

A Framework to Evaluate Potential Risks to Listed Species from Per- and Polyfluoroalkyl Substances

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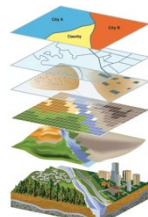
Objectives

Objective 1: Determine the Co-occurrence of PFAS contamination and T&E species on DoD sites.

- Identification of DoD installations with PFAS contamination



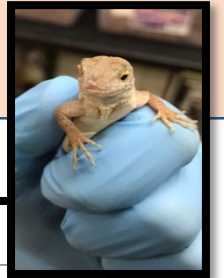
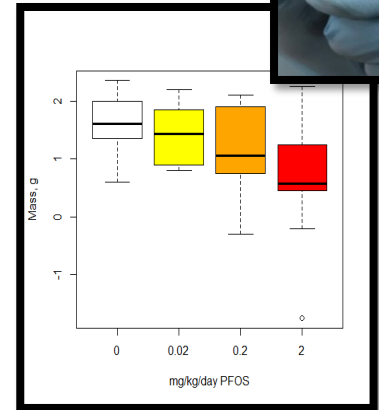
- Determine Locations, Occurrences, and Exposure of listed Species



Objectives

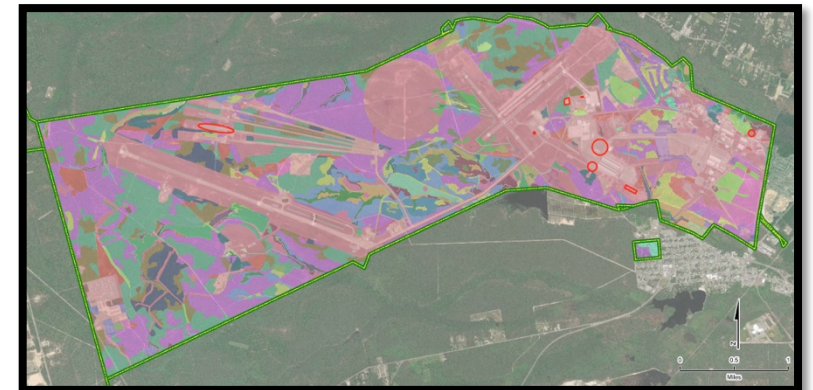
Objective 2: Develop an approach for listed species screening-level risk assessment.

- Identify and/or derive toxicity benchmarks to listed species (or taxa)
- Derive a conceptual framework for assessing risk to listed species



Methods

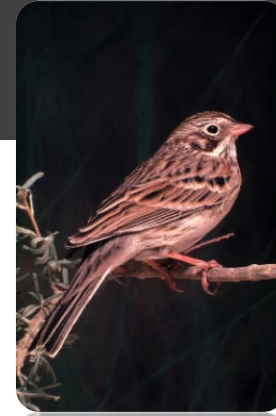
- Select DoD installations with PFAS contamination
- Determine Listed Species
 - Integrated Natural Resources Management Plan (INRMP)
 - Federal/State/County Listed Species
- Acquire available GIS land cover layers
 - Installation
 - USGS – streams & waterbodies; topography/ LiDAR
 - USFWS – wetlands
 - State Agencies



Methods

- Listed Species Exposure Potential

- Life-history traits
 - habitat requirements
 - home ranges
 - Diet



Vesper Sparrow
State Endangered (NJ)

Habitat: Open Areas/Fields

Diet: Seeds, waste grain,
insects and spiders

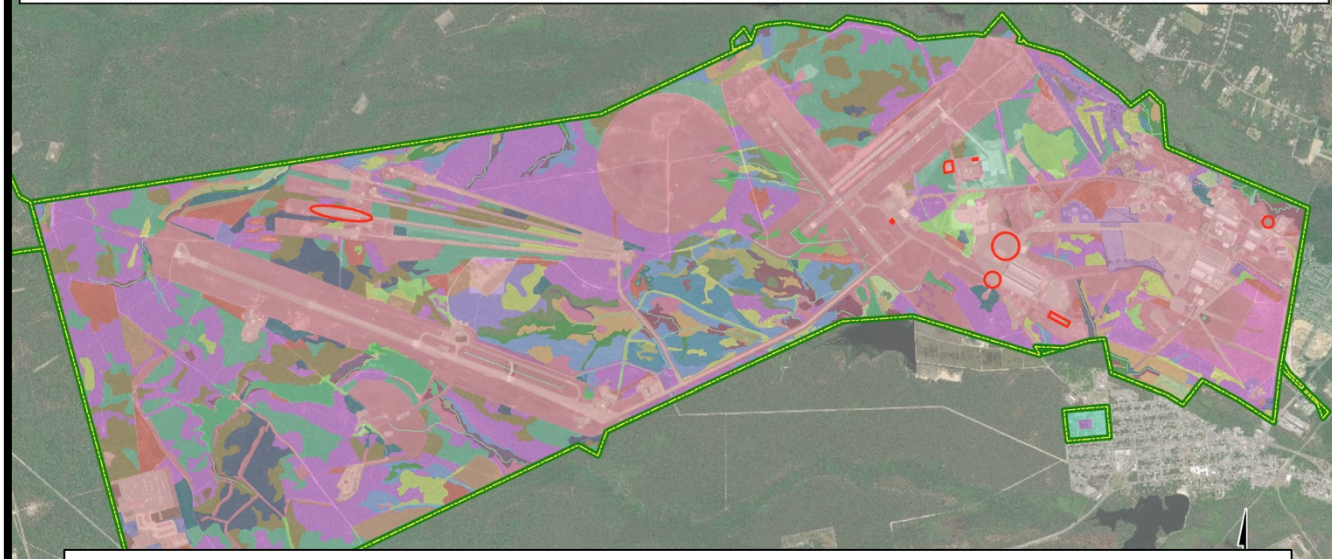
- Investigate listed species habitat overlap with known releases of AFFF and/or measured PFOS concentrations

