIFFICULT TO SEARCH HABITATS.
IT IS ALSO MEANINGFUL OR USEFUL TO NARROW OUR SEARCH TRANSECT WHEN WE ARE IN DIFFICULT HABITATS.
WHAT IS IMPORTANT IS NOT THAT THE TIME IS CONSTANT OR THE TRANSECT IS CONSTANT, WHAT IS IMPORTANT IS THE PROCESS YOU USE FOR THE ACTUAL SEARCHES IS EXACTLY OR IS THE SAME PROCESS AS IS USED WHEN THE SEARCHERS ARE BEING TESTED.
IF THEY SLOWDOWN IN DIFFICULT HABITATS WHEN THEY ARE NORMALLY SEARCHING, AND THEY SLOW DOWN IN THE SEARCHER EFFICIENCY TRIAL, THEN IT WILL BE REFLECTED.
THAT IS ALL WE NEED IS THAT THE TRIALS ARE DONE UNDER NORMAL PROTOCOL.
WHAT THAT REALLY MEANS IS THE

SEARCHERS CAN'T KNOW WHEN THEY ARE BEING TESTED.
SO WE HAVE TO BE REALLY CAREFUL WE DON'T GIVE THAT AWAY.
WE CAN DO THAT BY MAKING SURE THAT WE VARY THE NUMBER OF CARCASSES THAT WERE PLACED IN ANY ONE DAY OR AND ANY TURBINE SO WE KEEP THEM ON THEIR TOES.
TO CONTROL THE SEARCHER EFFICIENCY IT'S VERY DIFFICULT.
WE HAVE A FEW TOOLS.
WE CAN CLEAR VEGETATION.
THAT'S VERY EXPENSIVE.
WE CAN USE TRAINED DOGS TO INCREASE EFFICIENCY BUT NOT MUCH WE CAN DO ABOUT IT.
IT'S PRETTY MUCH A GIVEN.
FOR CARCASS PERSISTENCE, WE BASED THE CARCASS TRUST BASED ON THE RELEVANT FACTORS IN THE FACTOR COMBINATIONS.
HERE WE NEED TO GO AND CHECK THE CARCASSES TO SEE HOW LONG IT IS A PROCESS.
THAT'S WHAT WE'RE TRYING TO REMEASURE, PERSISTENCE TIME.
HERE'S AN EXAMPLE OF A CHECKLIST OR INTERVAL.
YOU WOULD CHECK OFTEN IN THE FIRST FEW DAYS, EARLY MONITORING IS CRITICAL.
AS THE CARCASS PROCESS LONGER AND LONGER, YOU DON'T NEED TO CHECK QUITE OFTEN.
YOU COULD CHECK ON THE EIGHTH DAY, THE TENTH DAY, YOU ARE SEPARATED BY TWO OR THREE DAYS AND THEN BY A WEEK.
EARLY ON, THAT'S WHERE IT'S CRITICAL.
WE WILL SEE THAT LATER.
WHAT WE ARE LOOKING FOR IS NOT WHETHER THE CARCASS IS THERE PARTICULARLY FOR BIRDS BUT

WHETHER THERE'S EVIDENCE OF THE CARCASS.
THAT MAY BEAT IN TERMS OF FEATHER SPOTS.
IF THERE'S A FEATHER SPOT EVEN THOUGH THE BODY OF THE BIRD IS NOT THERE THERE'S EVIDENCE THAT IT WAS THERE.
THAT WOULD BE CONSIDERED STILL PERSISTING.
THE TRICK WITH THIS WHOLE AFFAIR, THIS IS A TOUGH ONE, IS THAT THESE DATA ARE WHAT WE CALL CENSORED.
THAT IS WE DON'T ACTUALLY OBSERVE THE POINT AT WHICH THE CARCASS IS REMOVED.
WE ONLY OBSERVE FOR THE MOST PART AND INTERVAL.
THAT IS FOR EXAMPLE, IF I WENT OUT THERE AND I'M CHECKING A CARCASS ON THE TENTH DAY IT'S STILL THERE BUT I GO BACK ON THE 14TH DAY AND IT'S GONE, WHAT I KNOW IS THE INTERVAL IN WHICH IT WAS REMOVED.
THAT FEEDS INTO THE CARCASS PERSISTENCE MODEL ESTIMATION THAT WE HAVE.
SO WE MODEL PERSISTENCE TIME.
USING WELL KNOWN SURVIVAL TECHNIQUES -- SURVIVAL ANALYSIS TECHNIQUES.
FROM THOSE MODELS THAN WE DON'T ACTUALLY USE THE PERSISTENCE TIME ITSELF, BUT WE USE THE MODEL WE DEVELOPED AND FROM AN ESTIMATE THE FRACTIONS OF CARCASSES THAT WE EXPECT TO PERSIST THROUGH OUR INTERVAL UNTIL THE NEXT SEARCH.
HERE IS AN EXAMPLE OF 4 DIFFERENT MODELS THAT COME FROM SURVIVAL ANALYSIS MODEL APPLICATIONS.
ALL FOUR OF THEM ACTUALLY HAVE THE SAME AVERAGE PERSISTENCE TIME.

BUT THEY HAVE A VERY DIFFERENT
WAY OF ARRIVING AT THAT.
THE GREEN ONE IS ONE IN WHICH THE
CARCASSES PROCESSED QUITE WELL
EARLY ON BUT THEN PERHAPS THESE
ARE ALL FACTORY SCAVENGERS.
THEY DON'T DETECT THEM RIGHT
AWAY.
ONCE THEY DETECT THAN THEY ARE
REMOVED RELATIVELY RAPIDLY.
THE RED ONE IS ONE IN WHICH THEY
ARE REMOVED QUITE RAPIDLY
INITIALLY WHEN THEY ARE FRESH.
AND AFTER WHILE THEY'RE NOT SO
TASTY ANYMORE AND THEY START TO
PERSIST MUCH MORE READILY.
EVEN THOUGH THEY HAVE AN
AVERAGE PERSISTENCE TIME, THE
PROBABILITY OF PERSISTING WANT
TO DEVELOP THE MODELS WOULD
THAT BE THE SAME FOR THESE.
THE GREEN ONE WE HAVE A 76
PROBABILITY FOR THE INTERVAL AND
THE RED ONE IS ONLY ABOUT
50 PERCENT, QUITE DIFFERENT.
THIS IS WHERE THE MODEL ACTUALLY
MAKES A HUGE DIFFERENCE.
WE NEED USE USE SURVIVAL
ANALYSIS TOOLS.
THERE'S A PACKAGE PUT OUT
BYE-BYE O3, AN ORGANIZATION OUT
OF PORTUGAL.
THERE'S ALSO AT USGS DATA SERIES
729 ON THE WEB THAT WILL CARRY A
SURVIVAL ANALYSIS IN THE CONTEXT
OF WIND TURBINES.
SO HOW DO WE CONTROL FOR
AVERAGE PERSISTENCE TIME?
WE DON'T.
IT'S REALLY DIFFICULT.
IT'S A FUNCTION OF THE PRESSURE
RIGHT NOW.
WE COULD FENCE OUT OR TRAP OF
SCAVENGERS.
IT'S EXPENSIVE, BUT WE COULD DO IT.

BUT CONTROLLING THE PROBABILITY OF PERSISTENCE IS A MUCH EASIER THING TO DO.
WE DO THAT BY SIMPLY CONTROLLING THE LENGTH OF THE INTERVAL.
THE LONGER THE INTERVAL THE LESS LIKELY IT IS PERSISTING THREAT THE INTERVAL SO THAT'S AN EASY THING TO CHANGE.
TRANSECT WITH.
THE NEXT COMPONENT HAS TO DO WITH HOW WE DELINEATE THE SEARCH BOX.
IT'S PRETTY MUCH A FUNCTION OF THE BRUSHY NEST OF THE TERRAIN THE SIZE OF THE SEARCH PLOT WE WILL RECOMMEND THAT THE FULL WIDTH OF THE PLOT BE TWICE THAT TURBINE HEIGHT.
OF COURSE, IT WOULD BE LARGER FOR RAPTORS AND BIRDS.
BUT ONCE WE HAVE A DESIGNATED SEARCH PLOT, HOW DO WE ACCOUNT FOR UNSEARCHABLE AREAS?
EVEN MORE THAN THAT, DO WE ACTUALLY HAVE TO SEARCH THE WHOLE AREA?
HERE IS A SCHEMATIC OF THE LOCATIONS OF WHICH BAT CARCASSES WERE FOUND RELATIVE TO THE TURBINES AND THIS IS A COMPOSITE ACROSS SEVERAL SITES.
WHAT YOU SHOULD NOTICE IS THE DENSITY IS NOT CONSTANT.
THE OUTER RING IS 20 METERS, THERE ARE VERY FEW CARCASSES AND THE INNER 20-METER RING IT IS QUITE HIGH.
IF WE WERE TO TAKE THIS PLOT THAT IS 130 BY 130 METERS AND REDUCE IT BY 25 PERCENT, THAT 25 PERCENT WAS TAKEN AWAY FROM THE PERIMETER OF THE PLOT WE WOULD LOSE ALMOST NOTHING IN TERMS OF

THE CARCASSES THAT ARE LANDING THERE.
HOWEVER, IF WE TOOK IT OUT OF THE CENTER 25 PERCENT, WE WOULD LOSE ABOUT 85 PERCENT OF THE CARCASSES.
SO IT'S NOT JUST WHAT AREA WE ARE SEARCHING, BUT IT IS NOT THE FRACTION OF THE PLOT THAT IS SEARCHABLE BUT A QUESTION OF WHAT FRACTION OF THE CARCASSES WERE IN THE SEARCHABLE AREA, WERE POSSIBLY DETECTABLE.
HERE IS A 60-METER RADIUS POT, SAME KIND OF IDEA.
LET'S REDUCE THE AREA, THE RADIUS BY HALF.
SEARCH ONLY A 30-METER PLOT.
WE REDUCE THE AREA -- I'M SORRY THE RADIUS BY HALF, BUT IN SO DOING WE'VE
RESEARCHED -- REDUCE THE SEARCH AREA BY THREE QUARTERS AND WE'VE ONLY MISSED OR FORCED OURSELVES TO MISS ABOUT ONE QUARTER OF THE CARCASSES.
THIS IS SOMETHING WE PROBABLY NEED TO CONSIDER.
IN PRACTICE, THE AREAS THAT WE SEARCH ARE REALLY NOT REGULAR
SO HOW DO WE GO ABOUT ESTIMATING WHAT FRACTION OF CARCASSES ARE IN THOSE AREAS.
WE DEVELOP MODELS OF DENSITY AS A FUNCTION OF DISTANCE FROM THE TURBINE.
I CAN TAKE THOSE MODELS AND THEN TAKE THAT DENSITY AND PROJECT IT AS A THREE DIMENSIONAL OBJECT.
SO THIS THREE DIMENSIONAL CONE IS REPRESENTATIVE OF THE DENSITY AND HOW IT CHANGES WITH DISTANCE.
ITS VOLUME IS EQUAL TO ONE.
SO IF I CAN JUST CUT OUT THE

PORTION OF THAT CONE THAT I CANNOT SEARCH, I CAN ESTIMATE WHAT FRACTION OF THE CARCASSES REMAINED OBSERVABLE, NOT NECESSARILY OBSERVED BUT OBSERVABLE IN THAT SEARCH AREA.
IN THIS CASE I TOOK AWAY 75 PERCENT OF THE PHYSICAL AREA OF THE PLOT BUT LEFT MYSELF WITH 60 PERCENT OF THE CARCASSES.
SO IF FOR EXAMPLE, I HAD FOUND 50 CARCASSES IS AN AREA THIS SIZE, WITHOUT TAKING INTO ACCOUNT THE CHANGE IN DENSITY, I WOULD ESTIMATE THERE ARE 200 THAT WERE KILLED WHERE AS A MUCH CLOSER ESTIMATE WOULD BE 83 BECAUSE I KNOW THAT I'VE COMPRISED ABOUT 60 PERCENT, NOT JUST 25 PERCENT OF THE CARCASSES.
SO WHEN WE MODEL DENSITY, THE DIFFICULT PART OF IT IS WE NEED A LOT OF LOCATION DATA.
SO FOR THINGS LIKE EAGLES, LARGE RAPTORS WE DON'T HAVE A LARGE DATA SO IT MAY BE DIFFICULT, BUT WE CAN DEVELOP ALTERNATIVES.
WE WILL ALSO NEED DATA AND FAR DISTANCES MAYBE UP TO 150 METERS SO THAT WHEN WE SEARCH -- IF WE DECIDE A 30-METER SEARCH RADIUS WILL BE APPROPRIATE WE STILL NEED TO SEARCH RATHER THAN THAT IN SOME AREAS, BUT IT COULD BE ACHIEVED BY SEARCHING THE ROADS AND EASY AREAS.
THE HABITAT MAPS ARE WHAT DEFINED THE SEARCHED AREA AND WHAT WE USED TO EXTRACT WHAT PROPORTION OF CARCASSES WE BELIEVE ARE IN OUR SEARCH AREA.
WE CAN CONTROL THIS FACTOR BY PRIMARILY BY FOCUSING ON THE SEARCH AREAS OF HIGHEST DENSITY.

THE NEXT FACTOR IS THE GENERAL SEARCH PROTOCOL.
THEY LIST SEVERAL THINGS.
THEY ALL FEED INTO ESTIMATIONS WHETHER IT IS TO THE PROPORTION OF SEARCHED AREA OR THE PERSISTENCE OR THE SEARCHER EFFICIENCY.
THE ONE PIECE I WANT TO POINT OUT THEY DID NOT NECESSARILY MENTION WAS THAT NOT ONLY DO WE NEED THE DATE THAT THE CARCASS WAS FOUND, BUT WE ALSO NEED THE DATE OF THE MOST RECENT SEARCH THAT WAS CONDUCTED AT THAT PARTICULAR TURBINE.
THAT IS WHAT ALLOWS US TO ESTIMATE THE PERSISTENCE PROBABILITY.
NOW WE PUT THIS ALL TOGETHER INTO AN ESTIMATOR.
THIS IS SORT OF THE GENERAL FORM OF MOST ESTIMATORS.
WE HAVE K. EQUALS ALL THE DIFFERENT FACTOR COMBINATIONS, C. IS THE NUMBER OF CARCASSES WE FIND IN ANY FACTOR COMBINATION, F. IS THE FRACTION OF TURBINES WE SAMPLE.
S. IS THE PROPORTION OF CARCASSES IN THE SEARCHED AREA BENEATH THOSE TURBINES.
AND P. AND R. ARE THE SEARCHER EFFICIENCY AND THE PROBABILITY OF PERSISTING THROUGH INTERVAL.
ALL OF THOSE FACTORS ARE BETWEEN ZERO AND ONE AND ALL OF THEM COMBINE MULTIPLICATIVE LEAD TO FORM WHAT WE CALL THE GENERAL OR THE OVERALL PROBABILITY OF DETECTION WHICH I'VE NOTED AS G.
LET'S GO THROUGH AN EXAMPLE.
IN THIS PARTICULAR CASE WE HAVE EIGHT OUT OF 19 TURBINES THAT

WAS A SIGHT OF THE SEARCH.
WE HAVE WITHIN THE SEARCH AREA,
WE ESTIMATE THERE'S 85 PERCENT
OF THE CARCASSES WILL FALL.
THE PROBABILITY OF PERSISTING A
75 PERCENT AND THE PROBABILITY
THE SEARCHER WILL FIND
SOMETHING ON THE GROUND IS
60 PERCENT.
THIS IS FOR SOME PARTICULAR
FACTOR COMBINATION AT A SITE.
OVERALL PROBABILITY OF DETECTION
FOR THAT COMBINATION FACTOR IS
.16.
FROM THAT, IF FOR EXAMPLE, WE
FOUND 30 CARCASSES AND WE
DIVIDE BY .16, WE WOULD GET AN
ESTIMATE OF 187.5.
I WILL TELL YOU RIGHT NOW, THAT IS
WRONG.
ALMOST ALL ESTIMATES ARE WRONG
AND IT'S NOT JUST WRONG BECAUSE
IT'S A FRACTION AND CARCASSES
DON'T COME INFRACTIONS BUT IT'S A
WRONG BECAUSE THERE IS NO
UNCERTAINTY ASSOCIATED WITH IT.
WE DO NOT KNOW THAT THERE ARE
187.5 OUT THERE.
WE ONLY KNOW THERE ARE ABOUT
THAT MANY.
SO WE NEED TO INCORPORATE
UNCERTAINTY AND WE DO THAT BY
REALIZING THAT THE ESTIMATE FOR
OUR FRACTION OF CARCASSES IN
THE SEARCHED AREA IS JUST THAT
AN ESTIMATE.
IT RANGES IN THIS CASE
72-98 PERCENT.
SAME WITH PERSISTENCE AND
SEARCHER EFFICIENCY.
I WILL NOTE THAT THE FRACTION OF
TURBINES, NO ERROR ON THAT ONE.
NO VARIANTS.
WE KNOW HOW MANY TURBINES WE
SEARCHED.

