2015 Threat Assessment Instructions For Ranking Threats to Species and Habitats

Purpose of Identifying and Ranking Threats

1. Describe threats in a consistent, standardized format to facilitate planning decisions.
2. Provide a tool that will allow NHFG to objectively prioritize actions within and among levels of the ecological hierarchy (e.g., within species, within habitat, and among species and habitats).
3. Provide a source of data that can be queried to obtain a comprehensive overview of threats.

Step 1: Read Lexicon Threat Categories

(Text copied from the Northeast Lexicon text in brown)

Reference Appendix A of the Northeast Lexicon (Salafsky et al. 2008) for a detailed literature review of other ranking processes. Select text from Appendix A copied below.

NHWAP 2005 threat category definitions inserted below as appropriate for further comparison.

Chapter 3: Threats

Threats come from many different sources, and impacts can be observed at different spatial, temporal, and biological scales. As a result, the risk of the impacts is wide-ranging, as are actions taken in response. The Northeast Lexicon provides a hierarchical system for classifying and naming threats, based on the IUCN classification system (Salafsky et al. 2008) and threat characteristics that are important in determining threat risk and appropriate responses.

Threat Classification System: The Northeast Lexicon adopts the IUCN threat classification system to classify and name threats. This system is hierarchical, with three tiers and is used in the NatureServe rank calculator (see Element 1). The top tier indicates the broadest categorization of threats and includes:

- Residential and Commercial Development
- Agriculture and Aquaculture
- Energy Production and Mining
- Transportation and Service Corridors
- Biological Resource Use
- Human Intrusions and Disturbance
- Natural System Modifications
- Invasive and Other Problematic Species and Genes
- Pollution

- Geological Events
- Climate Change and Severe Weather.

Within this structure, regionally agreed upon or state-specific threats may be added when necessary.

Threat risk. To rank threats by risk (level of impact considering severity and likelihood), the Northeast Lexicon provides definitions for the severity, reversibility, immediacy, spatial extent, certainty, and likelihood of threats. These definitions may apply to single threats, or the compounding impact of interacting threats.

Threat categories from the NE Lexicon – see below, Table 7 - were reordered and additional text was added (*red italicized*) to further explain interpretation of factors.

Background and Rationale

State Wildlife Action Plans must include descriptions of problems adversely affecting Species of Greatest Conservation Need or their habitats. The Best Practices Report for State Wildlife Action Plans recommends the use of the IUCN threat classification system (Salafsky et al. 2008). Threats are viewed as important factors in prioritization of actions and ranking of conservation need.

After considering the applicability of the Wildlife TRACS and IUCN threat classification systems and the scope of threats addressed by conservation actions proposed in Wildlife Action Plans for northeastern states, the IUCN classification system appears most useful at this time, due in part to the more limited number of threats addressed in Wildlife TRACS. The IUCN system is also the recommended choice in the Best Practices Report. However, because actions will often be reported through the Wildlife TRACS system, a translation from IUCN to Wildlife TRACS is provided to facilitate data management.

In addition to naming threats, understanding threat characteristics can help highlight opportunities for species and habitat management or protection. Proposals to fund conservation actions typically explain the threat being addressed in the project justification, and reporting systems, such as Wildlife TRACS, integrate threat identification. To best meet these planning, funding, and reporting needs, utilizing this lexicon will help ensure that all needed information is available in the Wildlife Action Plan. It may also minimize workload as each proposed action is considered for funding or final results are reported and presented. In addition, it may be possible to prioritize threats (and/or associated actions) for regional coordination if multiple states have identified them as pervasive, severe, and/or immediate.