- Release site locations were obtained from the installation or were digitized from the Preliminary Investigation

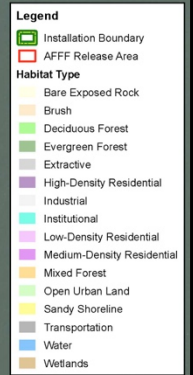
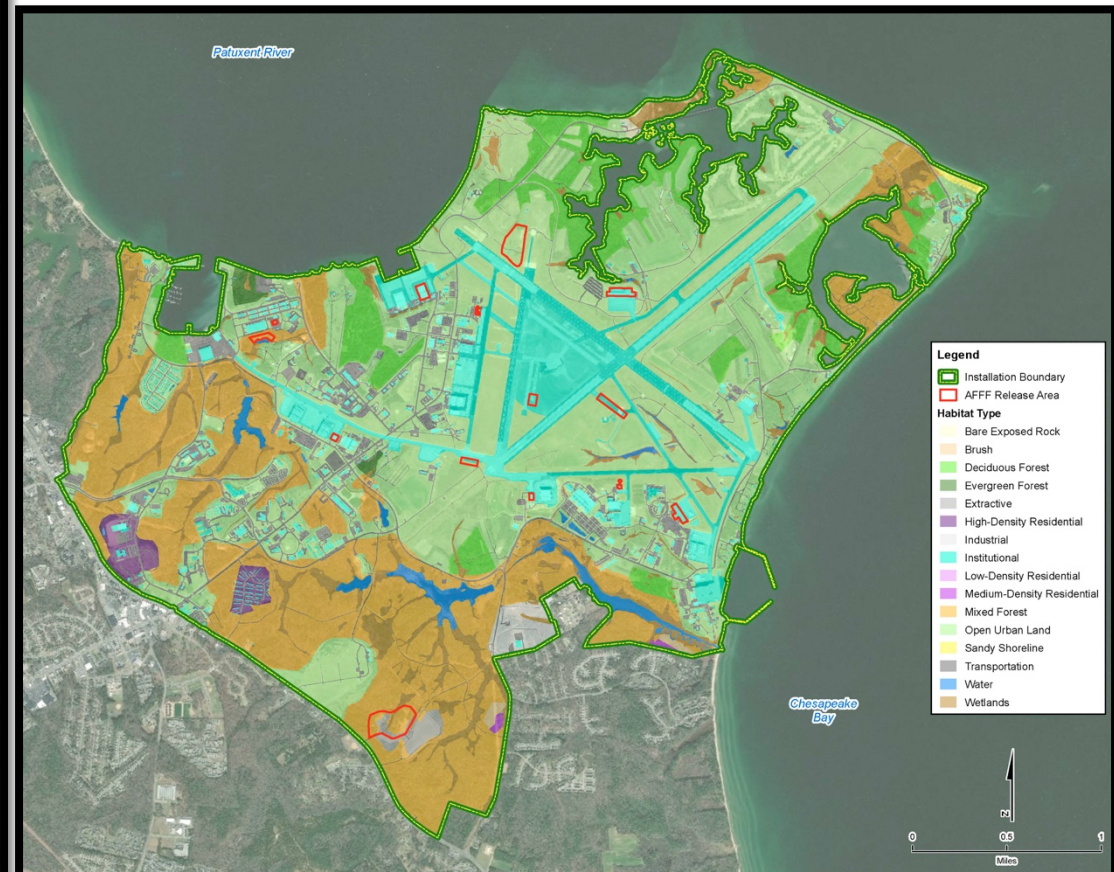
Methods – Site Selections