WE TAKE ALL OF THOSE AND LOOK AT THE VARIANTS ASSOCIATED WITH THAT AND NOW ARE PROBABILITY OF DETECTION IS NOT JUST .16, BUT IT RANGES SOMEWHERE BETWEEN .07 AND .0 25.
THE CONSEQUENCES OF THAT IS OUR ESTIMATE OF FATALITY ITSELF WILL HAVE A RANGE OF 120-360.
THAT IS A 230 CARCASS DIFFERENCE BETWEEN THE LOWEST AND THE HIGHEST.
SO WHAT DO WE DO?
IN THIS EXAMPLE I HAVE INCREASED ALL OF THOSE FACTORS OVER WHICH WE HAVE SOME CONTROL AND BROUGHT THEM TO A HIGH LEVEL SO THAT OUR OVERALL PROBABILITY OF DETECTION IS ABOUT .07.
AT THE SAME SITE WITH THE DETECTION OF .7 WE WILL SEE MORE CARCASSES SO LET'S SAY WE SEE 131, WE ARE STILL ESTIMATING ABOUT 185 CARCASSES, JUST LIKE WE DID BEFORE.
BUT, THE VARIANTS ON THESE COMPONENTS IS QUITE A BIT SMALLER AND OUR PROBABILITY OF DETECTION RANGES FROM .63-.77.
THE RESULTS BEING THAT THE ULTIMATE ESTIMATE OF FATALITY NOW RANGES FROM 170-206.
THAT'S ABOUT A 35 CARCASSES RANGE IN DIFFERENCE BETWEEN THE LOWEST AND THE HIGHEST.
MUCH, MUCH MORE PRECISE.
THE POINT IS, INCREASE YOUR PROBABILITY OF DETECTION AND YOU WILL DECREASE THE UNCERTAINTY IN YOUR ESTIMATE.
SO THERE ARE SEVERAL ESTIMATORS OF FATALITY AVAILABLE.
I HAVE DEVELOPED ONE, SCHONFELD IS OFTEN LEAD USED BUT NOT BEEN PUBLISHED IN A PEER REVIEW

LITERATURE.
IT'S CERTAINLY USED BY A LOT OF PEOPLE.
CORNER HAS PUBLISHED AN ESTIMATOR.
WOLPERT IS DEVELOPING ONE, AS FAR AS I KNOW IT'S NOT YET PUBLICLY AVAILABLE.
ALL OF THESE ARE ASSUMPTIONS.
IF THE ASSUMPTIONS OF THESE ARE MET, I THINK THAT ALL OF THEM WILL PRETTY MUCH ESTIMATE THE SAME THING.
BUT IT'S CRITICAL THAT THE ASSUMPTIONS BE MET.
THE FIRST THREE HAVE BEEN INCORPORATED INTO THE USGS DATA SERIES 729 AND THE LAST ONE PERHAPS WILL BE ONCE IT'S PUBLICLY AVAILABLE.
ALL OF THESE COMMENT NO MATTER WHICH ONE NEED A VARIANT ESTIMATE AND THAT'S DIFFICULT.
IT'S VERY DIFFICULT -- VERY HARD TO DEVELOP A VARIANT ON THIS FUNCTION THAT WE HAVE SO RECENT VARIATIONS, THE ONE I USE IS A BOOT STRAP IT TO WELL KNOWN DEVICE AND WOLPERT I BELIEVE USES A CLOSED FORM SOLUTION AND OTHER PEOPLE HAVE USED WHAT IS CALLED A SOLUTION YOU CAN WRITE AN EQUATION TO THE VARIANTS WERE A BOOTSTRAP THERE'S NO EQUATION WRITTEN IT'S A PROCESS THAT ALLOWS YOU TO ESTIMATE THAT WITHOUT WRITING ANY QUESTION AND MAKING ASSUMPTIONS.
THOSE ALTERNATIVES, NOT THE WOLPERT ONE BUT THE ALTERNATIVE SOLUTIONS HAVE RESULTED IN NEGATIVE LIMITS THAT HAVE BEEN REPORTED IN THE LITERATURE.
SO THIS BRINGS ME TO A REALLY

IMPORTANT POINT.
IF YOU ARE GIVEN A REPORT, AND THERE IS NO ESTIMATE -- SORRY THERE IS NO MEASURE OF UNCERTAINTY AS TO SAY WITH YOUR ESTIMATE, PLEASE SEND IT BACK.
IN FACT,, USE YOUR COMMON SENSE.
IF THERE'S AN ESTIMATE OF UNCERTAINTY BUT IT'S AS SMALL AS NEGATIVE 150, SEND IT BACK.
I KNOW THE STATISTICS ARE DIFFICULT BUT USUALLY WE ARE NOT UNREASONABLE.
WE NEED TO USE COMMON SENSE.
A QUESTION ARISES, THE SECOND QUESTION THAT WE ARE ADDRESSING IS WHAT ARE THE FATALITY RATES OF SPECIES OF CONCERN?
WE OF CURRENT PROPOSALS TO LIMIT -- TO PERMIT LIMITED NUMBER OF COLLISION CAUSED DEATHS OF CERTAIN SPECIES.
THE LIMITS OF OUR DIRECT FROM POPULATION MODELS AND COLLISION RISK MODELS, BUT ONE QUESTION IS HOW DO WE KNOW WHEN THEY ARE EXCEEDED?
SOMETIMES THE ANSWER GIVEN IS WE CAN ESTIMATE FATALITY USING OUR CURRENT POST-CONSTRUCTION PROTOCOLS.
I WANT TO POINT OUT THOSE PROTOCOLS ARE NOT DESIGNED TO DETECT WHEN CARCASSES -- TO BE ABLE TO ESTIMATE WELL WHEN THE CARCASS POPULATION IS VERY LOW.
THEY ARE DESIGNED FOR WHEN THE CARCASS POPULATION IS RELATIVELY HIGH.
THEY ARE DEFINITELY INADEQUATE FOR A SMALL POPULATION WHICH IS WHAT WE EXPECT WHEN WE ARE DEALING WITH T. AND E. SPECIES.
THERE IN ADEQUATE TO DETECT

WHEN A LIMIT HAS BEEN EXCEEDED.
SO THE CURRENT ESTIMATORS WE HAVE CANNOT ESTIMATE ANYTHING BUT ZERO WHEN WE OBSERVE ZERO.
THERE IS PULMONARY WORK GOING ON RIGHT NOW ON USING BAYESIAN ESTIMATORS TO BE ABLE TO DETECT WHETHER IT LIMITS MIGHT BE EXCEEDED.
THAT'S ABOUT ALL I WILL SAY ABOUT THAT BECAUSE THIS IS A TOPIC THAT WILL PROBABLY TAKE UP ON ANOTHER SESSION.
LET'S RETURN TO THE TIER 4 QUESTIONS.
I'VE KIND OF GROUPED THEM INTO SETS.
THESE THREE BASICALLY HAVE TO DO IS SIMPLY ESTIMATION.
WHAT IS THE FATALITY OF BIRDS AND BATS?
WHAT IS THE FATALITY OF SPECIES OF CONCERN?
WHAT'S THE FATALITY OF PARTICULAR SUBSETS OF BIRDS AND BATS?
WITH RESPECT TO THE FIRST ONE, WHAT OUR BIRD AND THAT FATALITY RATES?
QUESTIONS HAVE COME UP ABOUT HOW DO WE PRESENT THOSE DATA SHOULD WE PRESENT THEM PER TURBINE, PER MEGAWATT NAMEPLATE, PER ACTUAL MEGAWATT HOUR PRODUCTION OR MAYBE EVEN PER 10,000 METERS SQUARED OF ROAD SWEPT AREA.
ALL OF THESE ARE REASONABLE AND MIGHT ACTUALLY SERVE TO BETTER BE ABLE TO COMPARE ACROSS SITES WITH DIFFERENT TURBINES SIZES AND CONFIGURATIONS.
DIFFERENT TURBINES SIZES.
WHAT I WOULD LIKE YOU TO KEEP IN MIND IS ALL ARE DERIVED FROM A

BASIC MEASURE WHICH IS THE PER TURBINE FATALITY RATE.
I THINK THESE ARE VERY, VERY USEFUL, BUT IT DOES NOT MEAN WE WILL GET RID OF OUR SAMPLING PROCESS.
THAT IS STILL A TURBINE BY TURBINE PROCESS BUT REPORTING IT I THINK IS A GREAT IDEA TO TRY AND CHANGE TO ALTERNATIVE MEASURES.
IN ESTIMATING -- I GUESS THAT'S IT.
SO THE NEXT SET OF TIER 4 QUESTIONS HAVE TO DO WITH COMPARISONS.
TO THE ESTIMATED FATALITY RATES COMPARE WITH WHAT WE PREDICTED, DO THEY COMPARE WITH NEIGHBORING SITES AND HOW TODAY -- ARE THEY LARGE ENOUGH THAT THEY WOULD CAUSE US TO HAVE CONCERNS AND LEAD TO OTHER MEASURES TO REDUCE IMPACT?
THESE ARE ALSO GOOD COMPARISON QUESTIONS.
WHEN WE ARE ADDRESSING THOSE IT'S REALLY CRITICAL THAT WE KEEP IN MIND UNCERTAINTY.
UNCERTAINTY MATTERS.
WE REALLY HAVE TO UNDERSTAND THAT BOTH THE LOWER AND THE UPPER CONFIDENCE LIMITS PLAY IN.
WE DON'T REALLY KNOW WHERE THE TRUTH LIES WITHIN THAT CONFIDENCE LIMIT.
ALL WE KNOW IS FOR THE MOST PART IT WILL BE SOMEWHERE IN THERE.
SO IF WE NEED NARROW NEST WE NEED A PRECISE ANSWER AND WE NEED TO DESIGN TO ACHIEVE THAT PRECISION.
THE FINAL QUESTION IS A RELATIONSHIP QUESTION.
DOO BIRD AND BETH FATALITIES VARY WITH RELATIONS TO SITE

CHARACTERISTICS?
IT'S AN IMPORTANT QUESTION AND A DIFFICULT QUESTION TO ANSWER WITHOUT A LOT OF OBSERVED FATALITIES AND VARIATION ACROSS THE SITES.
IT'S SOMETHING WHERE IF THAT'S WHAT YOU WANT TO ANSWER, THE MORE TURBINES YOU SEARCH, THE BETTER.
SO WITH THAT, I'D LIKE TO CONCLUDE BY SAYING CAN WE ANSWER THE TIER 4 QUESTIONS.
THE ANSWER IS YES.
WE DEFINITELY CAN.
WHEN WE ARE DOING SO THOUGH, WE HAVE TO BE SURE WE KEEP IN MIND ALL THE TIME THE VARIANCES ASSOCIATE WITH THE ESTIMATES WE ARE USING TO MAKE OUR INFERENCE, TO UNDERSTAND OUR SYSTEM.
WITH THAT I WOULD LIKE TO CLOSE AND THANK CHRISTY FOR INVITING ME, THE U.S. FISH AND WILDLIFE SERVICE AND THE USGS FOR THEIR FINANCIAL SUPPORT FOR THIS RESEARCH OR THE WORK THAT I DO AND DEFINITELY MY COLLEAGUES DAVID DALE AND DAN GO FORTH FOR THEIR CONTRIBUTIONS.
FINALLY, I WANT YOU TO REMEMBER I WILL TAKE VERY LIBERALLY FROM ERICH SEGAL STATISTICS MEANS NEVER HAVING TO SAY YOU'RE CERTAIN.
AND ACTUALLY IT SAYS NEVER BEING ABLE TO SAY YOU ARE CERTAIN.
THANK YOU VERY MUCH.
WITH THAT I THINK I WILL MOVE OVER WITH CHRISTY AND TAKE YOUR QUESTIONS.
>>CHRISTY JOHNSON-HUGHES: THANK YOU SO MUCH FOR THAT GREAT PRESENTATION AND WE WOULD LIKE TO INVITE OUR

AUDIENCE TO TYPE IN ANY
QUESTIONS YOU HAVE INTO THE
CHAT BOX OR YOU CAN USE THE
E-MAIL ADDRESS IF YOU HAVE A
LONGER QUESTION.
ALSO MANUELA DID A LONGER
VERSION OF HER PRESENTATION
THAT WE WILL PUT UP ON THE
WEBSITE SO THAT IF YOU WOULD LIKE
TO HAVE FURTHER INFORMATION
WITH MORE OF THE REFERENCES,
YOU MAY ASK SAYS MANUELA'S
LONGER PRESENTATION ONCE THAT
LINK IS UP YOU BE ABLE TO GET TO
THAT.
WHAT WE WOULD LIKE TO DO NOW IS
TALK A LITTLE BIT MORE TO MANUELA
ABOUT HER RESEARCH AND SOME
QUESTIONS THAT WE HAVE BEEN
RECEIVING FROM OUR AUDIENCE.
MANUELA, LET'S GO AHEAD AND GET
TO SOME OF THESE QUESTIONS.
SO HOW DOES TIER 4 WORK FOR
FACILITIES OPERATIONAL WHEN THE
GUIDELINES ARE FINAL BUT WHERE
THE FACILITY HAS LIMITED BASELINE
SURVEY RESULTS?
THAT SOUNDS TO ME LIKE THE
FACILITY MAY NOT HAVE COLLECTED
TIER 3, POST- CONSTRUCTION DATA
AND THEY MAY NOT HAVE COLLECTED
IMMEDIATE TIER 4 POST
CONSTRUCTION DATA OPERATIONAL,
A YEAR AND A HALF OR TWO YEARS
AGO.
SO THEY MAY HAVE VERY LIMITED
DATA IF I UNDERSTAND THIS
KARESH -- QUESTION CORRECTLY.
IF THAT'S THE CASE, WE DO
ENCOURAGE ANY FACILITY TO BEGIN
LOSING THE GUIDELINES WERE
EVER -- BEGAN USING THE
GUIDELINES WHEREVER
APPROPRIATE.
IF THEY WERE OPERATIONAL WHEN

THE GUIDELINES WERE FINALIZED
THEY MAY STILL BE WORTH THEIR
WHILE TO ENGAGE IN
POST-CONSTRUCTION STUDIES
REALIZING IT MAY BE DIFFICULT TO
COMPARE THAT WITH
PRECONSTRUCTION, YOU DON'T HAVE
PRECONSTRUCTION DATA.
BUT IT MAY PROVIDE SOME DATA
THAT WE CAN COMPARE TO OTHER
WIND FACILITIES IN A SIMILAR AREA.
SO EVEN THOUGH IT YOU MAY NOT
HAVE A STRONG DATA SET TO USE,
THERE MAY BE STILL SOME UTILITY
COLLECTING THAT DATA.
THE FACILITY MAY ALSO WANT TO GO
INTO TIER FIVE AND TRADITIONAL
RESEARCH STUDIES.
IT'S SOMETHING TO TALK ABOUT WITH
YOUR LOCAL SERVICE FIELD OFFICE
AND YOUR STATE REPRESENTATIVES.
LET'S MOVE ON TO ANOTHER
QUESTION.
HOW DOES THE MODEL CHANGE IF
THE SEARCHES DONE WEEKLY?
DOES IT TAKE INTO ACCOUNT
TOPOGRAPHY OR ANY OTHER
FACTORS THAT MIGHT MAKE SOME
PARTS OF THE FACILITY MORE LIKELY
TO HAVE FLIGHTS?
LONG AND INVOLVED QUESTION
THERE.
WHAT DO YOU THINK MANUELA?
>>MANUELA HUSO: I THINK THAT'S
AN INTERESTING QUESTION.
THE QUESTION ABOUT THE FLIGHTS
IS SOMETHING I HOPE IS TAKEN INTO
ACCOUNT WHEN YOU ARE
DETERMINING WHICH TURBINES TO
SAMPLE.
AS STATISTICIANS, WE ALWAYS THEY
TAKE A RANDOM SAMPLE AND BY
TAKING A RANDOM SAMPLE YOU WILL
MORE OR LESS A SURE YOU HAVE
REPRESENTATION OF THE VARIATION