Threat Characteristic	*Low Impact*	*Moderate Impact*	*High Impact*	
Spatial Extent (% of habitat/population negatively impacted by threat. Consider impact of threat within 10 years)	**Localized**: (<10%) A small portion of the habitat or population is negatively impacted by the threat.	**Dispersed or Patchy:** (10-50%)	**Pervasive:** (>50%) A large portion of the habitat or population is negatively impacted by the threat.	**MAGNITUDE OF THREAT**
Severity *(intensity of stress impacting exposed target under Spatial Extent)*	**Slight Severity:** Degree of ecological change is minor	**Moderate Severity:** Degree of ecological change is substantial	**Severe:** Degree of ecological change is major	
Immediacy (This characteristic assesses the time scale over which impacts of the threat will be observable.)	**Long-term:** Effects of the threat are expected in 10-100 years given known ecosystem interactions or compounding threats	**Near-term:** Effects of the threat are expected within the next 1 - 10 years	**Immediate:** Effects of the threat are immediately observable (current or existing)	**URGENCY FACTORS**
Certainty *(Amount of information available/ understanding of threat and response. Termed 'Information' from NHWAP 2005)*	**Low Certainty:** threat is poorly understood, data are insufficient, or the response to threat is poorly understood	**Moderate Certainty:** some information describing the threat and ecological responses to it is available, but many questions remain	**High Certainty:** Sufficient information about the threat and ecological responses to it is available	
Likelihood (Consider impact of the threat within 10 years) (This characteristic is used to assess the certainty surrounding the threat and its impacts.) *Probability that Spatial Extent, Severity, and Immediacy of threat will be realized.*	**Unlikely:** Effects of the threat are unlikely to occur (less than 30% chance) *at Spatial Extent & Severity described.*	**Likely:** Effects of threat are likely to occur (30-99% chance) *at Spatial Extent & Severity described.*	**Occurring:** Effects of the threat are already observable (100% chance) *at Spatial Extent & Severity described.*	
Reversibility (Consider the likelihood of reversing the impacts within 10 years)	**Reversible:** Effects of the threat can be reversed by proven actions	**Reversible with difficulty:** Effects of the threat may be reversed but costs or logistics make action impractical	**Irreversible:** Effects of the threat are irreversible	**ACTION FEASIBILITY**

The extensive review of existing conservation planning approaches (see Appendix A – NE Lexicon) along with needs presented by northeastern states led to the threat characteristics described above. Many of the reviewed approaches used four levels of impact. The three-level approach described here provides a more rapid assessment yet still distinguishes threats. Some approaches characterize past, present, and future threats. *Current and future threats are represented here by the "immediacy" characteristic, but past threats are not included.*

Threat Characteristics

The following threat characteristics are reordered from the Lexicon to follow the order of the table.

Magnitude Factors

Spatial extent – Several alternatives were found in the literature, especially "scope". The Northeast Lexicon uses the term "spatial extent" because it is more specific, and many of the other words used by conservation organizations are employed in the impact descriptions for spatial extent, such as "localized", "patchy", "pervasive", and the reference to a "portion" of habitat. The possibility of interpreting "spatial extent" in the context of populations distributed across the state was added. NALCC and the Geospatial Habitat Condition Analysis provide additional information from models and predictions of spatial extent (NALCC 2013 and Anderson 2013- both ongoing)

> **NHWAP2005 definition:** SCOPE: A measure of the percent (%) of the statewide distribution of the target that may be exposed to the threat or number affected relative to the total area or number). A threat that is very localized, therefore not impacting a large percentage of the affected target, should score lowest, whereas a pervasive broad scale threat should score high. Consider whether outside factors like land protection influences the potential scope of the threat.

NH definition clarification (2015 revision): We are interpreting this as the percent of the population exposed to the threat, not just exposed to *possibility* of threat. In many cases, you will need to provide the best estimate of this metric. The 'likelihood' score can be adjusted based on how confident you are in your spatial extent.

NH Spatial Extent examples:
Blanding's turtles may be impacted by removing dams (either beaver or human created) by causing direct mortality of individuals (if during winter) and loss of habitat (if significant area dewatered). The vast majority of Blanding's turtle habitat (other than vernal pools) is influenced by beaver activity. However, only a small number of these dams are likely to be removed in short period of time. Therefore, we would interpret this as a '*localized/low rank'* threat under spatial extent. So even though most beaver dams are potentially exposed to dam removal (even those on conservation land have that potential), only a few are expected to be actually exposed to the threat.

If we expected > 50% of populations and/or habitats to be exposed to the threat, we would rank as pervasive/high impact, even if the severity may differ among locations (see severity below).

Examples of *pervasive* threats may include broad threats like climate change and acid deposition impacts.

Severity – Other approaches have variously used the terms "severity", "intensity", and "impact". The lexicon reserves the word "severity" for the overall assessment based on all of the threat characteristics and uses "intensity" to represent the degree of impact associated with the threat. "Impact" was used for all characteristics to represent the scale of influence the threat would have on resources.

> **NHWAP 2005 definition:** SEVERITY: A measure of the intensity of the stress impacting the proportion of the target *exposed* (as defined by SCOPE) to the threat. Severity is expressed as the percent (%) of the exposed population/habitat that will realize *loss of function as defined above (e.g., mortality, loss of viability, failed dispersal, starvation, competitive exclusion, community succession, etc.).* A stress inducing a very low rate of lost function in the exposed population should be assigned a low score while a stress inducing a high loss of function should be assigned a high score.