Data Availability Varies— Landcover GIS layers

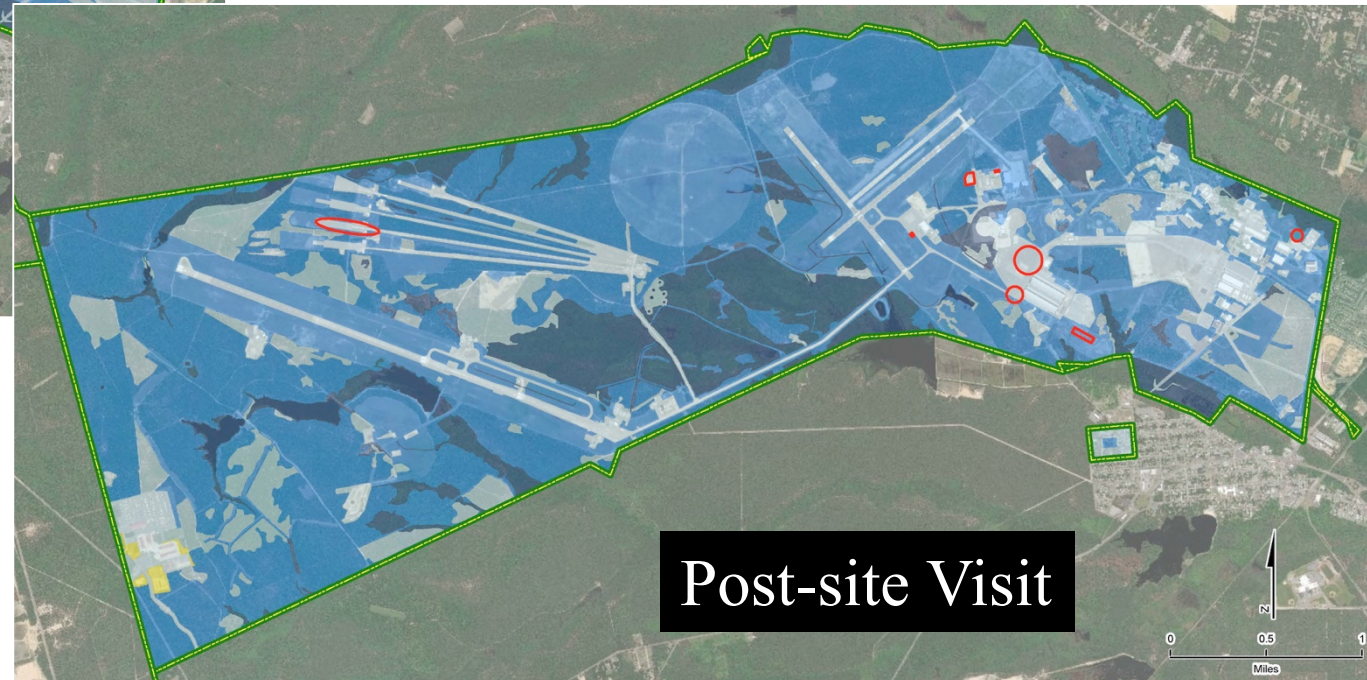
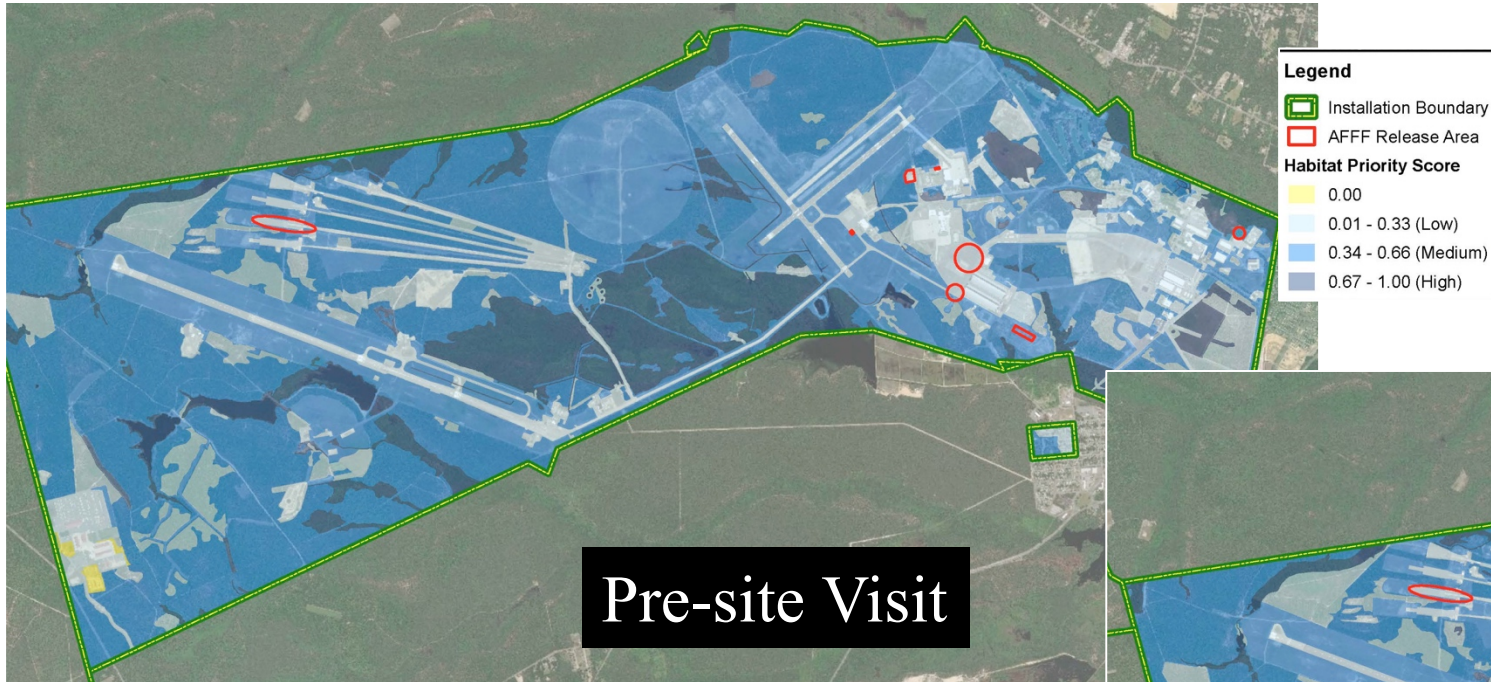


Joint Base McGuire Dix Lakehurst (JB MDL)



