# ATTACHMENT 4-1. Criteria for Strength of Evidence in LAA Determination

The discussion below outlines the criteria that were used for making an automated NLAA/LAA and assessing strength in the evidence (strongest, moderate or weakest). Individual species may have been reviewed by an assessor, which could lead to a change in the NLAA/LAA determination or the strength of evidence characterization (if LAA). Additional details are provided below.

1. Effects Determinations

LAA – If at least 1 individual under the maximum PCT/upper acres distribution scenario is predicted to be impacted, a preliminary LAA determination is generated.

NLAA – If less than 1 individual is predicted to be impacted under the maximum PCT/upper acres distribution scenario, an NLAA call is generated. The exception to this is any species with a population of 100 or less individuals – this generates a “Low population NLAA – needs review” flag (discussed further below).

1. Weight of Evidence (WoE) factors that determine overall strength in evidence of LAA determination

The strength of evidence in the effects determination is based on multiple factors or lines of evidence as outlined in **Table 1** below. The confidence in each line of evidence is assessed to determine its weight or influence in the overall strength of the LAA call, as outlined in the table below.

**Table 1. Lines of Evidence used to determine the strength of evidence of LAA call.**

| **Factor impacting WoE call 🡪****Confidence in that factor↓** | **1. Impacts to Mortality/****Sublethal/****Indirect (PPHD)** | **2. Impact of PCT/Acres Distribution** | **3. Impact of alternative assumptions for population, rates and toxicity data** | **4. Range Data Quality** | **5. Species Surrogacy** | **6. Usage Data Reliability** | **7. Incidents Reported** | **8.Habitat and Exposure model** | **9. Drift contribution to impact** | **10. Monitoring data** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Increased**  | If impacts are due to direct (mortality or sublethal) and indirect (PPHD) effects. | If impacts to either direct or indirect (PPHD) effects are still predicted in the average PCT, uniform acres distribution scenario. | If impacts to either direct or indirect (PPHD) effects are predicted in the alternative maximum PCT, upper acres distribution scenario. | If range data characterized as Green (i.e., review of Services documents indicate species range matches description). | Not used. | If CONUS Ag uses are in the top 3 drivers of risks to individuals. | Incidents are reported for either the direct or indirect (PPHD) taxa of concern.  | Not used. | Not used. | If concentrations from monitoring data within the species ranges exceeds toxicity endpoints. |
| **Decreased**  | If impacts are due only to direct or indirect (PPHD) effects. | If impacts to either direct or indirect (PPHD) effects are not predicted in the average PCT, uniform acres distribution scenario. | If impacts are not predicted to either direct or indirect (PPHD) effects in the alternative maximum PCT, upper acres distribution scenario. | If range data characterized as Yellow (i.e., review of Services documents indicate species range differs from the description). | If taxa is reptile or terrestrial amphibian and bird data used.  | If species range is in the NL48 or a Non-Ag use is the primary use associated with risks to individuals. | Not used.  | If habitat was identified as a mismatch to exposure models . | If 100% of impact is from drift, due to uncertainty in the magnitude and extent of drift in varied environments. | Not used. |
| **No impact on Confidence** | Not used | Not used | Not used | If range data not evaluated.  | All other taxa. | Those not meeting above criteria. | No incidents are reported. | If habitat was not identified as a mismatch to exposure models. | If drift only partially or does not contribute to impact. | If no monitoring data available or values are less than toxicity endpoints.  |

An automated explanation is provided in the output summary sheet based on which criteria above (increased, decreased or no impact on confidence) is assigned, as listed below in **Table 2**. This is the language that appears in the output for the corresponding confidence in that factor.

**Table 2. Output language associated with changes in confidence in each line of evidence.**

| **Factor impacting WoE call 🡪****Confidence in that factor↓** | **1. Impacts to Mortality/Sublethal/Indirect** | **2. Impact of PCT/Acres Distribution** | **3. Impact of alternative assumptions for population, rates and toxicity data** | **4. Range Data Quality** | **5. Species Surrogacy** | **6. Usage Data Reliability** | **7. Incidents Reported** | **8. Habitat and Exposure model** | **9. Drift contribution to impact** | **10. Monitoring data** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Increased**  | Impacts due to direct (mortality and/or sublethal) effects. | Impacts predicted even at less conservative PCT/Acre distributions. | Impacts predicted when less conservative population assumptions, application rates and toxicity endpoints are used in analysis.  | Range data used matches with Services documents. | Not used | Increased confidence in usage data due to region and/or use sites.  | Increased confidence due to presence of incidents.  | Not used | Not used | Monitoring data exceeds species toxicity endpoints. |
| **Decreased**  | Impacts due only to indirect effects. | Impacts only predicted at more conservative PCT/Acre distributions.  | Impacts are not predicted when less conservative population assumptions, application rates and toxicity endpoints are used in analysis.  | Parts of range data do not fit with Services document descriptions.  | Increased uncertainty regarding surrogacy of tested species for listed species.  | Decreased confidence in usage data due to region and/or use sites.  | Not used | Conceptual exposure models utilized in modeling differ substantially from species habitat.  | Increased uncertainty as impacts based entirely on drift. | Not used |
| **No impact on Confidence** | Not used | Not used | Not used | Range not evaluated against Services documents.  | Tested species represents adequate surrogate.  | Usage data adequate for species range.  | No reported incidents. | Exposure models adequately represent species habitat.  | Drift only partially contributes or does not contribute to impact.  | Monitoring data exceeds species toxicity endpoints. |