NH definition clarification (2015 revision): As in 2005, NH is interpreting this as the intensity of stress impacting the exposed target under spatial extent. The 'likelihood' score can be adjusted based on how confident you are in your spatial extent and severity ranks.

NH Severity example:
Removal of dams was predicted to have a 'localized/low' impact under spatial extent. The severity of that impact could vary depending on a number of factors (e.g., timing of drawdown, location of drawdown, landscape surrounding drawdown) which can have varying severity from low (slight) to high (severe). However, because the loss of individual adult turtles is a known large impact to Blanding's turtle populations, the potential of multiple animals dying simultaneous from an action indicates a severe threat. Again, the 'likelihood' score can be adjusted based on how confident you are in your spatial extent and severity ranks. These factors should be noted in comments and used to write narrative of the threat.

Urgency Factors

Immediacy – Other approaches have used the terms urgency or timing. The choice presented above is very similar to Master et al. (2012) and Salafsky et al. (2003).

Appendix A: Immediacy
The NE Draft Lexicon defines Immediacy as the temporal scale of the threat. Other interchangeable terms such as urgency (Salafsky and Margoluis 1999, WCS 2002, CMP 2007) and timing (Salafsky et al. 2003 and Ecoregional Assessment and Biodiversity Vision Toolbox 2006,) as well as immediacy (Bunnell et al. 2009 and NatureServe 2012) were found during the literature search. The NE Draft Lexicon scored Immediacy as long term, near term, and now, which is similar to NatureServe (2012) and Salafsky et al. (2003). NatureServe (2012) scores timing (Immediacy) as high (continuing), moderate (could happen in the short term), low (could happen in the long term), and insignificant/negligible (only in the past and unlikely to return).

This scoring was based on Birdlife International and draft proposed IUCN-CMP (and NatureServe) scoring of threat timing. *Salafsky et al. (2003) defined timing as the time until a threat will start having impact on targets* and scored it numerically: 4 = current (< 1 year), 3 = imminent (1-3 years), 2 = near-term (3-10 years), and 1 = long-term (> 10 years). Bunnell et al. (2009) scored Immediacy of the threat as high, moderate and low.

> **NHWAP 2005 definition:** TIMING: Time *until the target begins to lose function* (loss of function is defined above). If a threat already has caused a loss of function in the target, it should be considered current, and score highest.

NH definition clarification (2015 revision): NH interpreted this as the time until the target begins to lose function at the *population* level. In many cases, loses of individuals has an immediate impact to local populations (e.g., long-lived animals, low reproductive rates). However, in other cases, the loss of an individual may not necessarily have population impacts until multiple/many individuals are affected (e.g., often short-lived species and/or high fecundity; many invertebrates). Also, immediacy addresses the timing until impact *from today* (2014), not the amount of time after the threat takes place. If a threat already has caused a loss of function in the target, it should be considered current, and score highest. Many threats affecting adult turtles were considered to have *immediate* impacts whereas impacts to the turtle egg stage could be considered to have a longer-term impact. If you choose '*long-term/low impact*' for your Immediacy score, you must choose '*unlikely/low impact*' as your Likelihood score.

NH Immediacy example:
Continuing with Blanding's turtle example, the removal of dams was predicted to have a '*localized/low*' impact under spatial extent and have a '*high*' severity. Because we know that these types of dams, including ones occupied by Blanding's turtles, have been removed in NH previously and will continue to be removed, we consider the threat *immediate/high impact*.

Certainty – Uncertainty is a long-standing and challenging issue for natural resource managers. In the IUCN guidance for assessors (related to assigning CR/EN/VU ratings), uncertainty is seen as being derived from three sources: *natural variability, vagueness in the terms and definitions used in the criteria, and measurement error* (Akçakaya et al. 2000, IUCN Standards and Petitions Subcommittee 2013). Lack of data is not considered a part of uncertainty in the IUCN approach. In the discussion of how to deal with uncertainty, IUCN recognizes that risk tolerance and dispute tolerance are factors in decision-making with uncertain information. IUCN recommends a "precautionary but realistic attitude". *For the purposes of the Lexicon, lack of data has been included as a source of uncertainty.*

> **NHWAP 2005 definition:** INFORMATION: A measure of the *quality and reliability of evidence* that the threat will be manifested as defined above (e.g., at the levels projected for *scope, severity, and timing*). The information score increases as the quality and reliability of evidence increases.

