Element 3: Stressors

2015 State of Maine Wildlife Action Plan

Element 3: ‘Stressors’

Action Plans must include descriptions of problems facing SGCN or their habitats

IUCN Classification System

- International Union for the Conservation of Nature
  - http://www.iucnredlist.org/technical-documents/classification-schemes/threats-classification-scheme
- Recommended by both the Northeast Lexicon & Best Practices Report
- Used by all states in the NE

IUCN Classification System

- Provides standard terminology
  - Promotes regional & national collaboration
- Hierarchical
  - Includes 3 tiers:
    - 12 first level
    - 47 second level
    - 73 third level
  - Each tier is expandable
  - 3rd tier open-ended

IUCN Classification System

1. Residential and commercial development
2. Agriculture and aquaculture
3. Energy production and mining
4. Transportation & service corridors
5. Biological resource use
6. Human intrusions & disturbance
7. Natural system modifications
8. Invasive species & disease
9. Pollution
10. Geological events
11. Climate change & severe weather
12. Other

IUCN Classification System

- Developed for International Conservation Efforts
  - Many categories not relevant to Maine (e.g. nomadic grazing)
  - Some categories lack specificity (e.g. recreational activity)
- Does not describe the nature of the impact
  - Which life history traits are affected?
  - How severe is the impact?
  - Can the impact be mitigated in some way?
- Does not acknowledge positive impacts for other species

Refining Stressors

- Northeast Lexicon defines ‘Stressor Characteristics’
  - Helps determine the importance of the Stressor
  - Identify highest priority Stressors for Conservation Actions
- Six characteristics, 3 levels of Impact
  - Severity
  - Reversibility
  - Immediacy
  - Spatial Extent
  - Certainty
  - Likelihood

Stressor Characteristics

Threat Characteristic	*Low Impact*	*Moderate Impact*	*High Impact*
Severity	**Slight Severity:** Degree of ecological change is minor	**Moderate Severity:** Degree of ecological change is substantial	**Severe:** Degree of ecological change is major
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
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)
Spatial Extent (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.
Certainty	**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.)	**Unlikely:** Effects of the threat are unlikely to occur (less than 30% chance)	**Likely:** Effects of threat are likely to occur (30-99% chance)	**Occurring:** Effects of the threat are already observable (100% chance)

Stressor Characteristics

- Severity
  - 'Scale of Influence'
  - What is the overall level of impact?
- Reversibility
  - Adapted from Salafsky et al. (2003)
  - What is the practicality of reversing and/or preventing the impact?
- Immediacy
  - What is the time scale over which the impacts are likely to occur?
  - Range: Immediate impact → 100 years

Stressor Characteristics

- Spatial Extent
  - What proportion of the habitat or population is impacted, or likely to be impacted?
  - 10 year time horizon
- Certainty
  - How much knowledge is available for the Stressor?
  - Are appropriate responses/solutions known?
- Likelihood
  - Is the Stressor likely to occur within the next 10 years?

Element 3: 'Stressors'

Action Plans must include descriptions of problems facing SGCN or their habitats

‘Greater Prioritization’

- Impossible to conserve 300+ SGCN independently
- Conservation Actions should address many SGCN simultaneously
- Proposed Approach: Focus Conservation Actions on Priority Habitats and key SGCN
  - Example: ‘Promote prescribed burning in Atlantic White Cedar Swamps’
  - Some SGCN may have specific needs, or stressors that are not habitat-related.

Proposed Approach

1. Assign Stressors to Habitats
2. Assign Stressors to SGCN
3. Identify Priority Habitats & SGCN
4. Identify Priority Stressors
5. Develop Conservation Actions to address Priority Stressors

Assigning Stressors – Habitats & SGCN

- Which level of IUCN hierarchy?
  - Regional roll-up likely at Level 2
  - 3rd level still lacks sufficient detail

  Proposed approach: 2nd level, with a 'comments' field to describe specific issue

- Example: IUCN Stressor 4.1 (Roads & Railroads)
  - Comment: Faulty culverts impede passage
  - Comment: May lead to habitat fragmentation by impacting water seepage

Assigning Stressors – Habitats & SGCN

- Which Stressor Characteristics?
  - Initial trials found using all 6 to be repetitive & complex
  - 'Severity' is a broad descriptor
  - 'Reversibility' important to help prioritize

<u>Proposed Approach:</u> Assign Severity & Reversibility

  - Consider Immediacy & Spatial Extent when determining Severity
  - Do not assign if low Likelihood or Certainty

Threat Characteristic	*Low Impact*	*Moderate Impact*	*High Impact*
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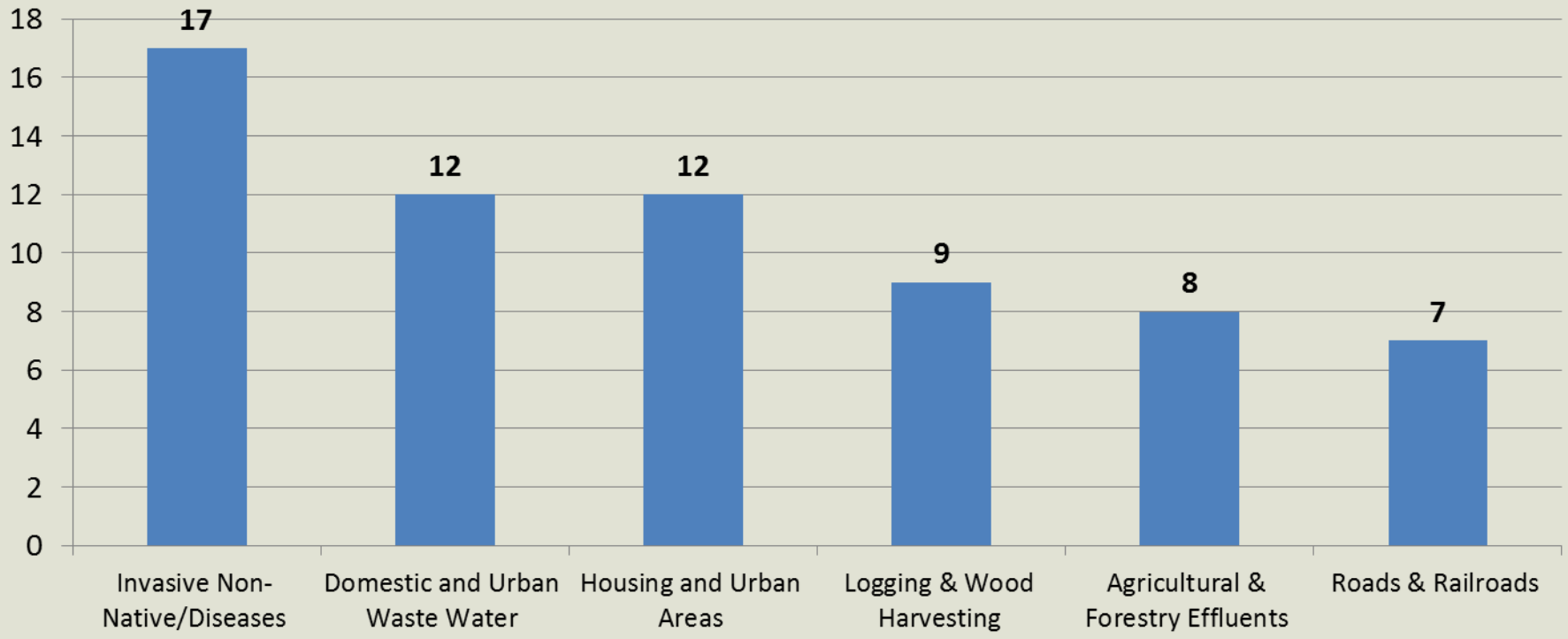
Habitat Stressors