Naval Air Station PAX River

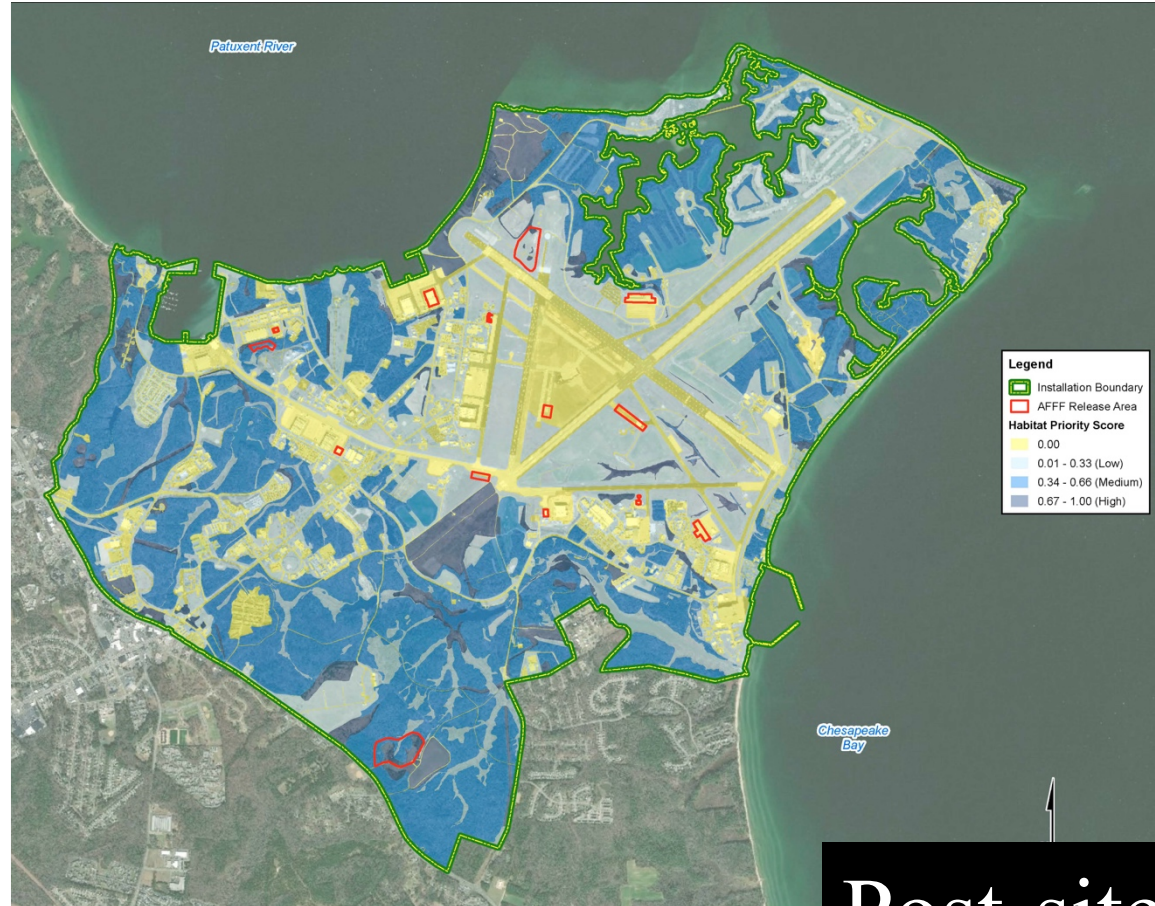
Spatial Analysis is Dependent on Accuracy of GIS



Spatial Analysis is Dependent on Accuracy of GIS



Pre-site Visit



Post-site Visit

Spatial Analysis Methodology: Conclusion

- Screening-level Exposure Modeling is **HIGHLY** dependent on the detail and accuracy of the GIS data layers

...application of this approach is limited to installations with up-to-date landscape layers

Focus: Joint Base McGuire-Dix-Lakehurst

- Listed Species and Species of Special Concern (Federal and State)