NH definition clarification (2015 revision): NH used the NHWAP2005 definition for Information.

NH Certainty example:
Continuing with Blanding's turtle example, the removal of dams was predicted to have a '*localized/low*' impact under spatial extent, '*high*' severity, and '*immediate*' impact. We know that these types of dams, including ones occupied by Blanding's turtles, have been removed in NH previously and will continue to be removed. We know that populations are adversely affected by the loss of even one individual. We know from work outside of NH, that drawdowns *can* result in increased mortality. We don't know how often and under which scenarios mortality will result. Therefore, we ranked this as *moderate certainty (some information describing threat and ecological response available, but questions remain).*

Likelihood – Sometimes referred to as probability (as in Salafsky et al. 2003).

Appendix A: Likelihood of Impact and Occurrence

The NE Draft Lexicon uses similar terms to those found in the literature, likelihood and probability, but was only seen in Salafsky et al. (2003), WWF (2002), and WCS (2002). The NE Draft Lexicon scored Likelihood of Impact and Occurrence as high, moderate, low, and none. Salafsky et al. (2003) score/ranked *likelihood as the probability that a threat will occur within the next 10 years numerically:* 4 = existing threat (100%), 3 = high probability (50-99%), 2 = moderate probability (10-49%) and 1 = low probability (0-9%).

> **NHWAP 2005 definition:** LIKELIHOOD: The probability that the threat will actually be manifested as defined above (e.g., *at the levels projected for scope, severity, and timing*). The likelihood score increases as probability increases.

NH definition clarification (2015 revision): This characteristic is used to assess the *probability* that the *spatial extent and severity* of the threat will occur within the *next 10 years*. If you choose '*long-term/low impact (10-100 years)*' for your Immediacy score, you must choose '*unlikely/low impact*' as your Likelihood score.

NH Likelihood example:
Continuing with the Blanding's turtle example, the removal of dams was predicted to have a '*localized/low*' impact under spatial extent, '*high*' severity, '*immediate*' impact, and '*moderate*' certainty. During the certainty evaluation, we acknowledged that we don't know how often and under which scenarios mortality will result. We were fairly confident in the spatial extent score of 'localized' but we were not 100% sure that the severity would be 'severe' (sometimes it might be less severe). Therefore, we ranked Likelihood as '*likely/moderate impact (30-99% chance)'.*

Immediacy, Certainty, and Likelihood

It is recognized that some factors may be correlated, especially the Urgency Factors; Likelihood, Certainty, and Immediacy. Immediacy refers to the timing that the threat will be realized (begin to lose function or is observable). Certainty refers to the level of information available to assess threat (categories of knowledge). Likelihood refers to the *probability* that Spatial Extent, Severity, and Immediacy of threat will be realized. So, Likelihood isn't just the probability that a threat is occurring; it is the likelihood that a threat is occurring at the scale, severity and timing as described. The NE Lexicon has limited the Likelihood evaluation to the next 10 years. If the

Immediacy score was identified as 'Long-term' (> 10 years), than Likelihood would be scored as 'Unlikely' (effects of the threat are unlikely to occur within 10 years.

Action Feasibility Factor

Reversibility – The impact levels for this characteristic are adapted from Salafsky et al. (2003).

NH definition clarification (2015 revision): Reversibility was considered during the NHWAP 2005 but ultimately was not evaluated. The NE Lexicon didn't provide much detail on Reversibility other than the definitions of each category. We reviewed Salafsky et al. 2008 but didn't find any additional details. Salafsky et al. 2008 did include the word 'extinction' under the high impact category for Reversibility. Reversibility could be interpreted several ways: 1) Can the threat be reversed once realized or 2) are there actions that can be taken to minimize the impact of the threat. NH concluded that the Reversibility factor was primarily useful in determining whether to take action and when.

Therefore, we chose the second option: *Are there actions that can be taken to minimize the impact of the threat?* If no action can minimize threat, the threat is irreversible. There are multiple examples of where a threat might be irreversible at the impact area but many of those threats can be reduced prior to the impact. For example, habitat loss due to residential development is largely irreversible once it occurs locally. However, there are numerous actions to reduce the impact of the development on various targets (e.g., land protection, regulations, BMP's, etc.). We anticipated that '*reversible with difficulty'* would be the most commonly used category.