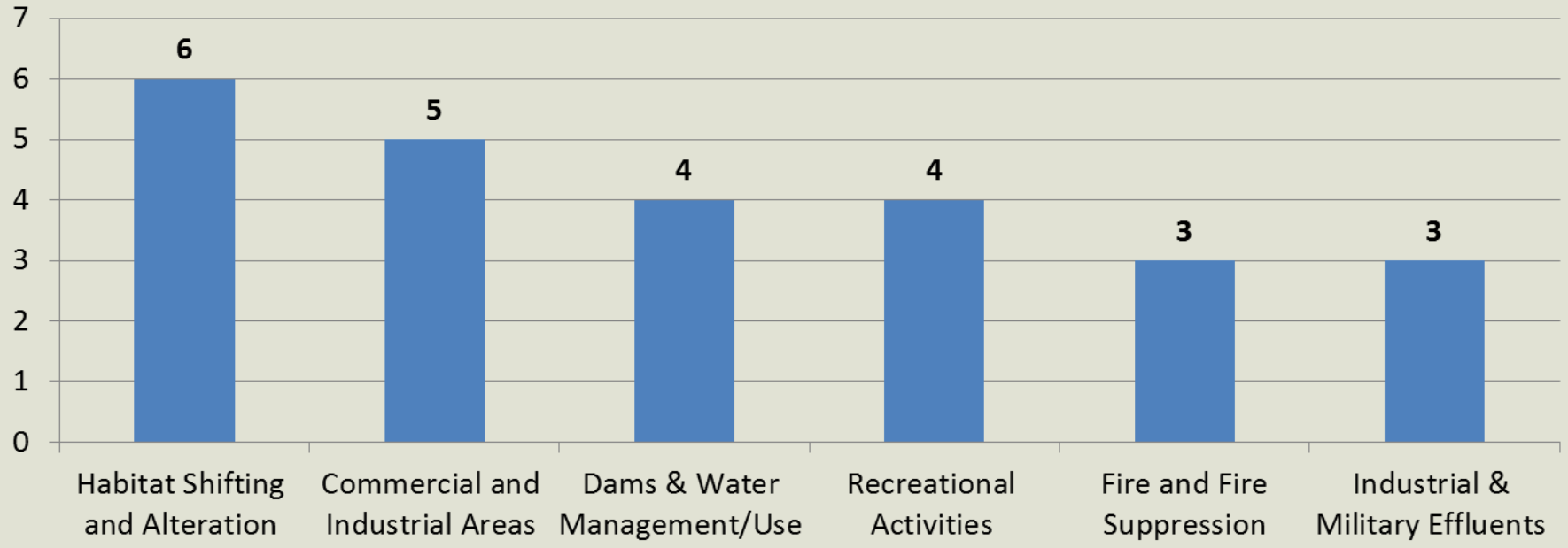
- Macrogroup Level
- Approach:
  - Assigned all Stressors for each Macrogroup
  - 2nd level of IUCN Hierarchy
  - Comment field to describe specific impact
  - Characteristics: Severity and Reversibility

- Results:
  - 18 Level 2 Stressors
  - Range: 1 – 9 Stressors/Macrogroup
  - Mean: 3.4 Stressors/Macrogroup