IN FLIGHTS AND CONSEQUENTLY
THEIR RISK THAT MIGHT BE A SISSY
WITH EACH OF THOSE TURBINE SO A
RANDOM SAMPLE OF TURBINES IF
YOU'RE NOT SEARCHING THEM ALL IS
DEFINITELY IN ORDER.
THE QUESTION OF WEEKLY, THAT IS
THE SORT OF INFORMATION YOU
PROVIDE TO THE ESTIMATORS.
SO THE ESTIMATORS ARE NOT
LIMITED BY YOUR SEARCHES.
YOU CAN HAVE SEARCHES ON A
DAILY BASIS, WEEKLY, OR MONTHLY
BASIS IF APPROPRIATE.
YOU CAN EVEN HAVE IT ON AN
IRREGULAR BASIS FOR SOME OF THE
ESTIMATIONS.
WHAT WE WANT TO TRY TO ASK YOU
TO THINK ABOUT WHEN YOU ARE
DESIGNING HOWEVER, IS THE
INTERVAL YOU CHOOSE TO SEARCH
AT IS SOMEWHAT BASED ON WHAT
YOU PERCEIVE TO BE THE RISK OF
SCAVENGING.
SO YOU DON'T HAVE AN INTERVAL
THAT IS SO WIDE THAT MOST OF
YOUR CARCASSES WILL BE GONE BY
THE TIME YOU GO LOOK FOR THEM
OR SO NARROW THAT YOU ARE
ALMOST WASTING MONEY AND
EFFORT BECAUSE HARDLY ANY OF
THEM HAVE BEEN TAKEN AWAY.
SO IT'S A TRADE-OFF AND A BALANCE
THAT THE ESTIMATOR CAN ADJUST
FOR DIFFERENT SEARCH AREAS.
>>CHRISTY JOHNSON-HUGHES:
THANK YOU.
LET'S GET TO ANOTHER QUESTION.
DOO METHODS CHANGE WHEN
TALKING ABOUT LARGER BIRDS FOR
EXAMPLE, WITH A 75 METERS CIRCLE
AROUND US IRVINE IN
APPROXIMATELY 20 DAY INTERVAL BE
ACCEPTABLE?
THIS WOULD BE ON THE SCALE OF

RAPTORS.
>>MANUELA HUSO: THE ANSWER IS YES, AND NO.
IN APPROPRIATE CONVICTIONS -- CONDITIONS PERHAPS THAT'S ACCEPTABLE.
BUT IT ALL DEPENDS WHAT YOUR INDIVIDUAL SITE PREDICTIONS ARE.
IF THERE'S RAPTOR PRESSURE -- SORRY SCAVENGER PRESSURE IS HIGH THAN A 20 DAY INTERVAL IS NOT NARROW ENOUGH.
SO THAT IS REALLY SOMETHING THAT IS DETERMINED ON A STATE BY STATE LEVEL.
>>CHRISTY JOHNSON-HUGHES: THANK YOU.
SO WE HAVE ONE QUESTION HERE ABOUT SPECIES OF HABITAT MENTATION CONCERNS.
LET'S GET TO THAT WITH OUR NEXT SET OF GUESS AND FOCUS ON THIS QUESTION ABOUT IS THERE A PARTICULAR MATHEMATICAL MODEL U.S. FISH AND WILDLIFE SERVICE RECOMMENDS?
I FEEL LIKE SAYING YES, AND NO TO THAT AS WELL.
AND THE REASON FOR THAT IS WE WORK VERY CLOSELY WITH THE USGS AND WITH MANUELA TO PUT TOGETHER THESE STATISTICAL MODELS BECAUSE WE SEE A NEED FOR THESE AND USGS HAS HELPED DEVELOP THESE MODELS.
THESE ARE CERTAINLY MODELS THAT WE PREFER TO USE.
WE HAVE A VESTED INTEREST IN THEM AND WE FEEL ANSWER THE QUESTIONS THAT WE ARE POSING.
WE DO KNOW THAT THERE ARE OTHER RESOURCES OUT THERE THAT PEOPLE CAN USE AND MANUELA, YOU'VE TALKED A LITTLE BIT ABOUT SOME OF THOSE RESOURCES.

DID YOU WANT TO BRING UP
ANYTHING FURTHER?
>>MANUELA HUSO: AS I SAID IN MY
TALK, THE ESTIMATORS THAT WE
HAVE CURRENTLY AVAILABLE HAVE
DIFFERENT ASSUMPTIONS.
IF YOU HAVE A SITE IN WHICH ONE OF
THOSE ESTIMATOR ASSUMPTIONS IS
MORE LIKELY TO BE MET THAN
ANOTHER THEN PROBABLY YOU
WANT TO USE THAT.
THE GUIDELINES THEMSELVES DO
MENTIONED THERE ARE SOME
ESTIMATORS IN THE LITERATURE
THAT ACTUALLY SHOULD NOT BE
USED.
THEY ARE THERE BUT MOST PEOPLE,
EVERYBODY BASICALLY AGREES
THEY HAVE FAULTS ASSOCIATE WITH
THEM SO THEY SHOULD NOT BE
USED.
SEVERAL OF THEM ARE OUT THERE,
THE ONES I MENTIONED ALL SHOULD
GIVE YOU ABOUT THE SAME ANSWER
AS LONG AS THE ASSUMPTIONS ARE
MET.
>>CHRISTY JOHNSON-HUGHES:
THANK YOU.
WITH PRECONSTRUCTION AND
DURING CONSTRUCTION, FATALITY
MONITORING IMPACTS THE MODELING
OF DATA.
IN THIS CASE THERE ARE NO
EXISTING TURBINES.
I AM TRYING TO UNDERSTAND THE
QUESTION.
SO WE HAVE PRECONSTRUCTION
DURING CONSTRUCTION FATALITY
MONITORING IMPACT THE MODELING
OF POST CONSTRUCTION DATA.
>>MANUELA HUSO: IF I
UNDERSTAND CORRECTLY I THINK
THE ANSWER IS NO.
WHAT WE DO WITH POST
CONSTRUCTION IS WE TRY TO

ESTIMATE THE FATALITY THAT'S BEEN CAUSED BY THE TURBINES.
WE COMPARE THAT WITH THE INFORMATION THAT WE GATHERED FROM PRECONSTRUCTION WITH WHICH WE ESTIMATED PREDICTED FATALITIES AND WE LOOK TO SEE IF WE WERE EVEN CLOSE.
IN TERMS OF USING THAT INFORMATION AT THIS POINT, NO THE DATA THAT WE USE FOR ESTIMATIONS COMES SOLELY POST CONSTRUCTION.
>>CHRISTY JOHNSON-HUGHES: THANK YOU.
WE HAVE A RATHER LONG QUESTION HERE SO LET'S GET TO THIS.
YOU PRESENTED A CARCASS DENSITY PLOTS FOR HELPING TO DETERMINE SEARCH AREAS.
IS THERE A PARTICULAR SOFTWARE YOU MIGHT RECOMMEND BE USED TO CREATE SITE SPECIFIC SEARCH PLOTS?
>>MANUELA HUSO: UNFORTUNATELY AT THIS POINT THERE IS NONE OTHER THAN SORT OF THE TYPICAL SOFTWARE THAT IS USED IN STATISTICS.
BUT YOU HAVE TO BE KNOWLEDGEABLE ABOUT HOW TO DEVELOP THOSE MODELS.
SO UNFORTUNATELY, NO THERE'S NO READILY AVAILABLE SOFTWARE YET.
WE ARE WORKING ON SOME SOFTWARE.
>>CHRISTY JOHNSON-HUGHES: WE ARE NOT THERE YET.
ALL RIGHT ANOTHER QUESTION, HOW DID A MODEL ACCOUNT FOR CARCASSES FROM OTHER SOURCES OF FATALITY?
SO THIS WOULD BE OTHER FATALITIES OTHER THAN PRESUMED TURBINE STRIKES?

SO IT COULD BE ANYTHING ELSE,
LIGHTNING OR SOMETHING ELSE.
>>MANUELA HUSO: AT THIS POINT,
THE JOB OF ACCOUNTING FOR THOSE
OTHER SOURCES OF FATALITIES IS
NOT PLACED ON THE SOFTWARE.
THE JOB OF ACCOUNTING FOR THOSE
ARE BASED ON THE BIOLOGIST AND
THE PEOPLE IN THE FIELD OBSERVING
THE CARCASSES.
THERE ARE SOME CARCASSES THAT
MIGHT BE ABLE TO INFER PROBABLY
WAS NOT KILLED BY A TURBINE.
IT MIGHT BE LIKE WITH BIRDS, BUT
OTHERS, THERE MAY BE SOME
REASON THE BIOLOGIST BELIEVES
THEY WERE NOT KILLED BY TURBINES
AND IF THAT WAS A CASE THEY
WOULD NOT BE ENTERED INTO THE
DATASET USED TO ESTIMATE THE
FATALITY.
ONCE THE DEBT IS ENTERED IN THE
DATASET THE ASSUMPTION IS THERE
IS REASON TO BELIEVE IT WAS
CAUSED BY THE TURBINES.
>>CHRISTY JOHNSON-HUGHES:
THAT MAKE SENSE.
ALL RIGHT ANOTHER QUESTION, HOW
DO YOU ACCOUNT THE DENSITY
WEIGHTED PROPORTION VALUE THAT
IS INPUT INTO THE FATALITY
ESTIMATOR SOFTWARE?
>>MANUELA HUSO: THERE ARE
SEVERAL WAYS TO DO THAT AND
THAT'S WHAT THAT WAS ANSWERING
IS THERE SOFTWARE AVAILABLE TO
DO THAT YET AND THERE IS NO
SOFTWARE DEDICATED TO DOING
THAT EXACTLY.
WHAT WE HAVE USED IS MODELS AND
THEY WORK QUITE WELL.
THERE OTHER APPROACHES THAT
COULD BE USED, BUT IT IS MORE OR
LESS A REGRESSION TYPE OF MODEL,
UNDERSTANDING THE RESPONSE

VARIABLE IS NOT [INAUDIBLE].
>>CHRISTY JOHNSON-HUGHES:
OKAY.
LET'S GO TO ANOTHER QUESTION
WHAT TYPE OF DATA SHOULD THE
APPLICANT COLLECT
PRE- OPERATION THAT WOULD HELP
FORM A BASELINE TO COMPARE TO I
WOULD ASSUME POST OPERATION?
WHAT AMOUNTS OF MORTALITY IS
DUE TO OPERATIONS VERSUS
BASELINE MORTALITY?
>>MANUELA HUSO: THIS IS A
QUESTION THAT COMES UP FAIRLY
OFTEN.
I THINK THE WAY YOU COULD DO
WITH IS TO DESIGNATE AREAS THAT
YOU BELIEVE TO BE REPRESENTATIVE
OF WHERE YOU MIGHT ESTABLISH
TURBINES FOR THE FUTURE.
SOME OF THOSE ARE SET UP
ALREADY.
THEY DON'T HAVE TO BE EXACT, BUT
IT WOULD REQUIRE THAT YOU GO
OUT AND PERFORM SEARCHES AS IF
THERE WERE TURBINES THERE AND
THAT'S THE ONLY DIFFERENCE.
THERE WOULD BE NO DIFFERENCE
OTHER THAN THAT.
AND THEN CALCULATE FATALITIES.
SO THAT IS VERY EXPENSIVE THEN
ASKING SOMEBODY TO DO THAT IS UP
TO WHETHER THEY'VE GOT THE
MONEY OR NOT.
OTHERWISE, I'M NOT SURE HOW YOU
WOULD GO ABOUT DISTINGUISHING
THE BACKGROUND FATALITY FROM
CURRENT FATALITY.
ONE POSSIBLE METHOD WHICH IS
PERHAPS A LITTLE DIFFERENT IS TO
DESIGNATE AREAS THAT ARE FAR
ENOUGH AWAY FROM THE TURBINES
THEY WOULD NOT BE LIKELY TO
CONTAIN TURBINE KILLED AREAS
THAT ARE SOMEHOW IN SIMILAR

HABITATS AND SIMILAR TYPES OF CONDITIONS THEY WOULD BE REFLECTIVE OF BASIC BACKGROUND.
CONDUCT THOSE STUDIES IN CONJUNCTION WITH YOUR POST CONSTRUCTION SURVEYS.
AGAIN IT WOULD BE A LITTLE MORE EXTENSIVE AND YOU WOULD JUST HAVE SOME EXTRA PSEUDO TURBINES OUT THERE TO SEARCH.
AND THAT MIGHT GIVE YOU A NICE BASELINE IDEA.
>>CHRISTY JOHNSON-HUGHES: EXACTLY.
THAT MIGHT ALSO BE AN IDEA FOR TIER FIVE RESEARCH PROJECTS IF IT WAS NOT DONE AT AN INDIVIDUAL FACILITY.
MOVING ON, DO MONITORING METHODS FOR BATS VARY SIGNIFICANTLY FROM BIRDS?
>>MANUELA HUSO: I WOULD SAY IN GENERAL, NO.
PROBABLY THE PRIMARY DIFFERENCE IF YOU TAKE THE GROUP OF BIRDS TOGETHER IS BATS ARE GENERALLY SMALLER THAN JUST ABOUT EVERY BIRD OUT THERE.
CERTAINLY NOT ALL OF THEM BUT A LOT OF THEM.
SO THE DIFFERENCE REALLY LIES IN THAT WE PROBABLY DO HAVE TO SEARCH A LITTLE BIT MORE SLOWLY.
A LITTLE HARDER IN ABLE TO FIND THE BATS THAT ARE OUT THERE BECAUSE THEY ARE SO SMALL BUT THE GENERAL PROCESS IS VERY MUCH THE SAME.
IT DOES NOT MATTER WHAT SPECIES YOU ARE APPLYING THEM TO.
>>CHRISTY JOHNSON-HUGHES: DOES PRECONSTRUCTION DESIGN AFFECT POST CONSTRUCTION STUDY DESIGN?
>>MANUELA HUSO: I DON'T QUITE

UNDERSTAND THAT ONE.
PRETE CONSTRUCTION DESIGN OF WHAT?
>>CHRISTY JOHNSON-HUGHES: I AM NOT SURE, BUT I WOULD TAKE AN INITIAL STAB AT THIS DOES PRECONSTRUCTION STUDY DESIGN AFFECT POST CONSTRUCTION STUDY DESIGN?
IF THAT HAS TO DO WITH RELATING TO THE ANTICIPATED TAKE -- WHAT WE ANTICIPATED WOULD OCCUR BUT THE THING IS THAT PRECONSTRUCTION STUDIES OFTEN DO NOT INVOLVE FATALITIES STUDIES.
THEY ARE THERE REALLY TO TRY AND FIGURE OUT WHAT SPECIES MIGHT BE THERE IF THERE ARE ANY SPECIES WE NEED TO PAY PARTICULAR ATTENTION TO ESPECIALLY FOR SPECIES OF CONCERN OR OTHER ISSUES WE MIGHT NOT BE AWARE OF ON THE INITIAL SEARCH SO THOSE PRECONSTRUCTION STUDIES CAN SOMETIMES PLAY A LITTLE DIFFERENT ROLE WE DO A RISK ESTIMATE AND THE RISK ESTIMATES SOMETIMES CAN GIVE US SOME KIND OF POTENTIAL ESTIMATE OF FATALITIES ESPECIALLY IF YOU ARE DEALING WITH A FEDERALLY LISTED SPECIES THAT NEEDS TO HAVE A TAKE NUMBER.
BUT I WOULD IMAGINE THAT THE POST CONSTRUCTION STUDIES WOULD BE DIFFERENT BECAUSE YOU ACTUALLY HAVE PURCHASES AT THAT POINT IN TIME VERSUS JUST TRYING TO BASES INFORMATION OFF OTHER FACILITIES OR INFORMATION IN THE LITERATURE.
>>MANUELA HUSO: LIKE I SAID IN MY TALK, THE WAY WE WOULD DESIGN FOR BEING ABLE TO DETERMINE