NH Reversibility example:
Continuing with the Blanding's turtle example, the removal of dams was predicted to have a '*localized/low*' impact under spatial extent, '*high*' severity, '*immediate*' impact, '*moderate*' certainty, and '*moderate*' likelihood. Once a dam is removed, the damage is often instantaneous. However, there are several actions that can be taken to reduce the impact of this action on the target (Blanding's turtle populations). For example, we could develop best management practices for removal of dams (e.g., use of beaver pipes, drawdowns could be completed during non-hibernation periods, etc.). These BMP could be provided to targeted landowners. The impact of the threat could be minimized by these actions but because the impacts of the threat are dependent on individual landowners following BMP, the threat can't be eliminated. Therefore, we ranked as '*reversible with difficulty'*.

Step 2: Review Excel Fields in Threat Evaluation

(Don't edit – that's Step 4)

Excel or Access Database?

An Excel spreadsheet has been designed to collect all of the information needed for Threat Assessment 2015 as well as comparison to WAP 2005 threat assessments. Once all threats were compiled in the Excel spreadsheet, all data was imported from the Excel spreadsheet into the Access database.

Notes about Excel Threat Spreadsheet

1) Excel table is Sorted by 1) Species Name, then 2) Habitat Name, then 3) IUCN Rank 1.

2) IUCN Level 1 (and sometimes 2) has been filled in for all existing Threat Categories. You'll need to review these for your species/habitat and add IUCN Level 2 and 3 (if relevant). If you add a NEW category for IUCN Level 3, indicate with 'NEW:' before the code.

3) Threat Ranking: Purple columns are WAP 2005 data and shouldn't be edited with one exception: If a new threat row is added (not ranked in 2005), the 2005 cells can be updated to include 'NR' within 2005 cells.

4) Green columns are '2015 WAP' and need to be filled in. This is the PRIMARY TASK. SEE LEXICON for further instructions on categories. WAP 2005 data is provided for comparison purposes – converted to H,M,L 2015 lexicon.

5) You may choose to 'hide' some columns or rows to make viewing easier.

Step 3: Identify Threats for Your Target Species or Habitat

Identify all possible threats to the greatest detail possible. If the species was evaluated during the NHWAP 2005, some or all of these threats may already be incorporated into the Excel evaluation table (See Step 4). If the species is a new SGCN addition or not thoroughly evaluated during 2005, you will need to consider all threats. See guidance from NHWAP 2005 below:

What Threats to Consider for Ranking?

Modified from 2005 WAP threat instructions:

a. SPATIAL SCALE: Identify all possible threats, regardless of spatial scale, for each conservation target (i.e., species or habitat). The scale of the threat should be commensurate with the scale of the target. Broad scale, pervasive threats like global climate change, acid rain, and heavy metal contamination should be assessed if exposure can be linked to a stress in the conservation target, even though it may be difficult to identify specific points on the exposure pathway for a given target. *It is recognized that ultimately it will be impractical to plan for such large-scale issues within the context of a particular species or habitat*; therefore major statewide threats will be compiled and explicitly addressed in a section of the Wildlife Action Plan specifically dedicated to statewide threats. As such, no conservation actions should be provided for statewide threats within a species or habitat profile.

b. TEMPORAL SCALE: Identify all possible threats that wildlife are currently or potentially exposed to. Limit potential threats to those with underlying causes that currently exist and are likely to increase with current human population patterns. Some broad scale, long-range issues (e.g., climate change, acid deposition) will receive attention elsewhere in the plan.

c. ECOLOGICAL SCALE: Threats that cause stress to individual species should be evaluated at the species level. For habitats, address threats that stress entire groups of species, such as small mammals, large mammals, birds, reptiles, amphibians, invertebrates, natural communities, or habitat structure/composition.

d. THREAT CATEGORIES: Consider all categories of threat identified in the IUCN table of threats, but only list threats that actually or potentially cause stress to the target.

e. CAUSALITY: The pathways of threat exposure are continuous chains of causality that lead from human action (usually) to impacts on a conservation target. There are an infinite number of discrete points along the exposure pathway, so it is expected that there will be variation in the underlying causes, direct threats, stresses, and targets that individuals identify for any given pathway. The ability to plan conservation actions effectively is limited by knowledge of the causes of ecological stress and effects on targets. It will be most useful to identify the underlying causes and direct threats for which it is most practical to develop and implement actions to abate the threat. Likewise, it will be most useful to identify stresses or aspects of the conservation target that can be easily monitored to observe a response to changes in the threat.

f. EVIDENCE: As much as possible, cite evidence in support of your assessment of each threat that has been identified. This will be needed for your narrative of the threat.