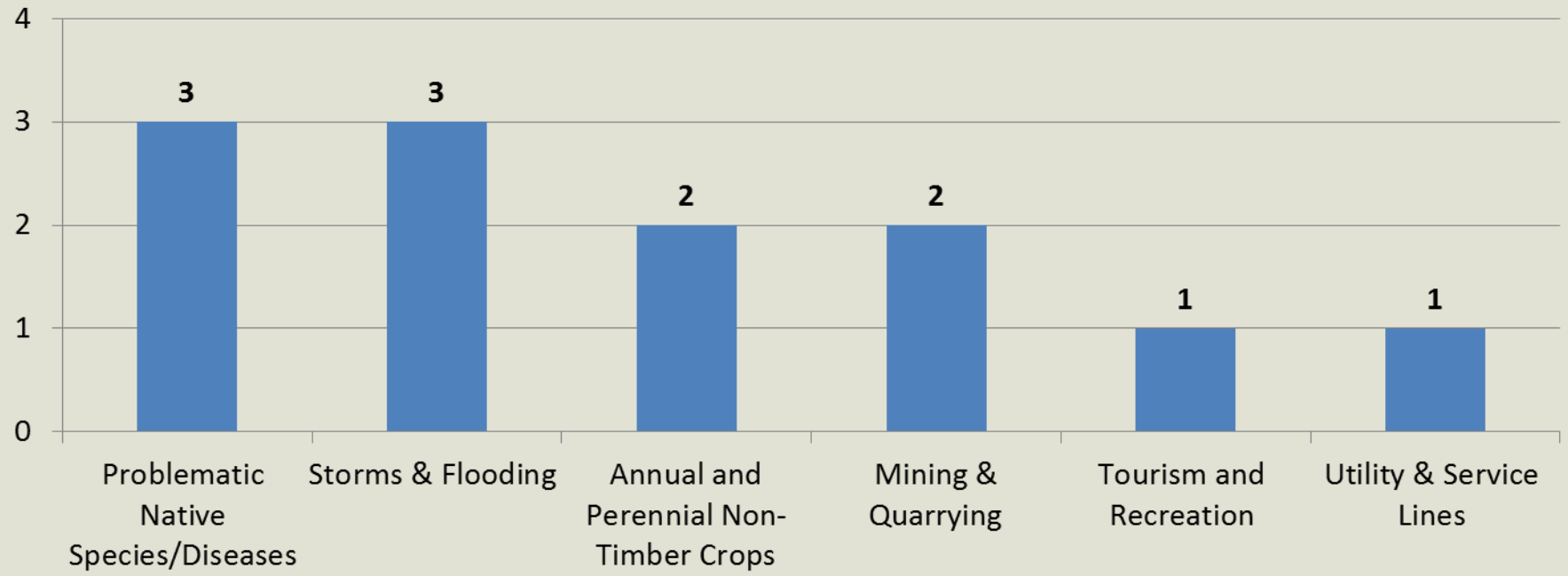
Habitat Macrogroup Stressors



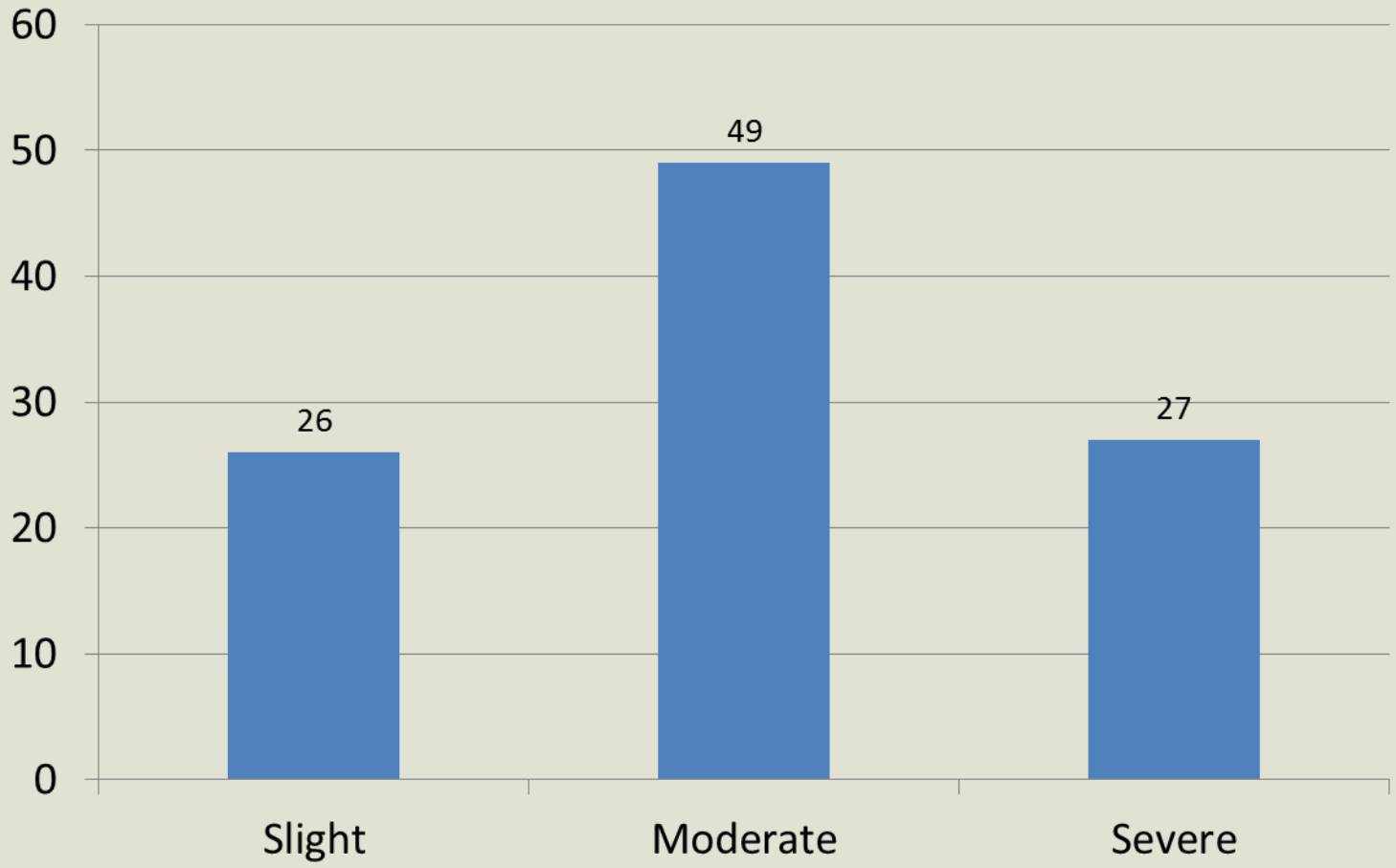
Habitat Macrogroup Stressors



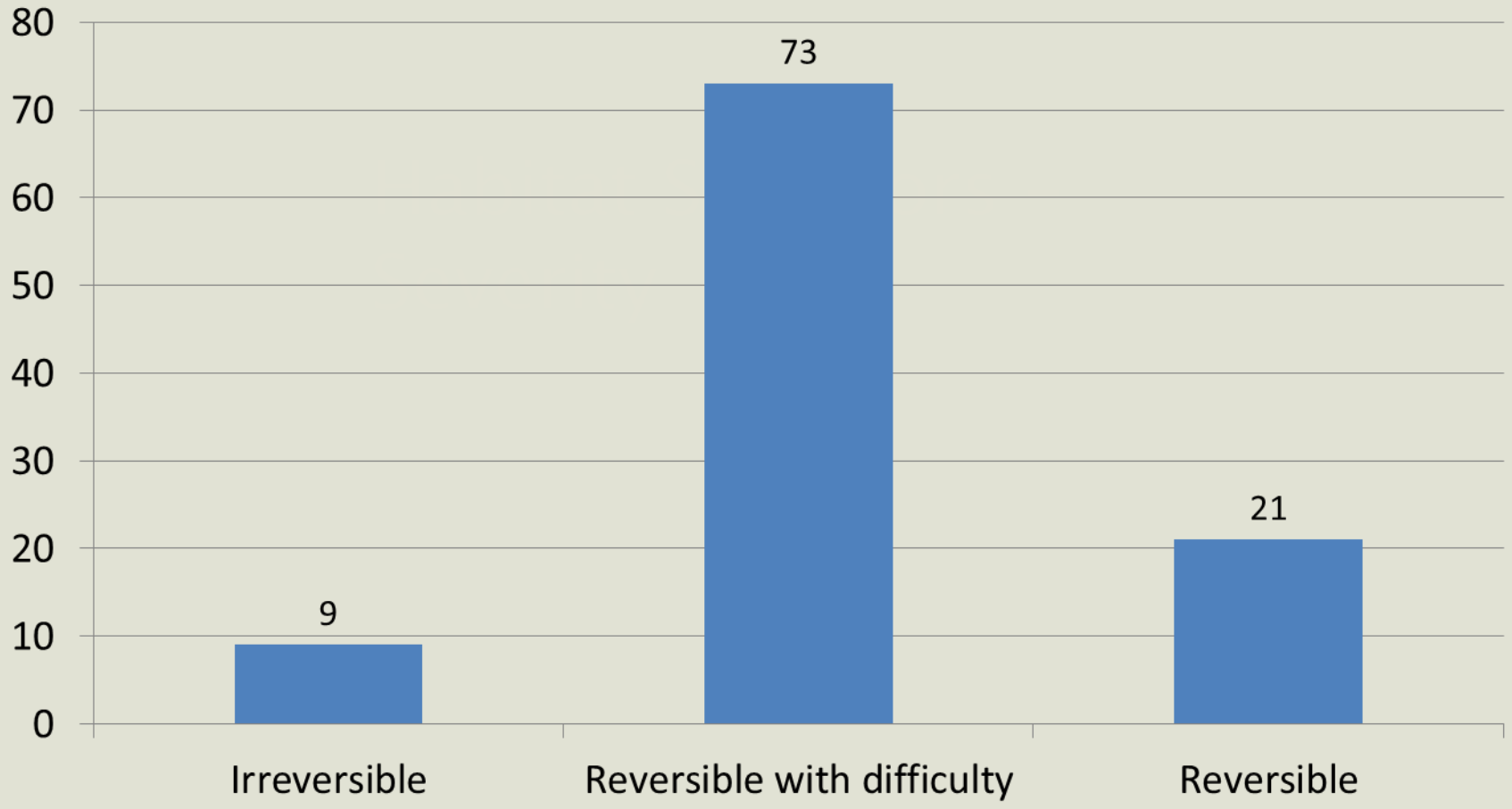
Habitat Macrogroup Stressors



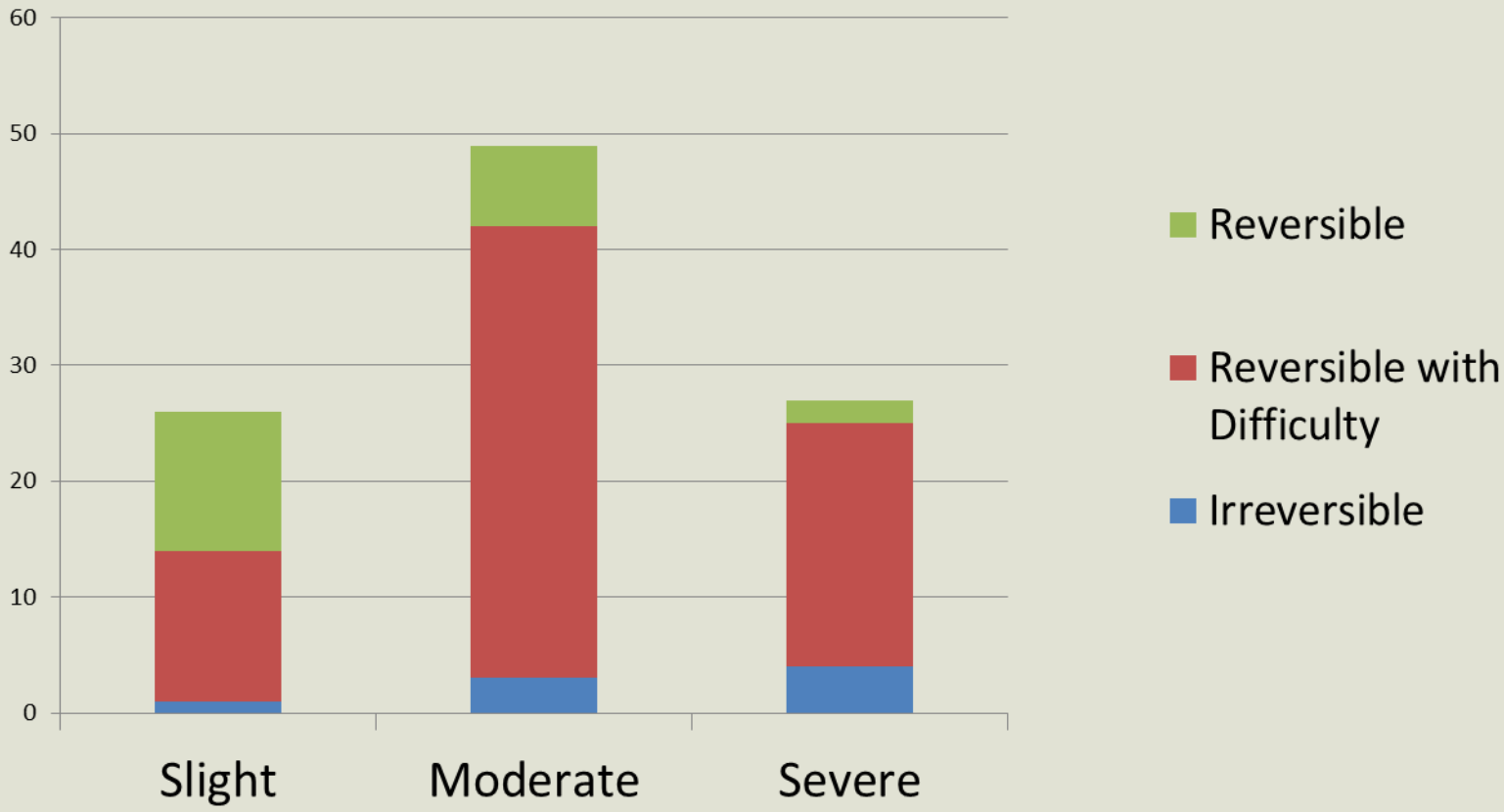
Habitat Stressors – Severity



Habitat Stressors – Reversibility