WHETHER I TAKE HAS BEEN
EXCEEDED IS VERY DIFFERENT FROM
WHAT I TALKED ABOUT TODAY.
SO IF THAT IS WHAT HAS BEEN
SIGNALED IN THE
PRECONSTRUCTION, THAT YOU HAVE
A SPECIES OF CONCERN YOU WERE
NOT AWARE OF BEFORE, THEN
DEFINITELY THAT WOULD AFFECT THE
DESIGN.
>>CHRISTY JOHNSON-HUGHES:
THAT'S GOOD TO KNOW.
THANK YOU.
ALL RIGHT A LARGE PROPORTION OF
FATALITIES IN THE GREAT LAKES ARE
RELATED TO WHETHER.
IS WHETHER A COVARIANT?
>>MANUELA HUSO: IN ESTIMATING
FATALITY ITSELF, IT DOES NOT NEED
TO BE.
IF WE WANT TO PREDICT FATALITY IT
CAN AND SHOULD BE.
IN ESTIMATING WHAT HAS HAPPENED,
THERE IS NO NEED FOR IT TO BE
BECAUSE WE ARE JUST BASICALLY
BASING OUR ESTIMATE ON WHAT WE
FIND.
IF WE FIND A LOT MORE BECAUSE THE
WEATHER IS IN THE SITUATION IN A
CONDITION THAT LEADS TO MORE
FATALITIES WE WILL FIND A LOT MORE
AND THAT'S REFLECTED IN OUR
ESTIMATE SO WE DON'T HAVE TO
TAKE WEATHER INTO ACCOUNT
DIRECTLY.
>> ANOTHER QUESTION WHAT IS
YOUR GENERAL STANCE ON PROJECT
OPERATORS VERSUS THIRD-PARTY
TRAINED BIOLOGIST?
>>MANUELA HUSO: I'M NOT SURE I
HAVE AN OPINION ON THAT.
WHAT I ASSUME IN DEVELOPING
THESE MODELS AND TRYING TO
COME UP WITH WAYS WE CAN
INTERPRET WHAT WE FIND INTO

WHAT LIKELY WAS TO HAPPEN I BELIEVE THAT WHOEVER IS DOING THE WORK IS SINCERE AND WELL TRAINED AND THEY KNOW HOW TO GO ABOUT SEARCHING AND HOW TO IDENTIFY THE CARCASSES.
SO THE SOURCE OF THEM, OF THEIR PROFESSION, I DON'T KNOW THAT MATTERS.
>>CHRISTY JOHNSON-HUGHES: I THINK THAT IS A GOOD POINT.
FROM THE FISSION WHAT LIFE SERVICE PERSPECTIVE, I UNDERSTAND THE CONCERN ABOUT INCIDENTAL MONITORING AND MAYBE HAVING NON-INCIDENTAL MONITORING WHICH IS THE POST CONSTRUCTION STUDIES.
I CAN UNDERSTAND THAT.
THAT CAN LEAD TO VERY VALUABLE INFORMATION.
THEY TO IT LEAST ONE YEAR OF PRECONSTRUCTION STUDIES AND THEN FOLLOW UP WITH INCIDENTAL MONITORING AND WE HAVE SEEN WHERE STAFF WHO WORK AT THE FACILITY CAN BE VERY WELL TRAINED TO IDENTIFY CARCASSES AND EVEN IF THEY CAN'T IDENTIFY THE SPECIES, THEY HAVE A PROTOCOL IN PLACE FOR COLLECTING THOSE CARCASSES AND PRESERVING THEM, USUALLY IN A FREEZER UNTIL A QUALIFIED BIOLOGIST CAN COME AND DO THE ACTUAL SPECIES IDENTIFICATION SO I DON'T KNOW IF THE DATA WOULD BE ROBUST ENOUGH ON INCIDENTAL ON THE TRAINED TO DO FATALITY ESTIMATIONS, BUT IT MIGHT BE USEFUL FOR LONG-TERM UNDERSTANDING OF WHAT MIGHT BE GOING ON AT THE SITE.
>>MANUELA HUSO: THANK YOU I THINK I MISUNDERSTOOD THE QUESTION.

THE INCIDENTAL PART WAS THE PART I DID NOT QUITE CATCH.
FOR US TO ESTIMATE FATALITY WE DO NEED TO HAVE AS I SAID IN MY TALK, WE NEED TO HAVE A SENSE OF HOW LONG IT'S BEEN SINCE THAT AREA WAS LAST SEARCHED.
INCIDENTAL MONITORING DOES NOT REALLY HAVE THAT SO WE DON'T HAVE ANY WAY OF ESTIMATING WHAT THE PROBABILITY THAT CARCASS HAVING PERSISTED SINCE ITS BEEN KILLED BECAUSE WE DON'T HAVE A FRAME OF REFERENCE TO KNOW PROBABLY WAS NOT THERE IN THE LAST ONE.
WITHOUT THAT, IT MIGHT GIVE US A LITTLE BIT OF A SENSE OF PATTERNS, BUT WE CAN TRULY ESTIMATE FATALITIES FROM INCIDENTAL.
>>CHRISTY JOHNSON-HUGHES: THAT MAKES SENSE.
ANOTHER QUESTION, CAN FAKE BATS BE USED FOR SEARCHER EFFICIENCY TRIAL INSTEAD OF THE USUAL MICE?
>>MANUELA HUSO: I DON'T KNOW.
THAT IS A GOOD QUESTION TO ASK AND DO SOME RESEARCH AND SEE IF THEY HAVE THE SAME KIND OF SEARCHER EFFICIENCY ASSOCIATED WITH THEM AS WE WOULD HAVE WITH REAL TRUE BATS.
AND WHETHER THEY ARE BETTER THAN MICE.
BUT I DON'T KNOW.
>>CHRISTY JOHNSON-HUGHES: FAKE BATS DO NOT HAVE THE SAME SENSE.
>>MANUELA HUSO: SEARCHER EFFICIENCIES, BUT FOR HUMANS IT'S PROBABLY NOT A BIG DEAL BUT THERE IS NOTHING ELSE MAYBE THAT'S AS GOOD AS IT WILL GET BUT THAT'S A GOOD QUESTION.
>>CHRISTY JOHNSON-HUGHES:

THANK YOU VERY MUCH.
WHAT WE WOULD LIKE TO DO IS MOVE INTO A FIVE MINUTE BREAK AT THIS POINT IN TIME AND REMEMBER, ON OUR WEBSITE TYPE IN THE QUESTIONS AND WE WILL BE MOVING ON TO SOME OTHER TRANSPORT ISSUES AFTER THE BREAK AND I WOULD LIKE TO THANK MANUELA FOR JOINING US TODAY.
THANK YOU VERY MUCH.
I THINK THIS IS VALUABLE FOR OUR AUDIENCE.
AFTER THE FIND A MINUTE BREAK WE WILL COME BACK TO THEIR ROUND TABLE AND ANSWER MORE OF YOUR QUESTIONS ABOUT TIER 4 REPORTING, COMMUNICATIONS AND ADAPTIVE MANAGEMENT.
>>CHRISTY JOHNSON-HUGHES: ALL RIGHT WHILE WE ARE BACK WITH ANOTHER SET OF GUESS.
LET'S CONTINUE OUR DISCUSSION ABOUT TIER 4 AND THEY'RE ARE A LOT IN TIER 4 TO COVER SO WE APPRECIATE YOU ARE HANGING WITH US AND WE HAVE A LOT TO COVER TODAY.
BUT I WOULD LIKE TO DO NOW IS INTRODUCE OUR NEXT SET OF GUESS AND WE HAVE JEFF EFFORT FROM THE U.S. FISH AND WILDLIFE SERVICE.
WELCOME JEFF.
YOU HAVE SEEN JEFF BEFORE.
HE JOINED US ON OUR FIRST BROADCAST AND HE IS ACTUALLY HERE IN THE STUDIO WITH US.
AND HE IS A WILDLIFE BIOLOGIST IN PORTLAND, OREGON WHERE HE SPECIALIZES IN RENEWABLE ENERGY PROJECT DEVELOPMENT AND COORDINATION AND HE FOCUSES ON COOPERATIVE DEVELOPMENT OF AVIAN DATA PROTECTION PLANS AND EAGLE CONSERVATION PLANS.

HE ALSO WORKS WITH OVERRIDE OF ENERGY ARENAS INCLUDING GEOTHERMAL, OCEAN RENEWABLE ENERGY PROJECTS AND TRANSMISSION INFRASTRUCTURE PROJECTS.
WELCOME.
AND THEN WE HAVE JERRY WHO IS FROM [INAUDIBLE] RENEWAL WILL.
WELCOME TO THE SHOW.
YOU ARE A WILDLIFE PERMITTING SCIENCE MANAGER AND YOU HAVE SPENT QUITE A BIT OF TIME IN THE ENERGY INDUSTRY AND EUPHORIC DONE THE AVIAN AND BATS PROTECTION POLICY OF THE COMPANY TO MEET COMPLIANCE COMMISSIONS AND DIRECTING STUDIES AT THE PROJECTS AND ALSO A MEMBER OF THE WILDLIFE WORKING GROUP FOR THE NATIONAL COLLABORATIVE AND A BOARD MEMBER FOR THE RENEWABLE ENERGY WORKING GROUP OF THE WILDLIFE SOCIETY.
WELCOME.
AND CERTAINLY NOT LEAST, IS JILL BIRCHELL THE U.S. FISH AND WILDLIFE SERVICE BUT JILL IS THE SPECIAL AGENT IN CHARGE OF THE U.S. FISH AND WILDLIFE SURFACE OFFICE OF REINFORCEMENT AND THAT INCLUDES CALIFORNIA AND NOW VIA AND SHE HAS BEEN A SERVICE OFFICER FOR 28 YEARS AND SHE HAS WORKED IN FIVE DIFFERENT FISH AND WILDLIFE SERVICE REGIONS AND SHE HAS DEALT WITH INDUSTRY ON ISSUES FROM BIRD ELECTRIC YOU SHOULDN'T IN ALASKA TO WIND INDUSTRY IN THE SOUTH WEST AND WORKING ON WIND AND SOLAR ISSUES IN CALIFORNIA AND NEVADA SO WELCOME.
GLAD YOU COULD JOIN US.

>> GOOD TO BE HERE.
>>CHRISTY JOHNSON-HUGHES:
NOW WE HAVE OUR EXPERTS WE WANT TO CONTINUE OUR DISCUSSION BECAUSE IT'S NOT JUST SEARCHING FOR CARCASSES AND ESTIMATING HOW MANY MAY OR MAY NOT HAVE BEEN FOUND AND SEARCHER EFFICIENCY EVEN THOUGH THAT'S AN IMPORTANT COMPONENT OF THAT THERE'S MORE TO IT THEN THAT.
WHAT DO YOU DO ONCE YOU FIND THESE CARCASSES?
HOW DO YOU COORDINATE WITH THE OTHER STAKEHOLDERS INVOLVED?
I THINK THAT IS ONE OF THE MOST COMMON QUESTIONS AND THE WIND ENERGY GOT BEEN SPENT A LOT OF TIME TALKING ABOUT THE COMMUNICATION WITH THE SERVICE AND ANYONE ELSE WORKING ON THIS SO LET'S TALK A LITTLE BIT ABOUT COMMUNICATIONS.
WE HAVE -- COMMUNICATION IS A VERY GENERAL TERM, BUT I THINK THAT IT INVOLVES MUCH MORE THAN JUST PICKING UP THE PHONE AND SAYING HELLO TO SOMEONE.
SO JEFF, IN YOUR EXPERIENCE AS A FISH AND WILDLIFE SERVICE BIOLOGIST WORKING IN THE FIELD, WHAT DOES COMMUNICATIONS MEAN TO YOU UNDER THE WIND ENERGY GUIDELINES?
>> AS IT RELATES TO TIER 4 COMMUNICATION IS EVERY BIT AS CRITICAL AS IT IS IN THE FIRST THREE TIERS OF DEVELOPMENT AND APPLICATION IN THE WIND ENERGY DEADLINE.
COMMUNICATION IS A FUNDAMENTAL THEME THROUGHOUT THE GUIDELINES AND WHEN IT COMES TO ESTABLISHING A TRUSTWORTHY PARTNERSHIP BETWEEN THE

SERVICE AND THE DEVELOPERS THAT ARE TRYING TO IMPLEMENT SUCCESSFUL PROJECTS, COMMUNICATION IS A FUNDAMENTAL PART TO MAKING SURE THE DYNAMIC BACK-AND-FORTH EXCHANGE OF INFORMATION IS WORKING AND EFFECTIVE.
THAT RELATIONSHIP IN MY EXPERIENCE NEEDS TO BE BUILT ON TRUST AND IN TIER 4 WHEN IT COMES TO THE COMMUNICATIONS BACK AND FORTH WITH THE COMPANY.
THE COMPANY CAN TRUST US AS SERVICE BIOLOGISTS TO RELAY BACK OUT TO THE FIELD AND THE PROJECT DEVELOPERS NEW OPPORTUNITIES FOR MITIGATION AND NEW ADVANCES IN THE AVOIDANCE OF MINIMIZATION OR POTENTIALLY NEW WAYS TO OPERATE A SUCCESSFUL PROJECT.
AT THE SAME TIME,, IF THE COMPANY APPROACHES US WITH A FATALITY REPORT OR POTENTIALLY A CHANGE IN OPERATIONAL MANAGEMENT, DIFFERENT THINGS LIKE THAT, IT IS BACK-AND-FORTH.
ULTIMATELY WHAT IT ALLOWS US TO DO IS MAKE BETTER DECISIONS AND INFORM FUTURE ADAPTIVE MANAGEMENT PROCESSES.
>>CHRISTY JOHNSON-HUGHES:
THAT IS REALLY HELPFUL ESPECIALLY AS WE LOOK AT THIS AS AN ONGOING PROCESS NOT JUST A STATIC PROCESS, NOT JUST SOMETHING WE DO IT THE BEGINNING AND WE ARE DONE.
IT IS A CONTINUUM OF COMMUNICATION AND DIFFERENT TYPES OF COMMUNICATION.
LIKE YOU SAID, IT HELPS US TO MOVE FORWARD.
IF SOMETHING DOES COME UP WE DID NOT ANTICIPATE.