Step 4: Complete the Threat Rank Information in the Excel Spreadsheet

Threat Assessments for habitats were completed by expert groups (e.g., Wetlands, Forests, Coastal, Freshwater Aquatic, etc.). Species were also evaluated by groups (> 1 person) whenever feasible/ appropriate. At least one Wildlife Action Plan Implementation Team (WAPIT) member was present for or reviewed all species rankings. Before beginning the Threat Assessment, a WAPIT member provided an overview of the process to all people involved in the ranking.

Directions for Filling out the Excel Spreadsheet

1) Find your target (species/habitat) in the excel table. Sort if necessary. You may choose to 'hide' other rows or copy your target into a new spreadsheet to simplify the view.
2) Review existing (2005 threats) first. Update IUCN and stressor fields using standardized excel tables. You may need to read Species/Habitat profiles to get more information on the threats listed.
3) Adding 'Primary Stressor (required) and Secondary Stressor (optional)' field from worksheet. Choose most appropriate stressor(s) for evaluation. You may choose to rank threats separately if multiple stressors are involved and threat ranks may be different.
4) Add Specific Threat Descriptor of action. This further describes the unique action and will be helpful in writing the narrative for the threat.
5) Add 'H,M,L' ranks for 5 Threat Categories (green columns). See lexicon for category instructions. You MUST choose one of these 3 categories. DO NOT combine (e.g., HM).
6) Add Comments (Column AC) as warranted. These are brief justifications/explanations for ranks given. See Northern black racer example. These will be helpful in writing the exposure pathway and evidence narratives.
7) Add new threats by adding row and filling out all of the 2015 columns. Columns for 2005 threat rank information will be left blank or filled in with NR. See Northern black racer example.
8) Save file with new date (if working from network copy under Nongame/WAP Revision/Threats…) or save only your edited species/habitat information with new file name (e.g., threats assessment_grasshopper sparrow_PH) if working externally. Don't send the whole file or it will be too difficult to track your changes. Email file to Loren Valliere and indicate whether threat assessments are complete.

Step 5: Assign an Overall Threat Rank

The NH Wildlife Action Plan Implementation Team (WAPIT) favored an approach that used qualitative measurements (High, Moderate, Low) compared to the previously approach used in NH WAP 2005 that used semi-quantitative measures (assigned numbers to four categories and used formula to calculate overall threat category).

Threat Compilation – Methodology

The following stepwise threat assessment uses 5 of the 6 threat categories assessed (Spatial Extent, Severity, Immediacy, Certainty, and Reversibility). After evaluation, Likelihood was excluded from the overall threat scores because of some redundancy with 'Low' scores for Immediacy. Reversibility was only used to determine a Priority for Action score but was not used in the Combined Threat Category for each target/threat combination.

Step 1: Assess magnitude of threat

		Spatial Extent		
		3-High	2-Moderate	1-Low
Severity	3- High	3-High	3-High	2-Moderate
	2-Moderate	2-Moderate	2-Moderate	1-Low
	1-Low	1-Low	1-Low	1-Low

Note: Severity is given some preference over spatial extent in this step. A High severity impact of 10-50% of population (Moderate spatial extent) is still a considerable threat and therefore maintained as a 'High' Magnitude ranking threat. A High severity threat of < 10% (Low spatial extent) could be a local extirpation and this was scored as a 'Moderate' Magnitude ranking threat. Low severity threats were maintained as low ranking threats, regardless of the spatial extent.

Step 2: Assess Threat Rank by integrating Magnitude and Immediacy

		Immediacy		
		3-High	2-Moderate	1-Low
Magnitude	3-High	3-High	3-High	2-Moderate
	2-Moderate	2-Moderate	2-Moderate	1-Low
	1-Low	1-Low	1-Low	1-Low

Note: The Magnitude of threat was unaltered when the Immediacy score was High (Immediate) and Moderate (Near –Term). However, when the threat had an Immediacy score of Low (Long-term), the Threat Rank was reduced one level from the Magnitude (High reduced to Moderate, Moderate reduced to Low).

Step 3: Determined *Combined Threat Category* by combining threat rank from Step 2 with Certainty of Information.