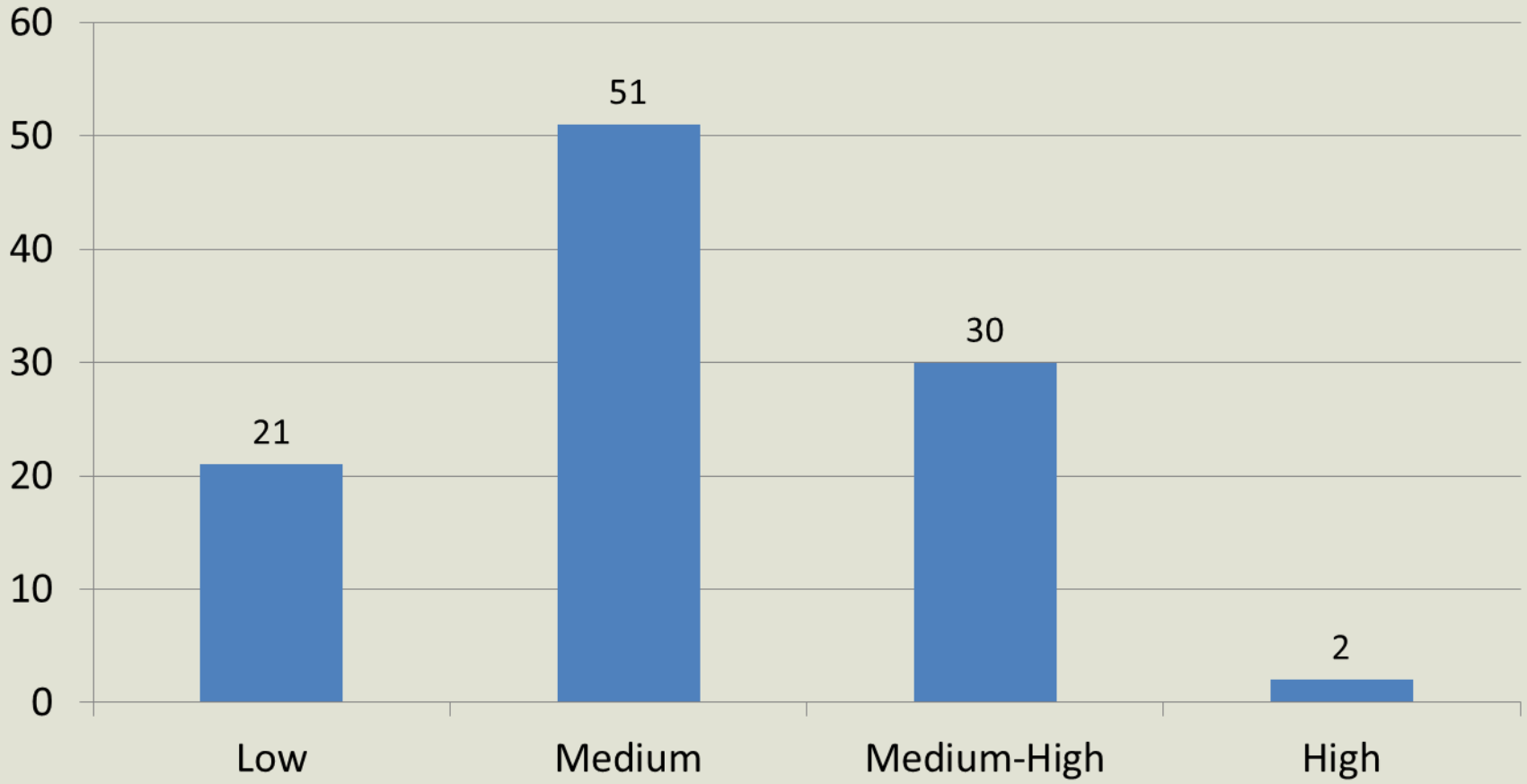
Habitat Stressors – Severity & Reversibility



Habitat Stressors – Ranking Priority

Reversibility	Severity: Slight	Severity: Moderate	Severity: Severe
Reversible	Medium	Medium-High	High
Reversible with Difficulty	Low	Medium	Medium-High
Irreversible	Low	Low	Low