I WOULD LIKE TO MOVE TO YOU JERRY AND THE SAME SORT OF QUESTION, YOU ARE WITH INDUSTRY, WHAT DOES COMMUNICATIONS MEAN TO YOU AS AN INDUSTRY REPRESENTATIVE?
>> ONE OF THE KEY FEATURES AND JEFF EXPLAINED IT PRETTY WELL IS YOU REALLY HAVE TO LOOK AT HOW YOU COMMUNICATE AND THE CONFIRMATION OR IF THERE ARE ISSUES ASSOCIATED WITH THE TIER 4 DATA DID YOU MEET THE TIER THREE EXPECTATIONS AND CAN YOU CONFIRM THAT AND THIS IS A 30 YEAR PROCESS WITH WHAT YOU ARE ALLUDING TO THAT IT'S A KEY FEATURE OF THE ADAPTIVE MANAGEMENT IS DEALING WITH THE REAL WORLD WITH TIER 4 IS WHERE WE START TO SEE THE REALITY OF WHAT WE'VE BUILT AND WE ARE TRYING TO OPERATE.
ONE OTHER FACET ASSOCIATED WITH THAT IS KNOWING THE STAKEHOLDERS AND DEVELOPING IF YOU WILL, AND ESTABLISHING CHANNELS FOR THAT TYPE OF COMMUNICATION.
LIKE YOU'VE ALLUDED TO, THERE'S A LOT OF DIFFERENT TYPES OF COMMUNICATIONS AND YOU NEED TO WORK WITH STAKEHOLDERS TO FIND OUT WHAT'S THE BEST WAY TO COMMUNICATE AND TO ENSURE THE INFORMATION IS THERE SO YOU CAN WORK ON MUTUAL SOLUTIONS AND WORK TO DEAL WITH THOSE LONG-TERM ASPECTS OF OPERATIONS AND ULTIMATE RESOURCE MANAGEMENT.
>>CHRISTY JOHNSON-HUGHES: YOU DO BRING UP A GOOD POINT IT'S NOT JUST ABOUT WHAT THE FISH AND WILDLIFE SERVICE WANTS TO SEE

BECAUSE WE MIGHT HAVE ONE WAY OF COMMUNICATING THAT WE ARE MOST COMFORTABLE WITH.
BUT THERE MAY BE AN ALTERNATIVE OR EVEN BETTER WAY OF COMMUNICATING WITH THE PROJECT MANAGER, THE COMPANY WHEN IT COMES TO THIS AND THAT IS A REALLY GOOD POINT.
IS ESTABLISH HOW YOU -- WHERE ARE THE BEST METHODS.
>> ANOTHER REASON AT LEAST IN OUR SITUATION RECOVER A NUMBER OF U.S. FISH AND WILDLIFE SERVICE REGIONS AND THEY HAVE CERTAIN AUTONOMY'S AND RELATIONSHIP SO IT'S IMPORTANT TO GET INTO THOSE AND UNDERSTAND THE CIRCUMSTANCES AND THE SITUATIONS AND MAKE SURE YOU ARE GETTING THE RIGHT INFORMATION.
>>CHRISTY JOHNSON-HUGHES: EXCELLENT.
NOW CHILL, AS LAW ENFORCEMENT, COMMUNICATION CAN MEAN COMPLETELY A DIFFERENT THING OR IT FEELS LIKE IT, BUT REALLY, IN THE GUIDELINES WE TALK A LOT ABOUT DOCUMENTATION AND THE PRESERVATION OF THE DOCUMENTATION SHOWING THE ACTIONS, THE RISK ASSESSMENTS THAT WERE CONSIDERED AND TAKEN BY THE COMPANY.
WHAT DOES THAT MEAN TO YOU AS A LAW ENFORCEMENT OFFICER?
>> I THINK FOR OUR PURPOSES, COMMUNICATION IS A LOT MORE THAN JUST PICKING UP THE PHONE AND CALLING FISH AND WILDLIFE SERVICE.
IN FACT,, I THINK SOMETIMES THAT IS WHAT A COMPANY MAY FEEL IS ADEQUATE AND THEY CAN CHECK A

BOX AND SAY THEY'VE
COMMUNICATED WITH FISH AMOUNT
OF SERVICE AND THEY'VE MET THAT
PARTICULAR REQUIREMENT, BUT IT IS
A LOT MORE IMPORTANT TO
EXCHANGE INFORMATION BETWEEN
THE COMPANY AND THE U.S. FISH AND
WILDLIFE SERVICE AND I CAN'T
STRESS ENOUGH THAT NEEDS TO
HAPPEN AS EARLY AS POSSIBLE IN
THE PROCESS.
THIS EVENT THE COMPANY
ESTABLISHES THAT RELATIONSHIP
WITH THE U.S. FISH AND WILDLIFE
SERVICE BIOLOGIST AND STARTS
GETTING THAT INPUT AND
INCORPORATING THE FEEDBACK INTO
THEIR PROJECT CITING AND THEIR
PROJECT DEVELOPMENT PLANS AND
THEN SHARING INFORMATION ABOUT
SURVEY RESULTS BOTH
PRECONSTRUCTION AND
POST- CONSTRUCTION AND THEN
ALSO PICKING UP THE PHONE AND
MAKING THE HARD PHONE CALL
WHEN THEY HAVE SOMETHING TO
REPORT.
SPECIES OF CONCERN IS KILLED OR
THERE'S A SIGNIFICANT EVENT
INVOLVING SEVERAL BIRDS, FOR
EXAMPLE.
THE MORE OFTEN AND THIS CAN'T BE
STRESSED ENOUGH FREQUENT AND
EARLY CONVERSATIONS BETWEEN
THE COMPANY AND THE SERVICE ARE
VERY IMPORTANT TO MAKE THE
WHOLE PROCESS A LOT SMOOTHER
AND LESS PAINFUL FOR THE
COMPANY.
>> .
>>CHRISTY JOHNSON-HUGHES:
ABSOLUTELY I BELIEVE THE WIND
ENERGY GUIDELINES TO TALK ABOUT
THAT.
THERE IS AN ADMINISTRATIVE

RECORD THAT NEEDS TO BE TAPPED BY THE COMPANY -- KEPT BY THE COMPANY SO IF THERE ARE ANY QUESTIONS EVERYONE CAN GO BACK TO THAT RECORDS AND SAY THESE WERE THE CHOICES MADE.
THIS IS HOW THEY DECIDED TO MOVE FORWARD AND HERE'S HOW THEY CAME TO THE SERVICE AND ON THE FLIPSIDE, THE SERVICE ALSO NEEDS TO HAVE A GOOD ADMINISTRATIVE RECORD AS WELL.
EVEN THOUGH IT IS OFTEN EASIER TO JUST JOT OFF A QUICK E-MAIL OR PICK UP THE PHONE REAL QUICK, SOMETIMES WE NEED TO FOLLOW UP WITH AN ACTUAL LETTER OR MEMO OR SOMETHING TO DOCUMENT THE EXCHANGE.
SO IF THERE ARE ANY QUESTIONS WE CAN ALWAYS REFER BACK TO THAT INTERNALLY AND COMPARE THOSE NOTES WITH WHAT THE COMPANY HAS KEPT.
AT LEAST THAT'S BEEN MY EXPERIENCE.
>>CHRISTY JOHNSON-HUGHES: --
>> ABSOLUTELY.
>>CHRISTY JOHNSON-HUGHES: LET'S MOVE ONTO ANOTHER ELEMENT OF TIER 4 I WOULD LIKE TO TALK ABOUT AND I MENTIONED IT EARLIER IN MY PRESENTATION, IS THAT TIER 4 NOT ONLY TALKS ABOUT DEAD THINGS, BUT ALSO TALKS ABOUT HABITAT AND IMPACTS TO HABITAT AND I THINK THIS IS ONE OF THE MOST EXCITING THINGS PROBABLY FROM THE FISH AND WILDLIFE SERVICE SCIENCE REALM IS WHERE WE HAVE ACTUALLY PUT INTO WORDS THE OPPORTUNITIES TO LOOK AT HABITAT LOSS AND FRAGMENTATION AND DISTRUCTION, DEGRADATION, WHATEVER YOU

WANT TO CALL IT AND THIS IS NOT
JUST A WIND ENERGY THING.
IT'S A LANDSCAPE LEVEL THING.
WE LOOK AT IT FROM A VARIETY OF
DIFFERENT IMPACTS, BUT THIS IS THE
FIRST TIME WE'VE HAD AN
OPPORTUNITY TO WRITE THIS DOWN
AND PUT THESE QUESTIONS TO THE
TEST SO WE TALK ABOUT HABITAT
AND THE REVIEW OF HABITAT IN THE
GUIDELINES AND POTENTIAL
MITIGATION.
SO WHEN I TAKE A LOOK AT THIS,
THAT SOUNDS GREAT.
BUT IN REALITY WHAT DOES THAT
MEAN ON THE GROUND.
JEFF I WOULD LIKE TO GO BACK WITH
YOU AS A SERVICE BIOLOGIST AND
WHAT ARE YOUR IMPRESSIONS OF
THE HABITAT IMPACT AND HOW DO
YOU LOOK AT THAT?
WHAT ARE YOUR IDEAS ON IT?
>> PRIMARILY WITH WIND AND/OR G.
PROJECTS THIRD TWO TYPES OF
HABITAT IMPACT WE ARE
CONCERNED WITH THE DIRECT
IMPACT WHICH IS THE DIRECT AND
IMMEDIATE IMPACTS TO THE HABITAT
IN THE AREA SURROUNDING THE
PROJECT THAT IS LOST TO THE
PROJECT DEVELOPMENT.
THINGS LIKE THE TURBINES, ACCESS
ROADS AND OTHER THINGS.
GENERALLY SPEAKING THOSE
IMPACTS TEND TO BE RELATIVELY
SMALL COMPARED TO THE
FOOTPRINT OF THE ENTIRE PROJECT
AREA.
POTENTIALLY ON A LARGER SCALE,
INDIRECT HABITAT IMPACTS ARE
CONSIDERABLY MORE A SOURCE OF
CONCERN WHEN YOU HAVE VERY
TALL STRUCTURES ON A RELATIVELY
FLAT LANDSCAPE OR HAVE
SOMETHING THAT GENERATES A LOT

OF NOISE THAT MAYBE IN DIRECT IMPACT FOR A VARIETY OF SPECIES.
SO MOST OF THE TIME WHEN WE TALK ABOUT HABITAT IMPACTS WE TALK ABOUT BIRDS BUT THINGS WE WOULD TAKE INTO CONSIDERATION IN THE EARLIER TIERS ARE POTENTIALLY FRAGMENTING HABITATS FOR BIG GAME WINTER RANGE OR MIGRATION CORRIDORS OR OTHER CRITICAL HABITAT WE'VE NOT REALLY -- THAT WE DON'T ALWAYS TAKE INTO CONSIDERATION WHEN WE HAVE SOMEWHAT OF A CLOSE SCOPE ON BIRDS OR THINGS THAT WOULD BE FLYING THROUGH THE TURBINES.
SO TIER 4 GIVES US A GOOD OPPORTUNITY AS PART OF OUR POST CONSTRUCTION IMPACT ASSESSMENT TO VALIDATE WHAT WE'VE LEARNED AND WHAT WE SAW IN THE FIRST THREE TIERS OF PROJECT DEVELOPMENT AND MAKE SURE FROM THE HABITAT POINT OF VIEW WE'VE GOT THINGS RIGHT.
>>CHRISTY JOHNSON-HUGHES: I THINK THAT IS A VERY IMPORTANT ELEMENT THAT WE HAVE THAT OPPORTUNITY TO INVESTIGATE.
AS WE ARE SEEING IN GENERAL, WE NEED TO CONSIDER THESE LANDSCAPE LEVEL ISSUES AND THESE HABITAT ISSUES LIKE YOU SAID FOR EVEN LAND-BASED LARGE GAME SPECIES.
JERRY, IN THE INDUSTRY, HOW DOES THE INDUSTRY THINK ABOUT THIS AND WHAT HAVE BEEN YOUR EXPERIENCES WITH THE HABITAT IMPACT QUESTION OF TIER 4?
>> A LOT OF THE EFFORT IS FOCUSED ON AVOIDANCE ESPECIALLY CRITICAL HABITATS FOR DEPENDING ON THE PROJECT THE CIRCUMSTANCES.

BUT IN THE CASES OF DIRECT LOSS, THERE'S A VARIETY OF MITIGATION MEASURES INSTITUTED WITH ACQUISITIONS, CONSERVATION AND MITIGATION BANKS.
A VARIETY OF MEASURES TO SECURE THAT REPLACEMENT HABITAT.
THAT IS WHAT THE DIRECT LOSS.
THE DEGRADATION CERTAINLY DEPENDS ON THE SITE AND THE SPECIES AS JEFF WAS ALLUDED TO THAT ARE PRESENT BUT A LOT MORE DIFFICULT TO DETERMINE AND A LOT OF THE 4 BE STUDIES ARE INGRAINED AND HAVE LIMITATIONS WAS TRYING TO GET A GENERAL FEEL IF THERE'S SOMETHING HAPPENING, BUT WITH SOME OF THE SPECIES LIKE SAGE GROUSE ETC. THEY ARE BETTER SUITED FOR THE TIER FIVE WORK OR COLLABORATIVE RESEARCH WORK SO YOU CAN USE THAT INFORMATION IN A CONTROLLED SENSE AND NOT COMPOUNDED BY A SERIES OF DIFFERENT ITEMS SO IT'S TRY TO ESTABLISH THAT.
AND SOMETIMES WHAT WE'VE DONE IS WE'VE MADE ASSUMPTIONS ON WHAT WE THINK THE DEGREE AND AFFECT OR LOSS WILL BE.
WE'VE MADE THAT A FACTOR IN OUR OVERALL LOSS MITIGATION EFFORT.
>>CHRISTY JOHNSON-HUGHES:
THAT'S A VERY VALUABLE POINT BECAUSE A LOT OF US WE DON'T NECESSARILY KNOW HOW THE ANIMALS MAY REACT TO THIS OCCURRENCE ON THE LANDSCAPE AS WE HAVE SEEN WITH SAGE GROUSE.
THERE WERE SOME IMPACTS WE DID NOT NECESSARILY ANTICIPATE BUT THEN ON THE OTHER HAND, THIS IS ALSO LARGER SCALE SO MAY BE DIFFICULT TO DO PROJECT BY PROJECT BUT IF WE LOOK AT IT IN A

LARGER SENSE, THERE MAY BE EVEN MORE OPPORTUNITIES.
>> AND TRYING TO CONTROL FOR VARIABLES AND PUT A PROJECT UP AND SAY THAT IS THE FACTOR THAT CAUSED THE EFFECT, THERE COULD BE OTHER FACTORS GOING ON OR YOU COULD HAVE SOME WEATHER ISSUES THAT MAY RESULT AT LEAST WITH CHICKENS IT COULD BE A BIG FACTOR.
SO THERE ARE A NUMBER OF THINGS THAT MAY CONFOUND WHAT YOU TRY TO DO IN THE STUDIES.
IT DOES NOT MEAN YOU DON'T DO SOME THINGS ARE TO GET A FEEL FOR THAT, BUT TO ME IT'S A REAL TIER 5 COMPONENT.
>>CHRISTY JOHNSON-HUGHES: I'D LIKE TO MOVE ONTO ANOTHER QUESTION.
AND THIS ONE ACTUALLY I KNOW ALSO GETS TO THE HEART OF A LOT OF QUESTIONS FOR MANY PEOPLE AND THIS IS REPORTING OF FATALITIES.
AND HOW THIS IS HANDLED BY INDUSTRY.
I KNOW THERE IS A LOT OF DISCUSSION ABOUT IT AT THE FIELD LEVEL AND THERE IS SOME SUPPOSITION ABOUT WHAT HAPPENS.
THERE'S ALSO SOME REALITY OF WHAT HAPPENS.
SO JERRY, I WOULD LIKE TO THROW THIS BACK AT YOU AGAIN AS AN INDUSTRY PERSON, HOW DO YOU HANDLE DEAD THINGS, YOU COME UP TO A TURBINE AND THERE IS A DEAD BIRD, BAT, HOW DO YOU HANDLE THAT?
>> ONE THING I WANT TO POINT OUT, I REALLY WANT TO TELL JILL HOW MUCH I HAVE APPRECIATED HER BEING ABLE TO SIT DOWN AND TALK

THROUGH SOME OF THESE DISCUSSIONS ABOUT HOW TO HANDLE THIS.
REALLY INFORMATIVE.
FROM THE STANDPOINT OF THE INDUSTRY, ACTUALLY WE PROVIDE REPORTS OF OUR POST CONSTRUCTION FATALITY SERVICE IS ONE COMPONENT.
ANOTHER'S INDIVIDUAL INSTANCES, BUT WE ARE ALWAYS BALANCING THOSE WITH THE TENSION OF THE LEGAL ASPECT.
SO WE PREPARE REPORTS WITH FATALITY ESTIMATES THAT FULFILL A SERIES OF MIGHT BE INTERNAL POLICIES WITH IBERDROLA BUT THOSE POST CONSTRUCTION FATALITY STUDIES ARE CONDUCTED HOPEFULLY FOLLOWING THE WIND BATTERED JEEP GUIDELINES AND SUITABLE PROTOCOLS AND MADE UP RUN 1-3 YEARS DEPENDING ON THE PROTOCOLS WHERE YOU ANALYZE THE INFORMATION AND COMPARED AND THE KEY IS THE COMPARISON BACK TO TIER THREE OR THE REGIONAL NORMS.
ARE YOU SEEING WHAT YOU EXPECTED AND PREPARED IN A REPORT AND THAT IS PROBABLY THE MAJOR WAY THAT WE TRY TO PROVIDE FATALITY INFORMATION BUT THERE'S ALSO THIS INCIDENT ASPECT AND THAT CAN BE LONG TERM BECAUSE THAT COULD BE A FACET THAT GOES ON FOR THE LIFE OF THE PROJECT, 30 YEARS WERE YOU DEAL WITH EVENTS AND THOSE EVENTS COULD BE STATE, FEDERAL, THEY COULD BE EAGLES OR THEY COULD BE RARER EVENTS LIKE A LARGE FATALITY OR SOMETHING LIKE THAT WHERE WITH THAT DISCOVERY VIEW REPORT THAT TO THE APPROPRIATE