		Certainty		
		3-High	2-Moderate	1-Low
Threat Rank	3-High	3-High	3-High	2-Moderate
	2-Moderate	2-Moderate	2-Moderate	1-Low
	1-Low	1-Low	1-Low	1-Low

Notes: Similar to Step 2 with Immediacy, Threat Rank (from result of Step 2) is not altered when Confidence is High or Moderate. However, the Combined Threat Category is reduced one level when the Certainty is Low. Low certainty reduces High threats to Moderate. Low certainty reduces Moderate Threats to Low. Low threats remain as low threats. Overall Threat Rank doesn't increase based on certainty. It can decrease however.

Categories under Step 3 are the *Combined Threat Cateory (CTC)* for each target/threat combination.

Step 4: **Action Priority Category (APC).** Step 4 is used to assess priority of threat for taking action**.** It is not used in calculating the final CTC.
To assess Priority CTC is combined with Irreversibility.

		Irreversibility		
		3-High	2-Moderate	1-Low
Threat Rank (CTC)	3-High	1-Low	3-High	3-High
	2-Moderate	1-Low	2-Moderate	2-Moderate
	1-Low	1-Low	1-Low	1-Low

Note: If a threat is not reversible (High), the Action Priority Category is reduced to Low regardless of the Combined Threat Category. If threat is reversible or reversible with difficulty, the CTC is not changed (i.e., there is no difference in impact between Low and Moderate ranked Reversibility). Following WAP revision, it is recommended that further prioritization for implementation occurs.

NHWAP2005 ranking methodology *(for reference only):*

Ranked factors will be applied to a formula that calculates the overall THREAT RANK (this will be done automatically if using the available Excel spreadsheets). The factors used to measure threats are reduced to magnitude (scope, severity) and urgency (timing, likelihood, information), by taking their means, and are then given a multiplicative relationship and scaled to 4 to retain the original scoring scale:

THREAT RANK= (((a+b)/2)/4)((c+d+e)/3) where a=SCOPE score, b=SEVERITY score, c=TIMING score, d=LIKELIHOOD score, and e=INFORMATION score.

INTERPRETING THREAT RANK: In the published literature, there are many examples of arithmetic and rule-based approaches that summarize the factors influencing threats. Most of these conservation-planning tools use a combination of weights, means, and additive or multiplicative interaction of factors. The resultant ordering varies according to how the summary algorithm or formula is defined. It is acknowledged that the summary rank is a planning and decision-making tool, not a true quantitative measure. Therefore, precise ordering is not the intended outcome. The purpose of the ranking process is to provide a consistent basis for comparing threats across all species and habitats, and for placing those threats into categories of appropriate conservation action.

CATEGORICAL CLASSES: For this planning effort, the THREAT RANK score will be used to assign the threat to a categorical class and decide which threats to plan to address in the current planning period with focused conservation strategies. When a score for a given threat falls near the threshold for two classes, careful scrutiny of the ranks given for each factor is warranted to ensure that the potency of the threat is being ranked appropriately relative to the other threats being ranked. When evaluating your scores, consider threats in the following context:

a. Without action, CRITICAL threats (3.25-4.00) will in the near future almost certainly result in the widespread complete loss of populations/habitat patches, with statewide extirpation already looming on the horizon. Immediate action is necessary to secure the conservation target, and there is not enough time to wait for better information.

b. Without action, SERIOUS threats (2.50-3.24) will in the near future almost certainly result in widespread degradation of populations/habitats, resulting in an increasing risk of statewide extirpation. Action is necessary to control the threat, but initiating research to improve the efficacy of actions is, in some cases, justifiable over immediately initiating abatement.

c. Without action, MODERATE threats (1.75-2.49) may in the near future degrade some populations/habitats, with a very low risk of statewide extirpation. The threat may need to be controlled at the local level in the short term, but it is advisable to first conduct research to obtain more accurate information about the threat or wait until changes in the level of the threat can be measured statewide.

d. Without action, LOW threats (0-1.74) may degrade some populations/habitats at a level that is currently sustainable. The threat may need to be controlled in the long term, but currently it is reasonable to plan to re-evaluate the threat later.

Conservation actions should only be generated for threats ranked as “SERIOUS” or “CRITICAL.” However, if you find that you have no serious or critical threats, then address those higher ranked “moderate” ones.