Bobcat



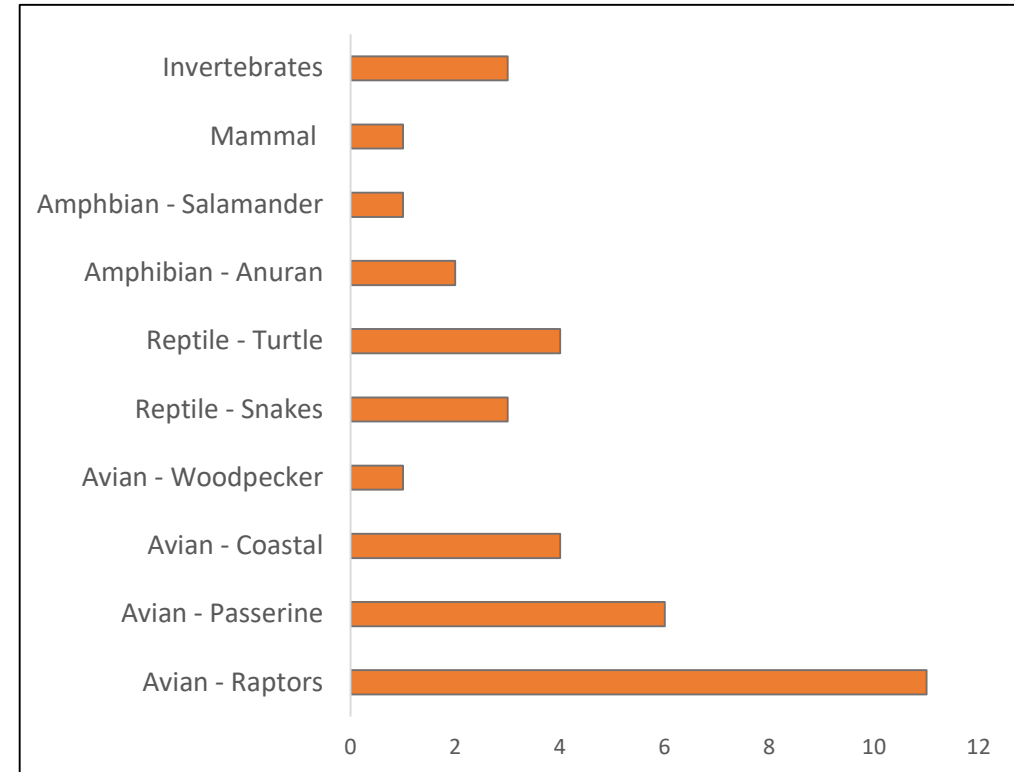
Short-eared Owl



Bog Turtle



Northern Pine Snake



Total Number of listed Fauna species = 36

Determining Species Distribution on the installation

Northern Pine Snake

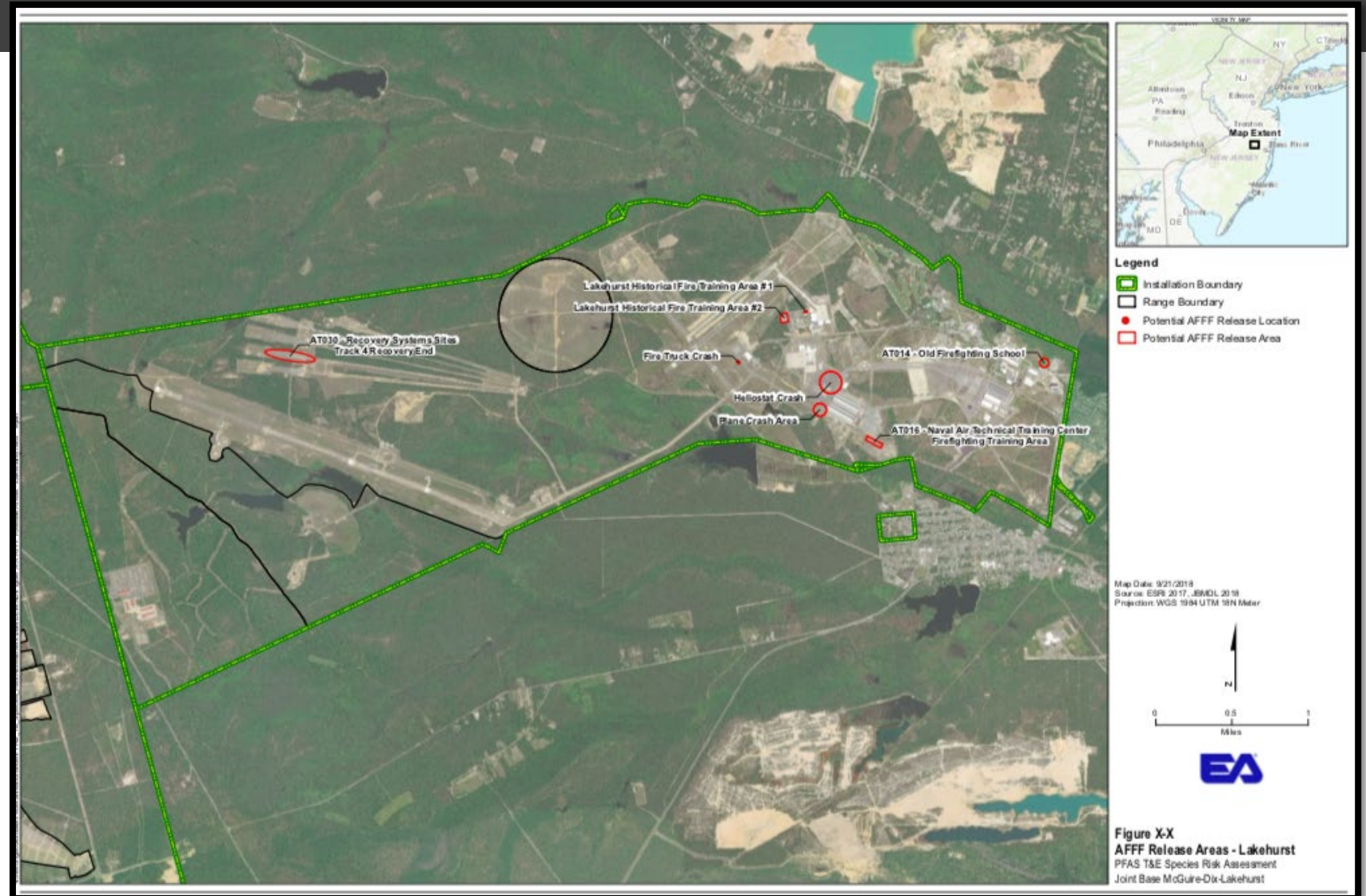


Joint Base McGuire Dix Lakehurst (JB MDL)

- UNDIFFERENTIATED BARREN LANDS
- DECIDUOUS FOREST (10-50% CROWN CLOSURE)
- DECIDUOUS FOREST (>50% CROWN CLOSURE)
- CONIFEROUS FOREST (10-50% CROWN CLOSURE)
- CONIFEROUS FOREST (>50% CROWN CLOSURE)
- PLANTATION
- MIXED FOREST (>50% CONIFEROUS WITH 10-50% CROWN CLOSURE)
- MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)
- MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)
- MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)
- OLD FIELD (< 25% BRUSH COVERED)