STATE OR FEDERAL AGENCY AND
THAT GOES BACK TO
COMMUNICATION CHANNELS BUT IT'S
DONE IN A MUCH MORE URGENT
BASIS, 24-48 HOURS IS PROBABLY THE
NORM WE TRY TO WORK WITH.
>>CHRISTY JOHNSON-HUGHES: YOU
MENTIONED TALKING TO JILL AND IT IS
TRUE, JILL, YOU HAVE A REALLY
GOOD WAY OF EXPLAINING THE
PROTOCOLS.
SO IF YOU WOULD NOT MIND, IF YOU
WOULD GO INTO A LITTLE BIT MORE
ABOUT FATALITY REPORTING FROM
YOUR PERSPECTIVE.
>> AS JERRY MENTION, THERE ARE
KIND OF TWO WAYS TO LOOK AT
FATALITY REPORTING.
YOU HAVE YOUR SORT OF ANNUAL
REPORTS PROVIDED TO THE VARIOUS
GOVERNMENT AGENCIES WHETHER
FEDERAL STATE OR LOCAL AS
REQUIRED BY PERMITS FOR THE
COMPANY POLICY.
THOSE ARE IMPORTANT.
BUT THERE IS ALSO THE INCIDENT
REPORTING AND I THINK FOR LAW
ENFORCEMENT IT'S VERY IMPORTANT
WE ARE BROUGHT INTO THE LOOP
FOR THOSE KINDS OF INCIDENTS.
FOR EXAMPLE, ENDANGERED
SPECIES, EAGLES, MASS
MORTALITIES, AND WE WILL BE
BROUGHT IN ONE WAY OR THE OTHER
AND I THINK IT'S PLAYED OUT OVER
TIME THAT COMPANIES THAT REPORT
DIRECTLY TO US OR TO THE LOCAL
BIOLOGIST WHO SHARES
INFORMATION WITH US IF THERE'S
THAT KIND OF RELATIONSHIP
ESTABLISHED AHEAD OF TIME AND
THERE'S THE SHARING OF
INFORMATION, WE KNOW WHERE THE
COMPANY IS IN DEALING WITH THE
SERVICE AND THE INCIDENT REPORTS

DON'T HAVE THE NEGATIVE IMPACT
THAT THEY MIGHT OTHERWISE IF THIS
IS A COMPANY THAT THIS IS THE
FIRST TIME WE HEAR FROM THEM IS
WHEN THERE'S A MASS MORTALITY
FOR EXAMPLE, AND WE HEAR FROM
AN NGO OR WE DISCOVER IN
OURSELVES, THEN IT'S CLEARLY A
LAW-ENFORCEMENT MATTER AND WE
WILL START DIGGING IN AND WE
START FROM THE BEGINNING
LOOKING AT ADMINISTRATIVE
RECORD AND THE WHOLE HISTORY
OF THE PROJECT AND THE EFFORTS
THAT HAVE BEEN MADE.
SO REPORTING I KNOW CAN BE SORT
OF TRICKY FOR COMPANIES, BUT IT
REALLY IS, AND IT'S CERTAINLY BEEN
MY EXPERIENCE IN MANY COMPANIES
WILL ATTEST TO THIS, IT IS BETTER
TO REPORT YOURSELF THAN HAVE
SOMEBODY ELSE REPORT OR HAVE
LAW ENFORCEMENT FIND OUT
THEMSELVES BECAUSE THEN THERE
WILL BE A FULL-BLOWN
INVESTIGATION AND EVERYTHING
THAT COMES WITH THAT.
>>CHRISTY JOHNSON-HUGHES:
ABSOLUTELY.
I KNOW YOU AND I HAVE TALKED
WHILE WE HAVE BEEN PREPARING
FOR THIS BROADCAST AND I THINK IT
IS INTERESTING THAT LAW
ENFORCEMENT HAS SUCH A BROAD
ROLE.
IT'S BROADER THAN WE ACTUALLY
REALIZE.
YOU DON'T JUST NECESSARILY COME
IN WHEN SOMETHING IS HAPPENED
AND SOMEONE HAS CALLED SHOOT
YOU CAN PLAY A LARGER ROLE IN
INTERACTING.
>> EXACTLY WE TRY TO DO THAT
ESPECIALLY WITH WIND BECAUSE
WITH THE ELECTRIC UTILITY

INDUSTRY FOR EXAMPLE, THERE ARE WAYS TO FIX PROBLEMS IF THEY ELECTROCUTE A BIRD, THERE ARE RETROFIT MEASURES THAT CAN BE PUT IN PLACE.
CERTAINLY FROM THE BEGINNING THEY CAN INSTALL BIRD FRIENDLY EQUIPMENT WHICH HELPS MINIMIZE AND AVOID THOSE KINDS OF TAKES.
BUT WITH WIND, AS WE ALL KNOW, ONCE THEY ARE INSTALLED, THERE'S NOT A LOT THAT CAN BE DONE.
IT IS SO IMPORTANT FOR COMPANIES TO DO WHAT THEY CAN UP FRONT.
THEIR OPTIONS ARE A LOT BROADER RANGING IF THEY WORK WITH THE SERVICE DURING THEIR CITING DETERMINATIONS, DURING THEIR DESIGN IMPLEMENTATION AND SO WE AND LAW ENFORCEMENT TRY TO BRING TO THEIR ATTENTION EVEN BEFORE THEY BUILD THAT WE UNDERSTAND YOU ARE LOOKING AT BUILDING THIS PROJECT AND YOU NEED TO GET AHOLD OF OUR BIOLOGIST.
WE TRY TO GET AHEAD OF THAT BECAUSE IT IS SO IMPORTANT IN TERMS OF WHAT IS AVAILABLE TO THEM FOR REMEDIATION WANTS TURBINES ARE UP AND SPINNING.
THERE'S JUST NOT A WHOLE LOT THAT CAN BE DONE.
WE DO HAVE A VERY IMPORTANT ROLE I THINK IN HELPING TO EDUCATE COMPANIES AND TO PUT THEM ON NOTICE ABOUT THE POTENTIAL LOSS THAT COULD BE IN FOLKS IF THEY BUILD AND THEY IMPACT SPECIES OF CONCERN OR MIGRATORY BIRDS WHICH ARE FEDERALLY PROTECTED.
SO WE REALLY WANT THEM TO DO WHAT THEY CAN UP FRONT AND AVOID TO THE EXTENT POSSIBLE.

SO EDUCATION HAS BECOME A LARGE PART OF WHAT WE DO IN THIS CONTEXT.
>>CHRISTY JOHNSON-HUGHES: EXCELLENT.
AND THANK YOU.
I THINK IT'S VERY IMPORTANT PEOPLE UNDERSTAND THAT BROADER ROLE.
JEFF, AGAIN AS A SERVICE BIOLOGIST IN THE FIELD, WHEN TAKE OCCURS, WHAT HAPPENS, WHAT IS YOUR EXPERIENCE WHEN SOMETHING HAPPENS AND THE COMPANY CALLS YOU, HOW DO YOU HANDLE THAT?
>> MOST OF THE TIME WHAT HAS HAPPENED IN MY EXPERIENCE IS A COMPANY, FOR LACK OF A BETTER ANALOGY WINDS UP THE U.S. FISH AND WILDLIFE SERVICE PHONE TREE.
I WILL GET A TELEPHONE CALL AND A SUPPLEMENTAL E-MAIL OFTEN WITH PICTURES OF THE EVENT AND AT THE SAME TIME, THE BIOLOGIST AT MY LEVEL RECEIVE THAT INFORMATION THEY ARE REACHING OUT TO THE LOCAL FIELD OFFICES AS WELL AS LAW ENFORCEMENT.
EVERYONE IS MADE AWARE OF WHAT HAS HAPPENED.
IF IT'S SOMETHING THAT NEEDS TO BE COLLECTED IT'S OUR FIELD OFFICE WERE ON FOR SMITH'S AT THE GOES OUT AND MAKES THE COLLECTION.
MOST OF THE COMPANIES I'VE HAD THE PLEASURE OF WORKING WITH HAVE BEEN FORTHRIGHT IN IMPLEMENTING EXACTLY WHAT JILL WAS DESCRIBING.
IT HELPS ALL OF US IN THAT CRITICAL COMPONENT OF THE TIERED APPROACH TO DOING ALL OF THIS WITH THAT POSITIVE FEEDBACK LOOP.
IF SOMETHING NEGATIVE MAY HAVE OCCURRED ON THE LANDSCAPE BUT

IT'S A TOOL FOR ALL OF US TO LEARN FROM, IDENTIFY A POTENTIAL SOURCE FOR DOING THINGS BETTER AND FEEDBACK INTO THAT ADAPTIVE MANAGEMENT LOOP AND MAKE BETTER DECISIONS ALL THE WAY THROUGH.
>>CHRISTY JOHNSON-HUGHES: AGAIN WE COME BACK TO COMMUNICATION, BUILDING THAT RELATIONSHIP AND WORKING TOGETHER THROUGH THESE ISSUES.
SO WHAT WE WOULD LIKE TO DO NOW IS TAKE A FEW QUESTIONS FROM OUR AUDIENCE.
I HAVE NOTICED A FEW QUESTIONS HAVE ROLLED IN.
ONE OF THE FIRST QUESTIONS IS IS THERE A LIST OF SPECIES OF HABITAT FRAGMENTATION CONCERNED AND WE DO NOT HAVE NECESSARILY A LIST WRITTEN DOWN AT THIS POINT IN TIME.
WE ARE WORKING WITH STATE AGENCIES AND THE ASSOCIATION OF FISH AND WILDLIFE AGENCIES TO DEVELOP CRITERIA FOR PUTTING DOWN THESE SPECIES.
WE FIGURED THAT MOST WILDLIFE SERVICES AND BIOLOGIST HAVE A LIST OF SPECIES THAT ARE PARTICULARLY AT RISK FOR HABITAT FRAGMENTATION BUT THE SPECIES ARE NOT NECESSARILY DOCUMENTED IN THAT WAY.
IN ORDER TO DO A TIER 4 ANALYSIS, YOU NEED TO HAVE THAT LIST OF HABITAT FRAGMENTATION CONCERNS.
WE WILL TALK ABOUT THIS ISSUE IN A FUTURE BROADCAST.
IT MAY WELL BE THE NEXT BROADCAST WHICH WE ARE ANTICIPATING WILL BE AROUND THE JANUARY /FEBRUARY TIMELINE

WHERE WE CAN TALK FURTHER ABOUT THE CRITERIA AND THE DEVELOPMENT OF THIS LIST OF SPECIES OF HABITAT FRAGMENTATION CONCERNS.
WHAT I WOULD LIKE TO DO NOW IS MOVE TO ANOTHER QUESTION.
OFTEN PRECONSTRUCTION SURVEYS ARE DIFFERENT THAN POST- CONSTRUCTION AND FOCUS MORE ON SERVING SPECIES PRESENT.
DO THESE SURVEYS NEED TO BE THE SAME?
I THINK I WILL THROW THIS ONE AT JEFF FIRST.
[CHUCKLING] AND I THINK YOU ARE CAPABLE OF HANDLING THIS QUESTION.
>> IN ORDER TO HAVE STATISTICALLY VIABLE DATA THAT CAN BE REALLY USED TO VALIDATE IN TIER 4 WHAT WE'VE DISCOVERED OR LEARNED IN THE FIRST COUPLE OF TIERS, THERE ARE SO SPECIFIC SEARCH PROTOCOLS, SOMETHING THAT MANUELA WAS SPEAKING ABOUT EARLIER THAT SHOULD BE USED TO PRODUCE DEFENSIBLE INFORMATION.
SO WHEN IT COMES -- IF THE PURPOSES ARE TO VALIDATE WHAT WE LEARNED IN THE EARLIER TIERS WITH LATER TIER SURVEY, TO HAVE THE SURVEYS DONE IN A WAY THAT IS DEFENSIBLE ACCORDING TO SPECIFIC PROTOCOL, WE CAN USE THAT TO VALIDATE A FATALITY MODELS, SOME OF THE SETTING RECOMMENDATIONS, SOME OF THE OPERATIONAL CONSIDERATIONS AND THAT SORT OF THING.
ALSO AS MANUELA WAS POINTING OUT EARLIER, IT SEPARATES THE INFORMATION WE LEARNED IN THOSE

STRUCTURED POST- CONSTRUCTION SURVEYS VERSUS WHAT WE FIND INCIDENTALLY WHICH IS VERY IMPORTANT TO SEPARATE ALL OF THAT OUT.
>>CHRISTY JOHNSON-HUGHES: ABSOLUTELY.
I THINK THAT IS VERY IMPORTANT.
AND AGAIN THERE CAN BE DIFFERENCES IN PRE- AND POST- CONSTRUCTION BUT IF YOU ARE THINKING ABOUT POST- CONSTRUCTION, EVEN DURING PRECONSTRUCTION, EARLIER TIERS, THEN YOU WILL MAKE YOUR ANALYSIS EVEN STRONGER.
SO I THINK THAT'S VERY HELPFUL.
THANK YOU.
CAN YOU STILL COMPLETE TIER 4 WITH SIMPLY DOING FATALITY ESTIMATES SURVEYS?
AND, YOU KNOW, JERRY, WHAT DO YOU THINK ABOUT THAT QUESTION?
CAN THEY JUST COMPLETE TIER 4 BY SIMPLY DOING FATALITY ESTIMATES SURVEYS?
>> A QUALIFIED YES.
I THINK AS JEFF HAS ALLUDED TO DEPENDING ON WHAT YOU'RE DEALING WITH FROM TIER 3, YOU HAVE TO LOOK AT WHAT YOUR PURPOSE IN THOSE FATALITY SURVEYS OR ANY OTHER SURVEY YOU ARE CONDUCTING OUT THERE AND THERE MAY BE A SITUATION WHERE YOU DON'T HAVE A LOT OF CONCERNS BUT WHAT YOU WANT TO DO IS GO IN AND VALIDATE WHAT YOUR EXPECTATIONS FROM TIER 3 WERE ON THE FATALITY LEVELS AND THAT MIGHT BE ADEQUATE FOR WHAT YOU ARE DEALING WITH.
THERE MAY BE OTHER PROJECTS IN THE VICINITY YOU CAN USE TO LOOK AT AND CAN REINFORCE THAT.

SO YES BUT A QUALIFIED YES.
>>CHRISTY JOHNSON-HUGHES: I
THINK THAT IS FAIR.
THANK YOU VERY MUCH.
JEFF DID YOU HAVE ANYTHING YOU
WANTED TO ADD TO THAT?
>> I THINK JERRY COVERED IT.
A QUALIFIED YES.
[CHUCKLING]
>>CHRISTY JOHNSON-HUGHES:
THAT'S ALL RIGHT.
NON-OF THIS IS BLACK AND WHITE.
THIS IS ALL A LEARNING CURVE.
WE ARE ALL FIGURING THIS OUT.
WE ARE DOING IT TOGETHER AND
ESPECIALLY WITH SOME OF THE
PRE- AND POST- CONSTRUCTION
SURVEY QUESTIONS.
>> I WOULD LIKE TO POINT OUT
THAT NO TWO PROJECTS ARE THE
SAME.
EVERY PROJECT IS BUILT IN A
DIFFERENT HABITAT.
EVERY PROJECT DECIDED BASED ON
THE UNIQUE CHARACTERISTICS OF
THE FACILITIES AND THE COMPANY IS
ABILITY TO IMPLEMENT AND AVOID
AND EACH PROJECT IS DIFFERENT
AND THEREFORE, IT GIVES US A
UNIQUE CHALLENGE AS FAR AS
RESPONSIBLE SITING AND
IMPLEMENTATION AND OPERATION
BUT AT THE SAME TIME UNIQUE
OPPORTUNITIES TO PRACTICE
AVOIDANCE AND MINIMIZATION AND
TO REALLY GET THINGS DONE RIGHT
OF THE LANDSCAPE FROM A
CONSERVATION STANDPOINT.
>>CHRISTY JOHNSON-HUGHES:
THANK YOU.
MOVING ONTO THE NEXT QUESTION,
WHAT LEGAL RESPONSIBILITIES DOES
ONE FACILITY HAVE TO REPORT
VIOLATIONS OF THE MIGRATORY BIRD
TREATY ACT ALSO KNOWN AS MBTA