Habitat Stressors – Ranking Priority



Habitat Stressors: High Priority

- Headwater Streams
  - IUCN Level 1: Transportation & Service Corridors
  - IUCN Level 2: Roads & Railroads
  - Comment: *Stream crossings*
  - Characteristics: Severe & Reversible
- Small Rivers
  - IUCN Level 1: Transportation & Service Corridors
  - IUCN Level 2: Roads & Railroads
  - Comment: *Faulty culverts impede passage*
  - Characteristics: Severe & Reversible

Habitat Stressors: Low Priority

- Central Hardwood Swamp
  - IUCN Level 1: Pollution
  - IUCN Level 2: Domestic & Urban Wastewater
  - Comment: *Pollution from poorly buffered development*
  - Characteristics: Slight Severity & Reversible with Difficulty

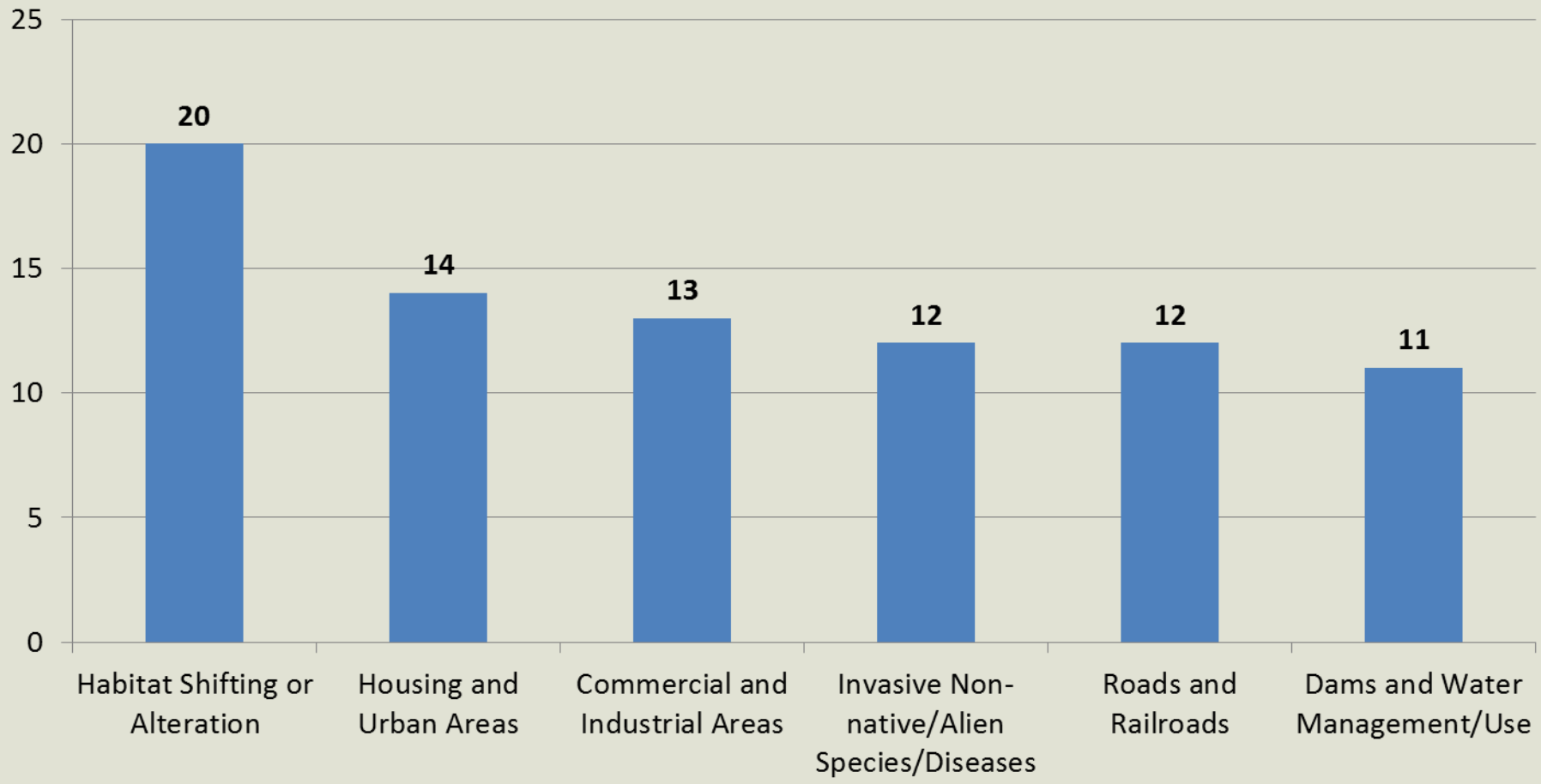
SGCN Stressors

P1 SGCN Only

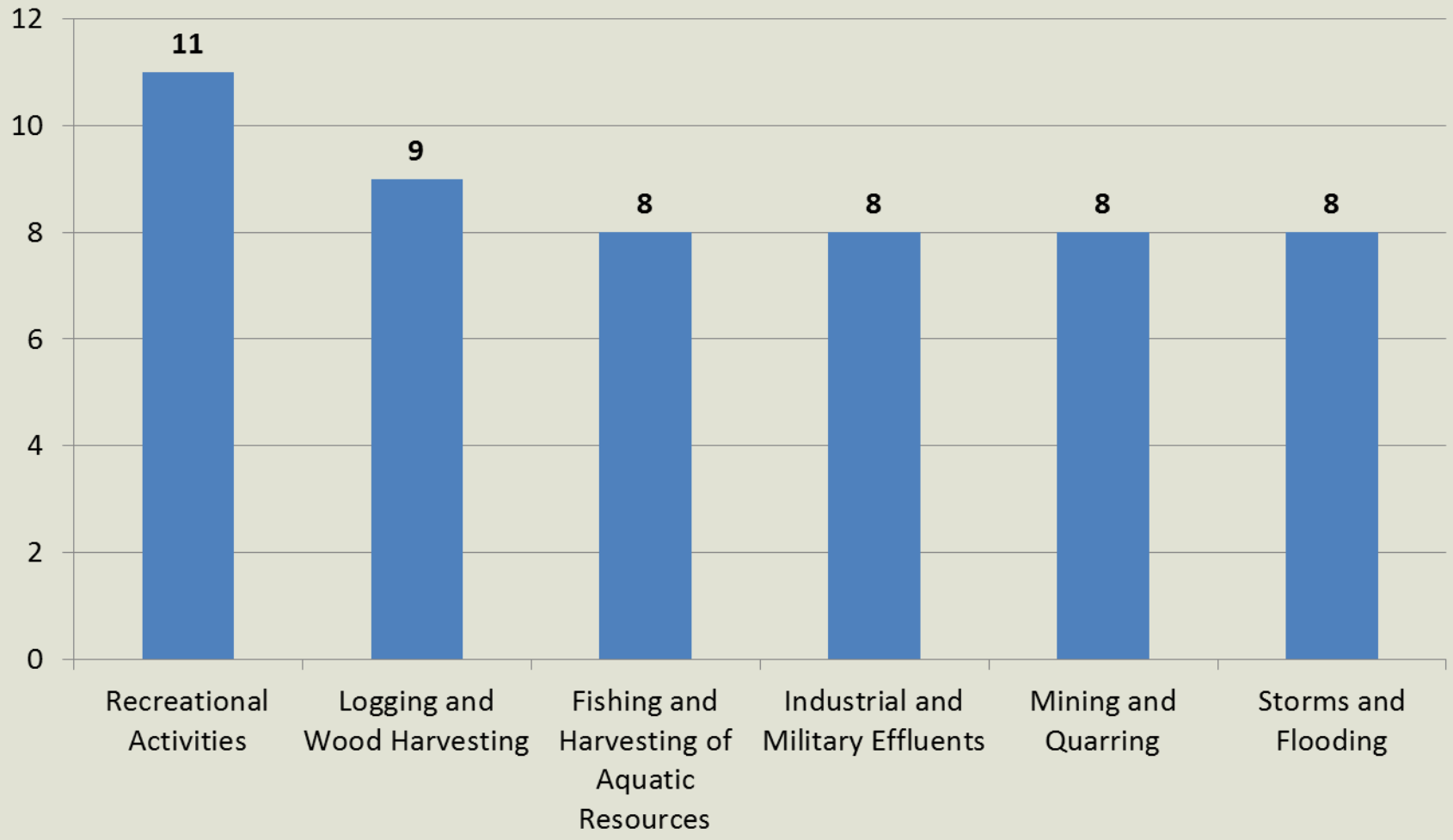
- Approach:
  - 2nd level of IUCN Hierarchy
  - Comment field to describe specific impact
  - Characteristics: Severity and Reversibility
  - *Assigned only Moderate or Severe Stressors*