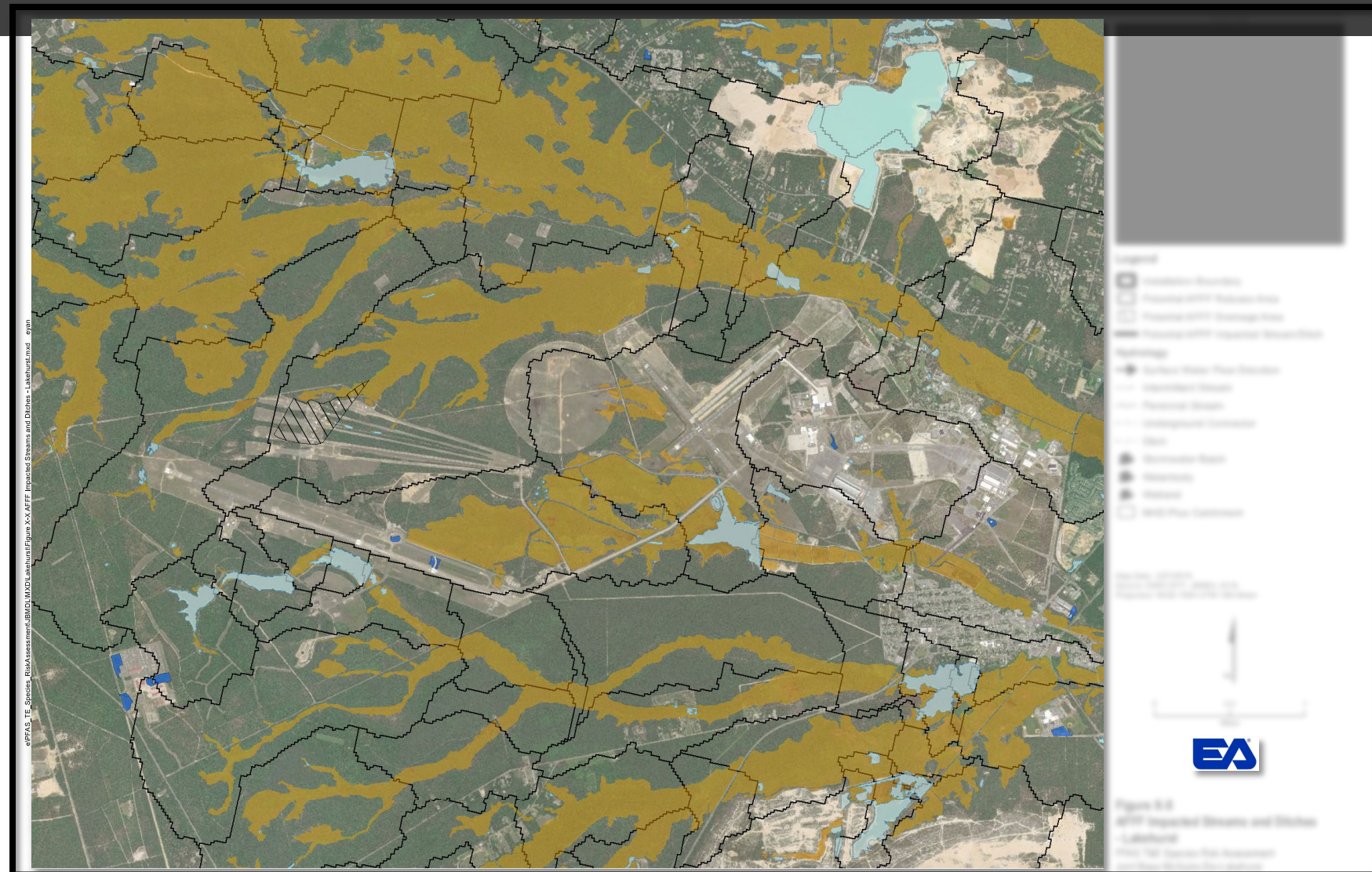
JB MDL: Per- and Polyfluoroalkyl Substance

- Sites of AFFF release based on the Preliminary Assessment were plotted
- True Exposure?



JB MDL: Per- and Polyfluoroalkyl Substance

- Extrapolation based on topography & surface water flow direction



Preliminary Results: Percent Impacted Habitat

	Percent of landcover Impacted
Lakehurst	3.06
Dix	1.39
McGuire	9.70

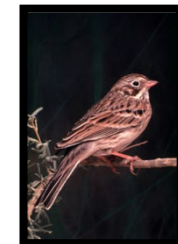
Dragonfly- Butterfly Insecta Terrestrial Herbivorous
1.05%
0.06%
14.57%



Bobcat Mammalian Carnivorous
2.16%
0.41%
0.16%

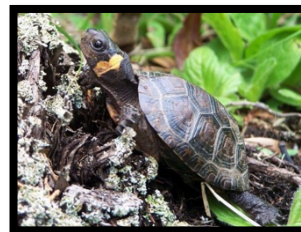


	Raptors	Sparrow/ Grebe/ Woodpecker	Wren
Avian - Overall	Avian Carnivorous	Avian Omnivorous	Avian Insectivorous
2.38%	2.39%	1.82%	2.04%
1.44%	1.44%	1.81%	0.05%
7.46%	7.47%	7.90%	14.32%



Preliminary Results: Percent Impacted Habitat

	Percent of landcover Impacted	Reptile - Overall	Turtles		Snakes	Frogs
			Reptile Omnivorous	Reptile Herbivorous	Reptile Carnivorous	Amphibian Insectivorous
Lakehurst	3.06%	1.90%	1.44%	2.82%	1.78%	1.04%
Dix	1.39%	0.82%	1.49%	1.63%	0.33%	1.49%
McGuire	9.70%	11.65%	11.81%	8.10%	10.74%	12.16%



Preliminary Results: Interpretation

- If the Percent of Impacted Habitat is high this is likely due to the small total available habitat on the installation
 - Many listed species are specialist and therefore have restrictive habitat requirements
- For Example:

Bog Turtle: total of approximately 15% of its habitat is impacted

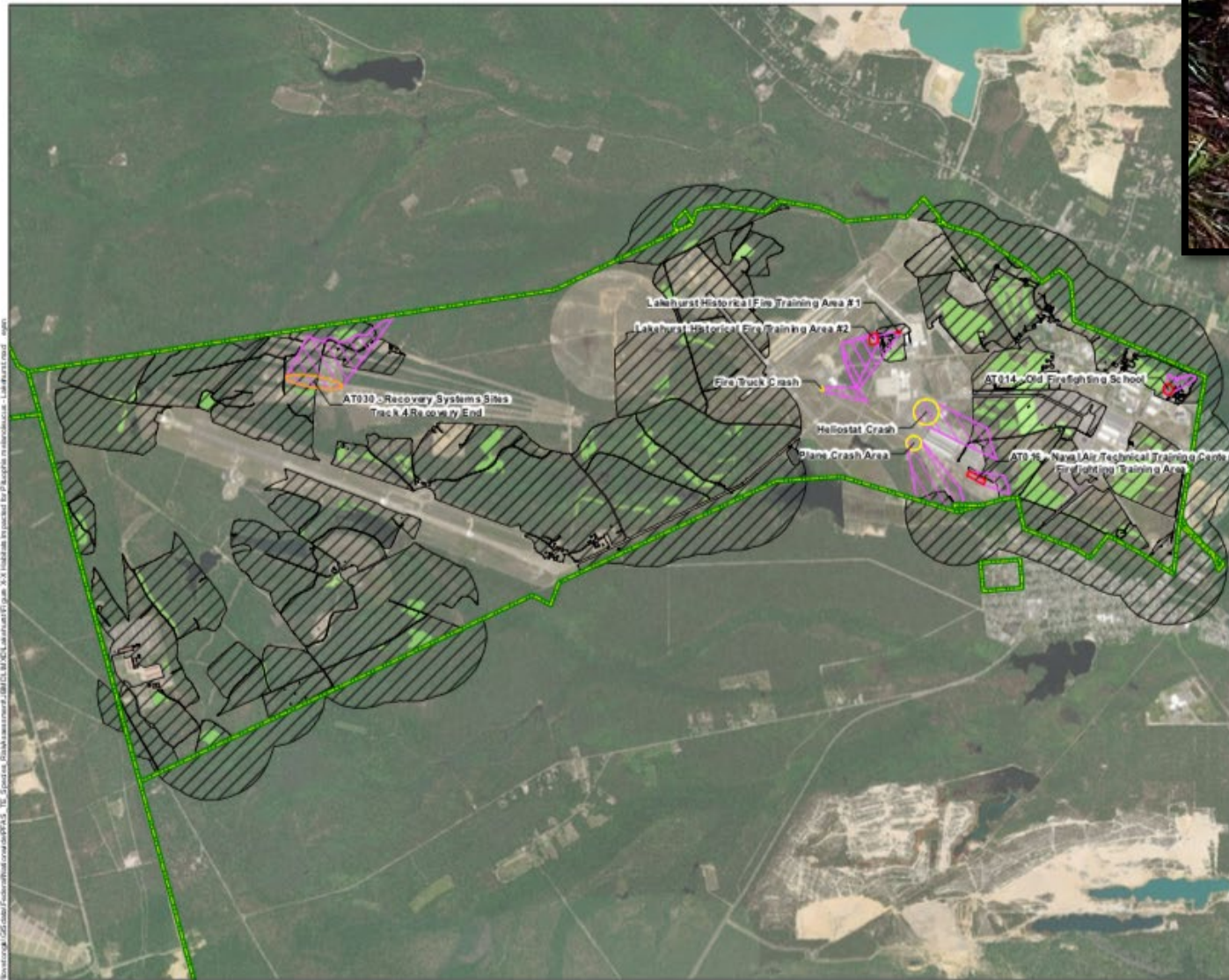


DECIDUOUS SCRUB/SHRUB WETLANDS
CONIFEROUS SCRUB/SHRUB WETLANDS
MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)
MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.)
HERBACEOUS WETLANDS

Risk Framework



Northern Pine Barren Snake



Legend

- Installation
- Pituophis melanoleucus Habitat
- Pituophis melanoleucus Range

Potential AFFF Release Areas

- Low-Volume
- Medium-Volume
- High-Volume
- Potential AFFF Drainage Area

Map Date: 4/5/2019
 Source: ESRI 2017, BMDL 2018, NJDEP 2012
 Projection: WGS 1984 UTM 18N Meter