AND JILL, WOULD YOU LIKE TO TRY THAT ONE FIRST?
>> AS MOST PEOPLE KNOW BY NOW, ANY DEATH OF A MIGRATORY BIRD THAT IS CAUSED BY SOMETHING OR SOMEBODY IS TECHNICALLY A VIOLATION OF THE MIGRATORY BIRD TREATY ACT BECAUSE IT DOES STICK -- TRICK BOBBITT SAID OF THE BIRD DIES AND YOU CAUSE IT, YOU ARE GUILTY.
WE DON'T TREAT EVERY BIRD DEATH AS A VIOLATION.
THERE ACTUALLY IS NO BROAD REQUIREMENT THAT SOMEBODY REPORT AND IN THIS CASE WHEN THE FACILITIES REPORT BIRD DEATHS TO THE FISH AND WILDLIFE SERVICE.
HOWEVER,, DEPENDING ON WHAT STATE YOU'RE IN THERE'S USUALLY SOME SORT OF EITHER LOCAL, STATE OR FEDERAL PERMIT ASSOCIATED WITH THAT WIND FACILITY AND THEY MAY VERY WELL HAVE REPORTING REQUIREMENTS.
BUT YOU KNOW, AGAIN THERE'S NOT A REQUIREMENT TO REPORT SOMETIMES.
THE COMPANY HAS FOR EXAMPLE, A. FEDERAL PERMIT AND THERE ARE SOME REPORTING REQUIREMENTS UNDER THAT BUT THAT HAS MORE TO DO WITH THE BIRDS THEY'VE PICKED UP TO CONDUCT THEIR STUDIES OR WHATEVER.
IT IS USEFUL TO KEEP TRACK OF THAT AND HAVE THAT INFORMATION ON HAND FOR THE COMPANY'S OWN PURPOSES, BUT ALSO AGAIN IT GOES TO THE BIG PICTURE OF HOW THE COMPANY IS EXERCISING THEIR DUE DILIGENCE AND IF THEY ARE DOING -- MAKING THE RIGHT KIND OF DECISIONS ABOUT SITING IN THE BEGINNING AND CONSULTING WITH

THE SERVICE AND IMPLEMENTING
THE RIGHT KIND OF SURVEYS AND
MONITORING AND MOST IMPORTANT
LINK FROM OUR PERSPECTIVE
ADAPTIVE MANAGEMENT WHEN THEY
IDENTIFY A PROBLEM IT'S NOT JUST
ABOUT COUNTING UP BIRD BODIES
ARE REPORTING INCIDENTS, IT'S
ABOUT DOING SOMETHING TO FIX THE
PROBLEM.
THAT'S ULTIMATELY WHAT IT COMES
DOWN TO FROM A LAW
ENFORCEMENT STANDPOINT.
WHAT IS REASONABLE FOR A
COMPANY TO DO TO AVOID TAKE AND
THEN WHEN PROBLEMS ARE
IDENTIFIED, TO FIX THAT TAKE.
SO AGAIN REPORTING IS NOT
ABSOLUTELY REQUIRED BUT
CERTAINLY ENCOURAGED.
>>CHRISTY JOHNSON-HUGHES:
ABSOLUTELY.
AND SPECIAL PURPOSE UTILITY WHAT
DOES THAT MEAN?
>> THAT'S FOR INDUSTRY AND
THERE'S ONE AVAILABLE FOR WIND
AS WAS THE OTHER INDUSTRIES AND
SPECIFIC FOR THE TYPE OF
INDUSTRY THEY COVER.
>>CHRISTY JOHNSON-HUGHES:
GREAT.
THANK YOU.
JERRY DID YOU HAVE ANYTHING YOU
WANTED TO ADD?
>> CHILL BROUGHT UP THE GOOD
POINT OF THE PERMIT FOR HANDLING
NOT REALLY A WAY TO REPORT OR
DOCUMENT FATALITIES SO I THINK
THAT IS A GOOD POINT AND THERE IS
ONE VENUE, THERE ARE PLACES WE
ARE STARTING TO SEE THIS
INFORMATION COMPILED AND THAT'S
ONE OF THE THINGS WITH THEIR
RESEARCH INFORMATION SYSTEM IS
WE TALK ABOUT ADAPTIVE

MANAGEMENT BUT IF WE DON'T GET THE DATA TO LOOK AT THE SITUATION THAT'S WHERE SOME SITUATIONS OF OPPORTUNITIES LIKE THAT WHERE VON INTERIOR REPORTING HAVE BEEN USED TO HELP THE INDUSTRY IN GENERAL.
>>CHRISTY JOHNSON-HUGHES: FISH AND WILDLIFE SERVICE IS TRYING TO PUT TOGETHER A MORE ROBUST DATABASE SO THAT WE CAN USE THAT INFORMATION OR AT LEAST PUT IT INTO CONTEXT SO WE KNOW WHETHER IT CAN BE USED FOR FATALITY ESTIMATES OR A GENERAL SENSE OF WHAT MIGHT BE GOING ON. THAT'S SOMETHING WE ARE WORKING ON.
AMERICAN WIND WILDLIFE INSTITUTE, WE KNOW PEOPLE ARE READING THESE VERY QUICKLY AND WHERE DO YOU SEE THESE ACRONYMS.
SO HERE IS A QUESTION THAT WE HAVE SEEN BEFORE, OIL AND GAS HAS BEEN HELD ACCOUNTABLE FOR VIOLATIONS UNDER THE MIGRATORY BIRD TREATY ACT WENT WILL WIN THE FACILITIES TO HELP TO THE SAME STANDARD?
I WILL GO BACK TO JOE FOR THIS QUESTION.
>> I'VE HEARD THAT QUESTION BEFORE.
LAW ENFORCEMENT HAS VIRTUALLY THE SAME APPROACH WITH ALL INDUSTRY AND THAT IS -- THIS IS SOMETHING WE'VE DONE FOR YEARS AND IT'S BEEN PUT INTO OFFICIAL LAW ENFORCEMENT POLICY, WE PROVIDE NOTICE TO A COMPANY WHEN A PROBLEM IS IDENTIFIED OR A PROBLEM IS ANTICIPATED WE PUT THE COMPANY A NOTICE AND LET THEM KNOW WHAT LAWS ARE IMPLICATED AND WE ENCOURAGE

COMPLIANCE IN THAT NOTICE AND
THEN WE PROVIDE THEM AN
OPPORTUNITY TO CORRECT THE
PROBLEM.
AGAIN IN SOME INDUSTRIES LIKE OIL
AND GAS, IT'S EASIER TO DO.
SO WE HAVE A PATTERN OF DEALING
WITH OIL AND GAS WHERE WE LET
THEM KNOW THERE'S A PROBLEM.
FOR EXAMPLE, A. OPEN PITS THAT
NEED TO BE NETTED AND WE
PROVIDE THEM NOTICE AND GIVE
THEM TIME TO FIX THE PROBLEM
BEFORE WE GO OUT AND TAKE
ENFORCEMENT ACTION.
THAT IS OUR APPROACH WITH
INDUSTRY IN GENERAL.
AGAIN GETTING BACK TO WIND, THE
DIFFICULTY IS THERE ARE LIMITED
OPPORTUNITIES TO CORRECT.
COMPANIES DON'T LIKE THE ONES
THAT ARE REALLY ON THE TABLE
WHICH IS CURTAILMENT, SHUT DOWN
OR MOVING THE TURBINES.
SO AGAIN, GETTING BACK TO THE
WHOLE IMPORTANCE OF PICKING THE
RIGHT SITE AND PUTTING THE RIGHT
DESIGN TO A WIND FACILITY IS SO
IMPORTANT AND CONSULTING WITH
THE SERVICE EARLY ON IS SO
IMPORTANT BECAUSE WHEN WE GET
TO THE POINT WHERE LAW
ENFORCEMENT GETS INVOLVED WITH
WIND TAKE, -- TAKE A PROTECTED
SPECIES, IT'S A LOT MORE DIFFICULT
FOR THEM AND A LOT MORE
EXPENSIVE QUITE FRANKLY BUT WE
ARE ACTIVELY INVESTIGATING SOME
WIND FARMS OUT THERE AND WE ARE
VERY NEAR HAVING OUR FIRST CASE
CHARGED.
SO IT'S NOT THAT WE ARE TREATING
THEM DIFFERENTLY IT'S JUST A LOT
MORE DIFFICULT.
THE ADMINISTRATIVE RECORD TAKES

A LONG TIME TO PUT TOGETHER FOR US TO DECIDE WHICH COMPANIES NEED TO BE CRIMINALLY PROSECUTED.
WE WANT TO MAKE SURE WE'VE GOT THE WHOLE COMPLETE PICTURE AND THAT IS TIME-CONSUMING AND TAKEN A WHILE, BUT WE ARE ALMOST THERE.
>>CHRISTY JOHNSON-HUGHES: IT'S NOT A VERY STRAIGHTFORWARD THING LIKE YOU SAID.
THEY'RE VERY US CONSIDERATIONS THAT COME INTO PLAY AND THAT INCLUDES THE RELATIONSHIP WITH THE COMPANY AND WHAT THE CIRCUMSTANCES ARE.
BUT I THINK THE REAL TAKE AWAY HERE IS WE ARE NOT TREATING WIND ANY DIFFERENTLY THEN ANY OTHER INDUSTRY IT'S JUST WE HAVE A LONGER HISTORY WITH OIL AND GAS AND WIND IS RELATIVELY NEW AT THIS SCALE AND WE ARE STILL LEARNING WHAT HAPPENS WITH WIND.
SO IT IS JUST WHERE WE ARE ON THE LANDSCAPE.
ALL RIGHT, TAKING ANOTHER QUESTION, DO THE POST- CONSTRUCTION AND RECOMMENDATION IN COULD RISK ASSESSMENT OF ANY NEW ELECTRIC TRANSMISSION LINES THAT MAYBE PART OF THE WIND PROJECT?
JEFF, I WOULD LIKE TO THROW THIS QUESTION OVER TO YOU.
HOW DO YOU VIEW THIS?
>> OVERWHELMINGLY, YES.
VERY FEW NEW WIND FACILITIES ARE LOCATED IMMEDIATELY ADJACENT TO A SUBSTATION OR TRANSMISSION LINE THEY COULD TIE INTO SOME MOST PROJECTS WE ARE INVOLVED IN REVIEWING AT THE MOMENT TO

HAVE SOME CRITICAL
INFRASTRUCTURE TRANSMISSION
LINES AND TO SOME EXTENT
DISTRIBUTION LINES ASSOCIATED
WITH THEM.
IN SOME CASES THEY ALSO INVOLVE
A SUBSTATION AS WELL.
TYING BACK TO WHAT WE WERE
DISCUSSING EARLIER THERE ARE
DIRECT AND INDIRECT HABITAT
ASSESSMENTS OR HABITAT IMPACTS
FROM THOSE NEW FEATURES ON THE
LANDSCAPE.
AS FAR AS THE RISK ASSESSMENT
GOES, THE FISH IN MY LIFE SERVICE
DOES RECOMMEND THAT NEW
TRANSMISSION LINES ASSOCIATED
WITH THE NEW PROJECT ARE
IMPLEMENTED WITH THE LATEST AND
GREATEST RECOMMENDATIONS
FROM THE COMMITTEE.
JERRY I MIGHT ASK YOU TO
ELABORATE ON THAT A LITTLE BIT
BUT BEFORE WE GO THERE, IN MANY
CASES, NEW PROJECTS ARE
DEVELOPED WITH FEDERAL LAND
NEXUS AND THAT TRIGGERS A
VARIETY OF IMPACT ASSESSMENTS.
THINGS LIKE IF YOU ARE BUILDING A
NEW PROJECT ON BML GROUNDED
THERE'S A TRANSMISSION LINE
RUNNING THROUGH THAT THEY
CONSULT WITH THE SERVICE ON THE
TRANSMISSION LINE AND
EVERYTHING ASSOCIATED WITH IT.
>>CHRISTY JOHNSON-HUGHES:
OKAY.
THANK YOU AND JERRY, SINCE THIS
WAS THROWN A LITTLE BIT IN YOUR
CORNER, DO YOU HAVE ANYTHING
YOU'D LIKE TO ADD?
>> THE COMMITTEE HAS A LONG
HISTORY OF DEALING WITH THE
DISTRIBUTION LINES AND THE
POTENTIAL ELECTROCUTION AND THE

TRANSMISSION LINES THEY HAVE DOCUMENTED GUIDANCE PROVIDED ON COLLISION FACTORS.
SO THERE IS SOME VALUABLE RESOURCES THERE THAT COULD BE GAINED FROM THIS INFORMATION.
>>CHRISTY JOHNSON-HUGHES: THANK YOU.
THIS LOOKS LIKE ANOTHER ONE FOR YOU JILL.
ASIDE FOR CRIMINAL PROSECUTION AND RESTITUTION ARE THERE ALTERNATIVE MECHANISMS IN PLACE SUCH AS UPFRONT MITIGATION AND THEN ACTUAL BIRD MORTALITY?
SO I SENT THIS OVER TO YOU JILL BUT CRIMINAL PROSECUTION ALTERNATIVE MECHANISMS AND THAT'S WHEN WE START GETTING INTO MITIGATION AND I ALMOST FEEL LIKE THOSE ARE TWO DIFFERENT SIDES OF THE ISSUE.
I WILL THROW THIS TO YOU, BUT THEN MAYBE GOING OVER TO JEFF AS WELL.
>> SURE.
WHAT I WOULD SAY TO ANY COMPANY THAT'S ASKING A QUESTION ABOUT WHAT CAN THEY DO TO LESSEN THEIR LIABILITY AT WHATEVER POINT THEY ARE IN THEIR DEVELOPMENT OR OPERATION, WAITING FOR CRIMINAL PROSECUTION TO HAPPEN IS NOT GOING TO BE YOUR BEST ACTION.
IF YOU KNOW YOU HAVE A PROBLEM, THE BEST THING TO DO IS COME INTO THE SERVICE AND IDENTIFY THE PROBLEM, TRY TO WORK WITH THE SERVICE TO RESOLVE THE END DOWN THE ROAD FOR WIND, THAT POINT WILL BE MORE PAINFUL THAN IT WOULD BE UPFRONT BUT IT'S BETTER TO ADDRESS THE PROBLEM AND TRY TO RESOLVE IT THAN TO WAIT FOR CRIMINAL PROSECUTION BECAUSE

WITH PROSECUTION THERE ARE FINES, RESTITUTION, POTENTIAL JAIL TIME DEPENDING ON THE CIRCUMSTANCES BUT WHAT WE ARE ALL AFTER HERE IS FIXING THE PROBLEM.
AVOIDING IT IDEALLY BUT FIXING IT ONCE IT'S BEEN IDENTIFIED SO THE COMPANY GETS IN FRONT OF THAT AND DOES EVERYTHING THEY CAN TO FIX THE PROBLEM, THEY MAY AVOID CRIMINAL PROSECUTION.
SO I WOULD ENCOURAGE ANY COMPANY THAT HAS A PROBLEM, KNOWS IT AND IS NOT SURE WHAT TO DO THE BEST THING THEY CAN DO IS BRING IT FORWARD AND ADDRESS IT. FIX THE PROBLEM.
>>CHRISTY JOHNSON-HUGHES: THAT'S A GREAT PERSPECTIVE THEN I WANT TO TAKE YOUR THOUGHT FURTHER AND SAY THIS IS ALSO PART OF THAT ADAPTIVE MANAGEMENT. BUT ALSO IDENTIFYING SOME OF THOSE OPPORTUNITIES BEFORE YOU EVEN GET THERE.
SOME OF THOSE MITIGATION OPPORTUNITIES SO THAT AGAIN WE ALL KNOW WHAT SOME OF OUR ACTIONS MIGHT BE IF AN UNEXPECTED EVENTS HAPPENS.
SO JEFF, WHEN THEY TALK ABOUT UPFRONT MITIGATION FOR MODEL THAN ACTUAL BIRD MORTALITY IS, YOU'VE PUT TOGETHER SOME PLANS THAT INCLUDED THIS.
CAN YOU DESCRIBE FOR US SOME OF THESE UPFRONT MITIGATION OPPORTUNITIES?
>> SURE.
IN KIND OF A NUTSHELL, ONCE YOU HAVE A CONCEPT WORKING THROUGH THE FIRST COUPLE TIERS OF THE IMPACT YOUR PROJECT IS LIKELY TO HAVE NOT DEFINITIVELY