Overall Strength of Evidence Characterization: The overall confidence is based on the number of increased or decreased factors in the criteria above. In the criteria for deciding the strength of the evidence, the top 3 factors have more weight, as they are based on the quantitative analysis. Factor 1 captures if greater than 1 individual is impacted from direct (mortality and sublethal) and/or indirect (PPHD) effects, factor 2 captures the influence of changes to the PCT or distribution of acres assumptions and factor 3 captures the influence of alternative assumptions regarding toxicological sensitivity and population values as well as the use of typical application rates and application method. All of these factors are important in addressing the uncertainty in the assumptions of the analysis. When these factors have little or no bearing on the prediction of greater than 1 individual being impacted, there is stronger evidence of the LAA determination. The additional lines of evidence or factors are also used to determine the strength of evidence, but are used to a lesser degree and may serve to characterize the quantitative results (*e.g.*, if there is less confidence in the usage data or there is a poor fit of the exposure model to the species habitat, the strength of the evidence may be reduced even if the quantitative output suggest impacts under all scenarios).

**Strongest evidence of LAA** – If 2 or more of factors # 1, 2, or 3 are increased, and 2 or more of factors of #4-9 are increased, then strongest evidence of LAA is concluded. However, if usage data reliability (#6), range data reliability (#4), or impacts to mort/sublethal/indirect (#1) are decreased, the strongest evidence category is not used (i.e., moderate evidence is concluded).

**Moderate evidence of LAA** – If usage data reliability (#6), range data reliability (#4), or impacts to mort/sublethal/indirect (#1) are decreased, the highest strength of evidence ranking is moderate. If either usage data reliability (#6), range data reliability (#4), or impacts to mort/sublethal/indirect (#1) are decreased, but 2 or more of factors # 1, 2, or 3 are increased, moderate evidence of LAA; otherwise weakest evidence of LAA is concluded. Additionally, if the criteria listed above and below for strongest or weakest evidence of LAA are not met, then the species is assigned moderate evidence of LAA.

**Weakest evidence of LAA** - If 1 or less factors #1, 2, or 3 are increased, and greater than 3 criteria overall are decreased, then weakest evidence of LAA is concluded. If either usage data reliability (#6) or range data reliability (#4) are decreased and 1 or less of factors # 1, 2, or 3 are increased, weakest evidence of LAA. If 100% of impact is from drift and species lives in forest habitat, weakest evidence of LAA.

Sample Output as appears in species files:





1. Further evaluation of automated determinations

For some species, factors were identified in the gathering of species data that would need further individual evaluation for potential adjustment of the species determination, such as a unique habitat or species traits. Additionally, determinations that were given an automated assignment of LAA with weak evidence and had very few individuals impacted, and determinations that were listed as NLAA with a low population, were also further evaluated. Certain criteria were identified in the output which served as a prompt for individual assessor review of the species determination:

* *Impacts only based on drift, habitat description of a forest species* – If a species was determined to likely be an interior forest dwelling species, and the assessed pesticide does not include uses that involve direct applications to forest, the determination was changed to an NLAA based on the unlikely chance that exposure would occur from drift and the poor representation of the species habitat by the drift model. If a species was found to likely be an edge forest inhabitant or was present in multiple habitats, the determination was left as LAA.
* *Impacts only based on drift, habitat description of a cliff dwelling species* – If a species was determined to be located on high cliffs, the determination was changed to an NLAA based on the unlikely chance that exposure would occur from drift and the poor representation of the species habitat by the drift model. If a species was found to likely be on varied cliffs or was present in multiple habitats, the determination was left as LAA.
* *Impacts only based on drift, elevation restrictions applied to species* – If a species was determined to be at high elevation and only impacted by drift, consideration was given to the likelihood of exposure.
* *Impacts only based on drift, non-specific* – If a species determination was determined to be due to drift only, consideration was given to other factors than those identified above which could impact the determination considering the basis of the drift model. These were briefly reviewed but were generally maintained with the automated determination.
* *NLAA with low population* – If a species with a low population was determined to be NLAA, if no individuals were impacted at the most conservative options and no other qualitative factors were identified that indicated a further evaluation was needed, the determination remained at NLAA.
* *Impacts to aquatic species that reside in cave/karst environments* - If an aquatic species resides in a cave/karst environment, the evidence for the determination was downgraded to weakest. While the EECs used in the quantitative analysis represent concentrations that could potentially be in waterways that feed the cave/karst systems, there is high uncertainty that they represent potential exposure estimates.
* *Federal Lands overlap greater than 95% with species range* – The same criteria were used for evaluating species with high overlap of Federal Lands with the species range, but LAA calls with very low individuals impacted under conservative assumptions were reevaluated for the likelihood of impacts to occur.