- Results:
  - 30 Level 2 Stressors
  - Range: 1 – 15 Stressors/SGCN
  - Mean: 4.8 Stressors/SGCN

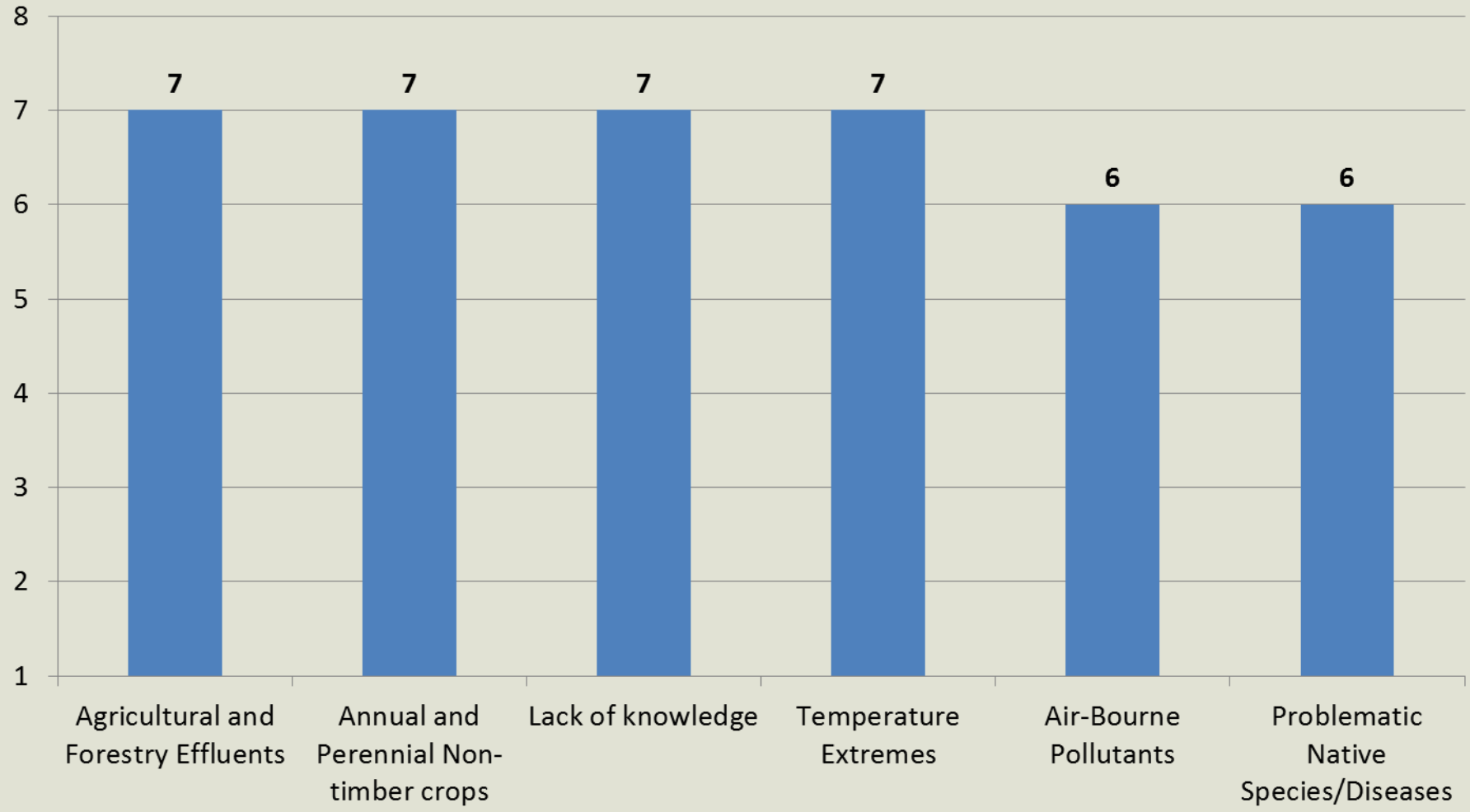
SGCN P1 Stressors



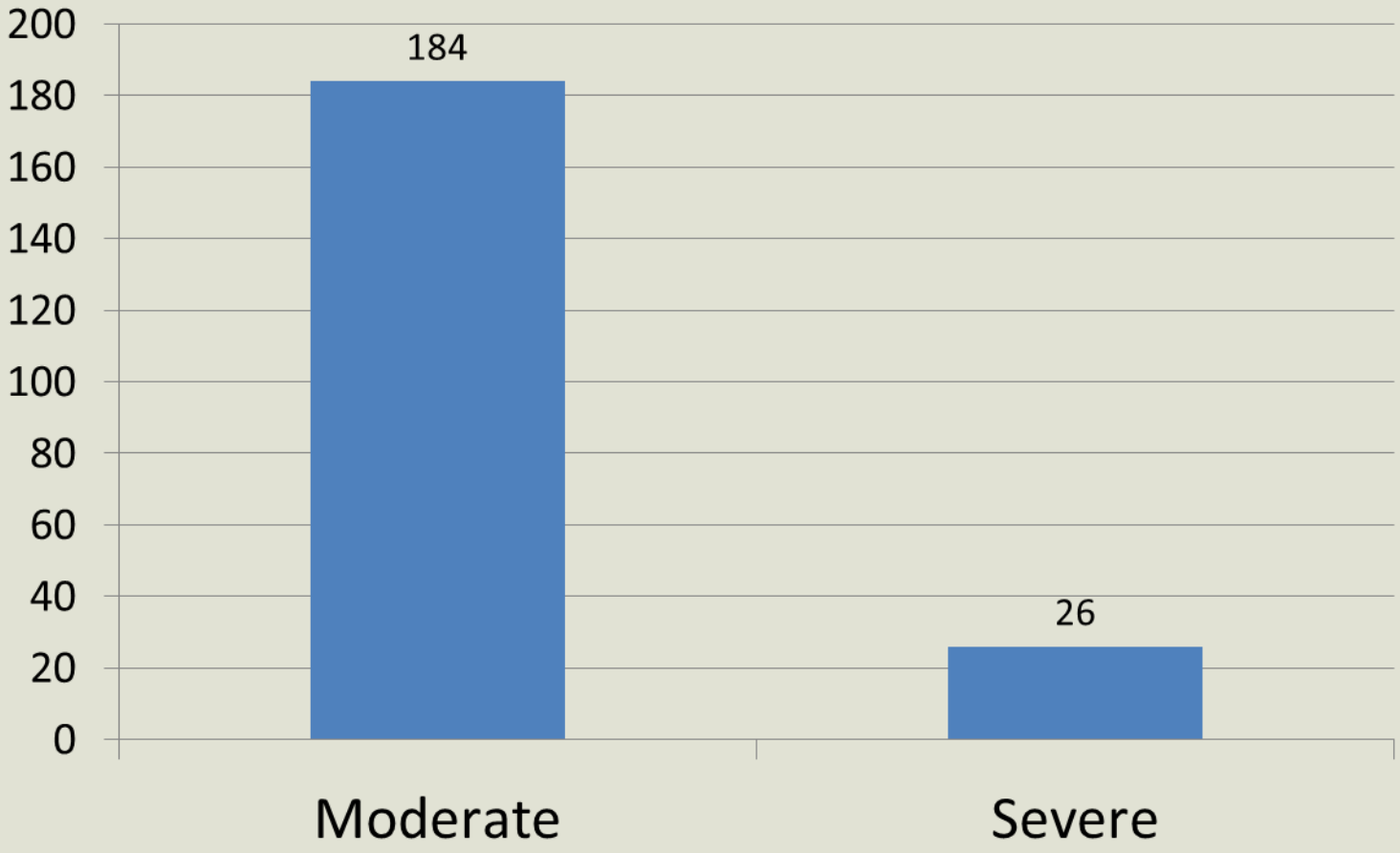
SGCN P1 Stressors



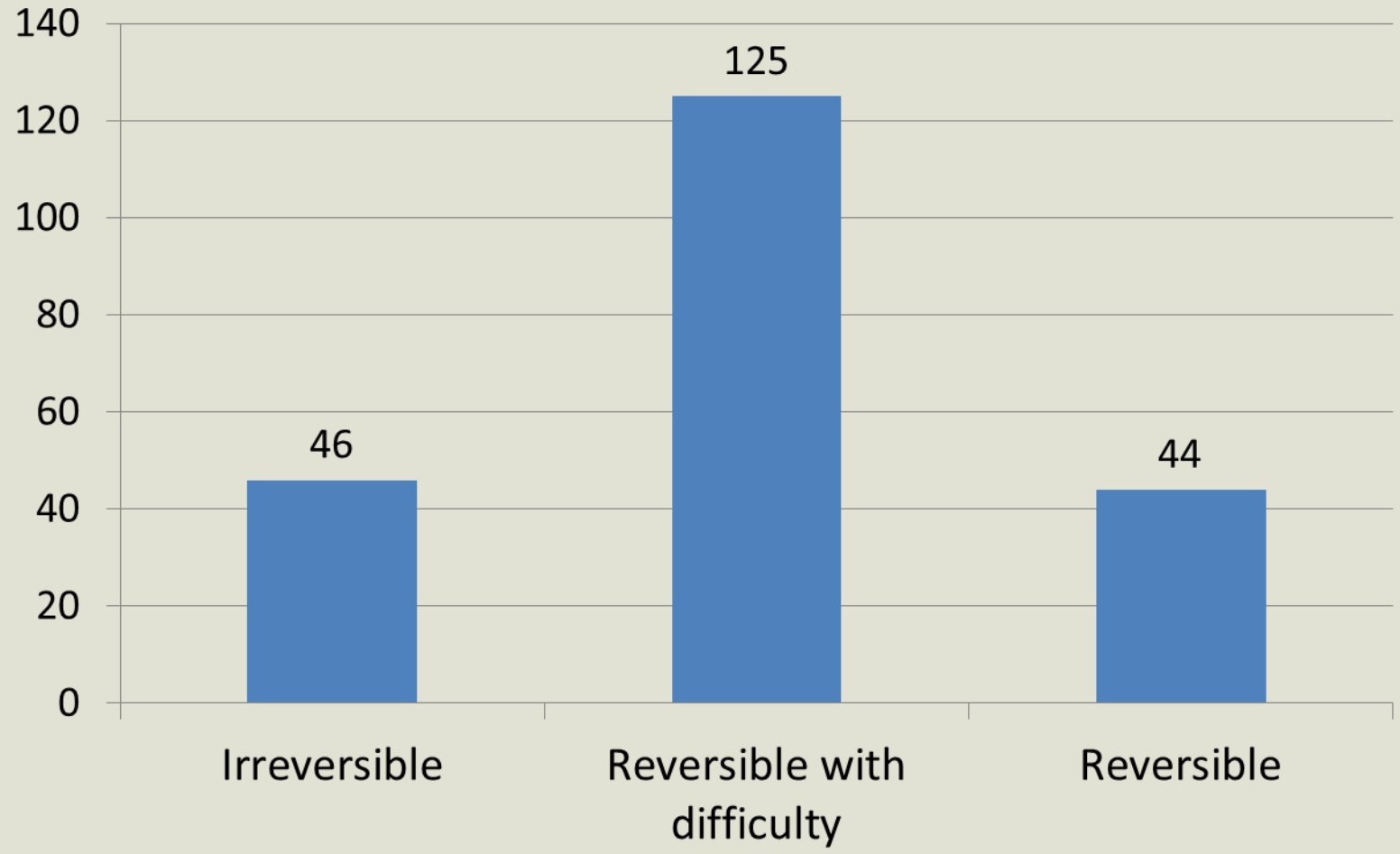
SGCN P1 Stressors



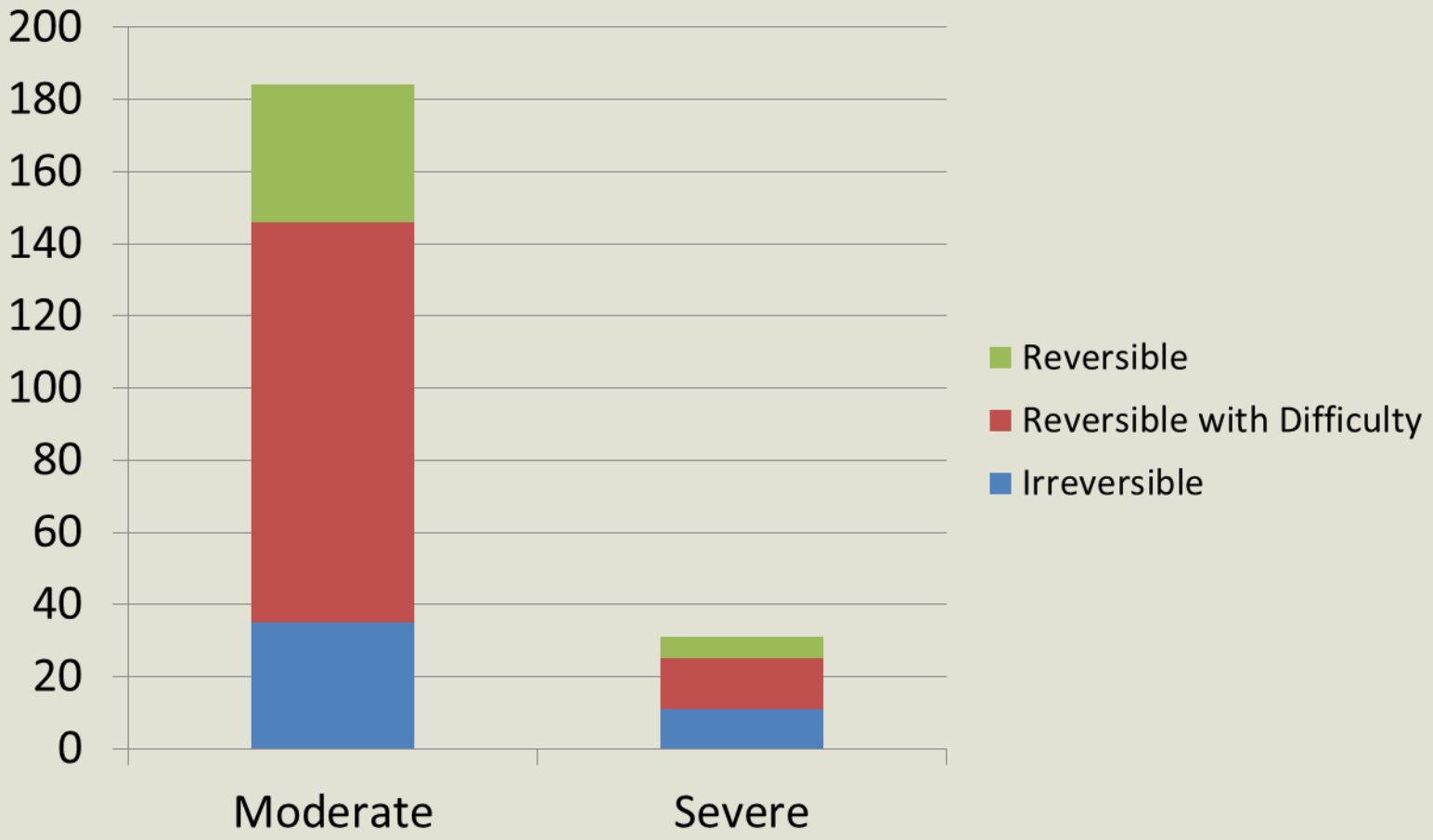
SGCN P1 Stressors – Severity



SGCN P1 Stressors – Reversibility



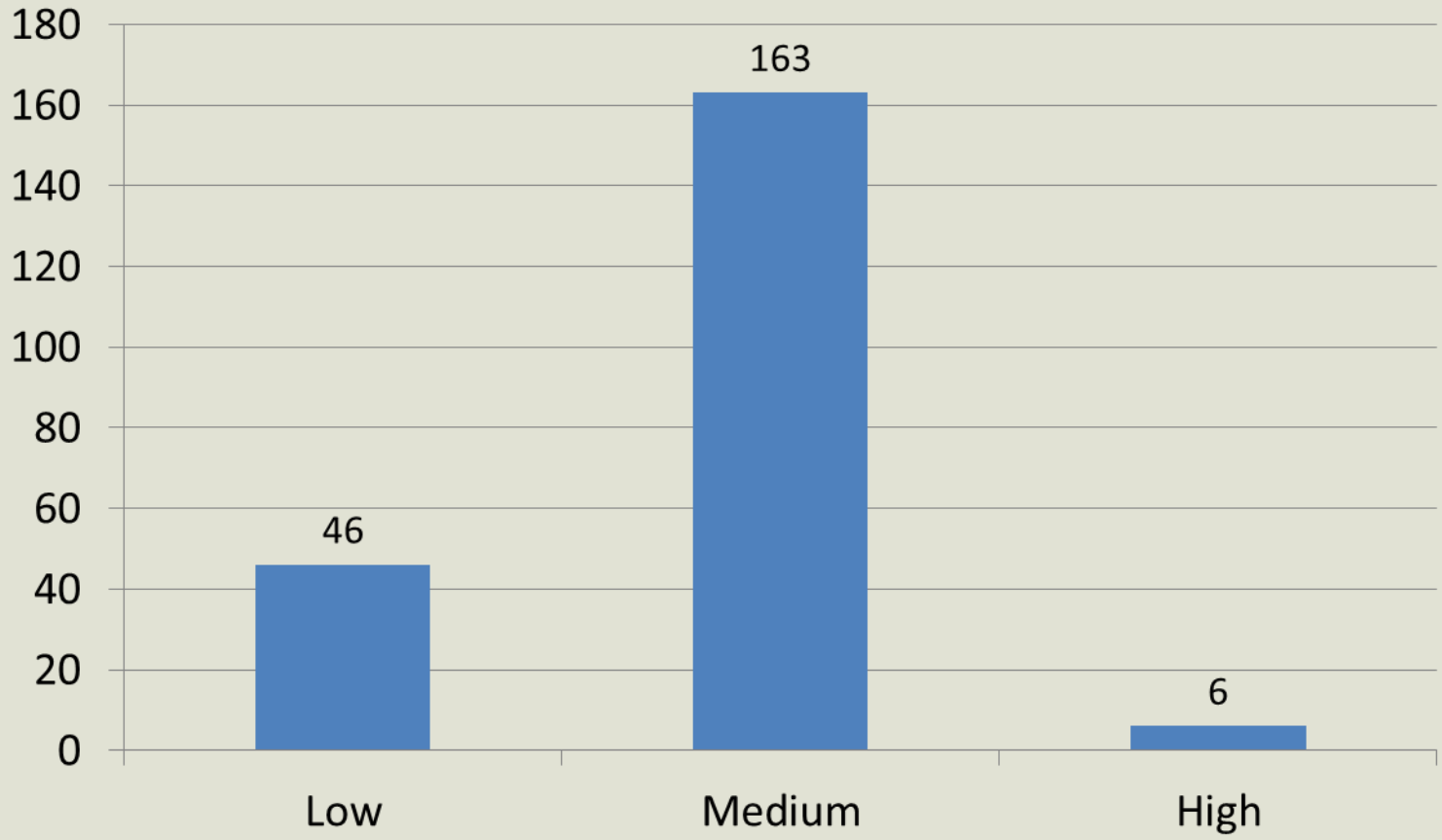
SGCN P1 Stressors – Severity & Reversibility



SGCN P1 Stressors – Ranking Priority

Reversibility	Severity: Moderate	Severity: High
Reversible	Medium	High