WILL HAVE BUT REASONABLY FORESEEABLE IMPACT YOU CAN BEGIN TO ADVANCE MITIGATION TO OFFSET THOSE IMPACTS BEFORE THE PROJECT IS EVEN ON THE LANDSCAPE.
AND THEREFORE, WE PASS A LITTLE BIT -- WE HAVE AN EASIER TIME PASSING BEEN NO NET LOSS CONCEPT WHERE THE EFFECTS OF A PROJECT TEND TO BE PRETTY IMMEDIATE ON THE LANDSCAPE AND RELATIVELY LONG-TERM AND IT'S NICE TO SEE MITIGATION PACKAGES PUT FORTH ON THE LANDSCAPE THAT ARE EQUALLY RESILIENT AND LONG-LASTING ON THE LANDSCAPE AND COMPARABLE TO WHAT WE THINK THE IMPACTS MIGHT BE.
WE GET INTO A LOT MORE DETAIL WITH THIS WHEN WE DISCUSSED EAGLE PERMITTING AND EAGLE LOSS AND EAGLE TAKE UNDER THE BALD EAGLE PROTECTION ACT AND IT'S A SUBJECT OF ADDITIONAL FUTURE WIND ENERGY BROADCASTS I HOPE.
BUT WHEN IT COMES TO THINGS LIKE DIRECT HABITAT LOSS, OR EVEN QUANTIFYING INDIRECT HABITAT LOSS, THERE'S A VARIETY OF TOOLS AVAILABLE TO HELP DO THAT WHICH INFORMED THAT MITIGATION PROPOSAL THAT IDEALLY WOULD BE IN PLACE BEFORE THE IMPACT OF THE PROPOSED PROJECT TAKE PLACE.
>> IF I COULD ADD TO THAT, JEFF MAKES A GREAT POINT ABOUT THE BENEFIT THAT WE CAN GET UPFRONT AND THE MORE THAT'S DONE TO OFFSET IMPACT, THE BETTER.
I DO HAVE TO POINT OUT THAT UNLESS AND UNTIL SUCH TIME AS WE HAVE MIGRATORY BIRD TREATY ACT TAKE PERMITS THERE'S NOT AN

OFFICIAL ACT LIKE THERE IS UNDER THE EAGLE TAKE ACT SO WE ENCOURAGE COMPANIES TO OFFSET A MINIMIZE THEIR TAKE OF MIGRATORY BIRDS BUT THERE IS NO OFFICIAL MITIGATION PROCESS UNDER MBTA LIKE THERE IS UNDER THE EAGLE PROTECTION ACT.
>>CHRISTY JOHNSON-HUGHES: I'D LIKE TO MOVE ONTO ANOTHER QUESTION.
THE FISH ON WHAT LIFE SERVICE HAS TALKED ABOUT DEVELOPING INCIDENTAL TAKE REGULATIONS FOR THE MIGRATORY BIRD TREATY ACT FOR YEARS.
ANY PROGRESS OR PLANS TO DO THIS?
WE DO NOT HAVE A REPRESENTATIVE FROM THE PROGRAM HERE WITH US TODAY AND THEY WOULD BE THE PROGRAM IN THE FISH AND WILDLIFE SERVICE THAT WOULD HANDLE A TAKE PERMITS UNDER THE MIGRATORY BIRD TREATY ACT WHAT I DO UNDERSTAND IS THIS IDEA HAS BEEN FLOATED IN FISH AND WILDLIFE SERVICE AND IT HAS BEEN DISCUSSED BUT NO DECISIONS HAVE BEEN MADE AT THIS POINT IN TIME SO WE DON'T HAVE ANY FURTHER INFORMATION TO GIVE YOU ON THAT.
ALL RIGHT SO YOU KNOW JERRY, I THINK THIS NEXT QUESTION WOULD BE GOOD FOR YOU, IS MOVING WIND TURBINES CONSIDERED FEASIBLE?
>> I'VE NOT SEEN A JOHN DEERE YOU COULD HOOK UP TO TURBINES THAT COULD MOVE IT.
THAT WAS SORT OF A JUST.
BUT THAT ASIDE, IT'S FEASIBLE, BUT IT COMES DOWN TO THE PARTICULAR CIRCUMSTANCES AND SITUATIONS.
I THINK JILL ALLUDED TO THERE IS A SERIES OF FACTORS ONE COULD

UTILIZE ASSOCIATE WITH A
PARTICULAR TURBINE AND IF THERE
IS A REASON IT HAS AN ISSUE,
LOOKING AT WHAT WE CALL A
ADAPTIVE MANAGEMENT OR ROOT
CAUSE ANALYSIS, WHAT FACTORS
ARE GOING ON AT THAT PARTICULAR
TURBINE THAT IS CREATING AN ISSUE.
WE BUILD THEM.
YOU CAN DEFINITELY DECOMMISSION
A TURBINE THAT IS A VERY
REALISTIC?
I WOULD THINK THERE'S A WHOLE
SERIES OF OTHER OPTIONS ONE
COULD CONSIDER FIRST.
>>CHRISTY JOHNSON-HUGHES: I
THINK YOU ARE RIGHT.
USUALLY MOVING A TURBINE IS NOT
WHAT WE ARE LOOKING AT.
MOVING IT IT MAY JUST BE HAVING IT
NON-OPERATIONAL.
OR ALTERING IT SO THAT -- AND THAT
IS PART OF CURTAILMENT AS USED IN
THE WIND ENERGY GUIDELINES
BECAUSE THAT TERM HAS BEEN
DEFINED MULTIPLE WAYS BUT,
CHANGING THE SPEED AT WHICH THE
BLADES BEGIN TO SPIN OR HAVING IT
IN BREAK MODE OR SLOWING DOWN
THE SPIN SO IT IS JUST
FREEWHEELING DURING MIGRATION
EVENTS.
THOSE ARE OPERATIONAL
MODIFICATIONS THAT CAN BE MADE
TO REDUCE THE IMPACT AND LIKE
YOU SAID, ALL OF THOSE WOULD
PROBABLY BE CONSIDERED WHILE
BEFORE DECOMMISSIONING OF THE
ACTUAL TURBINE.
>> ANOTHER THING WITH THE
INDUSTRY OF THE RESEARCH GOING
ON WITH BCI, AWWI AND OTHERS
DETERRENTS ARE BEING LOOKED AT
AND A WHOLE SERIES OF THINGS
THAT ARE BEING EXAMINED THAT

MIGHT BE IN THE FUTURE THAT
WOULD ALLOW FOR ENHANCING THAT
OPERATION SO I THINK THAT
RELOCATION OR MOVING IS VERY
LOW ON THE TOTEM POLE.
>> AT THE BOTTOM OF YOUR LIST
OF PREFERRED WAYS TO DEAL WITH
IT BUT IF THE PROBLEM WERE
SIGNIFICANT ENOUGH AND THE
COMPANY SHOULD KNOW BETTER
THAN TO PUT THE TURBINE THERE
AND WHATEVER THE TAKE ISSUE IS
TO TAKE IT DOWN THEN THAT MAYBE
THE ONLY SOLUTION AND IF WE
COULD NOT COME TO THAT
AGREEMENT WITH A COMPANY IN THE
WORST CASE SCENARIO A JUDGE
COULD VERY WELL ORDER THAT.
IT WOULD BE THE EXTREME
MEASURE, BUT IT COULD HAPPEN.
>>CHRISTY JOHNSON-HUGHES:
THAT'S A GOOD POINT JAIL AND
THERE MAY BE SITUATIONS THERE
THAT ARE EXTREME HOPEFULLY WE
AVOID THEM AND THAT'S THE WHOLE
POINT OF THE GUIDELINE IS WE DO
NOT GET TO THAT POINT WHERE THE
CIRCUMSTANCES ARE THAT
EXTREME.
SO LET'S MOVE ON TO ANOTHER
QUESTION, WHETHER RELATED MASS
TURBINE FATALITIES CAN BE
MITIGATED BY CURTAILMENT NOT
DAYS OR MONTHS BUT A MATTER OF
HOURS.
SHOULD WE THEN CONDUCT TIER
FIVE RESEARCH TO STUDY THE
WEATHER WIND TURBINE MASS
FATALITY INTERACTION.
AND ABSOLUTELY.
FROM WHAT I UNDERSTAND THEIR
EFFORTS TO LOOK AT WHETHER A
FENCE AND HOW THEY CAN
INFLUENCE THE MOVEMENT OF
SPECIES THROUGH THE AIR AND WE

HAVE SEEN CORRELATIONS WITH VARIOUS WEATHER ELEMENTS, BUT WE ARE STILL REFINING THAT INFORMATION FROM WHAT I UNDERSTAND.
SO IT'S NOT THAT IT'S NOT BEING DONE.
WE ARE STILL LEARNING ABOUT IT AND THERE ARE SO MANY ELEMENTS TO BE TAKEN INTO CONSIDERATION BUT JERRY HAS IBERDROLA LOOKED AT WHETHER AND FATALITIES IN WIND TURBINE INTERACTION?
>> WE ARE LOOKING AT FOR EXAMPLE, VISIBILITY HAS SHOWN TO BE A MAJOR CONCERN AND USING VISIBILITY IS AN OPERATING PARAMETER AND THEN WHEN YOU LOOK AT AGAIN BACK CONSERVATION INTERNATIONAL AND SOME THINGS WITH USGS, THERE'S A SIGNIFICANT AMOUNT OF RESEARCH GOING ON TRYING TO LOOK AT THIS AS A PREDICTIVE ASPECT AND HOW IT CAN FACILITATE OR OPTIMIZE OPERATIONS WHILE REDUCING THE POTENTIAL FATALITIES.
SO A LOT OF THINGS HAPPENING IN THAT REGARD.
>>CHRISTY JOHNSON-HUGHES: EXCELLENT.
THANK YOU.
JEFF DID YOU HAVE ANYTHING TO ADD TO THAT?
>> THERE IS A REALLY GOOD EXAMPLE OF AN OPPORTUNITY FOR THE COMMUNICATION TO WORK BACK AND FORTH BETWEEN THE PROJECT DIRECTORS AND FISH THEM WHILE LIFE SERVICE.
IN MANY CASES THEY WILL DEVELOP SEVERAL YEARS OF PRE- AND PROJECT WEATHER DATA THROUGH THE TOWERS AND THAT DATA SET CAN BE VERY VALUABLE IN TERMS OF

PREDICTING THINGS LIKE WEATHER EVENTS THAT MAY IMPACT MIGRATION ROUTES OR SOMETHING LIKE THAT.
IDEALLY, A LOT OF THIS INFORMATION ARE THE KINDS OF THINGS WE GATHER IN TIER 1 AND TIER TWO AND TIER 3 AS WELL.
A LOT OF THE MIGRATING CORRIDORS USING MIGRATION AS AN EXAMPLE WHEN COMBINED WITH THE WEATHER IS SENT CAN PRESCRIBE MITIGATION IN TERMS OF HOURS VERY SPECIFIC TIMELINES ARE CIRCUMSTANCES RATHER THAN DAYS OR SOMETHING LIKE THAT.
A LOT OF THE WHETHER OFFENSE THAT ARE USED BY THE SPECIES THAT ARE MIGRATING ARE ALSO OVERLAPPED WITH GEOGRAPHIC FEATURES WHETHER IT'S BAT MIGRATING DOWN WHEREVER CORRIDORS OR EAGLES OR RAPTORS MIGRATING DURING THE DAY DOWN CLIFF EDGES WHERE THEY TAKE A BANDAGE OF THE THERMALS AND THAT KIND OF THING SO TYPICALLY A LOT OF INFORMATION AVAILABLE TO HELP US MAKE THE INFORMED DECISIONS ON THE FRONT-END THAT CAN BE USED TO TAILOR AND CRAFT MITIGATION OR THINGS LIKE CURTAILMENT TO VERY SPECIFIC EVENTS THAT ARE NOT AS EXTREME AS A MONTHLONG SHUTDOWN OR SOMETHING LIKE THAT.
>>CHRISTY JOHNSON-HUGHES: OKAY.
I THINK YOU ARE RIGHT.
WE ARE MOVING IN THE DIRECTION OF HAVING MORE KNOWLEDGE THAT WE CAN APPLY AND APPLY IT VERY SPECIFICALLY.
AND MORE ACCURATELY.
AND I THINK THAT IS TERRIFIC.

AGAIN, IT LEADS BACK TO THE UTILITY OF THE TIER FIVE RESEARCH PROJECT WHICH WE DON'T HAVE TIME TO GET INTO BUT THAT INFORMATION HAS FED IN AS WELL TO THE SPECIFIC INFORMATION ABOUT A SPECIFIC PROJECT IN A VERY PARTICULAR LOCATION.
SO THANK YOU VERY MUCH.
WE HAVE ONE LAST QUESTION, I'M NOT SURE IF WE CAN ANSWER QUICKLY BUT LET'S GIVE IT A SHOT.
HAVE SOME STUDY SHOWED THAT MIGRATORY FLIGHTS ARE LESS LIKELY TO TAKE PLACE DURING BAD WEATHER, FALLING BAROMETRIC PRESSURE.
QUICKLY, JEFF AND JERRY, DO YOU HAVE ANY?
>> I THINK WE MIGHT BEST ANSWER THAT AFTER IN A WRITTEN FORM.
I'M NOT SURE WHAT THE RIGHT ANSWER WOULD BE FOR THAT.
>>CHRISTY JOHNSON-HUGHES: IT COULD WELL BE PART OF ANOTHER WIND ENERGY BROADCAST THAT INCLUDES THE LATEST ON RESEARCH.
SO, WITH THAT WHAT I WOULD LIKE TO DO IS ASK OUR GROUP AND THE LAST OBSERVATIONS OR RECOMMENDATIONS THAT THEY WOULD LIKE TO SHARE AND I WOULD LIKE TO START WITH YOU JEFF.
YOU HAVE ANYTHING YOU'D LIKE TO SHARE?
>> I WILL STEAL EVERYBODY'S THUNDER WHEN I RECOMMEND WE ALL CONTINUE TO COMMUNICATE EARLY AND OFTEN.
>>CHRISTY JOHNSON-HUGHES: THAT IS A POPULAR TERM.
>> IT WORKS.
>>CHRISTY JOHNSON-HUGHES: JERRY, HOW ABOUT YOURSELF?

>> DOCUMENT AND DEMONSTRATE.
BUT, THE ONE THING I WOULD THROW OUT IS THE LONG-TERM ASPECT WE REALLY DO NEED TO LOOK AT ONE ASPECT WIND ENERGY GUIDELINES DOES NOT COVER IS THE LONGER-TERM MONITORING AND ASSESSING WHAT THE EFFECTS MIGHT BE AN LOOKING AT THE OPPORTUNITIES TO DO INCIDENTAL OR SYSTEMATIC OBSERVATIONS WITH UTILIZING OPERATIONS PERSONNEL.
>>CHRISTY JOHNSON-HUGHES: ALL RIGHT.
THAT IS FAIR.
WORDS TO TALK ABOUT.
AND JILL, YOUR FINAL THOUGHTS.
>> I WOULD SAY FROM OUR PERSPECTIVE IS VERY IMPORTANT COMPANIES NOT ONLY HAVE THE COMMUNICATION AND SHARE INFORMATION, BUT THEY ACTUALLY IMPLEMENT THE SERVICES RECOMMENDATIONS.
THAT'S WHAT WE LOOK FOR WHEN WE LOOK AT THE ADMINISTRATIVE RECORD IF THEY'VE DONE EVERYTHING THEY SHOULD HAVE TO AVOID TAKE THAN THE LIKELIHOOD THEY WILL FACE A LAW ENFORCEMENT INVESTIGATION AND POTENTIAL PROSECUTION IS VERY LOW.
AND THE LAST THING I WOULD ADD IS IF THERE ARE PERMITS AVAILABLE, THEY SHOULD APPLY.
COMPANY SHOULD APPLY FOR THEM.
I WILL THROW THIS OUT FOR THOSE IN EAGLE COUNTRY, DON'T WAIT UNTIL YOU KILL AN EAGLE.
START WITH YOUR EGO CONSERVATION PLAN SOONER RATHER THAN LATER AND APPLY FOR AN EAGLE TAKE PERMIT.
THEY ARE AVAILABLE AND IF YOU

DON'T APPLY THAT'S AN AWFUL LOT -- AND UNLAWFUL TAKE THAT WILL BE TAKEN SERIOUS.
>>CHRISTY JOHNSON-HUGHES: WE WILL TALK MORE ABOUT THAT.
THANK YOU AGAIN FOR JOINING US TODAY WITH OUR THIRD WIND ENERGY BROADCAST.
LIKE I SAID, WE HOPE TO HAVE ANOTHER WIND ENERGY BROADCAST IN JANUARY OR FEBRUARY.
YOU WILL BE NOTIFIED OF THE DATE.
OF COURSE, THIS WILL BE ARCHIVED ON OUR WEBSITE ALONG WITH ALL OF THE RESOURCES THAT WE MENTIONED DURING THIS BROADCAST AN ADDITIONAL BASIC LEARNING POINTS.
THANK YOU FOR JOINING US TODAY.