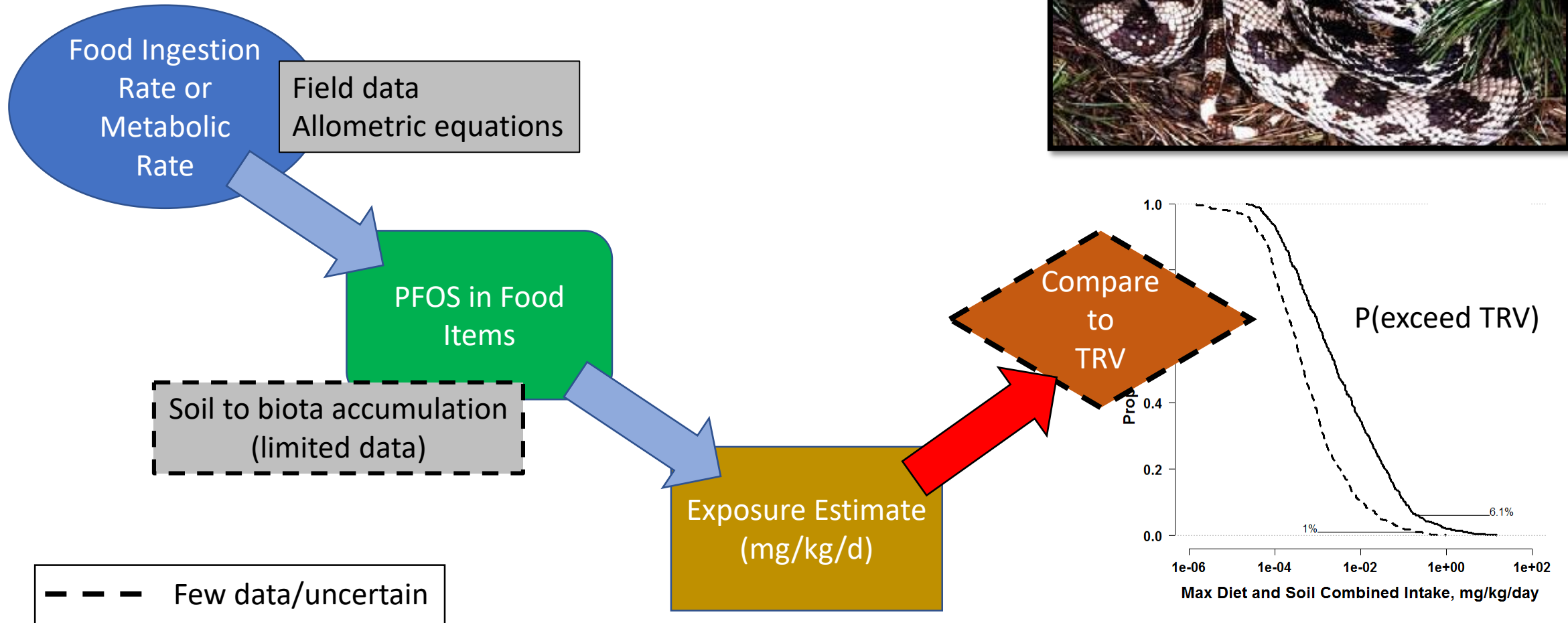
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Figure X-X
 Habitats Impacted for Pituophis melanoleucus - Lakehurst
 PFAS T&E Spedes Risk Assessment
 Joint Base McGuire-Dix-Lakehurst

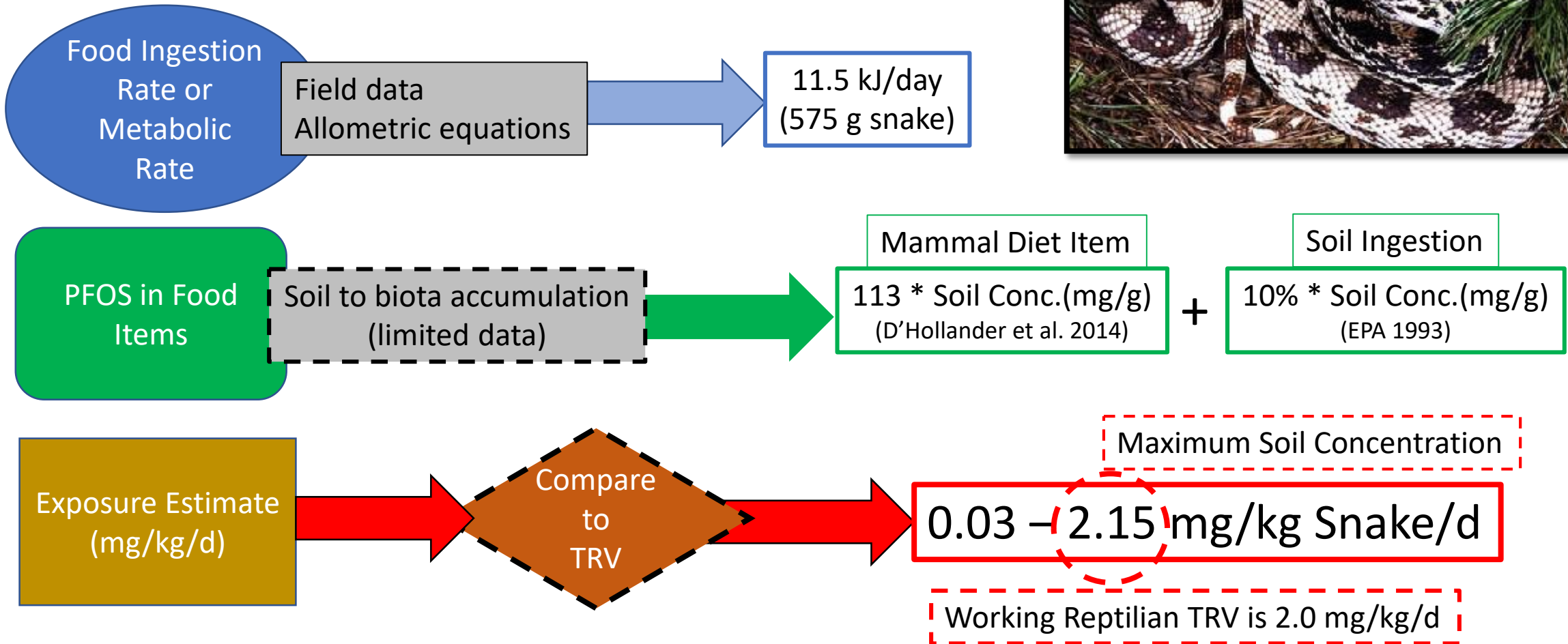
Percent of Impacted Habitat

Lakehurst	0.08
Dix	0.07
McGuire	13.65

Risk Estimation Framework



Risk Estimation Framework



Questions?

Funded By



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