Reversible with Difficulty	Medium	Medium
Irreversible	Low	Low

SGCN P1 Stressors -Priority



SGCN P1 Stressors – High Priority

- New England Cottontail: Lack of regenerating forest
- Arctic Tern: Predation by large gulls
- Piping Plover, Least Tern, Red Knot: Recreational use of nesting beaches
- Little Brown Bat: Wind turbines

SGCN P1 Stressors – Low Priority

- Arctic Tern, Roseate Tern, Least Tern, Red Knot, Lesser Yellowlegs, Saltmarsh Sparrow, Purple Sandpiper: Sea level rise (Moderate, Irreversible)

- Harlequin Duck: Loss of food resources due to increase in Ocean Temps (Severe, Irreversible)

- New England Cottontail: Loss of habitat to Development (Moderate, Irreversible)

Summary

- Draft Stressors identified for Habitat Macrogroups & SGCN of greatest concern
  - Level 2 of IUCN Hierarchy
  - Severity & Reversibility
  - Approaches for Prioritization

Feedback

- Is our approach reasonable?
- Is it necessary to assign Stressors to SGCN P2 and/or P3?
- Other approaches to Stressor Prioritization?
- Given the approach used, do assignments appear on target?

How do we combine Priority Habitats, SGCN, and Stressors to identify Conservation Actions?