Where data are available, quantitative analyses will be conducted to check results. As an additional check, threats assessments are nested within all species, habitats, and landscapes. It would be very difficult for a significant threat to a conservation target to be missed at each of these hierarchical filters. For example, on a hypothetical landscape scale, lack of concrete information limits our ability to develop a strategy to address climate change or even project the magnitude of stress induced by it, which may result in climate change receiving a "moderate" rather than a "critical" overall rank. Effort to address such a landscape threat would be allocated to informing regional, national, and global planners of our findings and by supporting regional monitoring and planning efforts. However, in some instances, climate change may be well documented in a specific location, with a fairly predictable pattern of high magnitude stress for a well-known species. In such cases a resulting threat rank of "critical" would be justified. In these cases, effort may be allocated to the critical species threat by immediately initiating research on rates of habitat change and evaluating preservation of the species in zoos before it becomes extinct.

Step 6: Guidance for Writing Threats Narrative

After a series of quality control checks, NHFG and TNC staff uploaded threat scores from Excel to the Access database in early February. Once that was completed, profile writers may initiate Species/Habitat Threat descriptions and scores in the Access database. Profile writers could choose to type narrative text directly into Access or write in word and transfer into Access with series of copy/paste.

Each threat has 2 text narratives: Exposure Pathway and Evidence. The information provided here is the same as the methodology used during NHWAP 2005.

Exposure Pathway

The pathways of threat exposure are continuous chains of causality that lead from human action (usually) to impacts on a conservation target (See Salafsky et al. 2003 definitions). There are an infinite number of discrete points along the exposure pathway, so it is expected that there will be variation in the underlying causes, direct threats, stresses, and targets that individuals identify for any given pathway. The ability to plan conservation actions effectively is limited by knowledge of the causes of ecological stress and effects on targets. It will be most useful to identify the underlying causes and direct threats for which it is most practical to develop and implement actions to abate the threat. Likewise, it will be most useful to identify stresses or aspects of the conservation target that can be easily monitored to observe a response to changes in the threat.

Evidence

As much as possible, cite evidence in support of your assessment of each threat that has been identified.

Which Threats to Write Narratives for?

Profile writers were able to include narratives for all threats evaluated within the Excel spreadsheet. Narrative is required for 'High' and 'Moderate' ranking threats and higher ranking threats should include more explanation than lower ranking threats. Threats that ranked 'Low' for certainty are candidates for research actions. Narrative is optional for low ranking threats.

Definitions (from Salafsky et al., 2003)

- Threats – Any human activity or process that has caused, is causing or may cause the destruction, degradation and/or impairment of biodiversity and natural processes. There is often a fine line between a naturally occurring event such as a fire set by lightning and human-caused threat such as fire set by a math or even increased intensity of fires due to forest management practices. In general, we would regard the latter two as threats whereas the former is not. In systems that depend on human actions to maintain biodiversity such as the use of prescribed burns, the removal or alteration of these management activates may also constitute a threat. Includes both *direct threat* and *underlying causes*. Synonymous with *pressures.*

- Direct Threats – Factors that immediately cause stress to conservation targets by physically causing their destruction or degrading their integrity.

- Underlying Causes – A condition or environment, usually social, economic, political, institutional, or cultural in nature, that enables or otherwise contributed to the occurrence and/or persistence of a direct threat. There is typically a chain of underlying causes behind any given direct threat. In a situation analysis, underlying causes can be subdivided into *indirect threats* (factors with a negative effect) and *opportunities* (factors with a positive effect). Synonymous with *drivers.*

- Targets – The biological entities (species, communities, or ecosystems) that the project is trying to conserve. Synonymous with *conservation targets, biodiversity targets*, and *focal targets*.

- Stress – The impairment or degradation to a key ecological attribute of a conservation target that results in reduced integrity of the target. As shown in the diagram, a stress is not a threat in and of itself, but rather a condition of the target. In many situations, defining specific stresses leads to an unnecessary level of detail, especially when the project is operating at a coarse scale. In these cases, it is better to just have the stress be implicit in the arrow leading from the threat to the target. For example, if a threat to a forest in a National Park is illegal clearcut logging, then the project team members will want to act to keep the loggers out of the forest. They don't need to worry about stresses. In some situations, however, it is important to detail the specific mechanisms by which a threat affects a target. For example, the threat to a forest in a managed timber area is legal selective logging, then the team may not be able to completely eliminate the loggers. Instead, the project may wish to ameliorate specific problems caused by the logging such as soil erosion into streams and secondary damage to trees caused by felling practices. In this case, the team members may wish to expand the arrow linking the logging threat to the forest target to show specific mechanisms or stresses.